STREETSCAPE GUIDANCE

Fourth Edition
2022 Revision 2

MAYOR OF LONDON

TRANSPORT FOR LONDON
EVERY JOURNEY MATTERS

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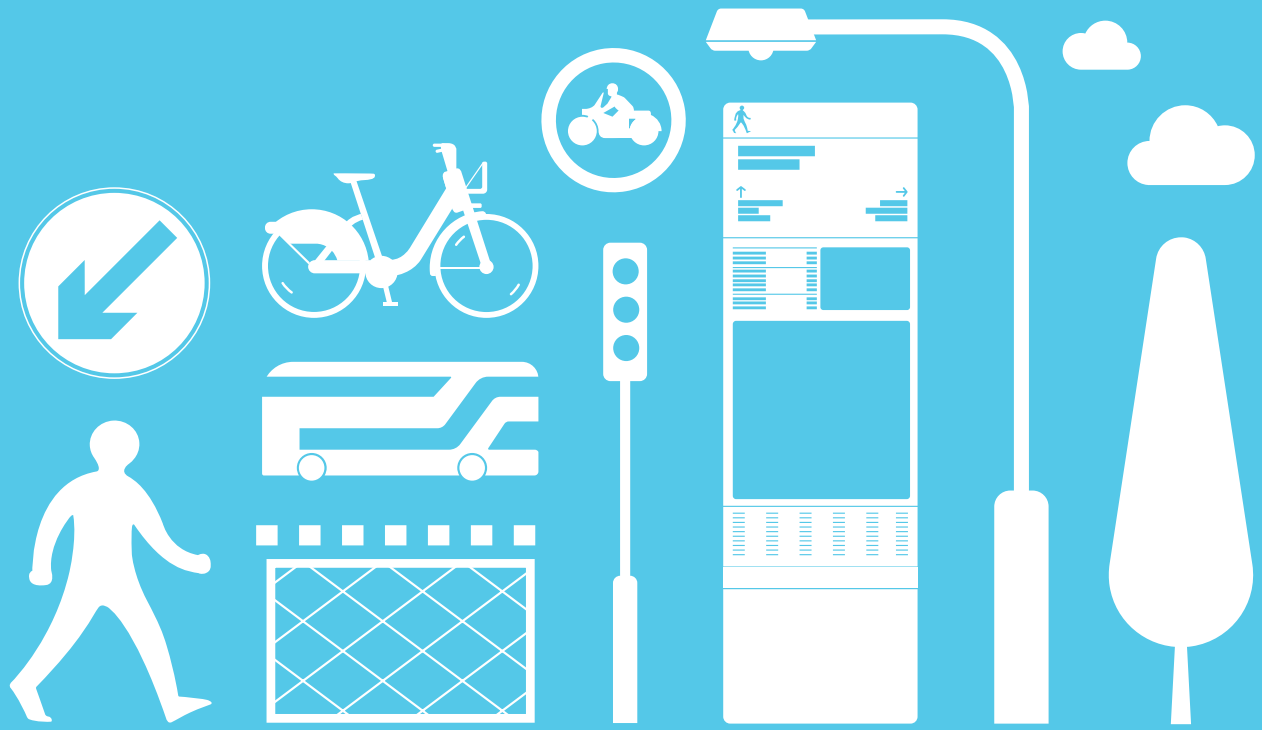
Introduction



1.1 Background

The purpose of this Streetscape Guidance is to set a high standard for the design of London's streets and spaces by applying best practice design principles. With imaginative application of the right materials and good craftsmanship, Transport for London (TfL) is working towards breathing new life into the public realm. Through better and bolder design, we intend to transform our streetscapes into welcoming places, creating a public realm and transport network fit for a globally competitive economy.

This guidance sets the standard for London's streets and whether a one-off major project or a smaller local adjustment, it defines our aspirations and outlines the criteria for good design, material selection, installation and maintenance.

Streets account for 80 per cent of London's public realm. Raising the ambition for streets with a collaborative, design-led approach is key to achieving new standards of excellence and recognising the fundamental role our streets and places play in improving the public realm and providing an enhanced quality of life.

Figure 1: Wimbledon Bridge

Streets are places for people. Successful streetscapes are inclusive and provide for the competing requirements of their users, including pedestrians, cyclists, motorcyclists, bus operators, bus passengers, private vehicle owners, and freight vehicle operators. Understanding and carefully balancing the diverse needs of these users will ensure better and safer places to support the variety of activity on our streets.

Figure 2: Oxford Street has been designed to provide for the competing requirements of its users

1.2 What is Streetscape Guidance?

Streetscape Guidance provides the tools to apply best practice design principles and create consistently high quality links and places across London. While this guidance has been developed primarily for the Transport for London Road Network (TLRN), the principles are equally applicable to any street in London should a local authority choose to adopt them.

The guidance has three primary functions, which are:

- To encourage those responsible for designing, building, operating and maintaining London's streets to use a robust design approach in balancing the movement of people and goods with high quality urban realm
- To demonstrate the high level of ambition, innovation and creativity required on London's streets to deliver excellent levels of service
- To highlight the design considerations required for appropriate layout, material selection, application and maintenance, and to reinforce best practice design principles, ensuring that a high quality approach to street design is implemented across London

Figure 3: Streetscape Guidance provides the tools necessary to create high quality streets

Streetscape Guidance acknowledges emerging policies and describes the need to better understand the role of London's streets for 'place' and 'movement' functions, and to prioritise street improvements which enhance the efficiency and quality of the street environment as a whole.

1.3 Who is Streetscape Guidance for?

This guidance is a working tool for those responsible for designing, building, operating and maintaining London's streets. It also provides more general guidance and advice for a wider audience, including design professionals, academics, highway authorities, road user groups, local communities and private developers.

A broad range of topic areas are covered in this document, commensurate with the variety of design considerations that exist in a city as complex and varied as London. This guidance is designed to supplement rather than replace existing standards, requirements, or guidelines, such as the Traffic Signs Regulations and General Directions (TSRGD) and the Design Manual for Roads and Bridges (DMRB). Where further information exists on a topic area from an associated TfL guidance document, this will be clearly highlighted. Our associated guidance documents are listed below:

- Streetscape Guidance
- London Cycling Design Standards Guidance
- Kerbside Loading Guidance
- Accessible Bus Stop Design Guidance
- Station Public Realm Urban Design Guidance

While Streetscape Guidance has been developed primarily for the Transport for London Route Network (TLRN) the principles are equally applicable to any street in London.

Figure 4: Upper Street in Angel has flexible amenities which allows for a more efficient use of space

1.4 How should I use the document?

Streetscape Guidance is structured so that the reader can systematically work through a process that establishes how to best **plan, select and compose elements** which contribute to improving the quality and function of London's streets and places.

Part A sets out the **vision** for London streets. It details our strategy and ambition to build a more efficient and effective transport system while balancing user needs. The 'Street Types' framework is presented to recognise the different roles London's streets perform and to assist in the application of context sensitive design.

Part B presents **best practice case** studies from all over London to exemplify how excellence can be achieved. The case studies highlight the importance of identifying suitable interventions and the most appropriate measures and amenities to be used, in a context sensitive way, to enhance the experience of those using the space.

Part C describes how **creativity and innovation** must be integrated into the overall approach to ensure London continues to be an attractive, vibrant and accessible place to work, live and visit. Where practical and appropriate, it encourages the trialling and testing of new initiatives to stimulate future

street improvements and meet the evolving expectations of all street users.
The barriers that prevent experimentation are identified and the process for incorporating innovative ideas, technologies, materials and layouts is explained.

Part D recognises that each street has a **unique function, performance and character** which must be balanced to ensure the needs of the users are met while reflecting and enhancing the character of the place.

Part E provides the **technical guidance** for a range of street components. It recommends the material palette and layout options for composing London streets, and provides advice on the selection and placement of products which meet the strategic criteria for quality and function, while enabling local flexibility.

1.5 How is the document relevant to my work?

Streetscape Guidance can be used to support a variety of street improvement works, from small scale decluttering regimes to extensive new streetscape layouts. It provides the framework and criteria for selecting surface materials and street furniture, and identifies how these should be configured within the street environment.

Streetscape Guidance should be used as early as possible in the development of a project or proposal to help define the brief and inform the initial stages of the design process. This helps to ensure best practice design principles are applied and that a consistent approach is taken in the design of London's streets and places.

Site specific design and good detailing is integral to producing excellent streetscapes and so this guidance should be used to provide general advice on design details. Arrangements and technical drawings are for illustrative purposes only.

Figure 5: This document is provided to support a variety of street improvement works from planning through to design and implementation



1.6 How do I collaborate?

Collaboration is essential in realising the vision for London; providing world-class streets and places that are fit for the future. Continuous improvement of our streets relies on the united effort of a wide range of skilled professionals, technical staff and stakeholders.

Meeting the desired level of ambition will require new and exciting ways of involving people, and developing a joint understanding of the challenges, the trade-offs and the need for action. Active and meaningful partnerships will need to be made; working together to explore new opportunities, to promote regulatory change where necessary, and to improve all users experiences on London's streets.

The importance of early engagement cannot be overstated. At TfL we are committed to the discussion of new ideas, innovations and improvements at a sufficiently early stage to allow an impact on decision-making, and ensure that better and more informed decisions can be made.

It is our intention that Streetscape Guidance be a 'live' document – regularly reviewed, edited and updated to reflect the latest in best practice. Of course, this requires ongoing and valued contributions from a wide audience. Suggestions, comments and queries are strongly encouraged and should be emailed to: **StreetscapeGuidance@tfl.gov.uk**

Future editions of this document will continue to set out London's evolving aspirations for world-class streets, including the goals, knowledge, and advances in technology and innovation. This will ensure our guidance remains a comprehensive and valuable resource for those responsible for designing, building, operating and maintaining our Capital's streets and places.

Figure 6: Collaboration and engagement with communities and necessary stakeholders is essential to ensure a cohesive approach to improving the quality of London's streets

1.7 Engagement and approvals

To achieve London's vision for streets, open and honest discussion is needed among a wide range of stakeholders, including design professionals, academics, highway authorities, road user groups, local communities and private developers.

New ideas, products, materials or layouts being proposed to us will require active and early engagement to ensure a shared understanding of the challenges, constraints, and opportunities.

1.8 How and when should I engage with TfL?

Developers, consultants and TfL staff with streetscape-related proposals for the TLRN should contact our streetscape manager during concept development. The streetscape manager is responsible for advising on the application of Streetscape Guidance and can assist in clarifying processes, expected timings, and criteria for decisions and decision makers. It is therefore strongly recommended that contact is made as early as possible.

If the proposal relates to a new idea, product, material or layout, the streetscape manager may decide that further information is needed and stakeholders will be requested to complete a streetscape application form. This form is used to understand if the proposal:

- Offers a solution to a problem, such as improving legibility, increasing safety, or providing a multipurpose function to improve the overall street-user experience
- Is technically feasible and meets wider planning criteria
- Improves to the look and feel of the streetscape
- Is safe, durable, and cost effective to maintain or replace
- Resists damage
- Has demonstrated use, either in London, the UK or worldwide

Please contact the streetscape manager at: StreetscapeGuidance@tfl.gov.uk

Following review of the application form, the streetscape manager may ask for additional information, grant consent, or request that the proposal be presented to our Streetscape Design Review Group (SDRG) for further review and discussion.

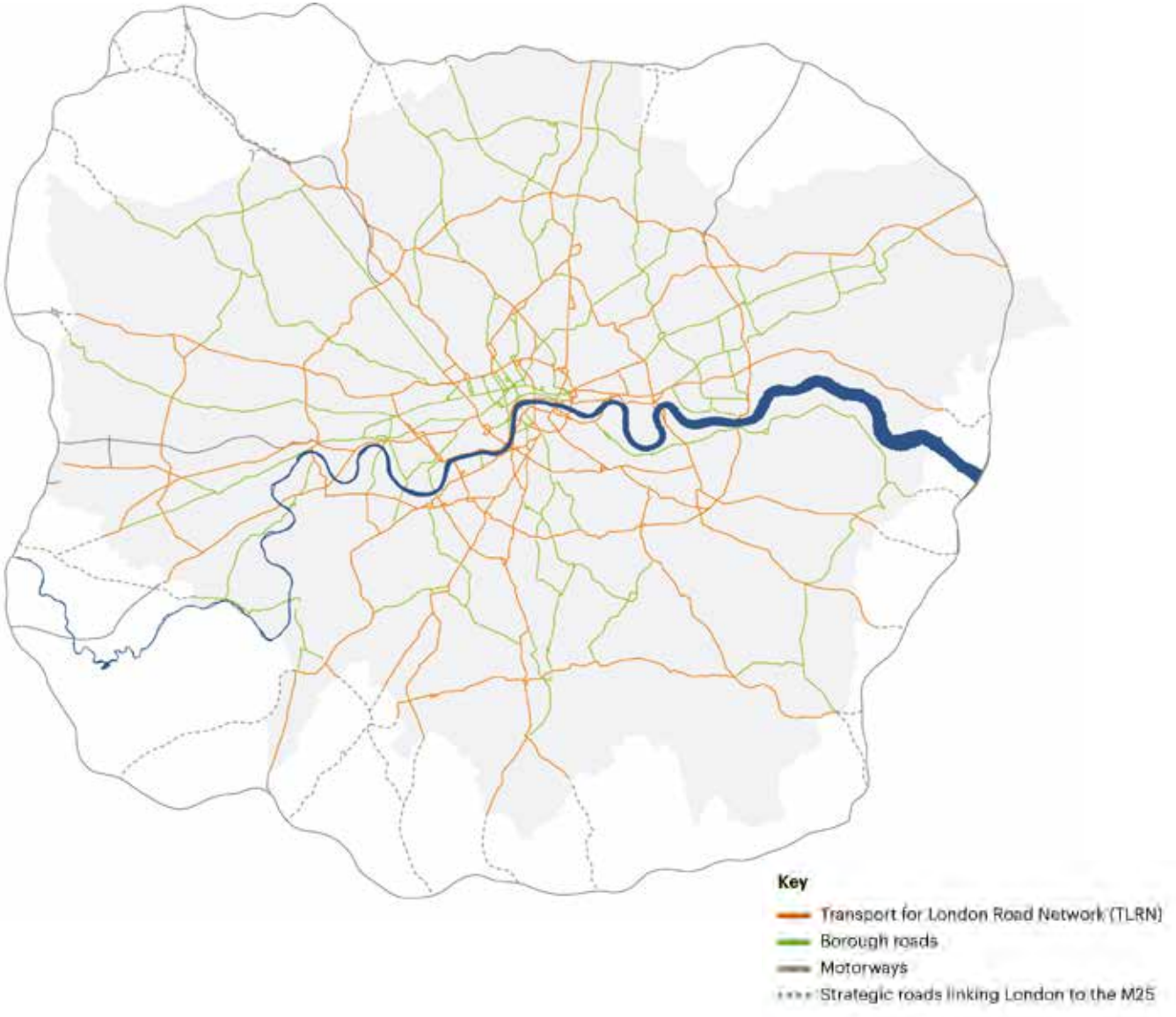
1.9 What is the Streetscape Design Review Group?

The SDRG is the decision-making body for all streetscape matters relating to the TLRN. It is a multidisciplinary panel formed of specialists from across TfL to ensure that the aspirations, design principles, materials and layouts outlined in Streetscape Guidance are well implemented and maintained. Meetings take place every four to six weeks and attendance is by invitation only.

We encourage early engagement as part of an iterative design process.

Proposals presented at the SDRG will receive practical advice and feedback to help guide ongoing development and design. The SDRG will also confirm if presented proposals deviate from Streetscape Guidance. Deviations from Streetscape Guidance will be subject to our formal approval process.

Figure 7: London's strategic road network



1.10 Do I require approval?

All proposals on the TLRN require formal approval from the SDRG. There is also an exceptions process for non-standard materials which is detailed below.

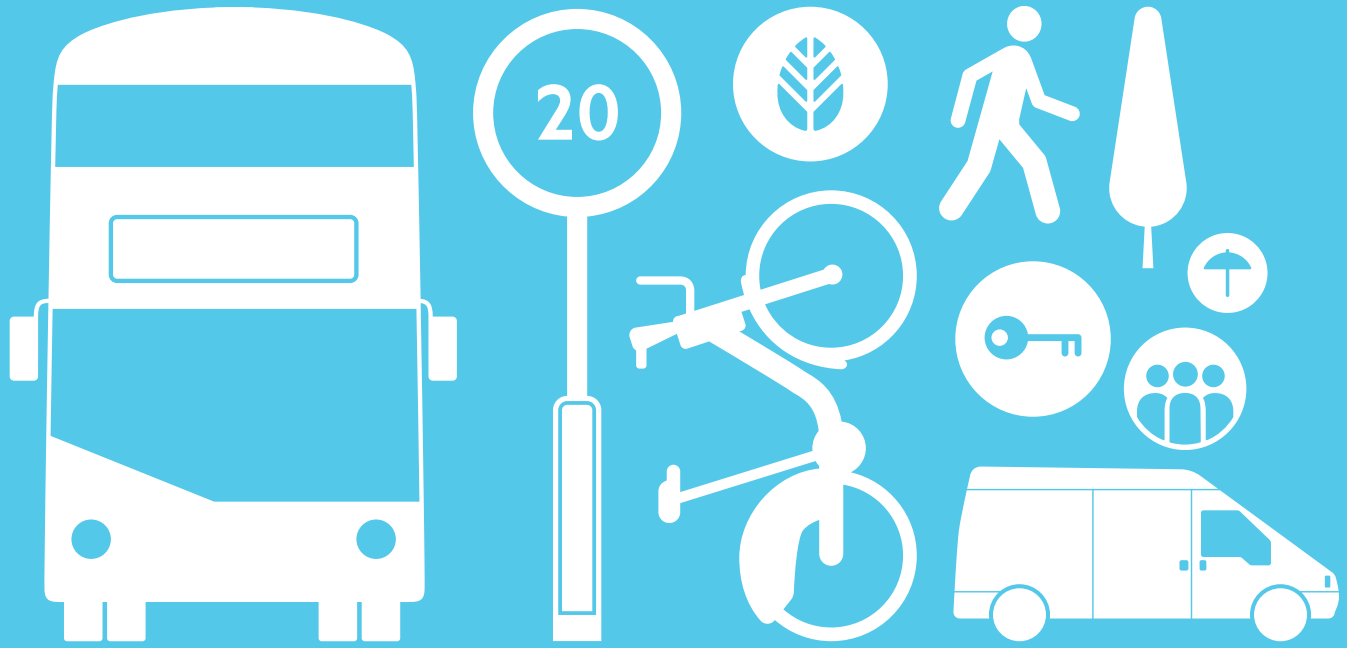
Proposals that are subject to our exceptions process may be invited to return to the SDRG periodically to ensure visibility of progress. Exception decisions will generally be informed within eight weeks if no further presentations have been requested by the SDRG. Additional information regarding the exceptions process can be made by contacting the streetscape manager at StreetscapeGuidance@tfl.gov.uk

Figure 8: TfL's exceptions process

1. Pre-exception	**Review the Streetscape Guidance** – You'll need to provide evidence that the materials proposed in the guidance do not offer a better solution
2. Initial enquiry	**Contact the streetscape manager** – Speak to the streetscape manager about your proposal to determine whether an exception should be sought
3. Application	**Complete a Streetscape exceptions request form** – Forward the exceptions request form to the streetscape manager
4. Review	**Internal review** – You may be required to attend an SDRG meeting to review your proposal. However, there are some instances where an exception can be assessed internally
5. Exception decision	**Notification** – You will be informed of the outcome of your application shortly after the SDRG meeting or within eight weeks of the initial application

Figure 9: Exhibition Road required multiple exceptions and approvals from SDRG

Part A A vision for London's streets



2.1 Planning for the future

London is knitted together by a vast network of streets, roads, public squares, interchanges and junctions. Accounting for 80 per cent of London's public spaces, roads play an important role in our daily lives: as places where we live, work and move through. With such a high percentage of our public realm located on our streets, these spaces need to work hard to provide high quality places that are resilient, flexible and functional.

London's population is expected to reach 10.8 million people by 2041. To combat the effects of population growth a more efficient and balanced transportation network is required to respond to ever increasing demand.

The Mayor's Transport Strategy (MTS) sets the vision for transportation in London. It also addresses the need to invest in the road network so that an improved public realm supports more walking and cycling, to improve access to transportation, and better balances the needs of road users.

2.2 The Mayor's Transport Strategy

The Mayor's Transport Strategy sets out plans to transform London's streets, improve public transport and create opportunities for new homes and jobs. To achieve this, the Mayor wants to encourage more people to walk, cycle and use public transport.

The strategy uses the Heathy Streets Approach. This makes health and personal experience the priority as we plan our city.

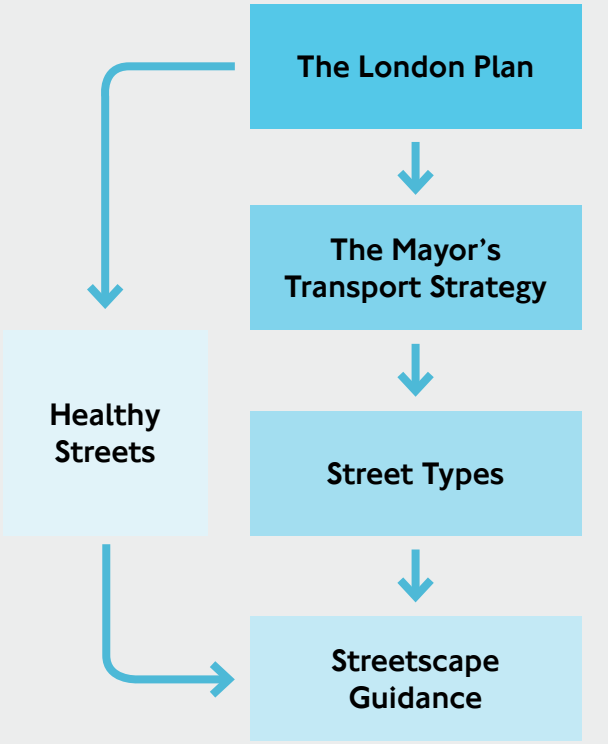
The Healthy Streets Approach will be applied to the whole transport system to help create:

- **Healthy Streets and healthy people:** Streets make up 80% of London's public spaces – making them Healthy Streets will improve the quality of life for everyone in London.
- **A good public transport experience:** Public transport is the most efficient way for people to travel distances that are often too long to walk or cycle. A seamless, 'whole-journey' experience will provide an attractive alternative to using the car.
- **New homes and jobs:** London needs 65,000 new homes every year to meet demand, plus around 1.3 million more jobs by 2041. We have an opportunity to reshape London and make sure it grows in a way that improves the quality of life for everyone.

Figure 10: London's network of streets knit the city together

[1]Commission for Architecture and the Built Environment (CABE)

Figure 11: London policy context map



2.3 Street Types for London

Key to delivering the goals set out by the MTS is a holistic understanding of and approach to managing London's current and future demands on the road network. Street Types sets out a new framework that helps takes account of local and network priorities and aims to guide operational, policy and investment decisions.

Street Types uses a classification matrix of nine categories to map London's streets according to their movement (of people and goods) and place functions. Thus far, the network in 32 out of 33 London boroughs has been mapped in a collaborative effort between TfL and the boroughs.

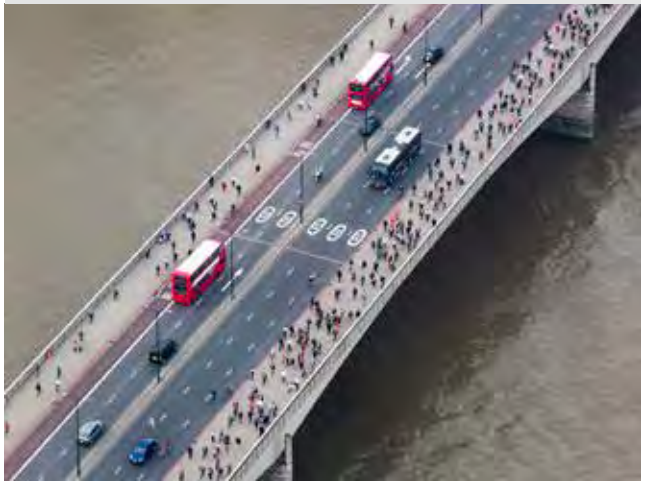
The resulting mapping of London's streets is intended to enable TfL, the boroughs and stakeholders to:

- Set priorities for different streets and roads, and make trade-offs accordingly
- Reflect changing functions and aspirations as streets and areas change
- Highlight to all interested parties where a mismatch between form and function may be limiting a location from realising its potential
- Identify the tools that may be appropriate locally to deliver change
- Balance place-specific needs with the overall function of the network
- Establish the need for intervention at a strategic level to keep London moving

Street Types has helped TfL, boroughs and developers collaborate to look at streets not as corridors that facilitate the movement of people, goods and services rather than 'traffic', and places which contribute to the Capital as a key part of the public realm. The mapping process has also helped us to understand the relative balance between movement and place functions at key locations across London.

This classification has identified parts of the road network which attract the most people allowing us to target locations where different types of intervention might be more or less appropriate. In that way we can ensure transport continues to support London's growth in a safe and sustainable manner, mindful that the

Figure 12: London bridge busy with pedestrians



that this is done by area or location, depending on outcomes sought.

Street Types for London (STfL) is an exciting and emerging transport planning concept. This new shared geography is helping to reshape how TfL and the boroughs use the limited space available on our road network. Importantly it doesn't just focus on the transformation of key locations, but ensures we are maximising the usage and maintenance of our existing infrastructure.

Please contact **StreetTypes@tfl.gov.uk** for further information, or visit our website tfl.gov.uk/street-types

Figure 13: Street Types matrix

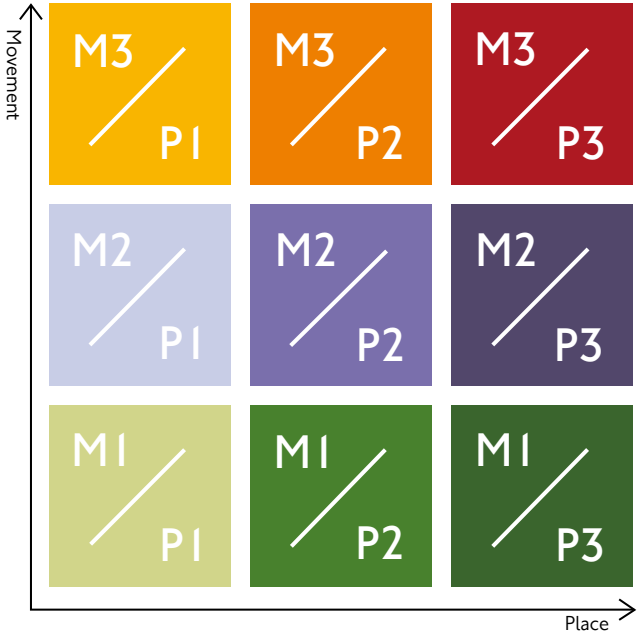
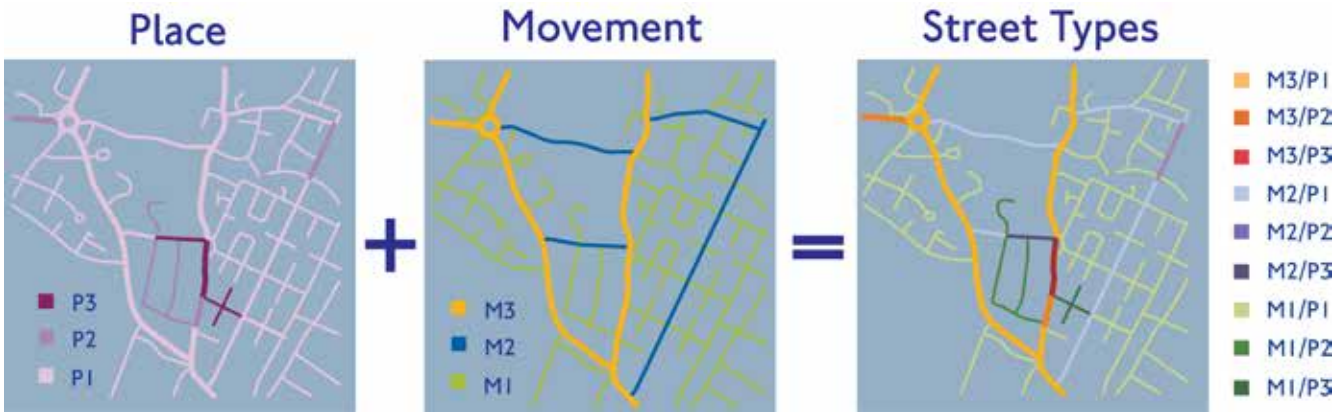


Figure 14: The Street Types transcend highway ownership and borough boundaries



2.4 Street design principles

Early 'Street Types' work proposed six key roles which streets and roads need to fulfil including moving, living, unlocking, functioning, protecting, and sustaining (www.tfl.gov.uk/cdn/static/cms/documents/rtf-report-chapter-1.pdf). Below, each role is described. From these six roles, key design principles have been extracted which define the aspirations of this guidance. These symbols will appear alongside case studies, vignettes and trials to denote how these interventions are working to achieve the aspirations of 'Street Types':

'Moving'

Help people, goods and services get from A to B, by enabling more efficient and reliable movement for a range of transport modes.

a) Facilitate an increase in walking and cycling – ensure that walking and cycling are the most competitive transport modes for short and medium length journeys. This can be achieved through an enhanced public realm, safer, more convenient crossings and prioritising pedestrian movements in key locations.

b) Balance user priorities – explore techniques that prioritise particular road users and communicate with the use of surfacing and material layouts.

c) Manage traffic speeds – ensure that vehicle speeds are appropriate for the surroundings, and reinforced through the street layout, scale and type of materials used.

'Living'

Provide welcoming and inclusive places which support economic, cultural and community activities.

a) Implement contextually sensitive design – streetscape design must respect the character of the place through which the TLRN passes, not only the physical attributes of landscape and townscape, but also the activity, vitality and distinctiveness of the local community.

b) Apply inclusive design principles – people of all abilities should be able to access different modes of transport and conveniently change between them. People should be able to comfortably move along footways unhindered by street clutter, poor quality materials or inappropriately located obstacles.

c) Facilitate social interaction – opportunities should be taken to encourage people to interact socially on the street and support stationary activities where appropriate.

d) Improve journey experience – ensure a high quality streetscape that makes the best use of the space available through rationalisation of street furniture and utilities, and through the use of high quality materials.

'Unlocking'

Improve the accessibility, connectivity and quality of major growth areas to support the delivery of new homes, jobs and economic sectors that London needs as it grows.

a) Reduce severance – the provision of safe and convenient crossings between neighbourhoods divided by infrastructure should be prioritised.

b) Foster regeneration – recognise the impact that streetscape improvements may have on public and private interests. Public realm improvements can act as a catalyst for further regeneration.

'Functioning'

Ensure essential access for deliveries and servicing, and upgrade utilities to better serve London's growing needs and foster a digital city.

a) Fit for purpose – products must be robust, durable, and fulfil their designed lifespan, wearing well over time.

b) Adaptable – select materials and products that are flexible to change, such as street light columns that can be adapted to take signs, signals and banners.

c) Convenient to maintain – new products should accord with current maintenance regimes and all existing assets brought up to a good state of repair.

d) Timeless – materials and designs must embody a simple and consistent approach to ensure that the street does not look dated quickly.

e) Seamless – avoid abrupt changes in paving and street furniture materials and patterns where possible and work to provide seamless integration of materials across administrative boundaries.

f) Simplicity – minimise the variety of materials; use intuitive solutions and declutter.

g) Improve legibility – streets need to be easy to understand and move through. This can be achieved through the consistent use of materials, good wayfinding signage, and a logical approach to street design.

'Protecting'

Improve safety and ensure that streets are secure.

a) Create safer streets –slowing traffic speeds where appropriate, maintaining good visibility and reducing the likelihood of collisions.

b) Improve the perception of personal security – design and manage our streets to actively reduce crime and the fear of crime.

c) Reduce crime and disorder – design teams have a duty to ensure that highway schemes provide a safe and secure environment and do not create opportunities for crime. This is especially important for pedestrian and cycling only routes.

'Sustaining'

Reduce road network emissions and support clean, green initiatives for a healthier and more active city.

a) Resilient design – mitigate the impact of current and future climatic conditions by assessing, managing and minimising risk through good design. Plant trees and integrate sustainable urban drainage systems to better accommodate surface water runoff.

b) Invest in modal change – support sustainable transport modes with greater capacity for cycling and higher quality public realm to enable walking.

c) Low carbon materials – priority should be given to materials that support local economies and reduce negative environmental impacts.

2.5 Healthy Streets for London

TfL is embedding a new Healthy Streets Approach, and putting in place policies and strategies to help Londoners use cars less and walk, cycle and use public transport more. You can take a look at this approach here: http://content.tfl.gov.uk/healthystreets-for-london.pdf and find more detailed information about walking here: https://content.tfl.gov.uk/the-planning-for-walking-toolkit.pdf

Because 80 per cent of London's journeys happen on our streets – including bus and tram trips and journeys to and from Tube and rail stations – we can only do this by creating streets that feel pleasant, safe and attractive, where noise, air pollution, accessibility and lack of seating and shelter are not barriers that prevent people – particularly our most vulnerable people – from getting out and about.

The purpose of the Healthy Streets Approach is not to provide an idealised vision for a model street. It is a long-term plan for improving Londoners' and visitors' experiences of our streets, helping everyone to be more active and enjoy the health benefits of being on our streets.

To deliver the Healthy Streets Approach, changes are required at three main levels of policy making and delivery:

1) Street level 2) Network level

3) Strategic level policy and planning

Work at every level aims to improve the experience of travelling through and spending time on London's streets and is judged on the ten Healthy Streets Indicators. The Healthy Streets Approach uses ten evidence-based indicators of what makes streets attractive and appealing places. Working towards these will help to create a healthier city, in which all people are included and can live well, and where inequalities are reduced.

Figure 15: Indicators of a healthy street environment

2.6. Delivering value

TfL is committed to ensuring that public money is invested to maintain and enhance London's transport network and provide the greatest benefits to all of society in the most efficient way. It is therefore vital that all investment decisions are based on clear and robust analysis of value for money.

TfL defines value for money as the optimal use of resources to achieve the intended outcomes. This focuses on spending less, spending well, spending wisely and spending fairly.

We adopt the following principles in practice as developed by National Audit Office (NAO) which consist of four main elements:

(a) Economy: minimising the cost of resources used or required (inputs) spending less;

(b) Efficiency: the relationship between the output from goods or services and the resources to produce them – spending well;

(c) Effectiveness: the relationship between the intended and actual results of public spending (outcomes) – spending wisely; and

(d) Equity: the extent to which services are available to and reach all people that they are intended to – spending fairly. Some people may receive differing levels of service for reasons other than differences in their levels of need.

TfL and the Borough's investment programmes should aim to deliver the optimal combination of whole-life cost, safety, reliability, effective commercial management, customer perception, mandatory standards and environmental impact in a sustainable way to meet requirements within the bounds of financial constraints.

The capability to realise value from any investment starts with *selecting the right things to do for the right reasons, then completing this work effectively and efficiently*.

Part B From strategy to delivery

3.1 Bringing it all together

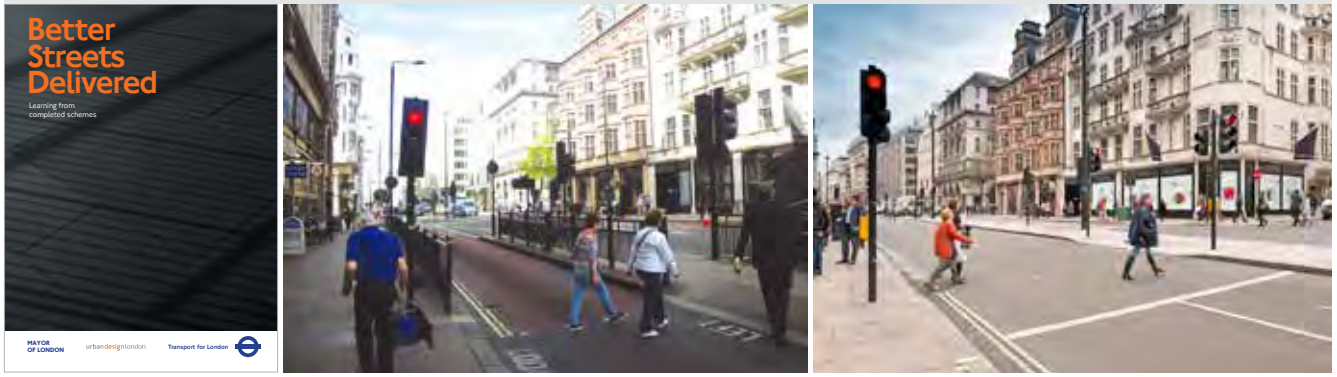
It is not always necessary to undertake wholesale redesign of a space when simple, light-touch measures may be all that is needed to make a place more functional and attractive. Understanding the context, purpose and demands placed on the space helps us understand how best to deliver the right type and scale of intervention.

It is essential that good public realm and street design provides for a myriad of social and economic needs, in addition to responding to the characteristic and functional diversity of different places and the vital movement function that the road performs.

The Better Streets agenda advocates a considered and staged approach to tackling these intrinsic differences in function, performance and urban form. This guidance asks designers to consider some fundamental guiding principles of design before presenting a staged approach which recommends five levels of intervention with increasing levels of complexity and cost to improving the public realm:

- **Tidy up** – look to remove unnecessary road markings or broken furniture which is simple to clear up and will not damage the footway

Figure 16: Better Streets Delivered provides examples of what has been achieved across London



- **De-clutter** – requires a more strategic justification for every individual piece of equipment in the street, with the presumption of removal unless a clear reason for retention is given
- **Relocate or merge functions** – any remaining features should be rationalised to combine signage and lighting or better locate street furniture to fulfil its intended use
- **Rethink traffic management options** – by considering user priority, changes to carriageway widths, or removal of traffic signals
- **Recreate the street** – complete remodelling of the street may be suitable if a new set of objectives or character is desired, for example, by creating a shared surface. This approach is not suitable in all locations and requires extensive consultation

Streetscape Guidance brings together many of the physical elements commonly found on London's streets. By consolidating various elements in a rationalised, clear and well-executed composition we can determine how well a street performs its function and serves the people who use it.

This guidance emphasises the importance of creating vibrant and inviting public spaces that promote the principles of Better Streets. This section investigates some of the recently completed schemes in London that have successfully transformed place and user experience through a range of techniques and creative vision.

Additional information

Better Streets Delivered: Learning from completed schemes (2013) **http://content.tfl.gov.uk/better-streets-delivered-web-version.pdf**

Better Streets Delivered 2: **http://content.tfl.gov.uk/better-streets-delivered-2.pdf**

3.2 A bold new approach

Exhibition Road

Royal Borough of Kensington and Chelsea
SW7

Completion date: December 2011
Cost: £29m

Improvements

- Recreate the street
- Rethink traffic management
- Relocate/merge functions
- De-clutter
- Tidy up

Exhibition Road, which runs south from Hyde Park to South Kensington, is home to some of the top educational and cultural institutions in London, including the Victoria and Albert Museum, Natural History Museum, Science Museum, Royal Geographical Society and Imperial College London. Until recently, Exhibition Road had a poor urban environment dominated by vehicular traffic and narrow footways, frequently blocked by parked coaches, cars and street clutter. With more than 11 million visitors a year, this unwelcoming pedestrian environment often led to overcrowding with people spilling out on to the busy carriageway.

Figure 17: The redeveloped Exhibition Road creates a more pleasant environment for those living, working and visiting the area

The transformation of Exhibition Road into one of the finest streetscapes in London required extensive public and stakeholder consultation to ensure all users were able to access the space, that the design responded appropriately to the historical context of the street, and the needs of local residents and institutions were met. As the layout of the street is unique, without traditional methods defining the footway and carriageway, concerns raised for visually impaired people were met with rigorous testing of tactile delineation and monitoring for two years following completion.

The Royal Borough of Kensington and Chelsea, in partnership with English Heritage, Exhibition Road Cultural Group, City of Westminster and TfL worked to convert a busy and unappealing traffic-dominated road into an elegant pedestrian boulevard, setting new standards for urban design. The bold design features a kerb-free surface with tactile materials to distinguish boundaries between pedestrian and vehicular areas, a reduction in speed limits to 20mph, and the removal of street clutter and gyratory system around South Kensington station. The result is one of the most recognisable cultural destinations in the world.

Before

1. Street furniture obstructs narrow footway
2. Car parking impedes crossings
3. Road markings create visual clutter
4. Material choice and design creates poor setting for historic buildings

After

1. Granite paving setts applied in bold pattern across entire area to create shared surface
2. Drainage channel, corduroy paving and bollards define shared space
3. Inspection covers seamlessly integrate with paving
4. Art, seating and car parking provided in street furniture zone
5. Street furniture and equipment use consistent colours

3.3 Enhancing a cultural heart

Leicester Square

City of Westminster
WC2H

Completion date: 2012
Cost: £15.3m

Improvements

- Recreate the street
- Rethink traffic management
- Relocate/merge functions
- De-clutter
- Tidy up

Prior to the works, the urban environs of Leicester Square no longer mirrored its international landmark status. Shabby with neglect, the space struggled to encourage the 250,000 people who pass through the square every day to linger in the area. At the physical heart of London's West End, it functions as a beacon for entertainment and a destination in its own right with bars, clubs, cafés, restaurants and hotels. As the home of UK cinema and a flagship red carpet destination, the square also hosts major film premieres. To sustain this reputation, Westminster City Council committed to transforming Leicester Square. Westminster ran a design competition in 2007, with Burns + Nice ultimately being awarded the contract.

Figure 18: The high quality public realm at Leicester Square now sits comfortably within its surrounding street network, reinforcing the identity of this internationally important space at the heart of London's West End

During the development stages, there was significant involvement with local businesses and representative groups. This was followed up with weekly public drop-in briefing sessions, monthly meetings with key groups, a website detailing the planned works, and information displayed on construction hoarding – all coordinated through a dedicated communications officer.

The redesign of Leicester Square into a must-see destination presented an opportunity to consider the gardens, the square and the connector streets as one entity and create a coherent public realm that strengthens the identity of this part of the West End. Around the perimeter of the gardens, a curvilinear seating wall and shrub planting now extends the experience of the green square beyond its boundaries, while new lighting incorporated into the seating wall deters antisocial behaviour and makes the square more appealing after dark.

The identity of the square is highlighted with dark granite, while the primary movement corridors adopt a lighter shade. The existing 19th century Shakespeare fountain was retained and features water jets around the statue. Along the building lines a consistent alignment of alfresco dining areas now appear, reinforced with consistent edge treatments which again feature in the railings around the square. Legible London signage has been provided at key decision points. Vehicular access for loading is severely limited to times of day with the least visitors.

The square's makeover was completed in time for the Queen's Diamond Jubilee and the London 2012 Olympic and Paralympic Games. These revitalisation works have breathed new life into London's West End, attracting a number of new businesses to the square by providing a flexible and contemporary space that works well for everyday use and for large red carpet functions.

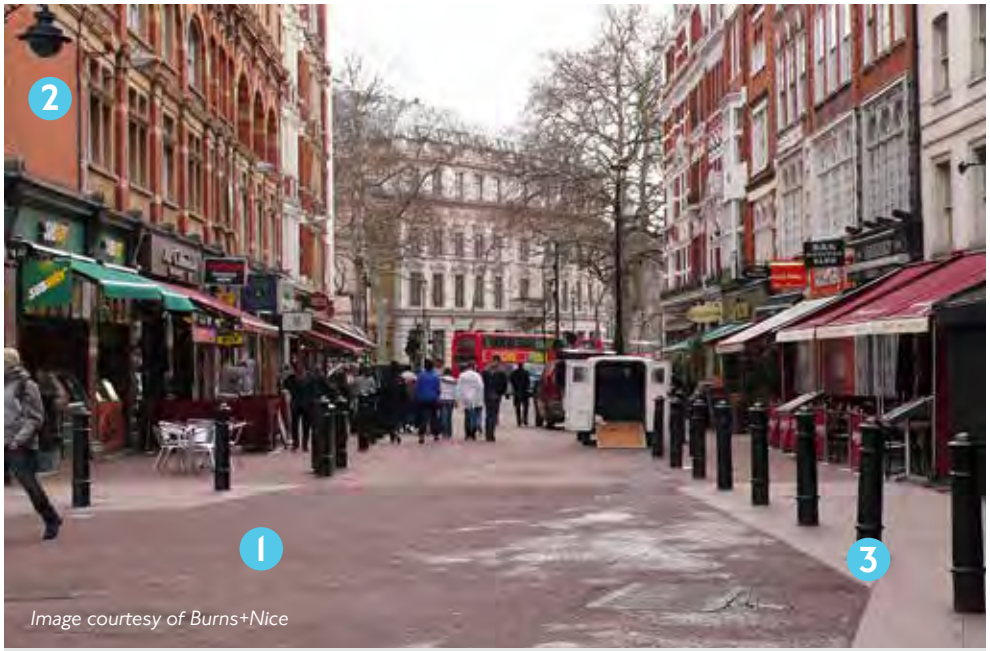


Image courtesy of Burns+Nice

Before

1. Multiple paving treatments create visual clutter
2. Paving tones conflict with architecture
3. Bollards restrict footways

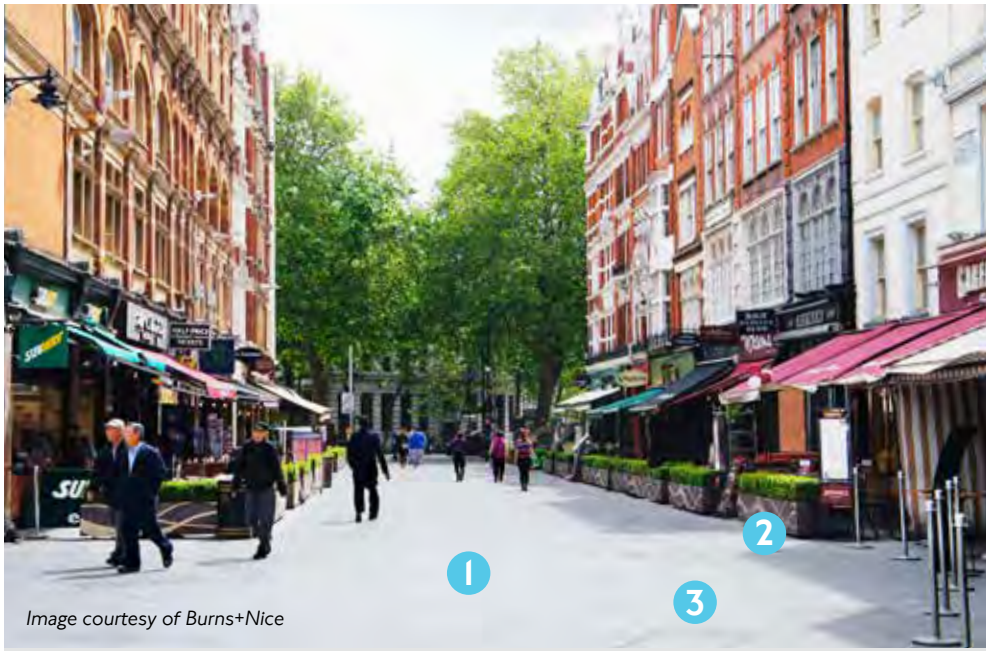


Image courtesy of Burns+Nice

After

1. Simple light grey granite paving provides simplified backdrop
2. Café planters tie laneways to railings in the main square
3. Utility covers consistently paved

3.4 Changing the purpose of the street

Braham Street Park

London Borough of Tower Hamlets
E1

Completion date: February 2010
Cost: £2m

Improvements

- Recreate the space
- Rethink traffic management
- Relocate/merge functions
- De-clutter
- Tidy up

Braham Street Park was the first project completed under the High Street 2012 programme to improve links between the Olympic Park and the rest of London. This scheme was also part of a wider transformation of the Aldgate gyratory into a two-way system.

The redirection of four lanes of traffic by reverting Whitechapel High Street back to a two-way street, freed up road space owned by TfL for the development of new offices. Through a public-private partnership between the developer Tishman Speyer and ourselves, a much-needed open public space was created transforming an unfriendly busy street into an oasis of green.

Figure 19: The closure of a former one-way street has allowed for the creation of a large, fully accessible linear park in a busy area at the edge of the City of London

This long narrow park features many of the wishes expressed through extensive public consultation, including accessibility for all, with large expanses of greenery achieved through the use of sloping grass mounds. A simple palette of surface materials included asphalt paving, gravel and granite kerbs. The areas of planting combine grass, hedges, shrubs and trees which contrast nicely with light grey lighting columns and light grey granite kerbs. As the site prioritises children's play, it also features a waterfall and Europe's longest bench.

Before

1. Pedestrian movement restricted by guardrail
2. Inconsistent street furniture colours
3. Streetscape provided poor setting for commercial buildings

After

1. Loose aggregate allows water to infiltrate
2. Bespoke timber seating incorporating planters
3. Lighting column colour provides consistency with colour of kerb, bench and trees
4. Granite kerb used as dwarf wall
5. Low planting provides clear views of area

3.5 Rebalancing user needs

Angel town centre – Upper Street

London Borough of Islington
N1

Completion date: June 2012
Cost: £2.2m

Improvements

Recreate the space	☐
Rethink traffic management	☐
Relocate/merge functions	■
De-clutter	■
Tidy up	■

The initial aim of this scheme was to improve the ease of running buses through Angel town centre. However, the scope of the project quickly expanded to include bus reliability, improved conditions for cyclists and pedestrians, measures to smooth traffic flows, public realm improvements, and improved conditions for local businesses.

Early proposals included the widening of footpaths and the removal of one southbound lane between Islington Green and Duncan Street. TRANSYT modelling suggested that the scheme would be capacity neutral, however, consultation revealed intense speculation that the proposed road layout would worsen congestion in the area. Pedestrian crossings were widened as a result of the consultation.

Figure 20: A series of interventions at Angel town centre has led to a more user friendly street with increased space allowance for pedestrian movement and a negligible impact on vehicle capacity

Creating more 'people friendly' streets with improved facilities for pedestrians was a key focus of this project. A programme of decluttering was undertaken which included the removal of guardrails from the centre median and along footpaths. A key crossing serving Angel Tube station was relocated to the north side of Liverpool Road junction and rephased so that crossings could be made in a single stage. A staggered crossing was also added at the junction of Essex Road. Where existing tree plantings used a raised edge, these were lowered to be flush with the footway to increase the available width for pedestrians.

To create a consistent public realm with visual appeal, Yorkstone paving was laid throughout the scheme. A band of setts was used on the edge of the footway to visually reinforce the edge and prevent cracking of paving should a vehicle mount the kerb. The wide central median was extended along the length of Upper Street and guardrails removed to accommodate more informal crossings.

The needs of local businesses were also better served with three new inset loading bays added to the east side of Upper Street. These were paved in setts to match the surrounding footway and therefore functioned as part of the footway when not being used for deliveries.

To help traffic flow and increase the accessibility of the bus stops on Upper Street, the kerbs in the waiting area were moved. The southbound bus lane was also widened to better accommodate cyclists and motorcyclists.

Prior to these improvements, movement in Angel was tightly controlled and was subject to speeds not suitable to its context. Since the improvements, Angel town centre is better able to safely and efficiently serve businesses, pedestrians, buses, cyclists and other traffic.

Before

1. Pedestrian movement restricted by guardrail
2. Central island guardrail restricts pedestrian movement and creates a hazard for those that choose to cross informally
3. Inconsistent and damaged paving
4. Inspection covers with poor finish
5. On-carriageway loading bay restricts vehicular movement when in use

After

1. Grade change incorporated as a landscape feature increasing usable space
2. Carriageway islands paved in Yorkstone provides safe refuge for informal crossings
3. Consistent Yorkstone paving provides high quality footways
4. Corduroy paving denotes grade change
5. Street furniture, equipment and plantings are arranged in two furniture zones

3.6. Reversing a gyratory

Piccadilly Two Way

City of Westminster W1J, SW1Y and SW1A

Completion date: Phase 1 completed June 2012

Cost: £12.5m

Improvements

Recreate the space	☐
Rethink traffic management	■
Relocate/merge functions	■
De-clutter	■
Tidy up	■

The road network from Piccadilly Circus to St James's Street junction, and through to Pall Mall/ Waterloo Place, was changed into a one-way gyratory system in the 1960s to optimise traffic flows in London. A by-product of this one-way gyratory was streets dominated by traffic and an unpleasant pedestrian environment.

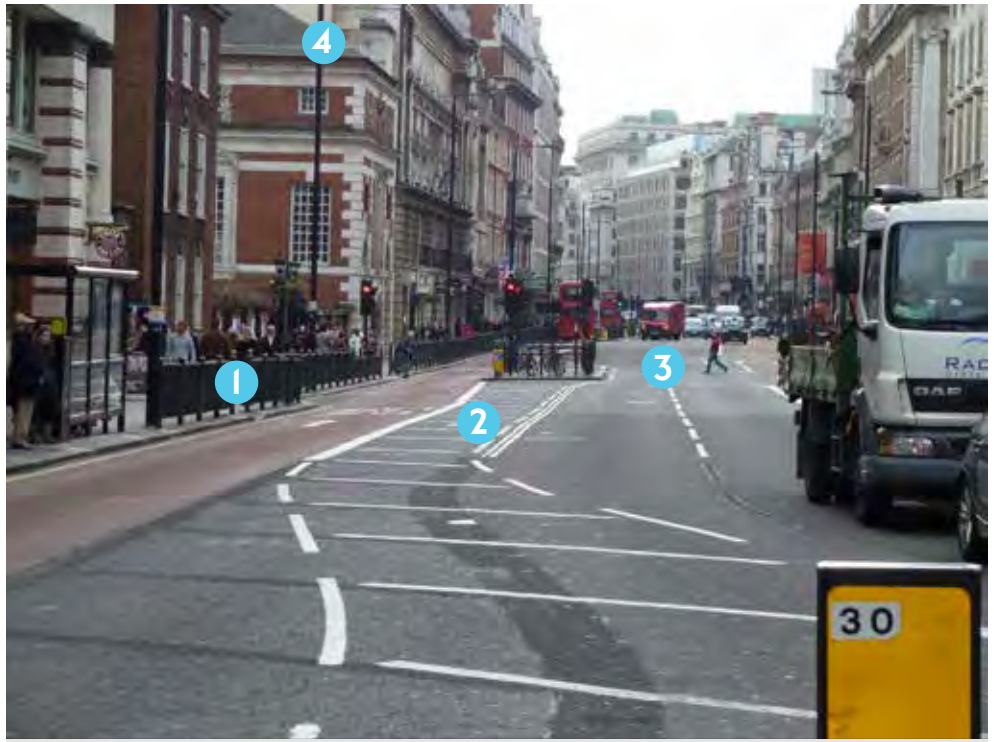
Besides the reversal of a one-way working system back to a two-way system, a major achievement of this project has been the partnership formed between TfL, Westminster City Council and The Crown Estate. The team worked collaboratively to undertake the modelling and design rather than TfL assessing a borough-led scheme. Three critical areas were identified by the team: Piccadilly Circus, Piccadilly/St James's Street junction and Pall Mall/ Waterloo Place. Each area required careful design and testing to balance and maintain efficient traffic flows and bus service reliability in an area of very high footfall, while simplifying crossings and creating additional public space in this architecturally and historically significant part of the Capital.

Figure 21: Streetscape enhancement has improved the historical setting of Piccadilly and provided greater space to accommodate the high level of pedestrian movement on the street

The scheme reintroduced a two-way traffic system to the road network, as well as significant improvements to the public realm. The scheme has responded to the high footfall levels by widening the footways on highly trafficked walking routes. Informal pedestrian crossings have been encouraged through the use of a wide central median paved in light grey granite setts and the removal of one kilometre of guardrailing. Pedestrian crossings have been improved with the use of single stage phasing and widened crossing points.

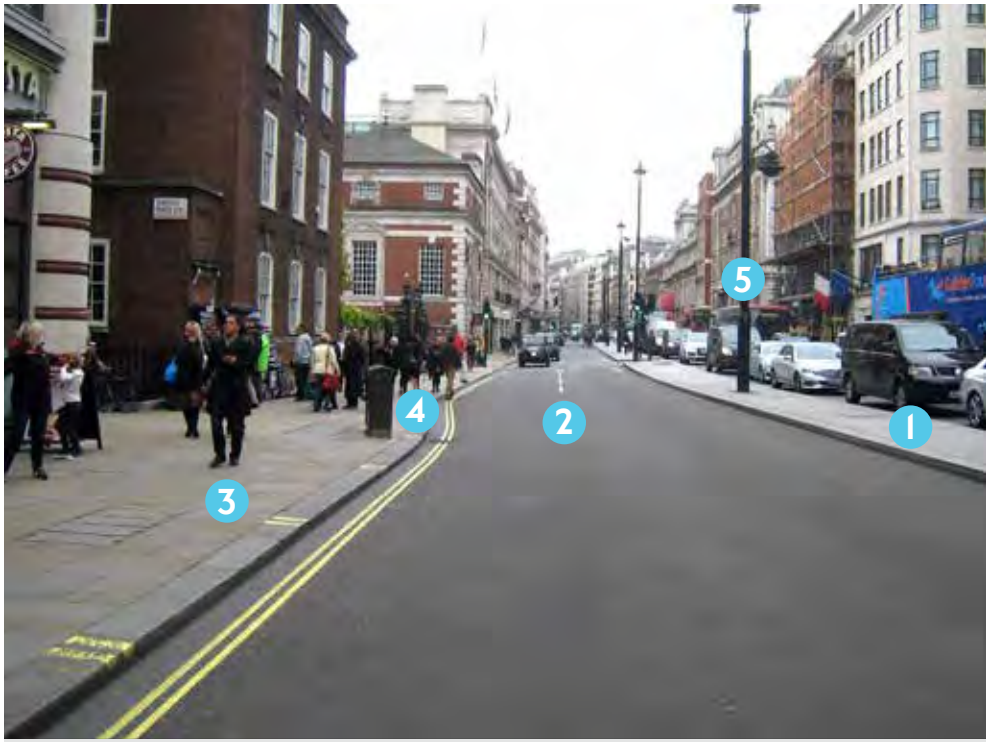
Street lighting previously placed on either side of the street was rationalised and included along the central medi an. Signals were combined with lighting and road markings were minimised where practical. To reflect the area's cultural and historic significance, heritage-style lighting, Yorkstone slabs, granite setts and kerbs were used.

The resulting street provides a quiet composition that allows the rhythm and beauty of the buildings to stand out. Movement for all modes has become less congested, safer and more enjoyable.



Before

1. Guardrails restrict pedestrian movement and add visual clutter
2. Road markings create visual clutter
3. Pedestrian crossings are narrow and infrequent
4. Lighting columns on both sides of street further restrict narrow footways



After

1. Wide central median paved in similar footway material encourages informal crossings
2. Minimal use of road markings
3. Footways are paved in Yorkstone slabs
4. Street furniture placed in single zone against carriageway
5. Central street lighting reduces clutter

3.7 Simplifying a junction

Herne Hill

London Borough of Lambeth
SE24

Completion date: July 2010
Cost: £1.7m

Improvements

Recreate the space	☐
Rethink traffic management	■
Relocate/merge functions	■
De-clutter	■
Tidy up	■

Figure 22: Strong relationships and flexibility throughout the design process has led to a multifaceted and vibrant space which is actively used by the local community and provides a distinct sense of arrival at Herne Hill

Image courtesy of the London Borough of Lambeth

The Herne Hill junction was identified as an overly complex arrangement with the intersection of six major roads causing significant traffic congestion. Initially, the scheme was a bus priority project to review bus lanes and signal timings, improve interchange links, and reduce bus delays by simplifying the junction.

The borough conducted extensive community engagement and set up a project board to help guide the process. As the brief developed, the focus shifted towards an all-encompassing town centre strategy. This included looking at walking and cycling facilities, opportunities for improved crossings and better access to Brockwell Park.

Policy 67 of the Unitary Development Plan (UDP) permitted 1,070 square metres of Brockwell Park to be used for a raised slip road between Norwood and Dulwich Roads, improving vehicular flow and safety for cyclists and pedestrians. This also allowed for a new, more open entrance to the park.

A major component of the design involved the closure of through traffic to Herne Hill station on Railton Road. A raised table outside the station and shared surfaces constructed of Yorkstone created a high quality pedestrianised environment.

On Milkwood Road, a raised zebra crossing and widened footway was introduced and staggered signalised crossings installed on Half Moon Lane. Junctions have also been tightened throughout the scheme to maximise footway space.

A strong project brief, coupled with political support from a project board, the local community and a flexible in-house design team, enabled the design of a more vibrant and multifaceted end product than originally planned. Simplifying the junction by closing Railton Road was the key component for justifying further interventions, with the pedestrianised area acting as an effective gateway to the scheme from the station.

Before

1. Pedestrian guardrail provides visual and physical barrier
2. Asphalt road surface in poor condition
3. Pedestrian realm poorly defined
4. Street furniture and equipment causes clutter and uses inconsistent colours

After

1. Pedestrian realm consistently defined with Yorkstone paving
2. Clear views to Brockwell Park enhanced
3. Granite kerbs provide a high quality finish
4. New tree planting

3.8 Making the most of constrained space

Kingsland High Street

London Borough of Hackney
E8

Completion date: April 2012
Cost: £2.58m

Improvements

Recreate the space	☐
Rethink traffic management	■
Relocate/merge functions	■
De-clutter	■
Tidy up	■

Figure 23: Bespoke detailing elements and treatment can help to enhance the sense of place and reinforce the identity of a street

Kingsland High Street is a bustling local centre in Dalston, east London, that experiences high footfall and traffic at all hours of the day. Prior to the improvements, the corridor suffered from a poor safety record largely as a result of narrow footways and high levels of pedestrians, with some forced to walk on the road due to congestion and inadequate footway widths. It was anticipated that following the completion of Dalston Junction station this situation would only worsen as passengers interchange between Overground stations and buses.

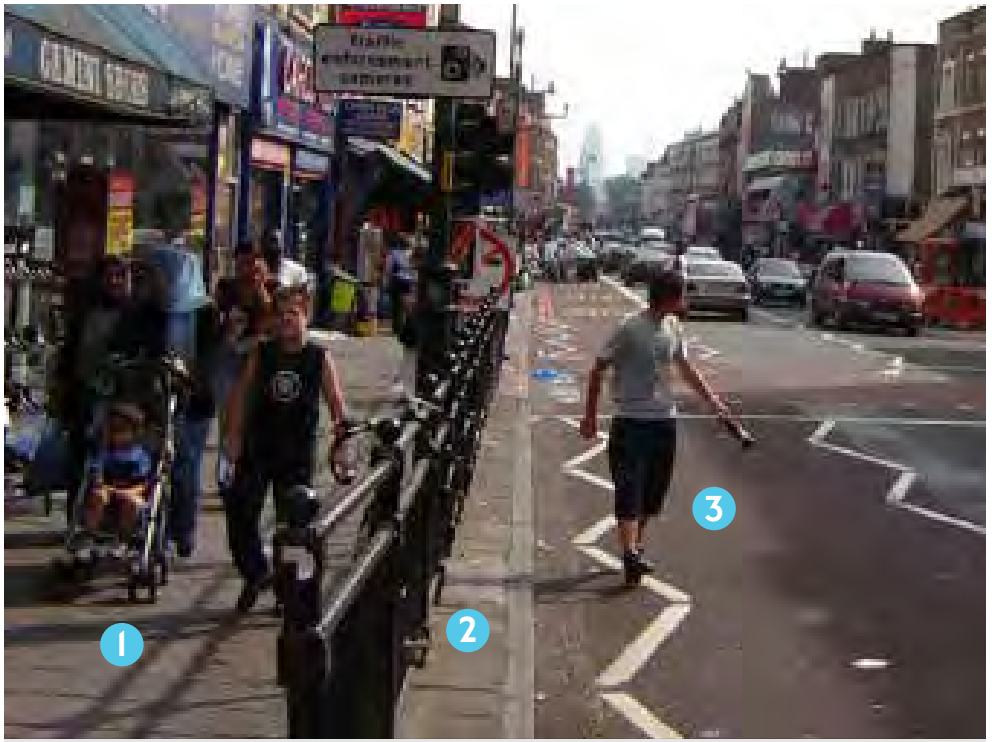
Coupled with the obvious transit-related need to improve Kingsland High Street, the London Borough of Hackney recognised the area was rundown and identified Dalston town centre as a regeneration area. Streetscape improvements were seen as the starting point for supporting regeneration aspirations to better support local communities and businesses, and encourage further investment and growth.

Following consultation with various parties including the police, the major objectives of the scheme were updated to include:

- Making Dalston a more walkable, attractive and thriving town centre
- Providing a more integrated streetscene and transport interchange
- Reducing levels of congestion and increasing levels of public transport use, cycling and walking
- Improving access to jobs, facilities and businesses
- Improving safety and security for residents and businesses

To simulate the effects of the scheme, which proposed a narrowed carriageway, a six-week trial was run. Temporary barriers were used to demonstrate that despite the reduction in overall capacity, congestion levels and bus travel times were not worsened.

This shift towards pedestrian priority is reflected in the new streetscape design which incorporates widened, decluttered and improved footways in Yorkstone and highlighted crossings. The transport interchange was highlighted with a bespoke treatment on the carriageway and relocation of bus stops. Businesses are better served with loading bays on the footway in granite setts. Wide kerbs were used to reinforce footway zones and bespoke paving was used to highlight special areas and enhance wayfinding. Lighting columns and lanterns were updated to LED. Despite the reduced carriageway capacity, traffic signals have been optimised to ensure that bus travel times are maintained and vehicle congestion minimised.



Before

1. Existing paving in poor condition
2. Signage and guardrails cluttering an already narrow footway
3. Crossings are infrequent causing pedestrians to cross informally

After

1. Consistent high quality footway paved in Yorkstone
2. Utility covers paved in Yorkstone provide unified footway
3. Wide granite kerbs provide elegant detail to pedestrian realm
4. Road markings rationalised
5. Street furniture and equipment have been decluttered and aligned in one furniture zone

3.9 Facilitating local businesses

Venn Street

London Borough of Lambeth
SW4

Completion date: September 2011
Cost: £0.46m

Improvements

- Recreate the space
- Rethink traffic management
- Relocate/merge functions
- De-clutter
- Tidy up

Figure 24: Engagement with local businesses and an innovative maintenance and funding regime has transformed Venn Street into a multifunctional space where businesses can benefit through the use of wide footway areas

Image courtesy of Ian Hingley, Urban Movement

Monthly markets were introduced to Venn Street in 2001. Since then the popularity of the market has grown and Lambeth Council was asked to investigate how a weekly market could be introduced. The ambition for better market infrastructure quickly developed into a wider vision for wholesale streetscape improvements.

Prior to the improvements, Venn Street was dominated by vehicles and the footways were narrow and cluttered with equipment, limiting the street's social and commercial potential. A key challenge was that part of Venn Street was on the TLRN, however, in 2011 the Mayor of London returned this section of road back to Lambeth.

The streetscape improvements have seen a new central paved area introduced using Yorkstone to create a level surface across the street. Recycled granite cobbles adjacent to this area demarcate the road and provide on-street car parking bays at either end. The shared surface approach helps to emphasise the 'villagey' Victorian character and enhances the quality of usable space for local businesses.

No road markings are painted on the street as it was granted a Restricted Zone by the Department for Transport (DfT) which has improved the aesthetic of the area. The design also includes building-mounted street lighting to reduce street clutter and electrical power points have been provided for market stalls.

The scheme has provided an economic boost for local businesses, as well as reducing council costs through a bespoke maintenance agreement. This has enabled businesses to take greater management responsibility for the street, which includes the funding of a regular jet wash. The bars and restaurants rent footway space and this money is invested in street cleaning and maintenance costs. Feedback from local residents and businesses has been positive, leading to calls for similar maintenance initiatives elsewhere.

Before

1. Streetscape dominated by car parking
2. Footways are narrow and cluttered

After

1. Yorkstone paving and granite kerbs provide defined spaces
2. Café seating, cycle parking and feature planting located in distinct zones
3. Key views are maintained

3.10 Good ordinary

Ambleside Avenue

London Borough of Lambeth
SW16

Completion date: November 2010
Cost: ±£1m (£60-£70 per sq m)

Improvements

- Recreate the space ☐
- Rethink traffic management ☐
- Relocate/merge functions ☐
- De-clutter ☐
- Tidy up ■

Ambleside Avenue is part of a one-way system linking Tooting Bec Green with Streatham High Road. It is flanked by attractive Edwardian houses; however, its streetscape had deteriorated and by 2010 was in a poor state.

As part of our commitment to streetscape improvement, we elected to carry out a full reconstruction, including complete re-kerbing and resurfacing as part of our capital renewal programme. Wide granite kerbs provide a clear edge between the footway and the carriageway; both were then surfaced in asphalt. New trees have been planted and skilfully integrated into the footway with attractive granite setts.

Figure 25: Ambleside Avenue was fully reconstructed

Amblesde Avenue is an excellent example of the 'good ordinary', where consistent and well-detailed application of our Streetscape Guidance can provide a significant enhancement in the quality of public open space, based solely on the use of standard components. Asphalt footway surfacing can be perfectly attractive if well implemented and framed by high-quality kerbstones. A similar scheme is currently underway over a long stretch of Edgware Road.

Before

1. Regular kerbs poorly define footway
2. Trees not defined with paving
3. Asphalt is scarred by repairs

After

1. Footway surfaced in asphalt
2. Wide granite kerbstone defines footway
3. Build-out protects car parking
4. Wide granite kerb used as channel for drainage
5. Granite setts used to define edge of tree pit

3.11 Accommodating all users

Royal College Street

London Borough of Camden
NW1

Completion date: August 2013
Cost: £0.37m

Improvements

Recreate the space	☐
Rethink traffic management	■
Relocate/merge functions	■
De-clutter	■
Tidy up	■

Royal College Street had a reputation for road accidents involving cyclists. Despite a 20mph speed limit, vehicles were averaging 30mph which made collisions more serious in nature. In the three years prior to the improvements, there had been 12 collisions with cyclists. A new scheme was implemented to tackle this but failed to reduce the number of collisions at Pratt Street and Plender Street junctions.

TfL and borough traffic engineers worked closely with cycling groups through several iterations to ensure final designs were robust. Completed in 2013, new segregated 2,000mm-wide cycle lanes run down both sides of the road. This narrows available space for drivers resulting in lower speeds which makes it easier to anticipate cyclists' movements. The cycle lanes use a 'light touch' approach to segregation with armadillo road bumps and planters placed between cycles and cars. These add greenery to the streetscape and provide an effective but permeable barrier to cars, while allowing pedestrians to cross the road and board buses. Car parking bays have been relocated away from the footway, doubling up as buffers to protect cyclists against traffic. Bus stops have been redesigned to accommodate the new layout and junction signals have been changed or removed to smooth traffic.

Six months after these works, traffic speed dropped by up to 21 per cent. The route also rapidly grew in popularity with a 46 per cent increase in cyclist use. This has led to aspirations to extend the scheme north and southbound of the site.

Figure 26: The use of 'light touch' cycle delineation measures at Royal College Street has led to a greener environment where cyclists feel safer using the road. The result has been a reduction in vehicle speeds and an increase in cycle numbers

Before

1. Bi-directional cycle lane with physical segregation
2. Inconsistent and small tree pits
3. 400x400mm concrete slabs

After

1. Two single direction cycle lanes separated with armadillos and planters
2. 600x900mm concrete slabs
3. Bus stop bypass
4. Tree pits resurfaced and new trees planted

3.12 Reflecting local character

Clapham Old Town

London Borough of Lambeth
SW4

Completion date: 2014
Cost: £2.8m

Improvements

Recreate the space	☐
Rethink traffic management	☐
Relocate/merge functions	■
De-clutter	■
Tidy up	■

Following the success of the public realm works undertaken in Venn Street, the Clapham Old Town Regeneration Project launched another scheme to improve Clapham Old Town, aiming to stimulate the local economy, improve connectivity and the overall ambience of the area. Working with local residents and stakeholder groups, the design consultants proposed the public realm works in conjunction with new traffic and road layouts to reverse the surface use from 35 per cent footway and 65 per cent road, to 65 per cent footway and 35 per cent road, effectively giving it over to pedestrians.

Figure 27: The Clapham Old Town scheme responded to the area's distinctive local character through the use of high quality materials and innovative treatments to pedestrian areas

The most transformative change was the replacement of a fast gyratory around a cluster of bus stands with a new public space connecting to businesses and pedestrian walkways, while retaining an efficient bus service.

To encourage walking and cycling in the area, new cycle paths and parking were introduced.

Footways have been widened, trees planted and seating added to create a pleasant environment to walk and pedal through while retaining loading facilities for local businesses. 'Copenhagen crossings', which extend the footway surface across the road, feature along the high street. These prioritise pedestrians, improve streetscape legibility and maintain traffic through flow.

Before

1. Taxi stand
2. Paving slabs in poor condition
3. Car parking on carriageway

After

1. Taxi rank relocated onto footway and stand removed
2. Paving renewed
3. Cycle parking provided
4. Car parking provided on footway

3.13 Rebranding a town centre

Hornchurch

London Borough of Havering
RM11
Completion date: April 2013
Cost: £2.5m

Improvements

- Recreate the space
- Rethink traffic management
- Relocate/merge functions
- De-clutter
- Tidy up

Hornchurch town centre is an important district centre in Havering distinguished by its medieval street pattern and modern centre. Although Hornchurch's retail economy is relatively healthy, the recent downturn has had a negative impact on local businesses. The area also suffers from road congestion, poor personal safety, inadequate inclusive design features and a tired public realm.

Recognising the increasing need for intervention, London Borough of Havering set out a programme of works consisting of cultural and residential redevelopment, physical improvements to the high street and support to rebrand businesses.

Figure 28: Hornchurch High Street has benefited from a series of interventions aimed at enhancing the pedestrian environment and reducing the visual and physical impact of vehicular traffic, resulting in a more prosperous town centre

Key features of the scheme included a focus on improving pedestrian permeability. This was achieved by removing guardrail, placing crossings on desire lines, increasing the width of the footways and implementing a continual central pedestrian crossing strip. The scheme also improved social spaces through planting, new lighting, wayfinding and street furniture. In addition to these, traffic was smoothed, bus stops were made fully accessible, and better provisions for cycling were installed.

Further public realm works have begun with additional funding from TfL following the success of the high street's improvements, which won a 'highly commended' Urban Transport Design Award in 2014.

Before

1. Small modular paving
2. Cluttered streets

After

1. Footway paved in 600x900mm slabs
2. Wide central median implemented to encourage informal crossings
3. New formal crossings implemented
4. Street furniture rationalised and new trees planted
5. Utility covers paved in same material

3.14 Ensuring good design

High quality urban design is an essential component for building a great city such as London. Streetscape Guidance is a tool to support the best in design which should be combined with the skilled judgement and expertise of professionals.

Multidisciplinary design teams are essential for exemplary streetscape design. A broad range of skills are vital for understanding the complex interactions, issues and requirements of the street environment. We recommend working with specialists to provide consistency and excellence in design, and encourage design teams to seek advice on specialist disciplines irrespective of project size.

Project design briefs

A systematic process should be employed for all street projects whereby a clear and succinct project brief forms the basis for delivering a focused and robust design. Refer to the DfT's Manual for Streets (2007) and CABE's Good practice in brief-writing (2011) for further information on briefs.

TfL Pathway is an integrated and consistent framework with the clear objective to provide the tools for delivery teams and their stakeholders to work effectively. Underpinned by common project management principles, it emphasises professional judgement in its flexible application to manage and control specific programme, project and delivery portfolio scenarios. Pathway is part of the TfL Management System and its use is mandatory for all project, programme and delivery portfolio work at TfL. Our staff should refer to the 'Pathway Handbook – Managing the Project, Programme or Delivery Portfolio' for further information.

The design team is responsible for producing designs which satisfy the brief and are Pathway compliant. Irrespective of the prime objective of the project, opportunities for streetscape improvements should be taken advantage of in accordance with Streetscape Guidance.

Reviewing the design

Internal review programmes should be embedded in the project programme as part of the design process.

Designers can also obtain impartial advice from Urban Design London (UDL), which is supported by TfL and strives to work closely with practitioners and other organisations to improve the quality of place. UDL runs a design surgery programme which can assist in shaping design decisions at an early stage in the project, and can prove useful as a sounding board for draft designs. For more information, contact info@urbandesignlondon.com

The Mayor's Design Advisory Group (MDAG) also provides expert advice and advocacy to support design quality, and is another sounding board for London-wide design strategies and major schemes. MDAG reviews serve as a prerequisite for selected projects and as a gateway to progress from development to delivery.

All streetscape projects impacting the TLRN should seek the endorsement of our technical approvals managers as well as the SDRG. Contact streetscapeguidance@tfl.gov.uk for more information, or refer to Section 1.8 – How and when should I engage with TfL?

How do we deliver and maintain high quality streets?

The materials outlined in Streetscape Guidance in the coming sections are recommended for all London streets and should be used across the TLRN regardless of project size, unless our SDRG approves an alternative. Like-for-like replacements will not achieve the world's best-managed streets, if they are not already world-class. The replacement of small quantities of surface materials or street furniture to correct a defect requires careful consideration.

Appropriate and timely maintenance regimes are essential for ensuring that the streetscape design and materials retain the quality of function set out by the designer, and meet safety, serviceability and sustainability requirements.

Working with TfL

Our routine maintenance works follow the principles of good practice set out in this guidance. Capital renewal works may occur on a cycle of more than 20 years. It is important that streetscape works are recognised as long-term investments in the streetscape of the TLRN. Any changes to materials or layouts should be reviewed by TfL Engineering and our road safety auditors at an early stage in the design process to ensure the scheme remains a long-term investment.

At regular intervals, a review of all TLRN streets is conducted to look for opportunities to improve aesthetics. Better Streets principles are applied to identify and remove unnecessary street signs, clear graffiti, declutter, relocate or merge functions, and in rare cases, to rethink or recreate the street.

Figure 29: It is important that detailed consideration is given to material type and method of laying to ensure longevity

Additional information

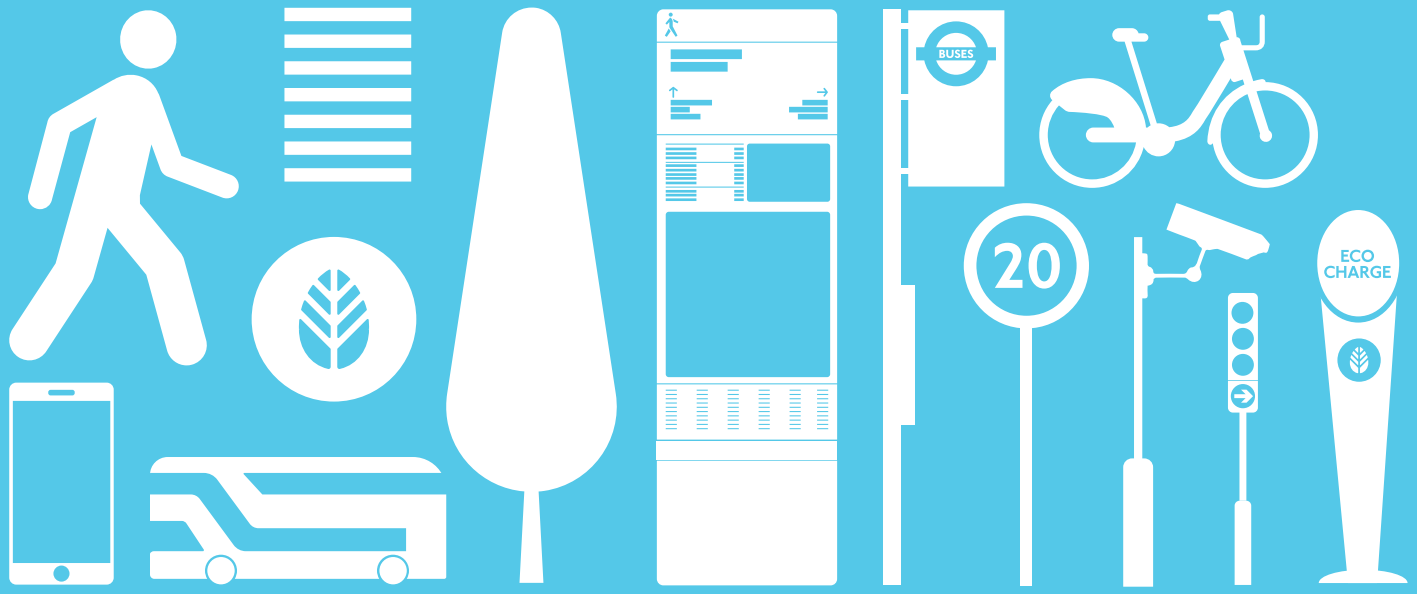
Commission for Architecture and the Built Environment (CABE):

Good practice in brief-writing (2011): http://webarchive.nationalarchives.gov.uk/20110118095356/http:/www.cabe.org.uk/masterplans/preparing-a-project-brief/good-practice

Department for Transport

Manual for Streets (2007)

Part C New measures for new challenges



4.1 Encouraging innovation and creativity

As London grows, the demands and expectations on streets and places will also grow and continue to diversify.

Continuous improvement of London's streets and places is therefore critical in meeting this challenge and will rely on best practice, creativity and innovation to develop places that are fit for purpose and fit for the future.

Best practice is an evolving concept and relies on continuous learning, research and trials. To maintain London's world-class streets and places, the barriers that prevent the uptake of new and innovative ideas need to be overcome.

This will require closer collaboration, open minds and earlier engagement.

Figure 30: Our streets need to be flexible to meet the changing demands that are placed on the network

Figure 31: The installation of the Oxford Circus all round crossing improved safety and aesthetics

Figure 32: New applications and technologies are working to improve information about the status of our network

Table 1: The innovation cycle

Innovate	**1. Aspiration** – London's streets must work hard to function and perform at a high level as places where we live, work and move through • An evidenced-based approach to innovation is required
Exception process	**2. Innovation** – Streetscape Guidance encourages designers to continually innovate; working with researchers and designers to produce better, more efficient and more attractive design solutions • Draw on best practice • The innovation must solve a problem, increase functionality, or better serve the customer
Deliver	**3. Exception** – The proposal must demonstrate that the innovation fulfils criteria set out within the Streetscape Guidance • The safety and security of all road users is of primary importance • The innovation must provide adequate accessibility features
Evaluate	**4. Installation** – Once the product is installed, it must be monitored and assessed as part of an iterative process of design development
Standardise	**5. Streetscape materials palette** – Where a design solution can be applied in a practical and reliable way across a range of settings, the Streetscape Design Review Group may elect to adopt the innovation as part of the approved materials palette for the TLRN • Use the materials palette as a baseline for the minimum standard required on the TLRN • Research new ways to improve the palette

Creativity and innovation should be directed at improving the efficiency of movement, the effectiveness of place, and in a way that improves the overall street user experience. To illustrate the level of creativity desired on London's streets, Streetscape Guidance references domestic and international examples of innovative streetscapes and streetscape components. These examples are not intended to be prescriptive but serve to demonstrate what is possible by adopting an innovative design attitude. While London is unique in character and complexity, the examples throughout the document highlight what may be achieved on its streets.

4.2 Trials and tests

Achieving the vision for London's streets requires a willingness to adopt a wider range of measures to address the emerging needs and functions of streets and places. This can be realised through trials and tests at small cost and scale to provide an evidence base from which to make permanent and positive change.

Off-street trialling of new measures, products, materials or layouts in a controlled environment, such as those at the Transport Research Laboratory (TRL), is generally required prior to proceeding to a DfT authorised on-street trial.

Off-street trials allow for quality testing and the collection of user feedback to help shape and refine proposals. Proceeding immediately to on-street trials may be necessary for testing site specific temporary measures, though should be subject to a range of authorisations and performance criteria assessments to determine whether adjustments are required. The results of on-street trials will determine if the measure, product, material or layout can be successfully implemented at a wider scale across London.

We are championing creativity and innovation at TfL by turning approach into action. A collection of examples below describe how innovation and creativity are being applied across a number of different functions.

Figure 33: Examples of creativity and innovation that will occur throughout the document

Protected junction temporary trial Portland, USA

A 'protected intersection' designed to eliminate cycle-car conflicts

Key functions

Opportunity
Right turns at junctions can put cyclists into conflict with motor vehicles. A redesigned junction can remove this conflict.

Benefits
This reinterpretation of a Dutch cycle-friendly junction provides a phased and safe way to make a right turn. The introduction of kerbs within the junction reduces the crossing distance and offers a refuge to cyclists while they wait to complete their turn.

Implementation
Junctions that avoid merging cyclists and drivers have proven safer for both. This is a trial aimed at making junctions more comfortable for cyclists to use. Cycle friendly junctions take many forms and need to be adapted to their context.

The image shows a trial example of a cycle friendly junction in Portland, Oregon, USA (Image courtesy of Nick Falbo)

Applying in London
This Dutch inspired concept is being studied to determine its suitability for the London context. The hope is that the design will provide an increased sense and level of safety and comfort for cyclists, especially at busy junctions. At the moment this is a concept design which will require further design development and trialling prior to implementation.

Figure 34: Innovations and creative ideas are constantly being reviewed to determine if they are right for our network

Figure 35: CMS is being installed on street lights across the network

4.3 Infrastructure and assets fit for the future

Better asset management

We are introducing Central Management Systems (CMS) on TLRN street lights. This system will allow us to remotely monitor and manage street lighting, allowing for dynamic control of lighting levels. This will allow lighting levels to be aligned better with traffic flows and road use, reducing energy consumption and carbon emissions without compromising safety or security. The system also remotely records failures allowing maintenance crews to ensure lighting levels are restored in a timely manner. CMS will dramatically cut carbon dioxide (CO_2) emissions by 9,700 tonnes and save approximately £1.85m a year. In addition, we are replacing conventional lighting with light emitting diodes (LED) which are more energy efficient and last longer.

Key functions – moving, living, protecting, sustaining

Figure 36: Trixi mirror on signals

Enhanced safety features

Improving safety for all street users is a top priority to ensure London remains an attractive place in which to live, work and invest. To reduce the conflict between cyclists and large vehicles, we have trialled the use of street cycle safety mirrors (also known as trixi mirrors) to give drivers of large vehicles better visibility of cyclists at junctions.

Key functions – moving, protecting

Improved materials

Adopting smarter and more innovative materials can drive significant improvements to streetscape performance by reducing environmental impacts and costs. Porous asphalt has been used at trial locations to better drain highway and footway surfaces from storm water to improve safety and reduce demand on storm water systems.

Key functions – moving, functioning, protecting, sustaining

Providing future flexibility

A lack of public and road space in London necessitates the need for streets and places to make best use of what is available. Implementing flexible street designs can allow for changing use over time. This is currently being explored with the introduction of 'pocket parks', small spaces that serve as extensions to the footway to provide amenities and green space.

Key functions – moving, living, sustaining

Basic street improvements

Areas with high foot traffic should have good quality footways to make walking easy and enjoyable and provide a range of pedestrian facilities, including good seating and lighting. At TfL we are using Better Streets principles to improve London's streets over time using a holistic highway maintenance approach.

Key functions – moving, living, protecting, sustaining

Figure 37: Permeable asphalt allows water to infiltrate

Figure 38: Derbyshire Street Pocket Park

Figure 39: New pedestrian facilities have been provided at Holborn Circus

Greener streets

Greater efforts can be made to enhance the environmental quality of London's streets through the use of recyclable materials and drainage improvements. Clapham Old Town has built a new town square which features tree planting and planters with seating.

Key functions – living, sustaining

4.4 Making more efficient and flexible use of space

More efficient people movement

New street and junction layouts can be used to build up safe, well-connected networks for travel by foot and cycle. We have sponsored UK trials of Dutch-style roundabouts for main roads. These use an orbital cycle track to separate cycles from motor traffic. This design minimises conflict and increases safety.

Key functions – moving, living, sustaining

Safer speed environments

Limiting traffic speeds through effective street design is important for cyclists and pedestrians. The introduction of 20mph trial zones and centreline removal studies takes a major step towards enhancing the quality of the streetscape beyond that of materials and layouts. Results suggest a consistent decrease in vehicle speeds as a result of these interventions.

Key functions – moving, living, sustaining

Figure 40: Clapham Old Town's new town square

Figure 41: Dutch style roundabout being trialled at TRL

Figure 42: 20mph speed limit

Enjoyable and active streets

As more people and families choose to live in London and its population grows, more is needed to get the most from public space, including the streets themselves. Around 4,000 planned events are already accommodated on London's streets every year. Simple but powerful ideas and showcase events can bring streets to life, boosting tourism, local economies and community interaction.

Key functions – moving, living

Figure 43: Tour of Britain at Westminster Bridge

Re-imagined streets and places

London must evolve to keep pace with the aspirations and needs of its population. There are a number of locations across the city that benefit from implementing bold new design and traffic management to support safety and regeneration. We supported a shared space scheme on Exhibition Road, South Kensington, to great effect following extensive local engagement.

Key functions – moving, living, sustaining

Figure 44: Exhibition Road has been reimagined

Enhanced public realm

Balancing user priorities, especially the needs of pedestrians and cyclists, is often challenging in busy urban contexts. We are trialling new configurations, phasing and infrastructure to respond to the most challenging junctions and increase permeability across London.

Key functions – moving, living, protecting

Figure 45: Hornchurch town centre redesigned to allow for informal crossings

Informal spaces

The creation of temporary and reversible city living spaces can support local initiatives to give streets a radical makeover in low cost and imaginative ways.

Key functions – moving, living

4.5 Intelligent systems and management

More dynamic information

We are promoting the use of cutting-edge cooperative technology at TfL to communicate with all streetscape users in real time to examine and improve customer experience, reliability, safety and the environment. Trials in this area include a real-time, state-of-the-art digital screen mapping tool at a Regent Street bus stop. The bus stop incorporates a data feed of live departure information. We share information across the modes and work with businesses to make this information accessible to all.

Key functions – moving, functioning, living

4.6 Changing behaviour and enabling different choices

Land use planning

High density, mixed-use development schemes with embedded walking and cycling infrastructure can ensure that travel by foot or cycle is the most competitive option for short and medium journeys. We are working with developers to promote schemes that implement car-free and 'car-lite' proposals, including the provision of Mayor's Cycle Hire Scheme and/or car club infrastructure to offer an attractive alternative to car ownership or use.

Key functions – moving, living, sustaining

Figure 46: Café seating in front of a pub

Figure 47: Interactive screen in a London bus shelter

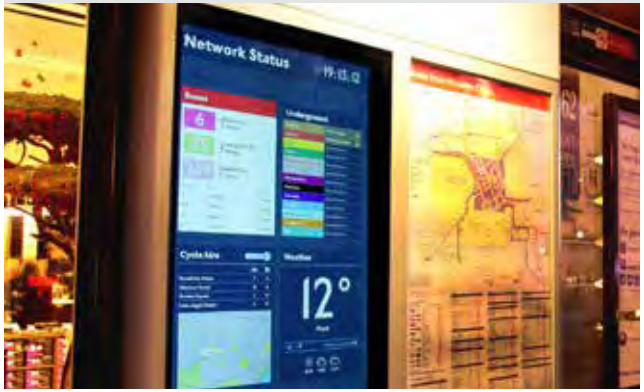


Figure 48: The Shard at London Bridge

Additional information:

Transport for London:

International Cycle Infrastructure Best Practice Study, 2014
Network Operating Strategy, 2011
Highway Licensing and Other Consents, 2011

Licence application:

http://www.tfl.gov.uk/info-for/urban-planning-and-construction/

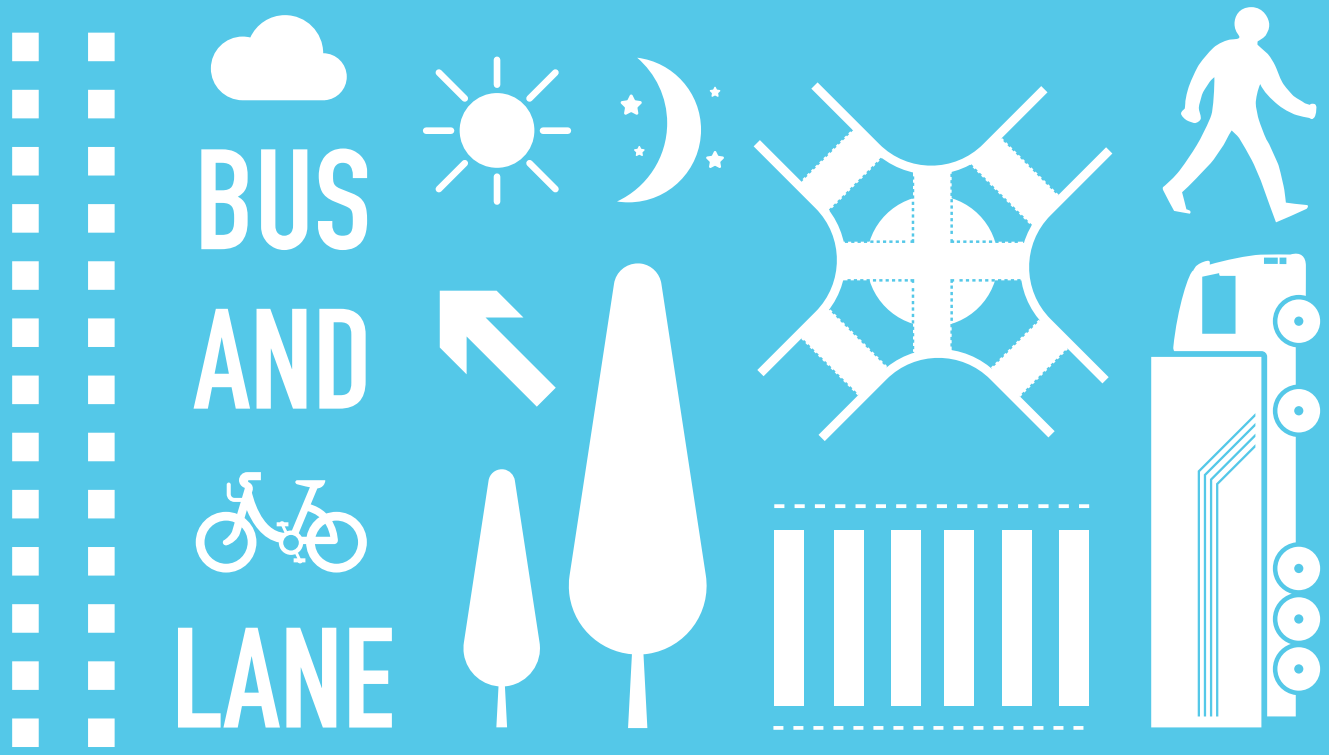
Legislation:

The Highways Act 1980

Infrastructure Commission:

World class infrastructure for a world city, 2010

Part D Balancing priorities



5.1 Accommodating movement

Streets are dynamic environments with movement playing a significant role in defining the character of the streetscape. The streetscape should act as a calm backdrop to facilitate movement in a logical, consistent and cohesive manner, acknowledging that streets are vibrant places of activity for a wide range of users.

Regardless of the mode of transport, all users require convenient, direct, safe, legible routes that are efficient and reliable. The design challenge is to facilitate these principles within the context of a confined street where different modes often require significantly different types of infrastructure. Only through a robust design process, backed up by safety and quality audits, can these objectives be achieved for all road users.

5.2 Understanding competing demands

Streets need to manage a wide range of road users and their competing demands by providing clear but flexible spaces, with consistent and legible features that acknowledge where, when and how users should interact. Priorities should be applied to best provide for efficient and safe movement of people, goods and services, while reflecting and enhancing the character of the place.

Detailed consideration should be given as to how different users inhabit, interpret and compete for the finite space available on streets. Particular attention needs to be given to accessibility and ease of movement for less able and less confident street users, which should be established through best practice design and consultation with accessibility groups and officers.

Figure 49: Streets support movement and can play a significant role in defining its character

5.3 Recognising place

A place is more than the sum of its spatial and physical attributes: the buildings, streets and spaces. A place is a location of meaning; one where everyday life occurs. Spaces are transformed through individual and communal experience into places. Places are diverse, dynamic, socially responsive and can range in cultural meaning. Places can also be considered across a multitude of scales; a seat within a park could be considered a 'place', or a park within a neighbourhood.

Successful streets and places tend to have common characteristics. These can be summarised as those places which have a distinct identity, vitality, are flexible, safe and easy to navigate.

Figure 50: Successful places are flexible, easy to access and navigate, locally identifiable and responsive to the needs of its users

5.4 Function, performance and form

While it may seem that the role of a street is defined and fixed, it is important to consider that spaces evolve, and that the function, performance and form of a street may change over time as a result of urban form redevelopment, changing demands, alterations to surrounding street network, new public transport stops etc. Designers should always consider the future aspirations of the street and surrounding area when developing proposals to ensure that they can respond successfully to change.

Function

Considering how the street functions in the wider movement network is a vital first step towards putting forward proposals which enable the street to perform better. A balanced design strategy must reflect the type and quantity of activity that exists on the street and ensure that all users are considered throughout the design process through quantitative analysis of the street.

Figure 51: Euston Circus sees large volumes of vehicles daily

Performance

Complex modal interactions regularly occur within the urban environment, for example, where pedestrians cross informally on desire lines or walk on the carriageway. Common activities not endorsed by or discouraged by existing infrastructure may indicate that the street is not performing well.

It is important to analyse the performance of the road network to ascertain how well the street is fulfilling its intended function and establish where changes can be made to improve conditions. For most roads, the width, speed limit, extent of kerbside activity, frequency of side roads and crossings, play a major role in how well the road is performing.

Many roads in London typically exhibit a morning and evening peak in use. However there are exceptions, such as some locations in central London, where roads are at capacity for most parts of the day. Measures to enhance capacity should be balanced so as not to compromise other uses.

Figure 52: Congestion may indicate that a street is not performing its intended function

Figure 53: Roads must perform well for all intended users

Figure 54: Streets need to be designed flexibly to allow for use at all times of the day

Form

Understanding the role and sense of place of the street or space is important for establishing how to compose its physical form and assist with the selection of materials that are of an appropriate scale, mix and fit for purpose.

When assessing the sense of place, it is essential to understand the site-specific qualities of the street and its surrounding area. These should be incorporated throughout the design process and can be established through a variety of techniques including site surveys, public consultation, mapping of historic street patterns, topographic surveys, public realm quality assessments, open space studies, land use analysis and townscape character assessments.

These methodologies can help to construct a detailed understanding of the place. They can also help identify constraints and opportunities, and should be used to inform the design brief.

Figure 55: Westminster Bridge

5.5. Facilitating place

Public space

Public spaces are at the cornerstone of all human interaction and engagement in London, with the majority of public life played out on the streets and public realm. The design of these spaces can have a significant impact on people's sense of belonging and quality of life as they can play a large role in promoting social cohesion and better mental and physical health.

Successful public realm allows for the congregation of people and social interaction to take place at all levels of the community. It offers different activities, caters for a variety of users, is safe and enjoyable to spend time in during both the day and night, and enhances the sense of place and identity of an area through cohesive integration with its surroundings.

Figure 56: Leicester Square is a vibrant London destination

In urban areas, public spaces can be considered as all areas open and accessible to the general public, and can include those spaces between buildings, parks, highways and cycleways. On streets, public spaces can be considered as any part of the streetscape where there is an opportunity for encouraging social activity. These can be gathering spots, places for interaction or simply a place to rest.

There are many important elements required to facilitate the design and maintenance of great streets, however, we would like to highlight four aspects of street design found to be critical in London. These include townscape character, local identity, heritage, and crime prevention and are briefly covered below. For further information on street design, please refer to following websites:

- www.livingstreets.org.uk
- www.designcouncil.org.uk
- www.landscapeinstitute.co.uk
- www.architecture.com

Townscape character

The aesthetic character and functional requirements of the surrounding buildings should be considered together with the street layout as part of an integrated composition. The urban structure, density and mix, together with the scale, massing and general appearance of buildings should influence the designer's

response. Designers should be sensitive to the architectural character of the buildings, their rhythm and scale and how these features can be reflected through detail in the streetscape.

Consideration should be given to other townscape elements such as framing of key vistas and landmarks, the texture, pattern and character of existing building materials, and the impact of microclimate and overshadowing as a result of tall buildings.

Figure 57: The street provides a neutral canvas that supports diverse architecture

Local identity

Local identity can be considered as the sense of distinctiveness defined by an individual or community. The look and feel of the streetscape impacts on how people perceive and respond to the street: it affects where people spend time and shop; where businesses choose to invest; it affects how neighbourhoods physically connect to each other; and it impacts on how people choose to travel. A poorly connected community with streets that are unattractive for walking will likely develop a completely different local identity to that of a neighbouring community which is well connected to retail centres with a vibrant street environment.

Designers should seek to reflect identity by engaging with local authorities and working collaboratively with communities to identify the attributes of the place which are important to local people.

It is important to be contextually aware, using the materials palette sensitively, detailing to a high standard, with careful placement and rationalisation of street furniture, signage and road markings to ensure context, character and identity are respected.

Figure 58: Coloured surfaces reinforce signalised diagonal crossings for pedestrian movements

Heritage

Buildings and elements within the streetscape provide symbols of community identity and are a focus for civic life. These assets and their setting should be celebrated so that their cultural and aesthetic value can be appreciated.

Figure 59: Cyclists riding past Victoria Tower and the Houses of Parliament

When dealing with heritage assets, it is important to consider that while the materials in this guidance are applicable in most circumstances, special treatments may be appropriate in accordance with areas of particular significance and the SDRG should be consulted in these instances.

It is the design team's responsibility to consult the relevant authority to establish the exact location and particular requirements of heritage sites and features, and the local authority's conservation officer should be consulted in all instances.

Detailed advice on conservation of assets in the urban environment is provided in Historic England's guidance The Setting of Heritage Assets (2011) which is recommended for assessing the value of the setting and the implications for change. For information on designated heritage assets, locally important buildings, archaeological remains and landscapes, contact the Greater London Archaeology Advisory Service, Heritage Environment Record at glher@HistoricEngland.org.uk

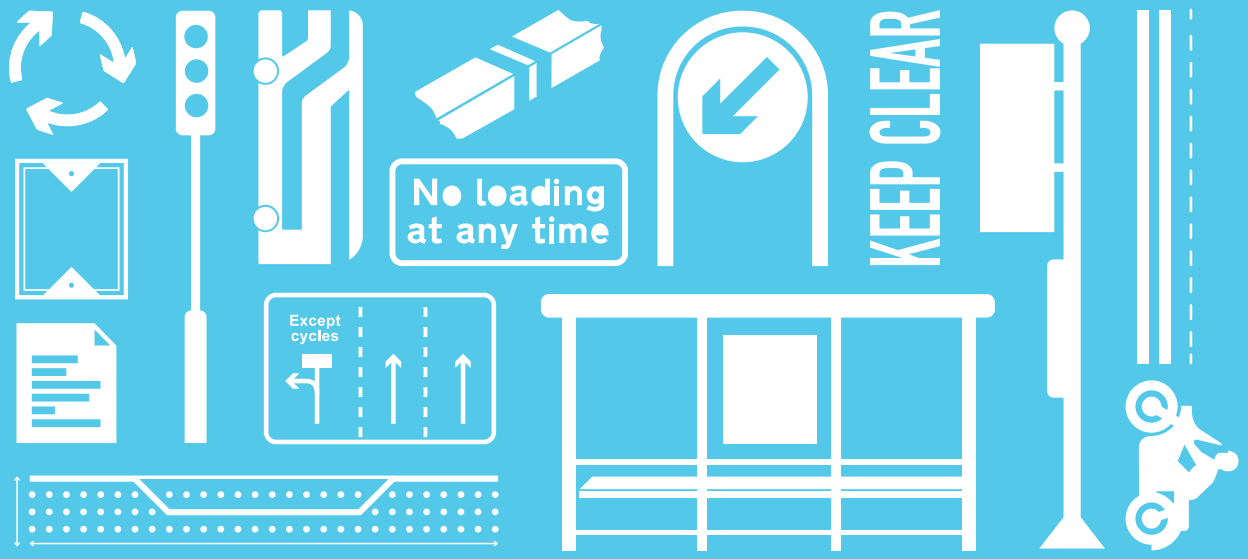
Crime prevention

All designers should seek to provide safe and secure environments, as outlined in Section 17 of the Crime and Disorder Act 1998. Our transport community safety managers can provide advice to help design teams meet their duties under the Act.

When developing public space design, contact should be made with a crime prevention officer to understand existing crime patterns early in the design process and ensure steps are taken to mitigate risk. Consideration should also be given to ensuring that routes designed exclusively for non-motorised users should be well-lit, overlooked (preferably by active frontages) well-connected, direct, following desire lines, and wide enough to avoid blind corners.

Figure 60: Safe and secure environments: A Metropolitan Police Service officer

Part E Physical design and materials



6 Introduction

Part E of Streetscape Guidance provides layout and design information, including layout drawings. It sets out a vision for London's streets, covering a broad range of topics. This section has been structured to reflect the discrete spaces and materials that are encountered on the street, footways, carriageways, crossings; activities that occur between the carriageway and the footway; and amenities on the footway including those that provide safety and comfort functions, elements that occur on any street environment and interchange zone.

Each section is introduced by a vision for the future and is followed by a breakdown of how to best achieve the vision.

Part E begins by discussing surface material in three sections: **'High quality footways'**, **'Carriageways'** and **'Crossings'**. These sections cover a standard palette of materials, preferred layouts, and selection criteria for those materials.

The following section, **'Kerbside activity'**, details how functions such as parking and loading bays, bus stops, and parking control can be accommodated in a range of circumstances.

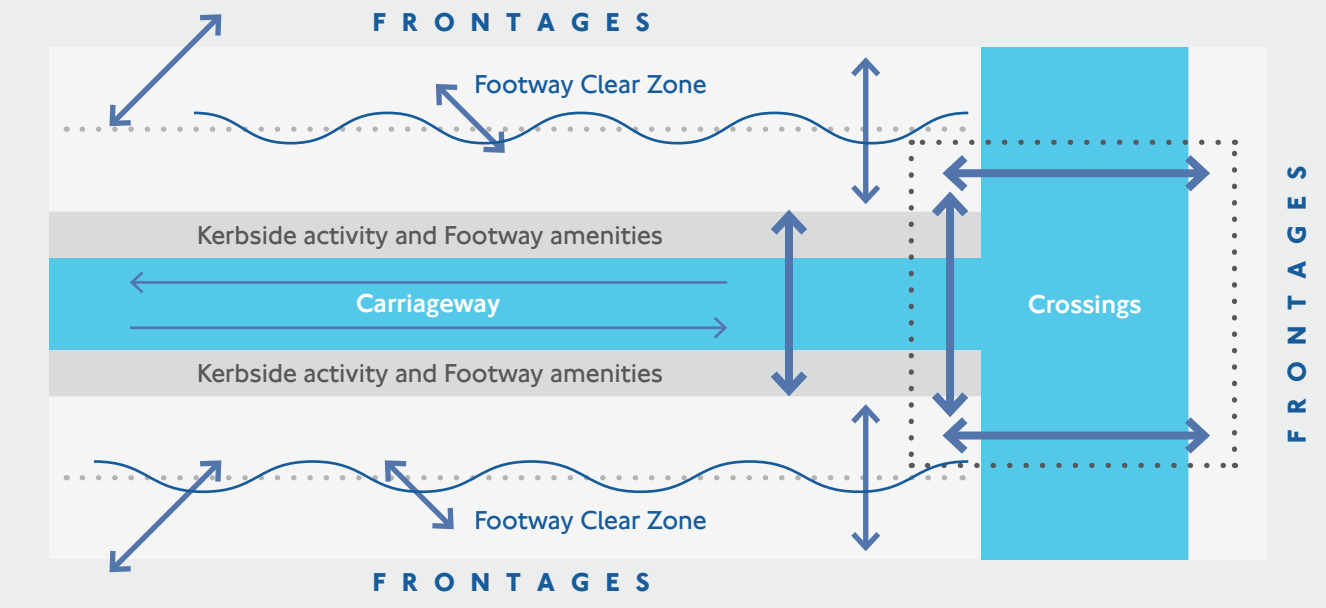
The next two sections, **'Footway amenities'** and **'Safety and functionality'**, deal with components on the footway that provide a comfort, convenience or facility to enrich the street environment or to provide another essential function.

The **'Street environment'** section outlines the elements essential to achieving a comfortable street for all users. Information is also provided on how to treat leftover spaces in the public realm and seek out opportunities for pocket parks.

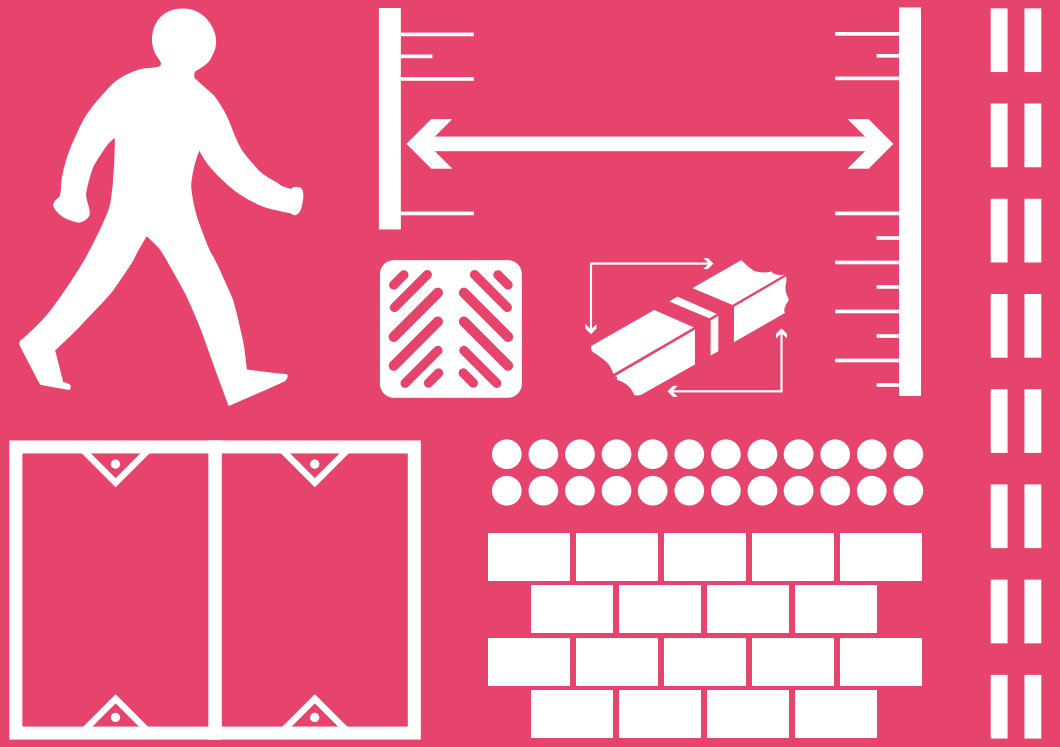
Finally, a section on **'Transport interchanges'** covers those areas where more than one transport mode combines to form an interchange environment. This section details how to treat on-street interchanges for various modes, and how specific design consideration is required to ensure successful integration with the surrounding street network.

While the principles included within Part E are provided by ourselves as exemplary practice, reference is also made to wider best practice, relevant guidance and technical documents which offer more detailed information on how a designer should approach a specific area.

Street Design Zones



Part E High quality footways



7.1 Vision

Paving forms the background for almost every street scene and it is our intention to provide high quality environments that are robust, timeless and beautiful. At the heart of all well-designed streetscapes are high quality surfaces that are visually appealing and functional. Good footways are simple, durable and well maintained. Well-considered surfaces will tie together the disparate elements of the setting, making it comfortable and enjoyable to linger. The following section provides guidance on how to achieve high quality footways in London through the recommendation of footway materials, layout and application.

7.2 Footway materials

We aim to ensure that London's streets are safe, reliable and well maintained. Footway materials should respond to the distinctiveness of the area as a neutral 'carpet' that complements adjacent buildings rather than standing out in their own right. To achieve this, Streetscape Guidance recommends a simple and durable selection of footway materials applied in standard sizes: concrete, a limited palette of natural stone materials and asphalt.

All footway materials should be applied to achieve a high quality finish. The requirement for a 'high quality finish' does not mean that the most expensive materials are used, rather, that the composition and application of materials are well executed to achieve the best possible result. Careful consideration should be given not just to the footway material, but also the kerb type, tactile paving design and the overall composition that these components create.

This section highlights the recommended materials, layout and application of footway surfaces. Please note that any deviations from this guidance will require approval from the SDRG.

Concrete slabs for footways

TLRN standards:

Colour: Grey natural

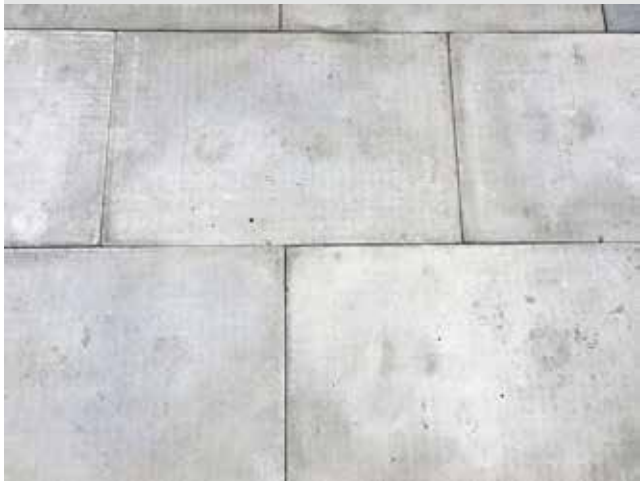
Finish: Pimpled

Dimensions: 900x600mm

Application: Preferred for extensive new areas of paving across most urban settings.

- Concrete and artificial stone paving (ASP) are the most common paving materials used on the TLRN and are TfL's preferred choice for large parts of the network

Figure 61: 900x600mm concrete slabs



Advantages:

- Cost effective
- Convenient to source
- Easy to cut and dress
- Can last between 20-40 years
- Can be reinforced to avoid cracking where vehicles are likely to mount the kerb

Disadvantages:

- The general appearance is utilitarian which may not be sufficient for special areas
- Can crack easily if mounted on poor construction base
- A moderate maintenance regime is required

Considerations:

- When considering a phased approach, designers should recognise that initially the interface will be evident between existing and new paving but will wear to provide a more seamless appearance
- Designers should work with adjacent property owners to better integrate private forecourts and promote a seamless use of paving materials across the footway
- Where the slabs are required to be cut, 600x450mm, 600mm and 750mm may be used to reduce onsite cutting and wastage. These sizes should not be used as standard within the footway without SDRG approval. Loading requirement must be considered when designing joints and structure. It is important to evaluate mechanical sweeping when designing a footway and in such cases butt finishes should be avoided. Bedding materials should be selected with equal care dependant on loading

Construction:

- Setting out of slabs including their orientation should be specified and based on existing interfaces or centrelines
- Chamfered edge concrete slabs should not be used

Figure 62: London Bridge is paved in concrete

Granite slabs for footways

TLRN standards:

Colour: Silver grey (also available in other colours)

Finish: Fine-picked

Dimensions: 900x600mm slabs (standard)

Application:

- Suitable in areas of high civic importance or adjacent to large new developments
- Granite is typically used as a paving surface within a distinct and defined area to highlight the area's importance
- Historically, granite was used extensively for footways and carriageways as small setts. More recently larger granite slabs have proved to be a durable and attractive material for footways. Bespoke treatments, including alternative dimensions and colours which are not standard, require SDRG approval

Figure 63: 900x600mm granite slabs

Advantages:

- High quality, organic appearance
- Durable, long lifespan, reusable and wears well with minimal colour fade
- Combines well with other footway materials
- Can be cut to size and dressed as required
- Relatively low maintenance
- A range of finishes and textures are available to achieve different effects using the same stone. Bespoke finishes must be approved by the SDRG

Disadvantages:

- High material cost
- Less convenient to source
- Installation can be more time consuming and costly than concrete

Considerations:

- The replacement of broken slabs that accurately colour match existing paving can be difficult as sourcing the same stone can be costly and time consuming
- Where the slabs are required to be cut, 600x450mm, 600mm and 750mm may be used to reduce onsite cutting and wastage. These sizes should not be used as standard within the footway without SDRG approval
- There are some circumstances where 100x100mm or 100x200mm stone setts may be used (see Carriageways for further guidance)
- Loading requirement must be considered when designing joints and structure. It is important to evaluate mechanical sweeping when designing a footway and in such cases butt finishes should be avoided. Bedding materials should be selected with equal care dependant on loading

Construction:

- Setting out of slabs including their orientation should be specified and based on existing interfaces or centrelines

Figure 64: Euston Circus uses two shades of granite paving

Yorkstone slabs for footways

TLRN standards:

Colour: Natural buff

Finish: Diamond sawn

Dimensions: 900x600mm slabs (standard) or variable lengthx600mm

Application:

- Yorkstone paving should be considered for use in conservation areas, sites of historic significance and locations with a high civic importance
- Existing Yorkstone should be recycled

Advantages:

- Attractive, organic appearance
- In keeping with much of London's traditional character
- Low maintenance
- Has a long lifespan if installed well; 60 years or more
- Can be cut to size and dressed as required
- Can be laid to sit alongside concrete slabs – this requires an aesthetic transition line, for example, tactile paving, crossover, etc

Disadvantages:

- High material cost
- Prone to fracturing if on an inadequate subbase
- Installation requires excellent workmanship
- Prone to staining

Considerations:

- Most locations should use a diamond sawn finish. However, it may be appropriate to use a flame texture, riven or reclaimed Yorkstone for repairs or to match an existing area
- To minimise waste and maintain a high quality finish, the length of the Yorkstone slab may be less than the prescribed 900mm, as long as it remains greater than the width and has a minimum bond stagger of at least 150mm
- Service ducting should be aligned in a strip and a flag removal method should be identified to minimise damage during service maintenance
- Loading requirement must be considered when designing joints and structure. It is important to evaluate mechanical sweeping when designing a footway and in such cases butt finishes should be avoided. Bedding materials should be selected with equal care dependant on loading.

Construction:

- No break joints less than 150mm on alternate courses and they should not be notched into each other
- Joints between slabs should have a uniform 8-10mm joint or if the specification is for close joints, the dimension is five to six millimetres

Figure 65: 900x600mm Yorkstone slabs

Figure 66: Yorkshire paving sits well alongside granite and concrete paving

Asphalt surfacing for footways

TLRN standards:

Colour: Neutral grey

Finish: Variable aggregate gradings acceptable

Application:

- Footways where structures such as cellars, subways or bridges are located directly beneath the surface
- Footways carrying shallow utilities
- Expansive areas of footway in suburban or rural-suburban areas with grassed verges
- Footways where vehicles regularly mount the kerb
- Cycle lanes and tracks
- Heavy footway crossovers

Figure 67: Asphalt paving

- Asphalt surfacing should not be disregarded as an inferior product to paving slabs as it can achieve an equally high quality finish when executed well. Always consult an experienced materials engineer to help decide on the appropriate bituminous mixture for particular surfacing requirements
- Shared footway/cycleways

Advantages:

- Construction is relatively fast and straightforward
- Finish is even and joint-free thereby reducing the risk of trip hazards and cracking
- Durable
- Easy to reinstate and recycle

Disadvantages:

- Reinstatement of asphalt paving can create a 'patchwork' effect
- A crossfall of two per cent is required
- Can deform with frequent heavy vehicle overrun if underlay is insufficient

Considerations:

- For areas that have a higher place value, consider using 300mm wide granite kerbs to emphasise the pedestrian realm
- Where it is anticipated services will regularly need to be accessed asphalt is not recommended as frequent reinstatement will degrade the appearance
- It is recommended that mastic asphalt is used for areas where waterproofing is essential

Construction:

- Recommendations for the laying of various asphalts are given in BS 594987

Figure 68: Westminster Bridge is paved with asphalt and wide kerbs

Footway construction

Consistent application is important for maintaining a clean aesthetic. Footway surfaces should be firm, slip resistant, and low in reflectivity, laid in a manner which is comfortable underfoot, minimises the risk of trip hazards and is well drained.

Structural design depends on the level of everyday use, the risk of vehicle overrun and the existing ground conditions. The relevant standard must be used to design the footway.

Joints and cuts

The following jointing parameters should be applied when selecting materials and constructing the surface:

Optimum jointing spacing	2-5mm between paving slabs
Acceptable joint spacing filled with compacted mortar	6-10mm between paving slabs
Maximum size of opening for covers and gratings	13mm

Design teams should consider the use of cuts to achieve changes in gradients where paving slabs are used. Generally the number of cuts should be kept to a minimum and a single straight line cut used as opposed to several. Residual slab lengths of less than 150mm should be avoided.

Where two footways intersect at awkward geometries, paving should be cut to ensure a clean aesthetic and respond appropriately to the road hierarchy and the building line. Generally, the primary road should take priority, with surface materials cut to provide continuity along this route.

Figure 69: Careful attention should be given to the treatment and appropriate cutting at locations where surface materials of different types or alignments join. The footway on the left side of the cut line shown in this image has taken precedence, as the primary road of the two

Figure 70: Paving units cut in a radial pattern could be appropriate at certain locations

An alternative approach is to cut the units in a radial pattern. Generally this approach should be reserved for wide or long corner radii and as a response to the adjacent building architecture.

Mortar

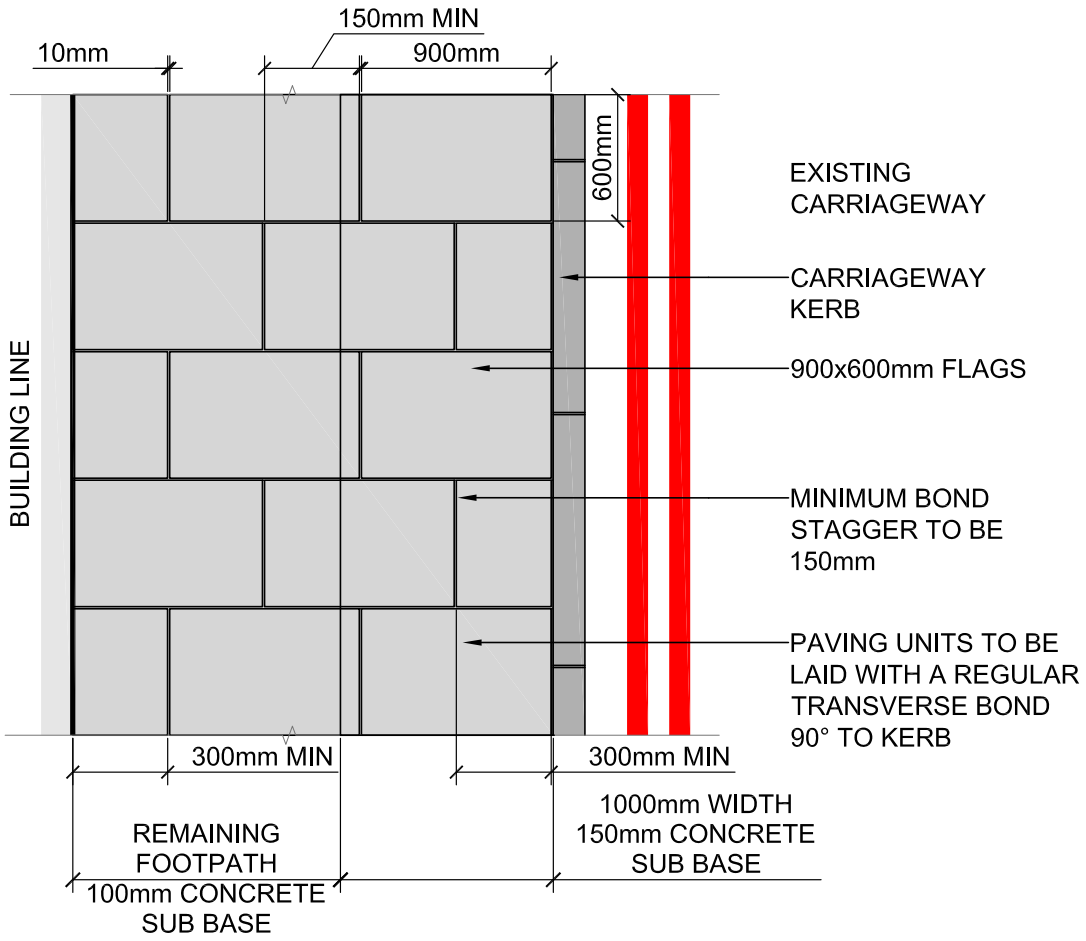
Where it is used, mortar has a significant impact on the aesthetic quality and overall appearance of the paving surface. Close butt jointing should be provided where possible to ensure a continuous high quality surface without a visible network of mortar joints. Good edge restraint on both sides is essential to prevent spreading. Where footways do not abut a kerb or existing wall, precast concrete edging is required. Clean joints at kerb edge and back of footway are required by careful detailing and cutting pre-construction.

Mortar infills must be avoided at the backs of kerbs, at building facades and around utility covers. Infills should be kept to a minimum around posts and special core drilled flags are recommended to ensure good fitting.

Quality control

A sample panel may be constructed at the start of the construction phase to establish specified standards of workmanship for the scheme, acting as a quality benchmark. Typically a sample panel area would cover around 30 square metres of footway and represent most features in the build, including a kerb edge, building line, inspection covers, a radius and at least one dropped kerb.

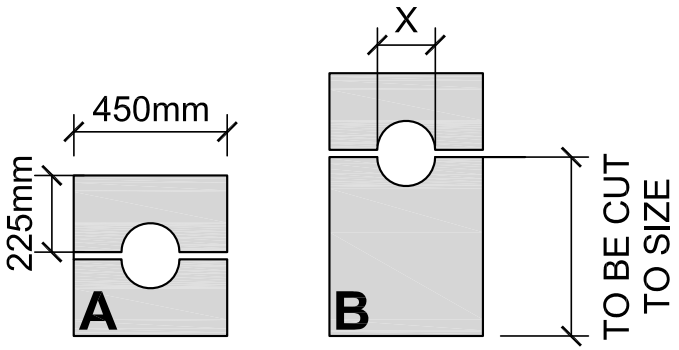
Figure 71: Paving slabs should be laid out as shown here



Notes :

1. Paving units to be laid out with a regular transverse bond across the footway at 90 degrees to the kerb.
2. Minimum bond stagger should be 150mm.
3. Designers should consider the layout of the paving to anticipate the minimising the amount of cuts that will be required and avoid creating small slivers of paving
4. Patterns which incorporate multiple sizes of flags or gauged width layouts are generally not recommended but may be considered for special areas or adjacent to larger civic or commercial projects.
5. When interfacing with private forecourts, cellars or basement lights, additional care should be taken to ensure that footway materials adjoin with surrounding materials smoothly by aligning with existing edges. it may be advantageous to gain the consent of the owner to realign or renew a small area of private forecourt to improve the overall footway design. if the forecourt is to remain private, it is usual to define the property boundary with metal studs on the footway surface.

Figure 72: Required cuts around signal poles, columns and rails



Notes:

Optional treatment around posts:

1. Pedestrian all fasteners shall be stainless steel.
2. Concrete ready-made at lengths of A=225mm and B=525mm with semi-circular cut-out with variable diameter from X=60mm to X=230mm.
3. Onsite core drilled flag with semi-circular arrangement as indicated.

Figure 73: Paving layouts turning a 90 degree corner

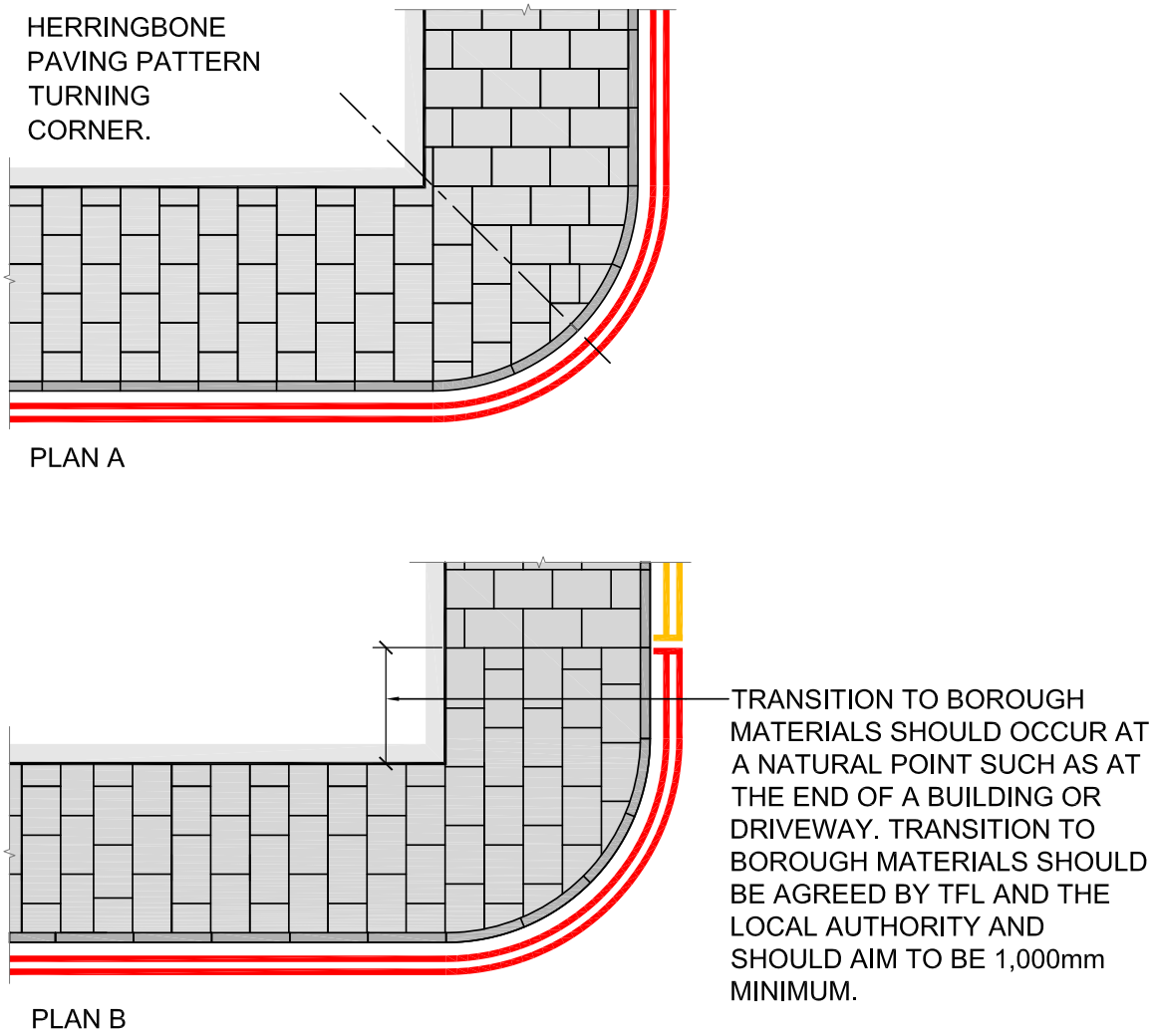
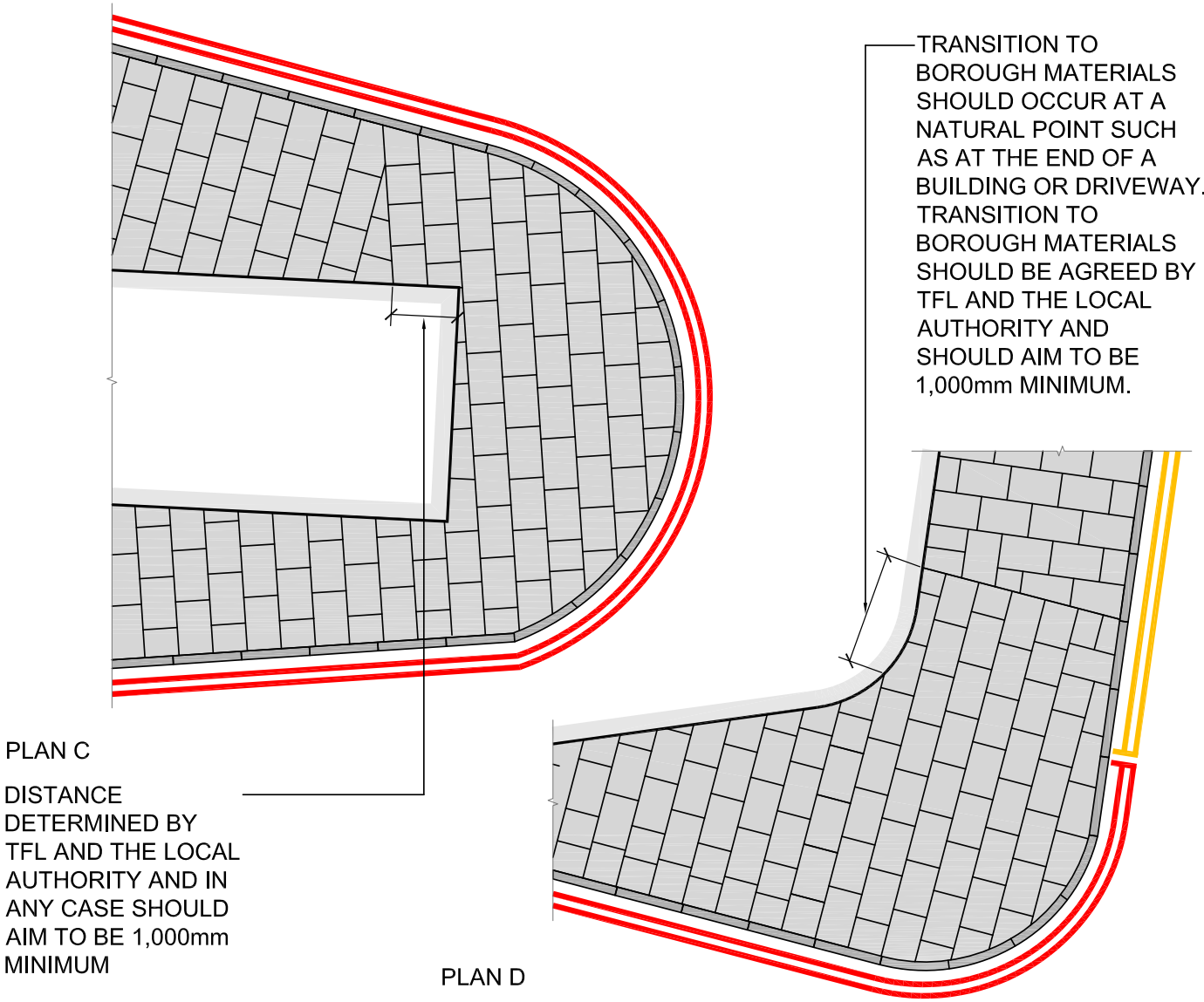


Figure 74: Paving layouts turning irregular corners



Additional information

Department for Transport, Highways Agency:

Design Manual for Roads and Bridges, Volume 6, Section 3, Part 4 TA81/99: Coloured Surfacing in Road Layout (Excluding Traffic Calming)

Design Manual for Roads and Bridges, Volume 7, Section 2, HD 39/01 Footway Design

British Standards:

BS EN 1341: provides guidance on the breaking load for setts and identifies some building specifications.

BS 7533: Part 4 offers a standard method of construction for pavements in natural stone or concrete pavers, including slabs.

BS 7533: Parts 7 and 10 offer a standard method for laying natural stone setts where traffic levels exceed 200 or 1,000 standard axles per day.

BS 7533: Part 12 provides sub-structure advice and shows the construction specification required for pedestrian areas which are occasionally used by vehicles. This detail applies to most pavement crossovers where vehicles occasionally drive on to them.

Transport Research Laboratory:

Footways and cycle route design, construction and maintenance guide

Commission for Architecture and the Built Environment (CABE):

Paving the way: How we achieve clean, safe and attractive streets, 2002

English Heritage:

Streets for All, 2005

7.3 Interfaces and transitions

Detailing of edges, insertions and level changes within paving should be resolved by the design team before construction and should not be left to site operatives. This is particularly important for how materials interface with the surrounding area, whether a borough road or a continuation of the TLRN.

Design teams should consider how the scheme terminates, where the edge is located and how to best tie-in with the adjoining street materials.

Figure 75: Yorkstone transitioning to granite setts with a flush granite kerb acting as a border

Good practice

Scheme boundary treatments:

- The scheme boundary should be detailed to provide a smooth transition between new and old materials, with appropriate edge restraints as required, ensuring alignment resilience
- Where possible, materials should terminate at a point which responds to the surrounding built character, for example, where a building frontage ends, or is aligned to a prominent feature such as a wall or street tree
- For side roads perpendicular to the TLRN, the surface material should continue around the corner for a minimum of 1,000mm
- Aim to avoid making a transition across an inspection cover as this will require additional work in cutting surface materials and result in the creation of small fragments of paving
- It is often more practical for new carriageway surfacing to not directly align with new footway materials. The scheme limits for the carriageway and footway should be resolved separately and detailed based on site-specific issues relating to the existing surface condition and drainage
- Any interface point should be discussed with the respective borough to reach an agreement on where the boundary limits should be extended to and how best to transition to borough materials

Materials

- Designers should look to optimise the modular nature of paving products to minimise cutting
- Footway materials should always be consistent on either side of the carriageway to provide visual continuity
- Any new surfacing should continue across the full width of the footway. This may be difficult to achieve where private forecourts or basements adjoin a building frontage. Design teams should work with shopfront owners to identify opportunities for continuing the paving across the forecourt to the building edge. This provides a far more visually attractive finish to the footway

Figure 76: 900x600mm concrete slabs transitioning to granite

Material transitions

Same modular size

Where new paving meets existing paving of the same size of unit, every effort should be made to ensure that the new paving units align directly with the surrounding materials and interlock.

Different modular sizes

Where new paving meets existing paving of a smaller unit size, a clean transition should be sought, such that new paving units are cut to provide a straight finish across the footway.

It is generally recommended that this cut should be at right angles to the kerb edge; however, it may be more appropriate in some instances where the footway is wide or the building line especially prominent, for the transition cut to be at right angles to the building.

Figure 77: Asphalt transitioning to 900x600mm concrete slabs with edging strip

Paving to asphalt

Where slabs meet non-paved areas, a clean line adjacent to the kerb edge should be implemented with a single row of slabs cut to one-third width 900x200mm and laid lengthways at the interface. This is particularly effective as a detail for natural stone surface edge treatments.

New developments

New building developments that front on to the road network will inherently change the character of the street. This especially relates to any changes that are made to the land use at ground floor level, the height of the new building, and the materials that are used in its construction.

New developments may therefore provide an opportunity to justify changes and improvements to the design of the street to meet new local requirements. This may include making improvements to surface materials, integrating additional street furniture and planting, or providing new crossing facilities and improved access to local public transport.

Building density and massing

In line with London development policies, new developments typically provide higher densities and greater building heights, putting additional pressure on the public realm to perform better for more people.

The ratio of building height to street width significantly impacts on the quality and experience of the public realm for all users.

Higher buildings can create a more overbearing presence on the streetscape, creating increased areas of shade and changing wind patterns and microclimate. This should be considered when planning for any new tree planting or seating in the area.

Buildings at the back edge of the footway, with no front garden or forecourt and a continuous frontage create a strong sense of enclosure and a more urban streetscape character.

Figure 78: A private development transitions subtly to the TLRN through use of similar materials and coordination with the streetscape

Land use changes and public realm design

New active frontages and building uses should be supported by reconsidering the design of the public realm where practicable. This may include providing space for outdoor seating, additional soft landscaping and other measures to support social activities and new land uses.

Any revisions to the street design should coordinate with new building accesses and changes in pedestrian behaviour.

Street furniture should be relocated and merged where appropriate and respond to the new character of the development where appropriate.

Figure 79: More London's active frontages are supported with seating, planting and water features

Street improvements

Where building heights are increased, there will likely be greater pedestrian flows to and from the development. This may provide justification for increased footway widths, cycle parking and new crossing facilities.

New buildings may provide additional opportunities to enhance the public realm through integrated facilities such as mounted lighting as part of the architecture, relocated street furniture, and enhanced wayfinding.

New buildings will likely require additional cycle parking to support the development. Designers should check building plans and internal parking facilities to establish whether additional cycle parking is required at street level. For further information about requirements on the TLRN, please contact our Borough Planning team by email at **boroughplanning@tfl.gov.uk**

Additional information

Department for Transport:
Manual for Streets, 2007

Greater London Authority Economics:
Retail in London, 2006

Transport for London:
Transport assessment best practice: Guidance document, 2010

Existing forecourts

The building setback distance and front boundary treatments significantly affect the character of the streetscape. We encourage developers to carefully consider the adjacent footway material so that the transition is visually cohesive with the street.

Where a forecourt area is provided, developers are encouraged to use Streetscape Guidance's recommended materials, to provide a more cohesive high-quality finish that transitions seamlessly with the street.

When working on the TLRN, should developers wish to extend the forecourt material to the kerb edge, SDRG approval is required. Materials should be suitably robust, slip resistant and maintainable. We will generally assume the maintenance liability for surfaces which extend across the footway for approved exceptions to the streetscape palette, but only up to the private property boundary.

Surface material transitions

Where a surface material transition occurs from private forecourt to the boundary of an authority, developers are encouraged to relate the forecourt surface treatment to the existing paving orientation and/or the surrounding paving module size.

Generally the existing paving will align with the kerb edge and so any new paving should intersect the building frontage at right angles if the building line is parallel to the kerb edge, providing a clean aesthetic.

Where a distinct change in surface paving is proposed, developers should terminate the paving at an agreed location on or adjacent to the boundary, such that the materials transition along a straight edge.

Figure 80: More London's paving extends to the kerb and is successful due to its attention to detail

Developers and the highways authority should agree an exact boundary point where the paving transition will occur to best accommodate the existing footway materials and avoid creating narrow fragments of paving and/or extensive areas of footway resurfacing.

Should the change in paving material not align with the public/private interface, metal studs no greater than six millimetres in height, can be used to outline the boundary.

New access arrangements

Additional footway crossovers may be required where new developments propose a change in access and servicing arrangements.

When working on the TLRN, new footway crossovers need to be approved by us and will be implemented at the cost of the adjoining landowner. Removal of defunct crossovers on the TLRN will be delivered by ourselves.

Additional information

Department for Transport:
Manual for Streets, 2007

Greater London Authority Economics:
Retail in London, 2006

7.4 Footway crossovers

Footway crossovers provide an entry point for motor vehicles to private land. They can be considered an intrusion by vehicles into pedestrian space and can have a detrimental impact on the streetscape if they disrupt the continuity and comfort of the footway. Designers should consider the impact of crossovers on pedestrian experience and ensure that they maintain ease of passage for wheelchair users.

Design

Footway crossovers take one of two forms, light crossovers and heavy crossovers.

Light crossovers are used to access a property with a low level use, such as a house. Light crossovers should provide restricted access to cars or light vehicles. They should provide a continuous footway surface for the crossover with a dropped kerb.

Heavy crossovers are used by heavy goods vehicles (HGVs) for deliveries and servicing requirements. A continuous footway surface is preferable which should be suitably robust. This may require using the same material but in smaller or deeper set paving units. Designers may delineate the crossover with flush kerb treatments or in exceptional circumstances, a change of material to setts or asphalt provided

that there is not a series of heavy crossovers in close proximity.

Good practice

- Tactile paving either side of the crossover is not required but may be recommended in some circumstances
- Sightlines should be kept clear for motorists to see pedestrians on the footway and give way accordingly. Access gates to private land must not open on to the public highway as they reduce sightlines and create a physical obstruction
- Surfacing should match that of the surrounding footway for light crossovers
- Generally, the ramp to the dropped kerb should not extend across the full width of the footway, but only sufficient to accommodate a suitable gradient of 1:12 and the transition kerbs. Where the footway is too narrow for such an approach, the whole width of the footway should be partially lowered for the crossover, such that a level area of footway is achieved with a constant gradient from back of footway to carriageway level
- When an existing crossover becomes redundant through changes in access arrangements to the private land, the developer or land owner will need to remove the crossover and reinstate the footway and kerb alignment through a Section 278 Agreement, without charge to the authority

Heavy crossover using setts and quadrant kerbs

The construction of crossovers should accommodate the magnitude of loading when vehicles cross the footway. The width of the dropped kerb and crossover should enable vehicles to pass without mounting the surrounding footway.

Surface runoff from the carriageway should not pool at the crossover or enter private land. Footway crossovers should not be located within bus stop cages, car parking or loading bays.

Crossovers are to be constructed in accordance with section 184 of the Highways Act 1980.

Figure 81: Heavy vehicle crossover

Design standards	
Typical width	2,400-3,000mm
Kerb upstand height from bottom of dropped kerb to carriageway	25mm
Minimum distance for crossover edge from street furniture	800mm
Gradient to dropped kerb	Maximum 1:12 Maximum 1:40

Planning

New footway crossovers require planning permission and may be requested by the adjacent landowner to the planning and highway authority. The authority will consider the impact of any proposed crossover on safety and free flow of traffic, as well as visibility and proximity to junctions and street furniture, among other considerations outlined in the Highways Act 1980, and will then decide whether to accept or modify the proposal. For work on the TLRN, please contact Borough Planning by emailing **boroughplanning@tfl.gov.uk**

The crossover is part of the public highway and does not give the occupier of the premises any particular rights, except to gain access to their property with a private motor vehicle.

The general presumption is to refuse an application if there is a conflict with a street tree.

If works are agreed they will usually be undertaken at the expense of the landowner, including the cost for footway strengthening and street furniture relocation. The authority is responsible for subsequent maintenance.

Additional information

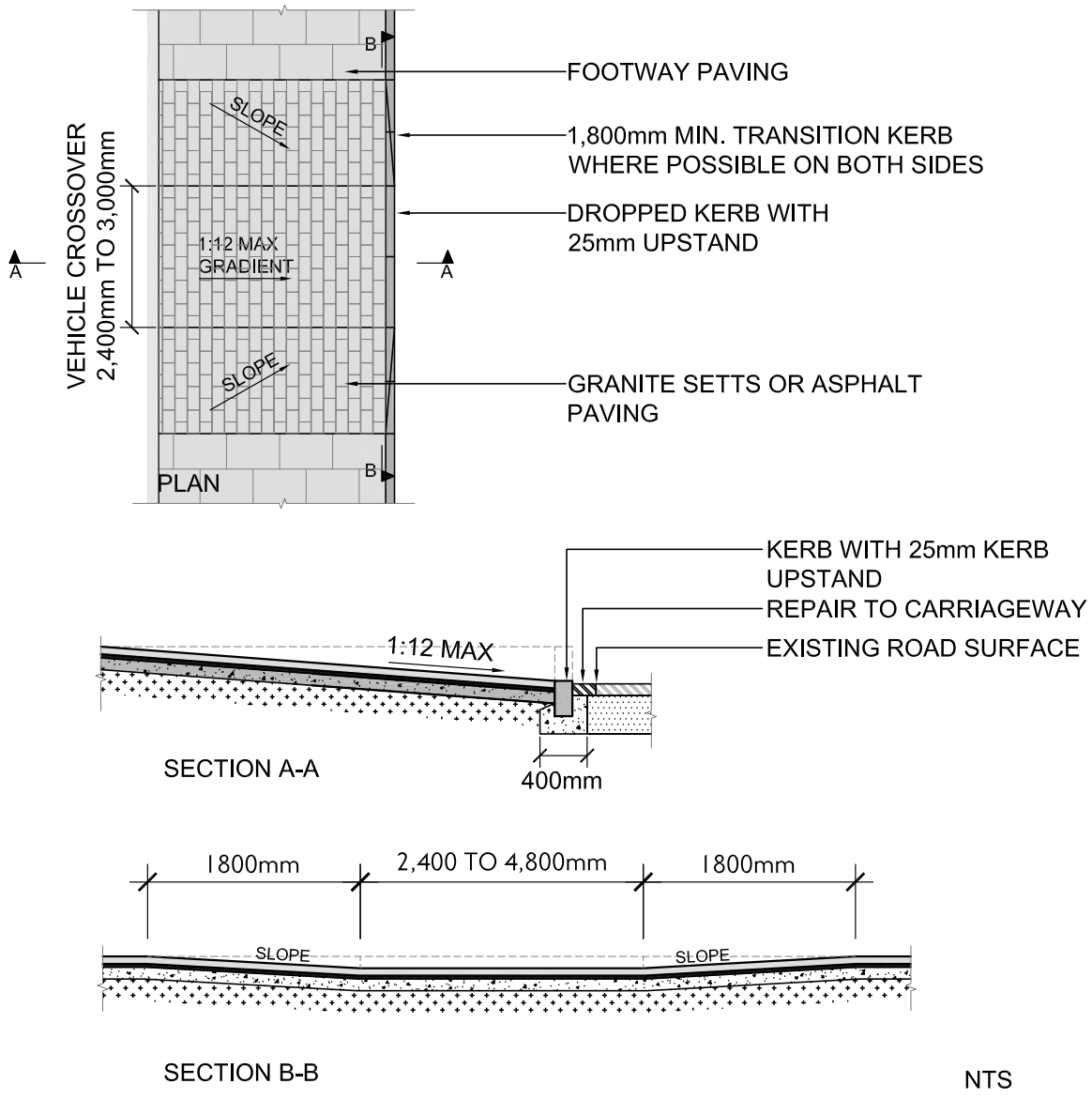
Legislation:

Highway Authorities, Highways Act 1980

Department for Transport:

Inclusive mobility – A guide to best practice on access to pedestrian and transport infrastructure, 2021

Figure 82: Domestic vehicle crossover in paved footway – Option 1

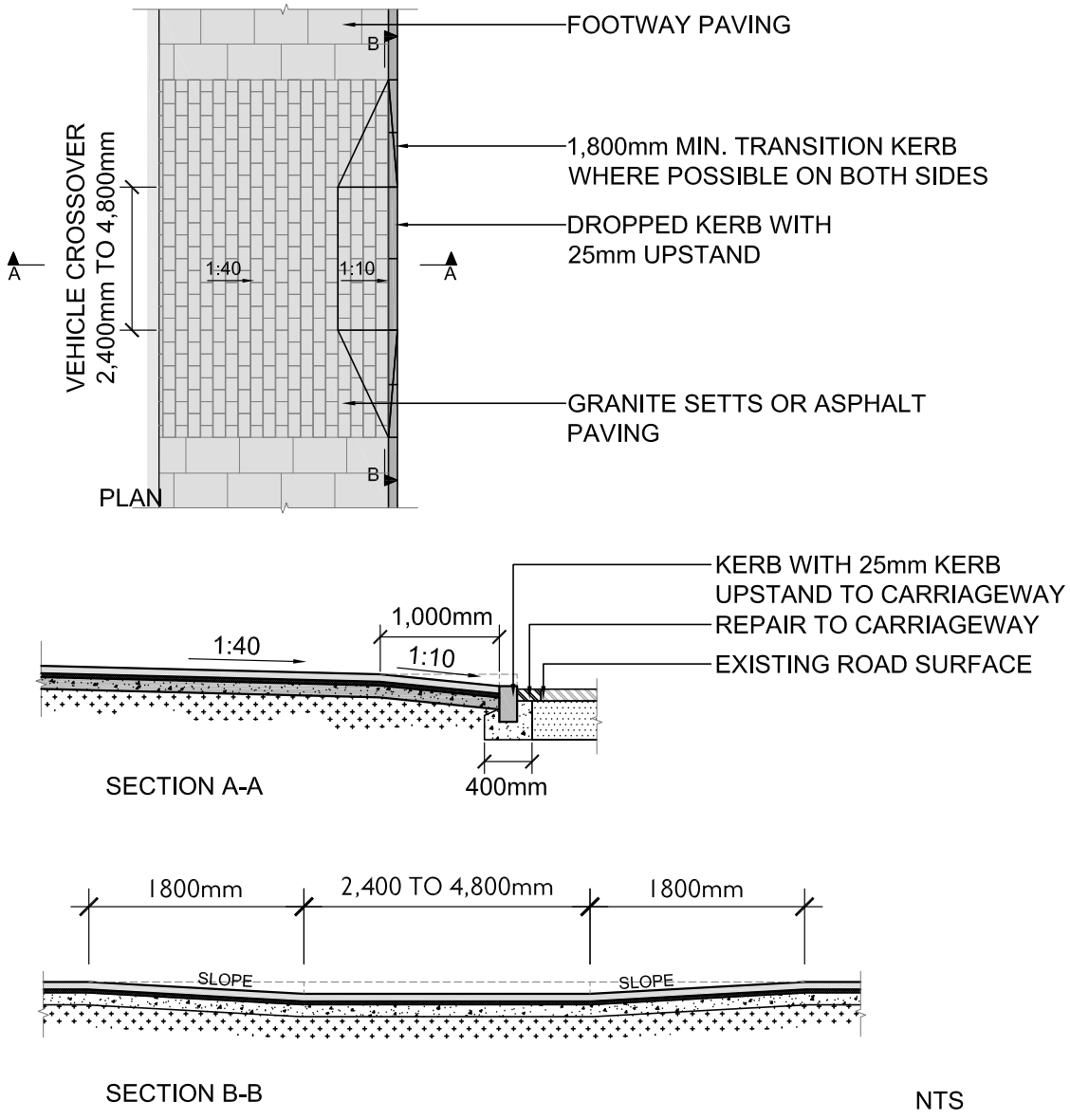


NTS

NOTES

1. Crossovers can be constructed using asphalt, setts or blocks. Material selection should be in keeping with the context.
2. Lateral clearance to all street furniture to be 450mm minimum from face of kerb.

Figure 83: Domestic vehicle crossover in paved footway – Option 2



NOTES

1. Crossovers can be constructed using asphalt, setts or blocks. Material selection should be in keeping with the context.
2. Lateral clearance to all street furniture to be 450mm minimum from face of kerb.

NTS

7.5 Inspection covers

Access chambers, inspection chambers and manholes, often collectively referred to as ironwork, are located across the highway to provide varying degrees of access to underground utilities. Inspection covers at the surface can be unsightly, especially when located on footways, as they can fragment the visual continuity of paving materials.

Placement

Ironwork should be positioned in a location that minimises visual disruption. When creating new streetscapes, it is important to liaise with utility companies to explore all opportunities for achieving this.

The utility company generally predetermines the location of ironwork to best satisfy servicing requirements.

The following points should be considered when determining the placement of an inspection cover:

- All inspection covers and frames should be to the appropriate strength rating to ensure that they do not "fail" under the expected loading conditions. These strength ratings are laid down in BS EN 124. In footways the normal strength rating would be B125
- Inset covers are only mandatory by TfL in tactile paving areas. Although not mandatory by TfL there may, in some instances, be a desire to use inset covers to achieve a more homogeneous footway surface finish. In these situations the designers should contact the utility companies concerned to ascertain their requirements. In some cases special types of covers may be specified with or without identification markings
- A highway authority can arrange for a utility company to relocate the access point in certain circumstances, however, this can be very expensive
- There is usually a small degree of flexibility for altering the orientation of ironwork within footways. Design teams should seek to align the orientation of the edges of a cover, where possible, with that of the pointing employed on rigid footway surfaces
- Care should be taken to ensure that access to chamber covers is not impeded with the addition of any new item of street furniture
- For new chambers, such as for traffic signal ductwork, the cover should be positioned in as inconspicuous a position as possible, and ideally aligned to the modular paving layout
- In high security areas, inspection covers may need to be marked. Advice should be sought from our transport community safety managers within the Community Safety, Enforcement and Policing directorate
- Some utility companies have bespoke labelled covers and inset covers – determine this by asking the utility company
- Inspection covers that are required to do so should have ventilation

Inset covers

Inset covers are composed of a recessed tray and frame, which can accommodate paving materials to match the surrounding palette and help hide the presence of ironwork. Inset covers are not mandatory; decide on a case-by-case basis whether they are appropriate for each location.

The cost of providing an inset cover will need to be part of the associated scheme costs and its maintenance will be borne by the highways authority. Contact the utility company well in advance so they can provide details of the covers that will need replacement.

Utility companies need to be consulted to approve the use of inset covers. At present

Figure 84: Granite tactile paving inset into an inspection cover

British Telecom and TfL ironwork can be finished with an inset cover.

Recessed fire hydrant covers should not be inlaid with paving materials as they need to remain visible for safety reasons.

Attention should be given to the detailing around the covers to ensure that footway surfaces abut the frame and to avoid unsightly cement infill.

Surface materials

We prioritise the use of inset covers in areas where high quality surfacing is provided in the form of natural stone and for areas of tactile paving.

Careful detailing should ensure that the inset cover matches the surrounding cuts and scale of the adjoining materials. This can include where different materials interface across the cover so that the inset cover is composed of both materials. On tactile surfaces, the detailing must ensure that the blister is orientated consistently across the inset cover and adjoining paving.

Any treatment which draws attention to the inspection cover should be avoided; do not use a different inset material to the surroundings, and do not provide a band of blocks around the inspection cover.

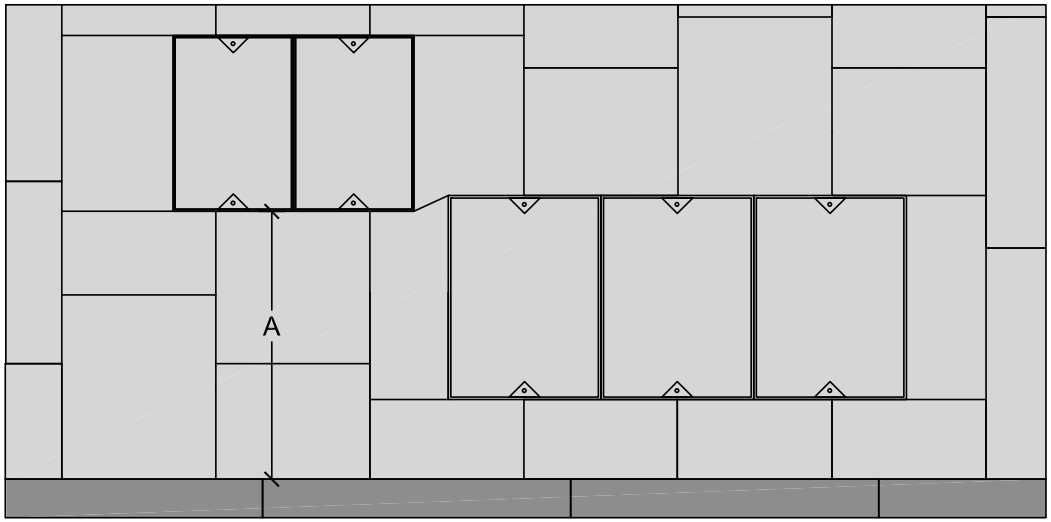
We recommend the use of deep frames and trays to enable a greater range of material depths to be used and help ensure consistency with footway surface materials. The depth of the inset cover must be sufficient for the proposed paving and bedding materials.

Where level changes occur in close proximity to the inspection cover, common at dropped kerbs, careful consideration should be given as to where surrounding materials are cut and folded. Ironwork cannot include a fold across the unit and therefore the surrounding surfaces need to be treated such that a new cut line may be introduced, or a more gradual change in levels detailed around the inspection cover.

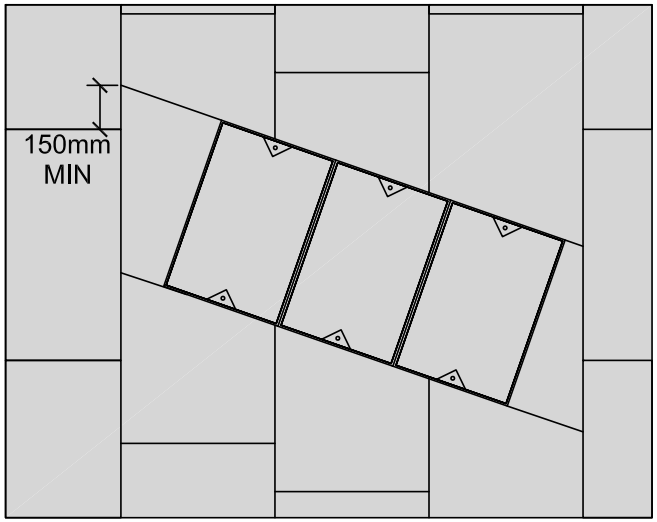
Figure 85: Paving pattern inset into an inspection cover

Figure 86: Tactile paving inset into an inspection cover with blisters orientated consistently

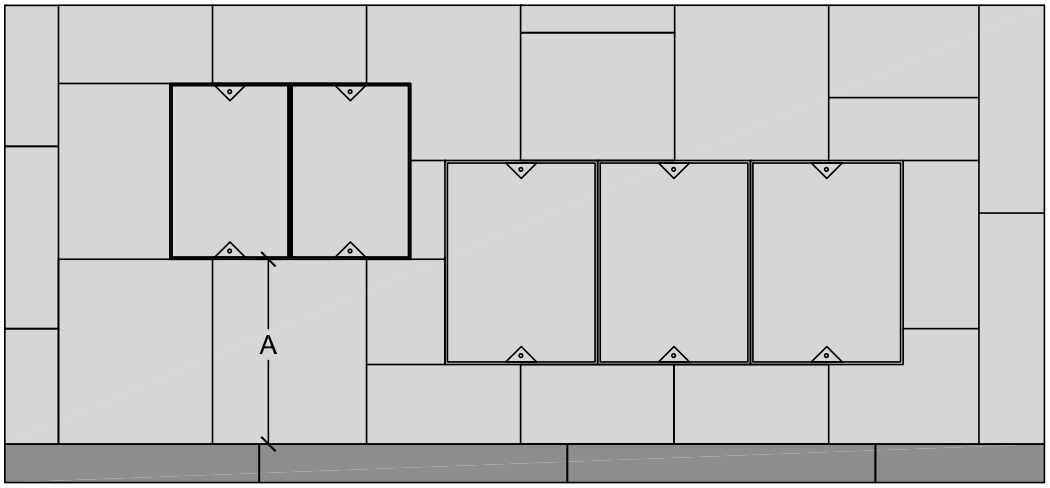
Figure 87: Utility cover arrangements in paving



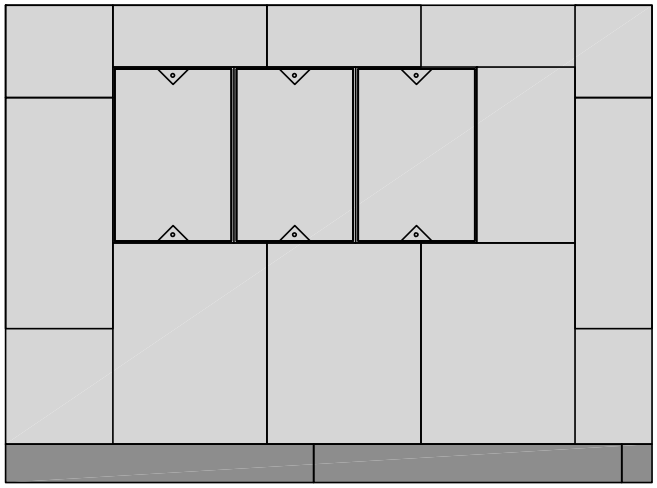
WHEN 'A' IS GREATER THAN 900mm SLABS TO ALIGN WITH EXISTING BOND



UTILITY COVER NOT IN LINE WITH PAVING

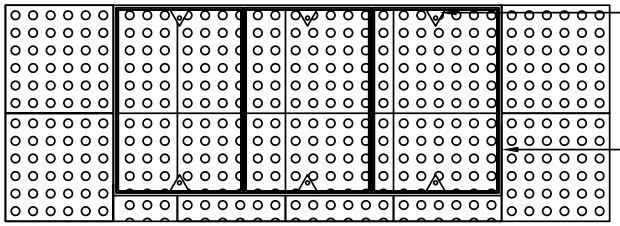


WHEN 'A' IS LESS THAN 900mm SLABS DO NOT ALIGN WITH EXISTING BOND



UTILITY COVER IN LINE WITH PAVING

Figure 88: Utility cover arrangements in blister paving



PLAN

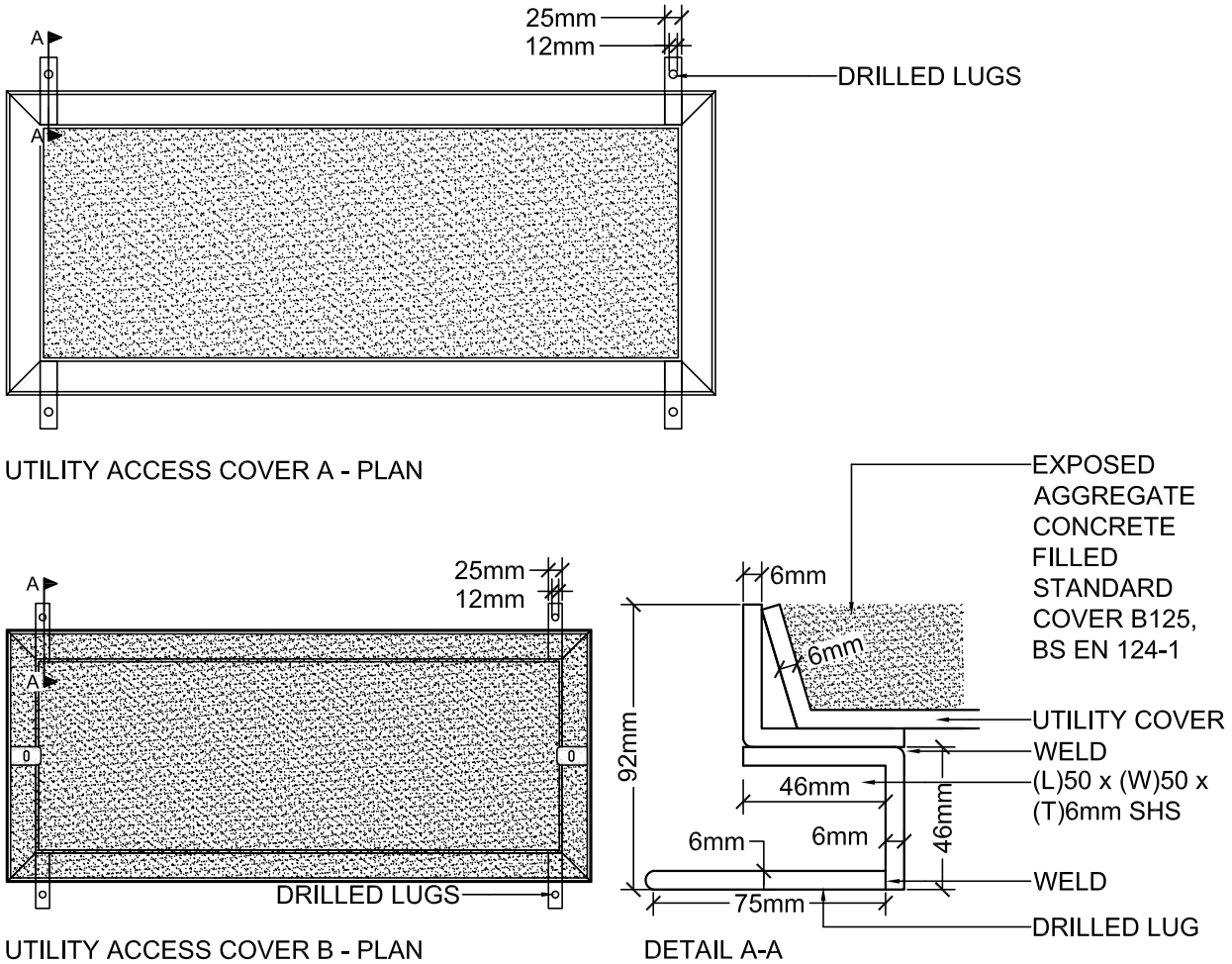
TYPICAL CLEAR OPENING CHAMBER SIZE	NUMBER OF COVERS	TYPICAL INDIVIDUAL COVER SIZE
725 X 225	1	785 X 315
915 X 445	2	485 X 505
610 X 610	2	333 X 670
1,310 X 610	3	454 X 670
1,690 X 710	5	347 X 770
2,285 X 710	6	388 X 770

THE NUMBER OF COVERS ON OTHER SIZED CHAMBERS TO BE COMPATIBLE WITH THE ABOVE TABLE TO ALLOW FOR ONE MAN LIFT OF THE COVERS

NOTES:

1. Existing chambers to be surveyed by the contractor to determine appropriate frame and cover to be supplied by utility company at each location.
2. All frames and covers to be to BSEN124-1 and constructed using min. 6mm thick structural steel plate formed to the required profile.
3. All steel frames and covers to be hot dipped galvanised after manufacture to BSENISO1461:2009.
4. Covers should be to the correct strength in accordance with BSEN124-1. In footways the normal strength requirement is "B125".

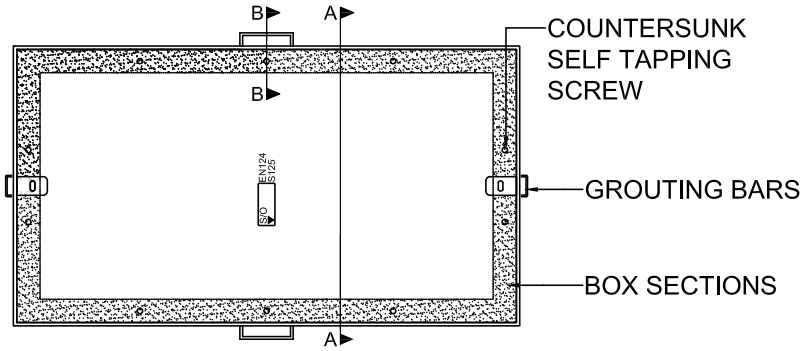
Figure 89: Deep type frame for utility access covers – water mains, EL, CT



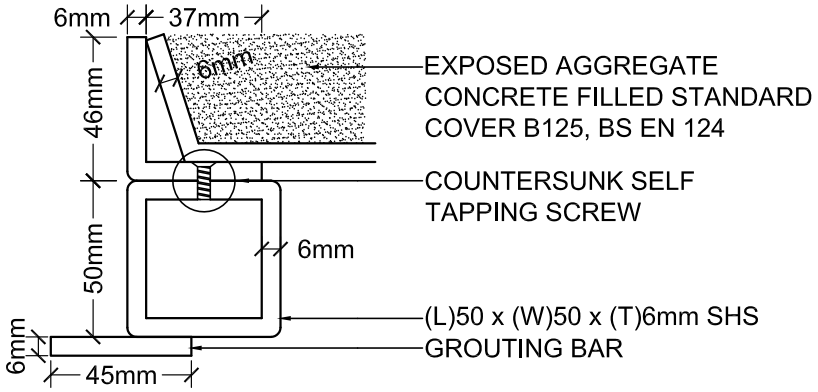
Notes

1. The deep frame allows close butting up to the frame of adjoining materials.
2. Existing chambers to be surveyed by the contractor to determine appropriate frame and cover to be supplied at each location.
3. Existing chamber walls may require lowering to accommodate the deeper frame. Where this is necessary a line of bricks is to be removed and the chamber wall rebuilt. The frame should be flush and must abut surrounding paving flags.
4. All frames and covers to be min. 6mm thick cast structural steel plate to BS EN 124-1 formed to required profile and wielded using co_2 process.
5. All frames and covers to be hot dipped galvanised after manufacture to BS 729:1995.
6. Bespoke covers from utility companies shall be provided.
7. After brushing in of sand, all covers shall be lifted, and sand between the covers and frame removed to ensure future ease of access. The covers shall then be re-fitted.
8. Six sets of lifting keys to be provided to engineer.
9. All work must be carried out in compliance with the requirements of the Manual Handling Operations Regulations 1992 (as amended in 2002).

Figure 90: Deep type frame for utility access covers – water mains, EL, CT



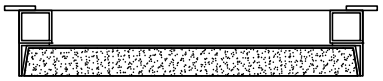
UTILITY ACCESS COVER FOR BRITISH TELECOM - PLAN



DETAIL B-B

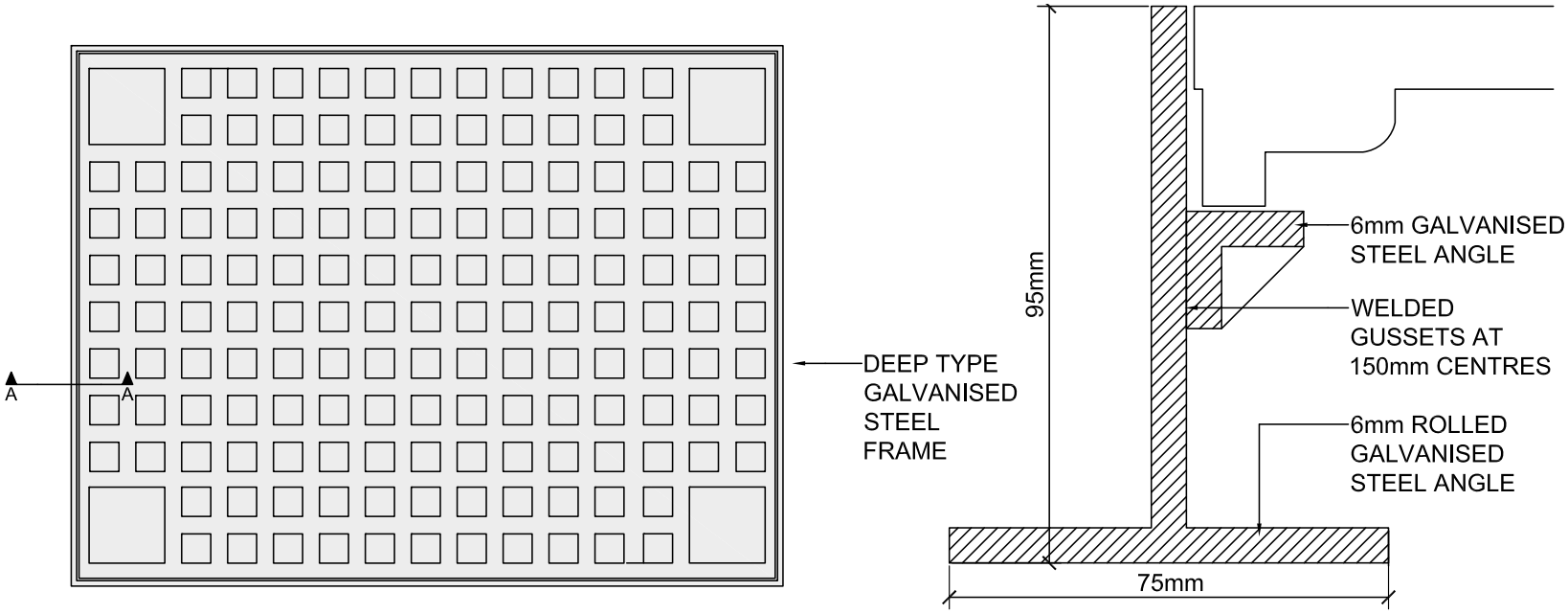
NOTES

1. The deep frame allows close butting up to the frame of adjoining materials.
2. Existing chambers to be surveyed by the contractor to determine appropriate frame and cover to be supplied at each location.
3. Existing chamber walls may require lowering to accommodate the deeper frame. Where this is necessary a line of bricks is to be removed and the chamber wall rebuilt. The frame should be flush and must abut surrounding paving flags.
4. All frames and covers to be min. 6mm thick cast structural steel plate to BS EN 124-1 formed to required profile and wielded using CO_2 process.
5. All frames and covers to be hot dipped galvanised after manufacture to BS 729:1995.
11. Bespoke covers from utility companies shall be provided.
12. After brushing in of sand, all covers shall be lifted, and sand between the covers and frame removed to ensure future ease of access. The covers shall then be re-fitted.
13. Six sets of lifting keys to be provided to engineer.
14. All work must be carried out in compliance with the requirements of the Manual Handling Operations Regulations 1992 (as amended in 2002).



DETAIL A-A

Figure 91: Deep type frame for utility access covers – TfL



DEEP TYPE FRAME FOR UTILITY ACCESS COVERS - PLAN

DETAIL A-A

Notes

1. The deep frame allows close butting up to the frame of adjoining material.
2. Existing chamber to be surveyed by the contractor to determine appropriate frame and cover to be supplied at each location.
3. Existing chambers walls may require lowering to accommodate the deeper frame. Where this is necessary a line of bricks is to be removed and the chamber wall rebuilt. The frame should be flush and must abut surrounding paving flags.
4. Strength class to suit location of cover in accordance with BSEN124-1.
5. All frames to be to BSEN124-1 and constructed using min. 6mm thick structural steel plate to BS formed to the required profile.
6. All steel frames and covers to be hot dipped galvanised after manufacture to BSENISO1461:2009.

Maintenance

Deep frame construction

- Inset covers that do not have a deep frame or edge restraint will not have the same load bearing capacity as the rest of the footway
- Where multiple inspection covers are arranged in a row, maintenance works should ensure that the covers are not swapped over, as any carefully detailed layout will become misaligned
- External edges of the tray should be lubricated with a non-setting petroleum jelly to avoid the tray becoming stuck in the frame
- Failure as a result of shallow inset materials

Ownership

Utility companies own the majority of ironwork that appears on the public highway and are responsible for the maintenance of their inspection covers. A small proportion are owned by the highway authority and these relate to traffic signalling, drainage and CCTV surveillance equipment. Where the highway authority replaces the utility company standard cover with a bespoke inset cover, the highway authority assumes the maintenance responsibility for that cover.

Additional information

Legislation:

New Roads and Street Works Act 1991

British Standards:

BS 7903: Guide to selection and use of gully tops and manhole covers for installation within the highway

BS EN 124: Gully tops and manhole tops for vehicular and pedestrian areas

7.6 Smoke vents

Smoke vents allow the fire brigade to vent smoke from basements by breaking the panels. Vents are generally located on private land belonging to the building they serve. There may be circumstances in which vents need to be located in the adopted highway, usually by grant of an undersailing licence. Permission must be sought from ourselves for any works below, above or on the TLRN, including the proposed introduction of any new smoke vents.

Performance criteria

Smoke vents should be slip resistant and sufficiently robust to meet appropriate loadings, as well as performing their intended fire safety function.

Vents should be flush with the footway surface and may be delineated with metal studs.

Responsibility

Where smoke vents are within the adopted highway, footway maintenance lies with the highway authority. Responsibility for repair of the smoke vent lies with the property owner.

Figure 92: A smoke vent demarcated with studs and an inscribed metal plate

7.7 Kerbs

Kerbs provide an important visual and physical delineation between footway and carriageway.

We advise using a limited material palette for kerbs, providing a clear and consistent aesthetic for all street types.

Kerb unit sizes, profiles and options vary significantly between different suppliers, so the Streetscape Guidance focuses on the key aspects of performance which are required on the TLRN. The core criteria are:

- To use a consistent material palette
- To enhance safety and legibility by providing an appropriate degree of carriageway delineation
- To provide long-term durability and ease of maintenance

Figure 93: Granite kerb

- To offer inclusive facilities for all users
- To enable good drainage and surface water removal

Kerb materials

Kerbs can be provided in both granite and concrete. Both materials have benefits and drawbacks.

Granite kerbs are preferred for environments that:

- Have regular pedestrian movement
- Have low to moderate speeds
- Are in conservation areas or
- Have historic or civic significance
- Require a high quality finish, especially when combined with other natural stones or asphalt footways
- Where footways need to be emphasised or high pedestrian flows exist
- Where enhanced longevity of a scheme is required as granite has a longer life than concrete and can be reused

Concrete kerbs are preferred:

- In high speed environments where pedestrians are less likely to linger or spend time
- Where a kerb must be cast in place to suit the circumstance

The initial installation and material cost of concrete kerbs is relatively inexpensive, however, it does not tend to wear well over time.

Standard kerb dimensions

The kerb face or upstand height is important for delineating the boundary of the carriageway, providing a visible edge and drainage channel.

Kerb heights can have a profound impact on physical visibility and protection, as well as a perceptual impact on user behaviour. Lower kerbs are more conducive to informal pedestrian crossing but offer less physical protection from vehicles and can prove difficult for those with visual impairments to navigate.

Dropped kerbs offer convenient, step-free access and are especially beneficial for users with impaired mobility, however, some users may experience discomfort if the gradient is too severe. Dropped kerbs should be provided with transition kerbs on the approach to provide a gentle gradient to a flush edge at carriageway level.

Figure 94: Southwark Street

Standard kerb dimensions on the TLRN

Application	Height above carriageway
Standard upstand height for conventional road layouts	125mm
Standard upstand height for bus stops	125-140mm
Suggested minimum kerb height for delineating footway and carriageway	60mm
Suggested minimum kerb height for delineating footway and cycle track Please note that the minimum kerb height between the cycle track and the carriageway is 125mm	50mm
Kerb upstand height from bottom of dropped kerb to carriageway	25mm
Upstand height for pedestrian crossings	0mm (ie flush); 6mm is the maximum allowance

Application	Width
Standard width	150mm
Conservation and bespoke width	300mm if laid horizontally; 200mm if laid vertically
Note: Kerbstones used in conservation areas have a rectangular (200x300mm) profile. They may be laid horizontally, giving a wide, shallow kerb, or vertically, giving a narrow, deep kerb	TfL prefers the use of 200mm width because this allows a height of 300mm, the majority of which is located below carriageway level, thus improving durability compared with shallower constructions (ie 175mm below carriageway compared with 75mm)

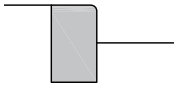
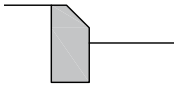
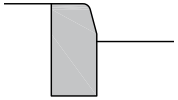
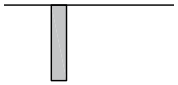
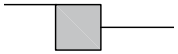
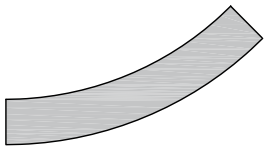
The physical limitations of pedestrians with mobility impairments should be considered when specifying kerb heights to ensure inclusive design standards are attained. The Accessibility Research Group's studies in 2009, at University College London (UCL), concluded that heights below 60mm could not be detected by some visually impaired users. It is recommended that should a shared space approach be employed, careful consideration of kerb heights is required based on the character of the road and the amount of activity.

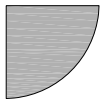
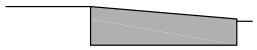
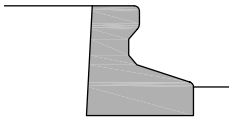
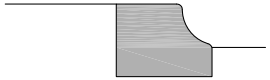
Figure 95: A selection of kerbs on the TLRN

Standard TLRN kerb types

The following guidance outlines the suite of standard kerb types used on the TLRN. This list focuses on the significance of the kerb upstand height and kerb profile for fulfilling a range of different functions in the street environment.

It should be noted that for a typical kerb with an upstand of 125mm, the kerbstone will be approximately 300mm in total height as it will be bedded approximately 175mm below the carriageway surface. Dimensions stated are therefore not representative of the kerbstone size, but of the intended surface level aesthetic.

Kerb type	Profile options	Upstand height	Application
Standard straight kerbs	Bull-nosed 	Maximum: 140mm (bus stops and central reserves) Standard: 125mm From footway to cycle tracks: 60-70mm maximum Low: 25mm (crossover)	These kerbs can be laid on their wide or narrow side however laying on the wider side will increase the risk of dislodging from vehicles. A technical specialist should be consulted. Low sizes can be used in shared space settings, crossovers, or on-footway loading bay edge treatment as an option.
	45° splayed 	Variable	Used where vehicles may need to ride up on to the verge (ie in an emergency). Bespoke splayed transition kerbs are also used adjacent to designated cycle lanes to maximise the effective width of the lane (125mm upstand) although any other kerb with a maximum 60-70mm upstand fulfils the same purpose.
	Half-battered 	Variable	Used to notify motorists when they are too close to the edge of the carriageway. Footpath can be provided next to this kerb.
	Edging 	Flush	Flat topped edging laid on edge used to contain paving when transitioning from one material to another.
Kerbs for channels	Square edge 	Flush Can be laid on edge or laid flat based on requirements	Channel (normally laid flat). These kerbs can be used to delineate a raised table at an entry treatment (normally laid on edge).
Kerbs for corners	Radius 	Maximum: 140mm Standard: 125mm	To provide a smooth radius where the carriageway is turning. For corner radii greater than 15 metres, standard straight kerbs can be used interspersed with radius kerbs.

Kerb type	Profile options	Upstand height	Application
	Quadrant 	Variable (to match surrounding kerbs)	To provide a radiused kerb where otherwise there would be a right angled corner geometry. May be used at entry treatments, islands or refuges.
Transition kerbs	Transition 	Variable configurations to meet requirements	To transition from one level to another (ie a crossing). The kerb profile is angled to allow for a smooth transition from one kerb height to another without stepping down.
Safety and containment kerbs	High containment 	Variable	Carriageways (40mph or greater). For use as a high containment safety kerb.
	Bus access 	Maximum: 200mm Standard: 140mm	For use at bus stops – allows 50mm gap between bus and footway. Can be customised for different entry levels of public transport vehicles.

Radius and special shaped kerbs

Changes in kerb alignment should be smooth and detailed using radiused kerbs, not mitred.

Always refer to the outward facing kerb edge side of the radius: ie if the outer kerb profile is the long edge, refer to the external radius; if the kerb profile is the short edge, refer to the internal radius.

Bespoke special shaped kerbs may be ordered where a more robust kerb is required, for example, at narrow, busy side road entries which may be more susceptible to vehicle impact.

Containment kerbs may be considered for high speed settings where a clear visual edge and additional safety precautions are required to help contain vehicles within the carriageway and to discourage pedestrians from crossing.

At crossovers where the footway continues across an access to a driveway or garage, pedestrians are given full right of way, with preferably no change in footway height except adjacent to the carriageway. Kerb heights should be dropped and subbase construction detailed to a loading grade.

Figure 96: Splayed kerb on a cycle super highway

Figure 97: Kerb type options plan and section views

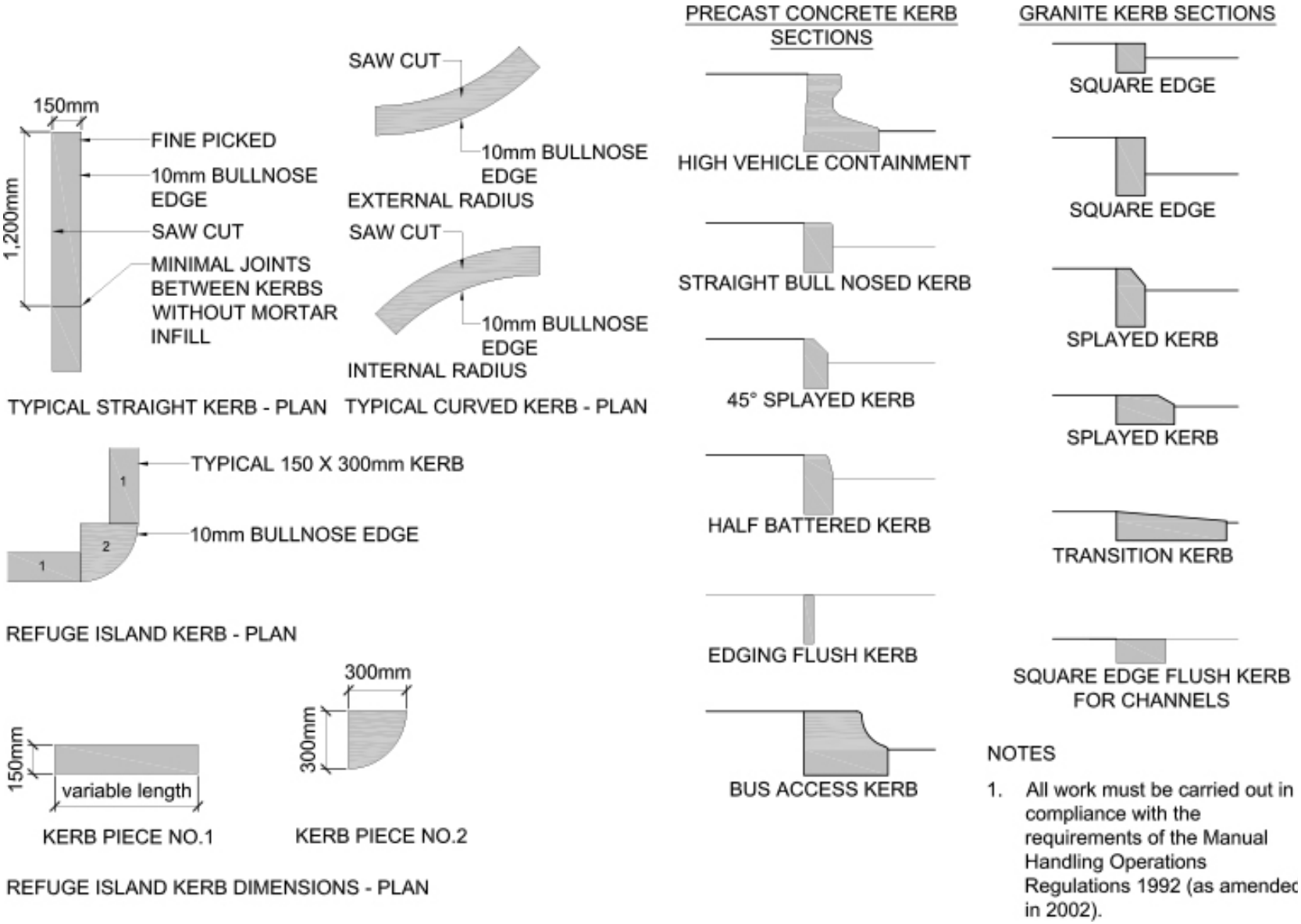
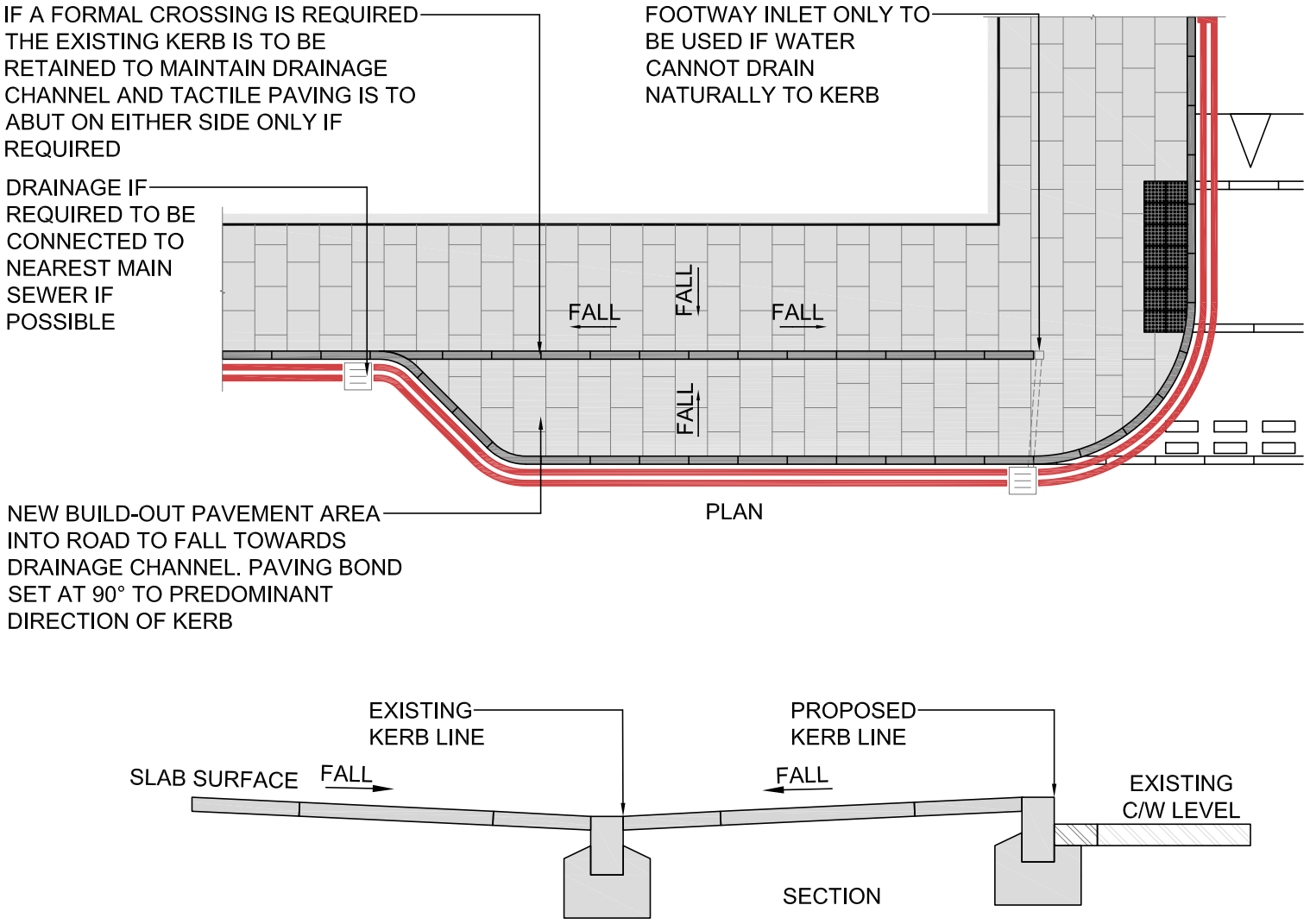


Figure 98: Footway build-out with flush kerb to facilitate drainage



Kerb construction

Kerbs should be:

- Dry jointed and closely butted where possible
- Sawn on the rear face to avoid the need for mortar infill between paving
- Set on a concrete subbase of minimum 150mm depth as standard

Additional information

British Standards:

BS EN 1340:2003 Concrete kerbs

BS EN 1343:2012 Kerbs of natural stone for external paving. Requirements and test methods

BS 7533-6:1999

University College London:

Effective Kerb Heights for Blind and Partially Sighted People (Accessibility Research Group, UCL, 2009)

Transport for London:

Accessible Bus Stop Design Guidance, 2015

Part E Carriageways

8.1 Vision

If we are to achieve world-class roads and streets appropriate surfacing specification is essential for providing durable, safe, comfortable and legible road layouts. Selecting the right materials is key to creating a backdrop that will sustain all the activities within the streetscape. Materials should be selected based on their:

- Long-term durability
- Safety performance
- Legibility
- Relationship to the surrounding urban character and overall appearance of the streetscape
- Visual performance characteristics
- Cost to implement
- Whole life cost (maintenance)
- Asset accessibility

Asphalt, and in special circumstances, coloured surfacing and natural stone setts are recommended for carriageway surfaces.

Surface construction must be detailed to accommodate the loads and foreseeable uses acting upon it, and to ensure long-term durability and maintenance of the materials. Surfaces should be smooth, firm and non-slip in all weather conditions with gradients that are both comfortable to walk on and sufficient for free draining of surface water.

We have an internal procedure to review new products proposed for the TLRN and approval should be sought from the SDRG and TfL Engineering at the design stage.

Figure 99: Roundabout where Stamford street joins Waterloo Road

8.2 Carriageway materials

Asphalt surfacing for carriageways

Asphalt is the standard surface material for all carriageways and should be applied in most cases. Asphalt has a high deformation resistance and can be repaired relatively quickly and inexpensively. It can be designed to meet the needs of the expected use. Variable aggregate gradings are acceptable. Aggregate properties such as shape and size, and resistance to crushing or polishing, should be selected based on site conditions. All asphalt surfacing should comply with BS EN 13108 Bituminous mixtures standards.

Figure 100: Cheyne Walk and Battersea Bridge

Maintenance

Resurfacing regimes should be based on an understanding of the existing surface composition and condition of the carriageway. Contractors are encouraged to recycle materials where practicable

Innovative surface materials

There is continual innovation within the industry of materials science, improving the performance and cost effectiveness of surfacing through more efficient laying techniques and new technologies. While the materials palette is strictly defined on the TLRN to ensure quality and consistency, advances in material technologies will be considered on an ad hoc basis to trial new finishes and test the resilience of the product on a limited stretch of road.

Additional information

British Standard:

BS 594987:2015 Asphalt for roads and other paved areas. Specification for transport, laying, compaction and product-type testing protocols

Granite setts for carriageways

A sett is a dressed block or stone, 50-300mm in length and 75mm or more in depth. Setts are used to aid the creation of a high quality surface finish to help emphasise greater pedestrian priority. Setts may be considered in exceptional circumstances where looking to:

- Provide a high quality low speed environment, for example, for shared space schemes, where vehicle traffic is especially low
- Communicate a traffic calmed space with visually related carriageway and footway surfaces
- Improve material durability for footway surfaces which are subject to regular vehicle overrun
- Reflect the historic character of an area

Figure 101: Granite setts used on a carriageway to slow vehicles and create a more pedestrian friendly setting

Design considerations

The installation of setts should be considered for:

- Inset on-carriageway bays and on-footway loading or parking bays and in front of pubs
- The flat surface of raised tables on side road entry treatments, but not on the ramp
- Footway crossovers
- Traffic islands, central median strips or within central reservations that are not flush and do not have regular vehicle overrun

Only in exceptional locations where vehicles are known to mount the kerb, can a band of five 100x100mm setts be installed on the footway, running parallel to the kerb.

Figure 102: Granite setts on a raised table at Goswell Triangle

These may be considered where:

- The area has special historic or civic significance and requires a high quality surface finish
- There is no capacity to provide designated loading bays, but where informal loading is known to take place with a high number of retail units fronting on to the street
- Footways are narrow such that installing bollards would overly impinge on footway space
- There is insufficient depth to structurally reinforce paving slabs

When considering the use of setts it is important to anticipate loading requirements. The specified material and subbase must be designed to withstand expected loading, traffic volume and ground conditions. Where setts terminate and meet tarmac, it is important to specify a robust edge containment detail.

Materials

Setts should be composed of natural stone: granite or Yorkstone, to match the surrounding footways and complement the character of the built environment.

Granite setts are recommended for footways and low speed carriageway settings on side roads or minor roads which do not serve as a bus route.

Yorkstone setts are permitted where vehicle overrun is infrequent, such as adjacent to the kerb edge or on footway crossovers.

Preferred sizes

Generally 200x100mm units are preferred on the TLRN, with depths selected based on the load bearing requirements – please refer to BS7533-12 for further information. Other bespoke dimensions may be permitted upon approval by the SDRG.

Herringbone pattern is the preferred way to lay block paving as the interlocking pattern makes it more resilient to turning movements.

Maintenance

Maintenance of setts is more costly and time consuming than asphalt. Using a mixed palette of colours can help mask dirt, discolouration and marks.

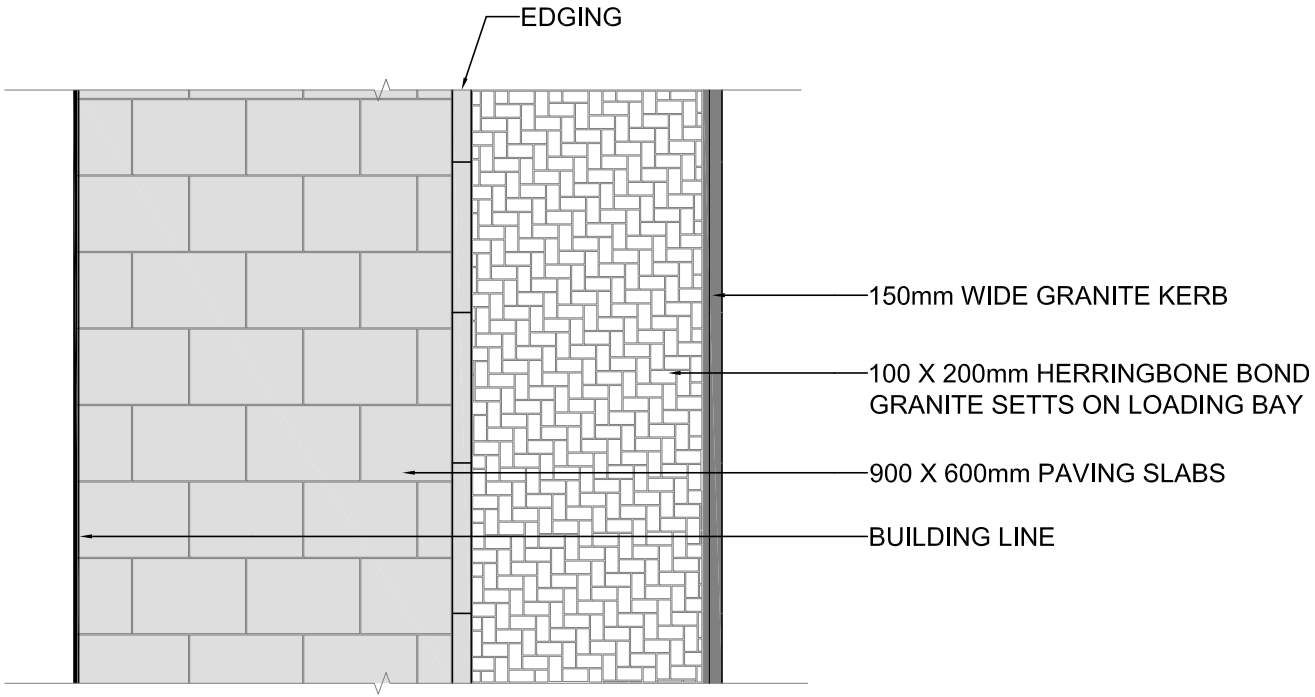
Additional information

British Standards:

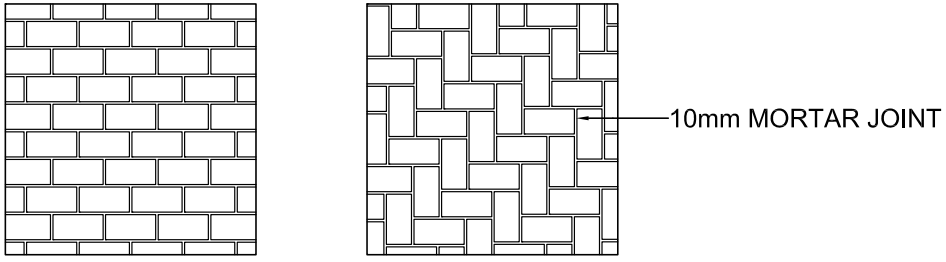
BS EN 1341: Provides guidance on the breaking load for setts

BS 7533: Part 12 provides sub-structure advice for pedestrian areas

Figure 103: Sett paving patterns on footway loading bay



EXAMPLE PLAN - HERRINGBONE JETS IN WADING BAY FLUSH WITH FOOTWAY



TYPES OF BONDS - ELEVATION

Coloured surfacing

Coloured surfacing includes any surfacing that changes the appearance of the conventional asphalt wearing course. The use of coloured surfacing should be justified on a site-by-site basis and approved by the SDRG.

Coloured surfacing may be considered where there is a safety or operational benefit to specified users in making a facility more conspicuous and should only be implemented when other remedial measures have been deemed inappropriate. Coloured surfacing should be used sparingly and selectively to minimise capital and maintenance costs and improve the appearance outcome where surface repairs are required.

Figure 104: Colour used to emphasise a crossing and used to delineate a cycle track

Use across London

There is variable support for use of coloured surfacing across the London boroughs. The use of conspicuous colours, especially in areas with high heritage and conservation value has been challenged based on concerns about their visual impact. However, some partially sighted pedestrians use differences in colour and tone to help them identify the interface between footway and cycle tracks or carriageways. Therefore where there is an identified risk of conflict between various users, the use of coloured surfacing may be recommended to support legibility and road user recognition.

Design considerations

Design teams are encouraged to carefully consider the use of coloured surfacing treatments as they should only be applied to highlight areas of conflict by emphasising the existence of certain facilities.

Coloured surfaces have no legal status as they do not constitute a formal road marking or sign, however, they can be used to supplement road signs and markings and discourage vehicle encroachment.

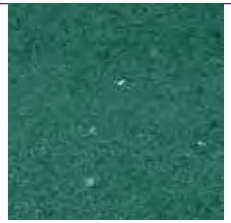
Coloured surfacing should not be applied at locations with a high density of utilities or where one or several utility companies have a high rate of attendance and trenching as the reinstatement of this type of surface still shows as a trench. Colour does not show up well at night under headlights or in wet conditions.

Application

There are several materials that can be used to achieve a coloured surface on the carriageway including: coloured asphalt, resin-bound aggregate and a surface dressing. The specification of coloured surface, skid resistance and method of application is to be in accordance with Clause 924 of the Highways Agency's Specification for Highway Works.

Please speak to one of our technical specialists when considering the use of a coloured surface on the TLRN. The table on the following page provides a range of colours commonly used on the road network.

Figure 105: Coloured surface on the carriageway is used to suggest pedestrian priority

Colour	Example	Purpose
'Venetian' red BS381C – colour 445		To supplement road markings and aid bus lane compliance. We no longer apply red surfacing to bus lanes, however, some boroughs still do require this.
'Deep chrome' green BS381C – colour 267		To highlight cycle facilities that do not have physical segregation.
'Sky blue' RAL5015		To highlight cycle facilities that do not have physical segregation.
Natural buff – to match Yorkstone paving		To visually reinforce crossing locations, a change in traffic management, or align the colour of an off-carriageway facility to other elements in the streetscape for aesthetic reasons.
Grey – to match granite or concrete streetscape elements		To visually reinforce crossing locations, a change in traffic management, or align the colour of an off-carriageway facility to other elements in the streetscape for aesthetic reasons.

Maintenance

Some types of coloured surfacing fade rapidly in heavily trafficked locations (after 6-12 months) and may need to be reapplied regularly. Maintenance regimes should match the original colour pigmentation by selecting the same coloured product and binder. Bespoke treatments are more difficult to maintain, especially where underground servicing is required.

Where maintenance or highway works are required, the colour surface should be laid to provide a consistent finish across the carriageway and should not be applied as a patchwork. Good quality repair work requires the whole surface to be relaid as patchwork repairs are unsightly.

8.3 Road markings

Road markings provide traffic signing information and look to enhance the safety and legibility of the road space for all road users. Road markings are applied to the carriageway surface as lines, symbols or words, and in some instances will be marked on the kerb and footway, or temporarily at roadworks.

Road markings are classified as:

- Regulatory – enforceable traffic management markings
- Warning and information – road markings that increase awareness of likely hazards
- Directional – location and route guidance

Statutory requirements and detailed information on the design and placement of road markings for the public highway are provided in the TSRGD.

Design approach

Design teams should adopt a consistent approach across the network to:

- Ensure safety
- Provide sufficient information to promote good lane discipline
- Encourage traffic regulation compliance and enable efficient enforcement

Minimising visual clutter

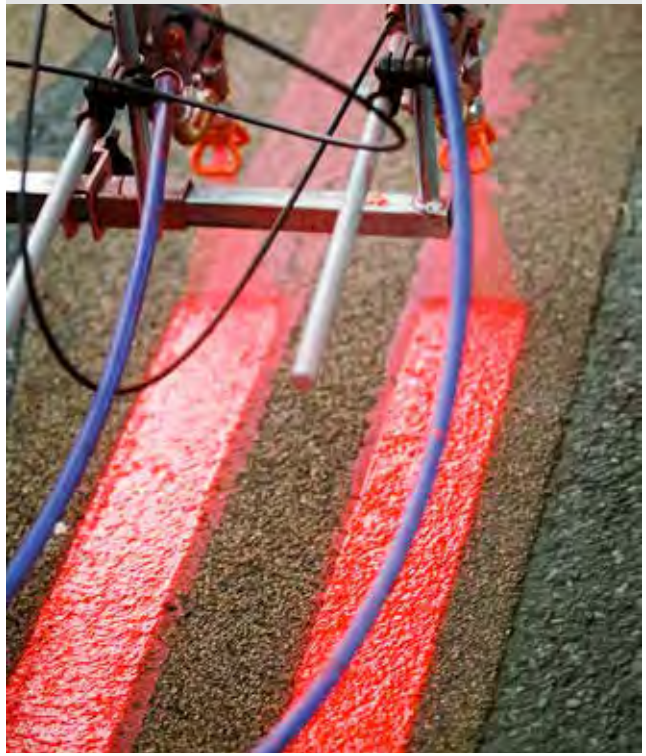
Design teams should adopt an approach of minimising road markings to ensure they are carefully considered in conjunction with the character and function of the street, as well as the placement of adjacent traffic signs. The removal of any unnecessary road markings will help to reduce visual clutter and maintenance costs, and in most cases contribute to improved legibility. The following considerations should be made to rationalise road markings:

- Road markings which include words (for example, 'keep clear'/'look left') should be assessed to see if they are needed
- Yellow boxed areas can look unsightly and consideration should be given to removal where legal enforcement is not necessary
- To help facilitate a traffic calming effect, reduced road markings can help in some locations, such as the removal of carriageway centrelines (Centreline removal trial, TfL, 2014)

Figure 106: Victoria Embankment: 'Keep clear' markings have been used instead of a yellow box

Figure 107: Carefully considered road markings will improve legibility and reduce visual clutter

Figure 108: Renewed red line markings



Marking dimensions

Many markings are fully dimensioned in the TSRGD and Traffic Signs Manual (TSM). These documents are the main resource for prescribing standard road markings.

Markings should be provided to a maximum thickness of six millimetres where pedestrian activity might be expected. Any higher and the marking could pose a trip hazard or adversely impact on drainage.

Red route road markings to diagrams 1018.1 and 1017 (TSRGD) should not be thinner than 100mm as this would pose an issue for enforcement cameras.

Materials

Expert advice should always be sought before prescribing the road marking material as a range of products are available with widely differing performance characteristics.

Road markings are available as:

- **Water based paint** – best restricted to roads with lower traffic flows as the markings are more prone to wear
- **Thermoplastics** – standard paint system and should be avoided on concrete and natural stone
- **Preformed markings** – preferred where complex shapes and symbols are required
- **Cold plastic** – can be used to mark pedestrian crossings, yellow boxes, bus lanes and other common road markings. If applied well it can last between four to eight years
- **Setts** – where setts are used on a side road entry treatment, red setts are permitted to designate the red route but are not a requirement; conventional markings may be used

Performance

Most road markings that have a regulatory function are required to incorporate a retroreflecting material such as glass beads that better reflect vehicle headlights (TSM chapter 5, table 23-1 and TSRGD).

Line colours

All markings and colours should be in accordance with the TSRGD, British Standards (BS EN 1790 and BS EN 1871) and our Design Standards for Signal Schemes in London.

The colours white, red and yellow are prescribed for road marking materials on the TLRN. Black road marking materials may also be introduced where existing markings need to be temporarily obscured. Black road markings have been used to change an advisory cycle lane as a temporary measure.

Figure 109: An advanced stop line coloured in sky blue on a Cycle Superhighway

Coloured resin aggregates for larger areas of carriageway such as bus lanes or for demarcating cycle infrastructure are not formal road markings, but aim to improve the compliance of regulatory road marking signage.

Road studs

Retro-reflective road studs may be used to supplement longitudinal road markings, and are particularly effective for areas with low lighting levels. Metal road studs should be avoided as they can cause problems for two-wheeled vehicles.

Removal

It is important that all the material used to define the road marking is removed where new marking arrangements are proposed. Ghost images of old markings are unsightly, detract from the streetscape and can have an impact upon legibility and road safety.

Trials – centreline removal

Our aspiration for a safer network, reinforced through good design, has been put forward in a recent study which challenges conventional assumptions into the application of centrelines (Centreline removal trial, 2014). The study looks at the impact of removing centrelines on traffic speeds, across three outer London routes scheduled for resurfacing. Initial results suggest a consistent decrease in vehicle speeds as a result of the interventions. We will continue to monitor collision data at these sites and use this evidence to determine the long-term applicability of centreline removal for encouraging lower speed driving environments. Any centreline removal trial should be subject to a pre and post-construction road safety audit.

Maintenance

Regulatory markings must be maintained adequately to provide good visual contrast and ensure good effective enforcement. To ensure this:

- Road markings should be regularly reviewed to ensure good legibility and definition
- Maintenance requirements are dependent on traffic flows, the material used and the position of the marking on the road surface, and so will not be the same for all types of street
- During routine maintenance when road markings are often re-marked it is important to ensure the new surface is accurately applied over the old material so that the edges of the markings remain crisp and of the desired width
- The excessive build up of thermoplastic can lead to the ponding of surface water and should be avoided

Centreline removal trial London, UK

Investigating the impact of centreline removal on traffic speeds across three sites in London

Key functions

Opportunity

The Mayor's Better Streets initiative challenged TfL to justify any road marking.

Benefits

The investigation showed that at all three sites there was a statistically significant reduction in traffic speed. Collision data will be tracked at these sites for the next three years to ascertain the long-term effects of centreline removal.

Implementation

A study was conducted at three sites across London to judge the effect of removing centrelines on traffic speeds and accidents.

Applying in London

While it is not suitable to remove markings at all locations, it is desirable to remove clutter where possible.

Additional information

Statutory instruments:

Traffic Signs Regulations and General Directions (TSRGD)

British Standards:

BS EN 1790: For preformed markings

BS EN 1871: For directly laid materials

Department for Transport:

Traffic Signs Manual, 2003

Traffic Advisory Leaflet 01/13: Reducing Sign Clutter, 2013

Transport for London:

Design Standards for Signal Schemes in London, 2011

Centreline removal trial, 2014

8.4 Cycle infrastructure

The London Cycling Design Standards (2014) (LCDS) provides comprehensive advice that all designers of cycling infrastructure should refer to. It uses the Cycling Level of Service (CLoS) methodology as a measure for the quality of provision for cycling on any street or route.

Streetscape Guidance identifies the palette of materials appropriate for the different types of cycling infrastructure identified in the LCDS. It also reinforces the importance of a holistic approach to street design, to maintain the quality and continuity of the streetscape character.

Design considerations

Network planning

The network for cycling comprises signed cycle routes and any other street or space that cyclists may legally use. In general, a higher level of service for cycling can be achieved on branded routes and on any street where motor traffic speeds and volumes have been calmed, such as where 20mph limits apply.

New and improved cycling facilities should be planned coherently to encourage more cycling, to address risks to cycle safety and allow coherent, direct and comfortable access to local destinations. All route proposals should include a maintenance plan to ensure cycle routes remain free of debris and in a good riding condition.

We acknowledge the significance of 20mph speed limits for enhancing the quality of the cycling environment and will continue to review sections of the road network with a view to broadening the 20mph designation.

Figure 110: Blackfriars bridge mandatory cycle lane

Cycling interventions

Proposals for cycling should reflect the place function of a street within a wider area – the street's character and the uses and activities that take place within it – rather than be determined solely by the movement of other vehicles.

Cycling facilities should enhance the area through which a route passes and design teams should consider the cycling experience along the full length of the route to provide a consistently attractive setting for cycling and walking. Good design should provide cycle routes which are safe, continuous, clear, coherent and attractive. They should complement the existing streetscape quality and avoid additional unnecessary clutter.

The degree of separation required for cycling should be based on an assessment of the existing conditions, on proposals for improvement of the area and on addressing key safety, capacity and accessibility issues. Higher levels of service for cycling can be achieved through designing for lower speeds, lower motor traffic volumes and through greater separation from motor vehicles, while avoiding conflict with pedestrians.

A street may be part of a proposed new or improved cycle route, or may have existing or proposed cycle routes crossing it. In both cases, the level of service offered at junctions and crossing points is a key determinant of the overall quality of provision for cyclists.

- Cycle infrastructure need not be heavily engineered or costly but should be consistent and aligned to the uses and dimensions of the street environment
- Streetscape Guidance encourages designers to consider the impact of cycle infrastructure on the pedestrian environment as well as the visual quality of the streetscape. This includes being mindful of any facility that proposes additional street clutter, the creation of small fragmented areas of space, or overly complicated arrangements to the detriment of other users
- Designs should avoid making cosmetic alterations for the sake of change and should be rooted in an evidence-based design approach
- Trials of temporary layouts to assess impacts of changes to road space allocation should be considered as a step-change towards long-term infrastructure provision

Designating space for cycling

Formal cycle infrastructure on the highway consists of: cycle lanes (regulatory road markings on carriageway), cycle tracks (generally, provision dedicated to cycling off the carriageway) or areas shared with pedestrians.

Cycle tracks are usually away from the carriageway or separated from it by a verge or height difference. A Section 65 Notice (Highways Act, 1980) can be used to convert a footway into a cycle track and prioritise cycling. Appropriate signing should be incorporated including TSRGD diagram 955 and associated cycle symbol marking (diagram 1057).

LCDS describes different kinds of provision for cycling in terms of the 'degree of separation' they offer from motor vehicles on-carriageway or from pedestrians off-carriageway. With the highest degree of separation first, the on-carriageway options are:

Full separation on links

Segregated lane/track:
Cycle lane or track separated by a continuous or near-continuous physical upstand along links (usually verges or kerbed segregating islands).

Stepped tracks:
Vertically separated cycle tracks at an intermediate level between the footway and main carriageway, with or without a buffer zone.

Dedicated cycle lanes

Light segregated lane:
A facility separated and protected by intermittently placed objects generally alongside formal, mandatory cycle lane markings. (Note that no light segregation product has been approved for use across the TLRN, so any proposal should be brought to the attention of the SDRG to ensure that the product satisfies streetscape requirements and does not pose a maintenance and safety liability).

Mandatory cycle lane:
A marked lane for exclusive use of cyclists during the advertised hours of operation. It is an offence for other vehicles to enter, unless they are exempted. Separate parking restrictions are needed to be fully effective.

Shared lanes

Shared bus lane:
Cyclists may use the full width of the bus lane during and beyond its hours of operation. Applies to all nearside, with-flow bus lanes, and should extend to contraflow and offside types.

Advisory cycle lane:
An area intended for, but not legally restricted to, cyclists' use. Other vehicles are permitted to enter or cross it.

Integrated with other users

Cycle street:

A street where cyclists have assumed priority in a speed restricted area, variously marked with or without formal cycle lanes or indicative areas for cycling.

Mixed traffic:

A street or space without cycle lanes or tracks, often including cycle symbols on carriageway. Motorised traffic is either absent or at low volumes and speeds. May include space shared between all road users.

Footways and footpaths may be designated as shared between pedestrians and cyclists. Degrees of separation between cyclists and pedestrians by the carriageway are:

Separated footway ('segregated shared use'):

A footway divided between users usually with a low, raised delineator, often punctuated by fully shared areas. Marked with a sign to diagram 957 of TSRGD.

Shared use footway or area ('unsegregated shared use'):

A footway fully shared between users and marked with sign to diagram 956 of TSRGD. May exist in a limited area, usually to allow cyclists to make a crossing movement and/or transfer from on- to off-carriageway provision.

However, as a general principle, there is a presumption that footways are to be used only by pedestrians. These two options should therefore only be used in exceptional circumstances – for example, where the footway is wide and pedestrian flows sufficiently low, or where motor traffic conditions justify off-carriageway provision and cycle tracks are not suitable or viable.

See LCDS for further description and guidance on the application of each of these cycle infrastructure types.

Materials

Surface materials

The visual impact of materials associated with cycle infrastructure should be carefully considered. Layouts which are overly complex will not only impact on the visual quality of the streetscape, but will likely lead to ambiguous layouts which reduce the legibility of the scheme design for all road users.

Where there is a requirement for kerbside access an adequate dropped kerb access across the cycle track must be provided.

Where there is a requirement for vehicles to access equipment for maintenance purposes on the footway including lighting columns, utilities, etc., any adjacent cycle facilities must be constructed to withstand the weight of vehicles. The material palette should be simple to minimise issues of maintenance and ensure consistency across the network. Mechanically laid asphalt, where possible, is the standard surfacing material for cycle infrastructure on the TLRN and may take the form of either:

- **Asphalt concrete** – typically a six millimetre aggregate is recommended to provide a smooth finish
- **Proprietary asphalt** – thin surface course systems (TSCS) may be considered in special areas
- **High stone content hot**-rolled asphalt – typically HRA55/10

In selecting a type of asphalt, consideration should be given to the permeability of the surface and the extent to which more porous open-graded mixes are incorporated as part of a sustainable drainage strategy.

Natural stone for prolonged stretches of cycle routes should be avoided as skid resistance can be low. Anti-skid surfacing for cycle routes is acceptable for use on the TLRN but should be laid longitudinally to avoid ridges. Resin-bound aggregate may be considered for footway areas which operate as a shared use area. Unbound surfaces such as gravel or hoggin are not recommended for major cycle routes as they can deteriorate quickly and provide a low quality of riding surface.

Signage

Signage should be designed to minimise visual clutter and be combined with existing street furniture, such as lamp columns, and only used at decision points and sparingly as route repeater signs. The sign reverse should match the surrounding street furniture colour: black-backed in central London and town centres, grey on arterial routes.

The height of the signage should provide adequate head clearance: 2400mm as a minimum. Where cycle tracks or shared use areas are provided the appropriate signing must be erected with consideration to minimising clutter.

Road markings

TSRGD standards should be applied to ensure consistency for all road markings across the road network. Consult LCDS for guidance on how to use road markings for cycling.

Bespoke cycle symbol treatments such as engraved or inlayed natural stone may be appropriate in conservation areas; approval should be sought from the SDRG for TLRN cycle routes.

Coloured surfacing and cycling

Coloured surfacing is not a formal traffic sign and should be kept to a minimum for aesthetic and maintenance reasons. Please refer to LCDS for further information on applying colour to cycle infrastructure.

The provision of highly conspicuous surfacing can detract from the aesthetics of the streetscape and may not be appropriate in conservation areas.

Where coloured surfacing is to be applied, a veneer coat should be laid on to the wearing course.

Figure 111: Cycle track demarcated with lines and colour

Figure 112: Cycle lane delineator strip

Kerbs

- Low kerbs of between 50-100mm may be considered for the cycling and footway surface interface however a 125mm kerb must be provided between the cycle facility and carriageway
- Kerb heights should be carefully detailed to maximise the effective width of the cycle facility by allowing cyclists to travel closer to the kerb, reducing the likelihood of a cyclist catching their pedals on the upstand
- Bull-nose, battered (45 degree) or half-battered kerbs may be used adjacent to any cycle facility
- Where cycle provision is next to the footway and at footway level, a raised delineator strip (diagram 1049.1 of TSRGD) must be used
- The delineation for segregated cycle lanes needs to be carefully detailed to provide good visual definition between carriageways and footways
- Where cycle tracks or shared use areas are provided, flush dropped kerbs must be provided at entry and exit points from the carriageway

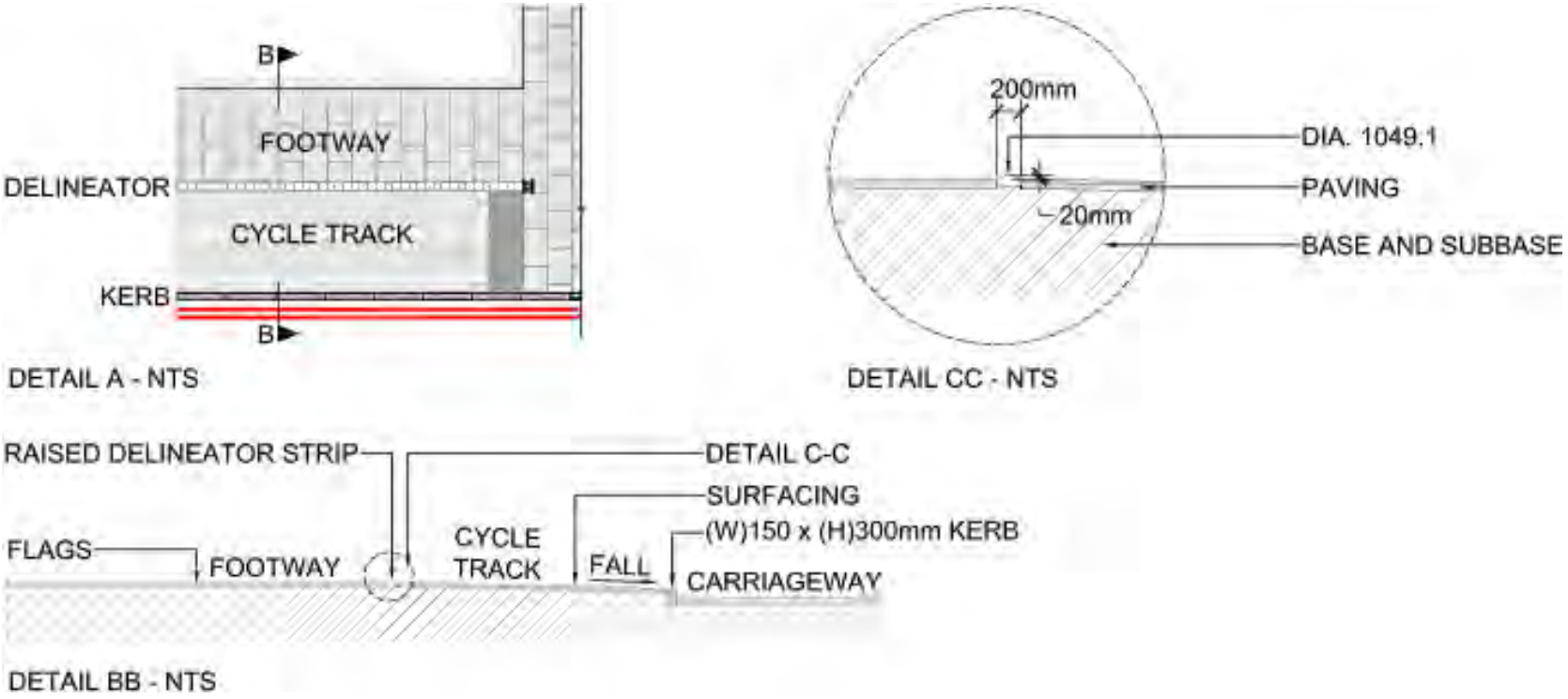
Drainage

- Cycle infrastructure should be free-draining to ensure effective widths for cycling and skid resistance properties are maintained across the facility
- Gully locations and levels need to be carefully detailed and the type of grating needs to be considered to best provide for cycling, refer to 'Keeping London dry' in this guidance for further information
- Gully gratings should be perpendicular to the direction of cyclists' travel to avoid wheels becoming caught in the grating

Maintenance

- All signing should be regularly monitored to ensure that surface markings are maintained and signs appropriately positioned
- Planting adjacent to cycle lanes and tracks should be maintained regularly to ensure cyclists do not have to leave the facility to avoid overhanging vegetation
- Surface defects can cause significant risks for cyclists and a regime to maintain high quality surfacing is essential for all designated routes
- Maintenance regimes should be aligned to our hierarchy of designated cycle routes, to ensure that the level of maintenance matches the extent of use

Figure 113: Segregated route on footway



Protected junction temporary trial Portland, USA

A 'protected intersection' designed to eliminate cycle-car conflicts

Key functions

Opportunity

Right turns at junctions can put cyclists into conflict with motor vehicles. A redesigned junction can remove this conflict.

Benefits

This reinterpretation of a Dutch cycle-friendly junction provides a phased and safe way to make a right turn. The introduction of kerbs within the junction reduces the crossing distance and offers a refuge to cyclists while they wait to complete their turn.

Implementation

Junctions that avoid merging cyclists and drivers have proven safer for both. This is a trial aimed at making junctions more comfortable for cyclists to use. Cycle friendly junctions take many forms and need to be adapted to their context.

The image shows a trial example of a cycle friendly junction in Portland, Oregon, USA (Image courtesy of Nick Falbo)

Applying in London

This Dutch inspired concept is being studied to determine its suitability for the London context. The hope is that the design will provide an increased sense and level of safety and comfort for cyclists, especially at busy junctions. At the moment this is a concept design which will require further design development and trialling prior to implementation.

Additional information

British Standards:

BS 594987:2010 Asphalt for roads and other paved areas

BS EN 13108: Bituminous mixtures. Material specifications (BSI, 2010)

Transport for London:

London Cycling Design Standards, 2014

Figure 114: Bus lane and advisory cycle lane on Westminster Bridge

8.5 Bus lanes

Bus lanes are provided on many red routes to increase journey time reliability for certain types of vehicles and encourage the use of sustainable transport modes. They are usually located at the kerbside to serve bus stops. However, they can also be located in the centre or offside of the lane. Other bus priority features on the carriageway can also include bus gates and access to bus station.

Other vehicles that may be permitted in bus lanes during designated times include coaches, taxis, motorcycles and cycles. In some limited locations, heavy goods vehicles may also use the bus lane and this will be indicated accordingly.

Design considerations

In determining the feasibility of implementing a bus lane within the existing built environment, consideration should be given to:

- The volume of potential bus users
- The carriageway width
- The overall capacity of the carriageway
- The proximity of street trees to the carriageway
- Delays to buses and impacts on general traffic

Start and end points of bus lanes

When determining the precise position of the start and end points of bus lanes, coordination of regulatory signs with other street furniture should be considered. Minor bus lane amendments may involve moving the start and finish by a few metres to enable existing street furniture to be used to locate regulatory signing, and minimise clutter. Any amendment to a bus lane requires a Traffic Regulation Order (TRO).

Designing for cyclists

There should be a general presumption that cycles are allowed to use bus lanes, however there are exceptions. For further information on bus lanes and cycling please see LCDS.

Road markings and signage

Signs and markings are a powerful way of representing legally enforceable bus lanes. Their format and use are controlled by the DfT, and they are disseminated via TSRGD, Traffic Signs Manual and TfL's Red Route Signing Manual.

Design teams should consider how to minimise the physical and visual impact by avoiding the unnecessary introduction of additional signposts.

Contact

Advice on the design and layout of bus lanes should be sought from our buses team, please contact the streetscape manager to determine the appropriate contact by emailing: **StreetscapeGuidance@tfl.gov.uk**

Authorisation

Any changes to a bus lane length or location requires a Traffic Regulation Order from the relevant regulatory authority, in the case of the TLRN the authority would be TfL. The installation or removal of a bus lane also requires a TRO.

Additional information

Statutory instruments:

Traffic Signs Regulations and General Directions (TSRGD)

Department for Transport:

Design Manual for Roads and Bridges

Local Transport Note 1/97: Keeping Buses Moving

Traffic Signs Manual, Chapter 3: Regulatory Signs

Traffic Signs Manual, Chapter 5: Road Markings

Figure 115: Waterloo Bridge Roundabout

8.6 Median strips/central reservations

Median strips have traditionally been used on high speed arterial routes to separate traffic flows and provide safety and operational benefits on the approach to junctions. These centrally located islands, usually consisting of a raised kerb edge and paved surface, are also found on numerous inner city roads with four lanes or more.

The use of median strips within urban street environments is becoming an increasingly attractive design option to provide an informal crossing point thereby reducing severance created by a wide carriageway or heavy volumes of traffic.

Figure 116: Upper Street in Angel with a wide central median used by pedestrians for informal crossings

Benefits

Median strips offer several benefits including:

- Facilitating safer and more convenient informal pedestrian crossing movements by effectively acting as an extended pedestrian refuge
- Reducing the carriageway width can help to reduce vehicle speeds, reduce crossing distances and create an environment more conducive to informal pedestrian crossing and social vibrancy
- Providing an opportunity to declutter the footway by locating street furniture on the median itself
- Kerbside activities such as loading or parking can also be integrated within wider median strips, while ensuring sightlines are maintained

Layout

Median strip design standards

There is no prescribed minimum width for a median strip, however, where the median is intended to also act as a central refuge for pedestrians, the following dimensions should be applied:

Median strip width	Suitable functions
1200mm – absolute minimum	Pedestrian refuge space for a straight across single phase formal crossing or informal crossing
1500mm – preferred minimum	More comfortable pedestrian refuge space for a straight across single phase crossing
3000mm	Sufficient space to accommodate a staggered crossing facility Minimum width to consider cycle parking Minimum width to consider tree planting Minimum width to consider central loading or parking bay
4000mm	Minimum width to consider a pedestrian refuge space for a straight across two phase crossing

Design considerations

Designs which have numerous short sections of median strip and open carriageway can detract from the quality and legibility of the street environment, and reduce the visual coherence of the median as a whole.

Layouts which significantly vary the width of the median strip should be avoided as this can create pinch points on the carriageway, pockets of ineffective space and visual clutter.

Medians may be introduced asymmetrically within the overall street layout, such that a single lane in one direction may be separated from two lanes in another direction, for example. This can be used to help support contraflow bus lane and contraflow cycle lane designs.

Figure 117: Brixton Road where a narrow median (less than 1,200mm) is widened at a controlled crossing to provide an acceptable refuge width

Road hatching is not always required therefore road geometry on the approach to the medians should be detailed so that minimal use of road hatching markings are required to reduce visual clutter and maximise useable road space.

The decision to include a median strip should consider the impact on cyclist comfort, as narrowing of the carriageway will likely be required. Poorly positioned or overly wide median strips can create pinch points on the carriageway which impact on cycle comfort and safety.

Street furniture

Care should be taken when locating furniture on the central median as it can impede informal crossing movements and reduce visibility of oncoming traffic.

Standard streetscape principles apply so that the median strip does not become overly cluttered and detract from the view of the other side of the street and the surrounding architecture.

- Street furniture on a median strip should be located a minimum 600mm from either kerb edge
- Street furniture should be located a minimum 1,000mm away from adjacent objects in long profile along the length of the median strip; 1,200mm for cycle parking stands, to allow for adequate pedestrian permeability across the median
- For speed limits of 40mph or more, the type of street furniture used on the median should be carefully considered. Furniture such as cycle parking will likely not be appropriate
- Low-level 'keep left' bollards can be used at the start of the median strip and should be clearly positioned 450mm from the kerb edge

Relocating lighting columns on the median strip can help to reduce clutter on the footway; however, this is a non-standard arrangement on the TLRN and requires SDRG approval. Designers should recognise the aesthetic impact of locating light columns in the centre of the road, and the safety implications in terms of lighting distribution, glare and providing sufficient footway lighting.

Figure 118: The central median on A40 Holborn Circus utilised for highway lighting and cycle parking

Planting on median strips can have maintenance implications which may require lane closures. Consult an arboriculturist to discuss viable planting options.

Cycle parking placed on the median strip can help to reduce clutter on the footways, but care should be taken as traffic conditions may make it difficult for cyclists to cross to the parking and rejoin the carriageway afterwards. It may also increase the distance to their destination such that they choose to 'fly park' on the footway instead.

Seating is rarely a practical solution on a central median and unlikely to provide a comfortable resting environment unless the median strip is sufficiently wide.

Figure 119: The central median on Kensington High Street utilised for cycle parking and tree planting

Construction

Surface materials

Surface materials for the median strip should be consistently applied along the length of the median and the tone and colour should resemble the surrounding footways.

The median strip surface materials do not need to match the actual materials used for the footway, however, a higher quality of finish and consistent aesthetic can be achieved when the materials do match.

Where a raised kerb is provided, no tactile paving delineation is required, except at designated formal crossing points with a dropped flush kerb.

Where vehicle overrun is anticipated or parking and loading bays incorporated as part of the median, small unit paving should be applied in the form of setts. Alternatively, these areas may be surfaced in asphalt with a kerb edge to delineate the median strip and appropriate edge restraint construction detailing for either side of the kerb.

Kerbs

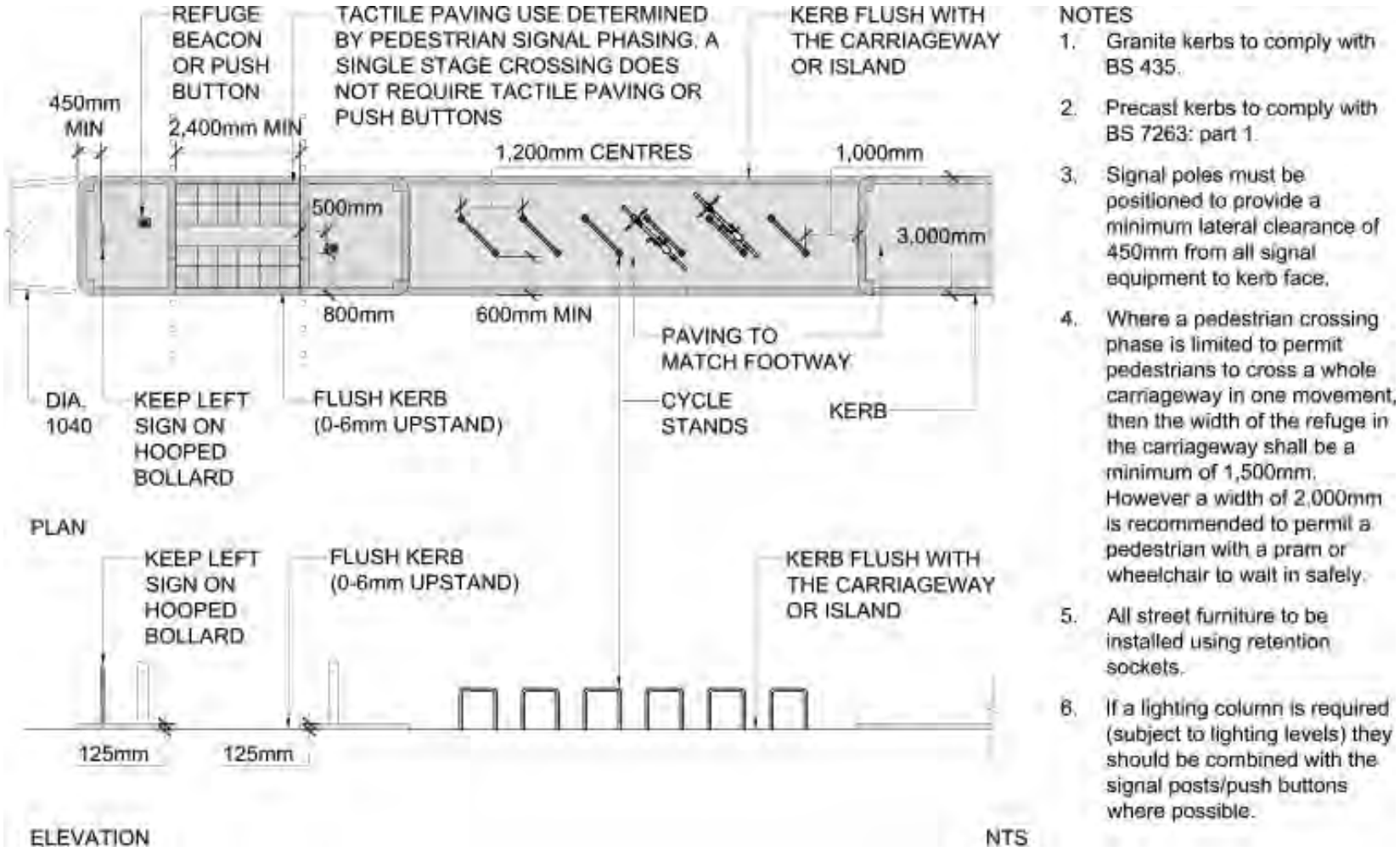
The kerb material and width should be consistent along the length of the median to provide clear delineation from the carriageway surface.

The kerb edge restraint detailing is vitally important and should be able to withstand impacts from vehicle overrun.

The kerb height for the median strip should be carefully considered and respond to the character and use of the street. The height is important to delineate the median from the carriageway and support the functional requirements of the median strip at specific locations.

Where inspection covers intersect the line of the median strip it may be necessary to detail the kerb edge around the cover. The preference, however, would be to accommodate the inspection cover on the median strip itself by moving the access point where practicable.

Figure 120: Median strip with street furniture



NOTES

1. Granite kerbs to comply with BS 435.
2. Precast kerbs to comply with BS 7263: part 1.
3. Signal poles must be positioned to provide a minimum lateral clearance of 450mm from all signal equipment to kerb face.
4. Where a pedestrian crossing phase is limited to permit pedestrians to cross a whole carriageway in one movement, then the width of the refuge in the carriageway shall be a minimum of 1,500mm. However a width of 2,000mm is recommended to permit a pedestrian with a pram or wheelchair to wait in safely.
5. All street furniture to be installed using retention sockets.
6. If a lighting column is required (subject to lighting levels) they should be combined with the signal posts/push buttons where possible.

Technical detail

Kerb cuts and paving layout for median strip

Kerb height	Median strip application
125mm-150mm	Standard upstand height where vehicle speeds are 40mph or greater
	Standard upstand height for central refuge at controlled crossing points and designated uncontrolled crossing points
60mm-125mm	Standard kerb upstand range where vehicle speeds are 30mph or less
Flush-6mm	Adjacent to centrally located cycle parking provision to allow convenient access for cyclists
Dropped kerb at formal crossings	
60mm	For shared surface schemes
	For centrally located parking and loading bay access

Additional information

The Highways Agency:
Design Manual for Roads and Bridges, Volume 6, Section 2: TD 42/95 Geometric Design of Major/ Minor Priority Junctions, 1995

Department for Transport:
Traffic Signs Manual (2003), Chapter 5: Road Markings

Figure 121: The central median should be paved in the same material as the footway

Figure 122: Oxford street's central median is paved in granite setts to match the concrete paving on the footways

Part E Crossings

Figure 123: Tactile paving is used to communicate important information to the visually impaired

9.1 Introduction

Walking is a great way of getting around London. It's free, healthy, environmentally friendly, and often the quickest option for short journeys. The provision of safe, inclusive and well-designed crossings is key to ensuring a quick and pleasant journey. Crossings can take on several forms including controlled, uncontrolled and grade-separated which are detailed here.

Figure 124: A crossing on Bishopsgate

9.2 Tactile paving

The consistent application of tactile paving is crucial for ensuring that pedestrians with visual impairments are supported in navigating the street environment safely and confidently.

A range of tactile paving types are used to help people identify particular hazards in the street and/or orientate towards a crossing. Generally these are units of paving that are specially designed to differ from the surrounding footway material, providing a detectable change in texture underfoot and a visual tonal contrast.

Figure 125: A busy crossing

There are four types of tactile paving used in London:

Blister

Corduroy

Ladder and tramline

Lozenge

Those involved in the design of tactile paving layouts should familiarise themselves with the design principles outlined in DfT's Guidance on the use of Tactile Paving Surfaces (2021), acting as the current national guidance. Designers should also acknowledge that ongoing research and experience in delivery has shaped what we consider to be best practice.

Common issues in application

Along with other local authorities in London, we have become increasingly aware that rigid application of the national guidance can have a detrimental impact on the legibility of tactile provision and negatively impact on the visual quality of the footway.

The complexity of London's street network, with irregular kerb geometries and angles of crossings, creates challenges for designers to comply with national guidance while providing a visually clean layout which is easily understood by people with visual impairments.

Common issues with layouts have emerged since the national guidance was produced and Streetscape Guidance recommends a number of departures from national guidance to overcome these challenges.

Ongoing research

We are undertaking ongoing research to conclude best practice designs for tactile paving to ensure the materials are effective. Streetscape Guidance will be reviewed and updated as research is completed to reflect best practice. TfL are in discussion with DfT to understand the latest research and will review any departures from National Guidance considering the latest research.

Good practice

Tactile paving should be carefully detailed to ensure consistency and quality in application so that it does not adversely affect the overall aesthetic of the streetscape. This extends to the workmanship and neatness of finish, with good planning and detailing required for overcoming any potential construction issue.

Detailing

- Inset covers should always be used where tactile paving meets an inspection cover and the careful design of fold and cut lines should be detailed to ensure the blister texture is consistently aligned across the cut
- Borders, such as the use of paint or setts, should not be provided around tactile paving
- The gradient of dropped kerbs should be carefully designed so as to maintain a constant gradient across the tactile surface
- Quadrant kerbs can be useful to ensure a neat finish at tight corners, ensuring vertical alignments are well integrated to avoid trip hazards
- Minimise the amount of tactile surfaces used to provide adequate support for visually impaired people while reducing the discomfort for those with walking difficulties and users of buggies or large bags

Materials

Concrete and natural stone are the most suitable materials for tactile paving as they are readily available in a range of appropriate colours, can be precast or cut into the required shape and have good slip resistance properties.

Yorkstone and granite may be considered at the request of the borough or where there is an urban design or heritage justification. It is prone to wear and does not generally comply with colour guidance. Use of Yorkstone or granite for tactile paving is subject to SDRG approval.

Metal studs are not generally recommended for use on the TLRN but may be considered by the SDRG in exceptional circumstances.

Detailed application

Blister paving

Application: Blister paving is used for two different purposes, functioning as a navigational guide for visually impaired pedestrians to help users locate, operate and cross at:

- Controlled crossings
- Uncontrolled crossings


Red concrete


Grey concrete


Yorkstone


Granite


Metal studs

The design and layout differs for these two applications, enabling this variation in crossing type to be communicated to users.

Layout

Blister paving at signal controlled crossings

- Should be provided at the kerb of the designated crossing point, as well as across the footway itself as a 'tactile tail'.

Figure 126: Blister paving at a crossing

Layout criteria

Dimensions

- 400x400mm paving unit with series of regular flat-topped blisters (5mm high, 25mm diameter) regularly spaced at 64-67mm across the unit.

Placement

- Two rows of 400x400mm tactile, for a total of 800mm wide at the narrowest point across the full width of the flush crossing. Tactile tails will form an 'L' shape at the crossing and are to be 800mm wide
- Blister paving should be oriented to align with the direction of the crossing
- Only full tactile slabs should be installed
- The maximum gradient should be of eight per cent (1 in 12) on the direct approach to a crossing and nine per cent (1 in 11) on the flared sides

Colour

- Red is standard on the TLRN for controlled crossings
- Contrasting grey for controlled crossings will be considered in conservation areas, or where red paving does not provide suitable contrast with surrounding paving
- Natural stone tactile paving may be produced using milled Yorkstone or granite but must have SDRG approval
- Metal paving studs are generally not recommended but may be adopted as an exception with SDRG approval

TLRN departures from national guidance

The following departures from national guidance should be used by designers working on TLRN schemes when designing tactile paving at controlled crossings:

- Exceptionally, where the area covered in tactile paving will be unnecessarily extensive or illegible due to a high radii kerb line combined with an abnormally wide crossing, consideration should be given to cutting the area of tactile paving to be consistently 800mm from the kerb edge. Each location is to be assessed and approved by TfL Engineering individually at the detailed level
- Research shows that partially visually impaired people often use the contrasting colour of tactile paving to guide them through the streetscape. However, there is less evidence that the specific colour used makes the space more legible. As such, the use of alternative contrasting coloured tactile paving will be considered on a case-by-case basis, for instance, in conservation areas or where the 'standard coloured' tactile paving does not contrast with the surrounding paving
- The use of reduced width tactile tails and tactile paving at the kerb edge (800mm instead of 1,200mm). Research undertaken in 2010 by University College London concluded that 'the blister profile is readily detectable when it is 800mm wide' as it will always capture a person's stride. We have therefore reduced the width used for all tactile paving surfaces from 1,200mm to 800mm; two rows of 400x400mm flags (reduced from three)
- The crossing of tactile tails can cause confusion for visually impaired users, and should be avoided. To avoid tails crossing, the tail associated with the crossing with lower pedestrian demand should be terminated at least 800mm from the other tail

Recording departures from national guidance

Consistency in application is of fundamental importance for legibility and so any deviations from national guidance and the national approach to tactile provision should be carefully justified.

Project files must record the reason for not following the national guidance. This includes recording how Streetscape Guidance has been followed in respect of the aforementioned departures from national guidance.

Figure 127: Blister tactile paving at controlled and uncontrolled crossings

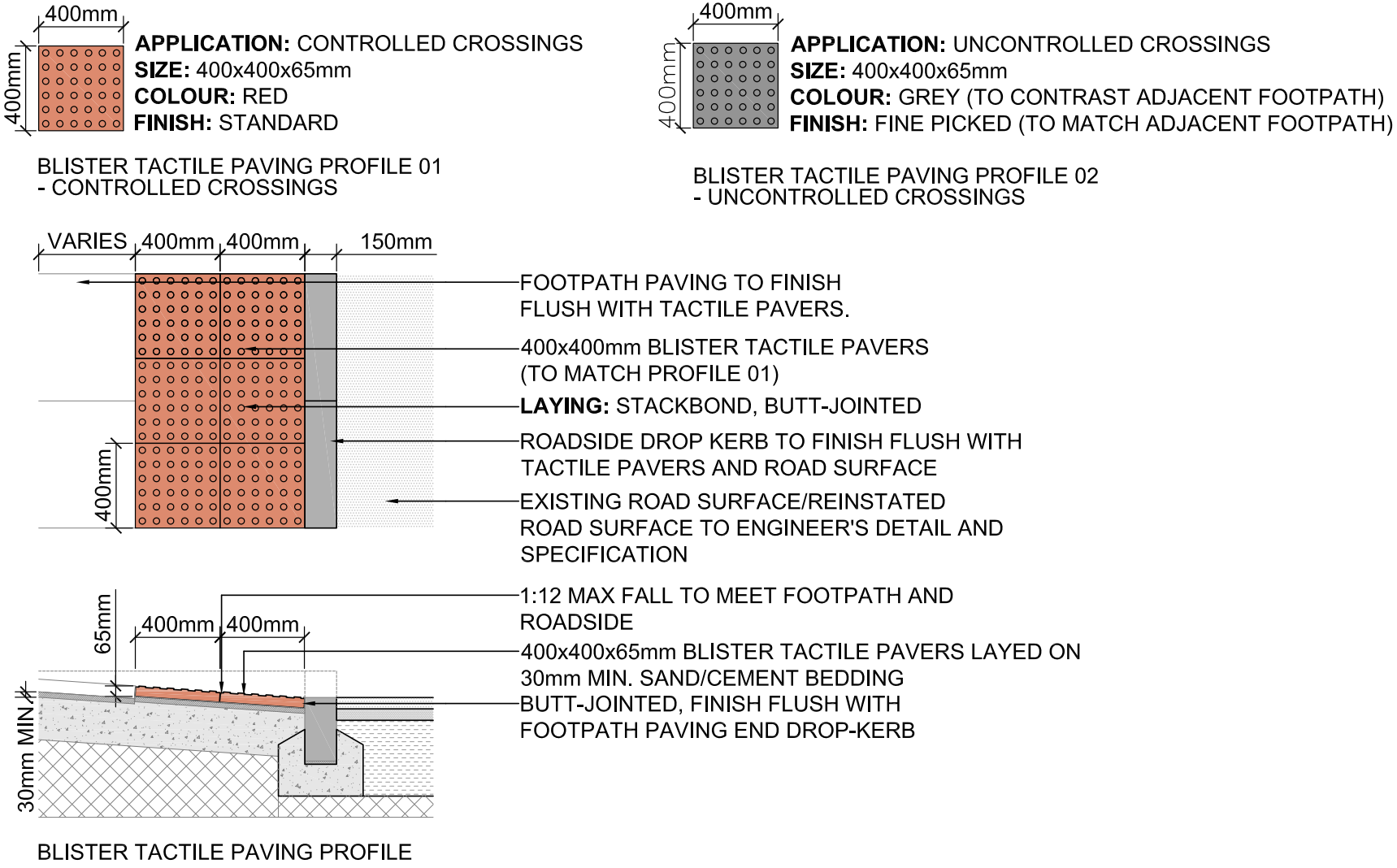


Figure 128: Controlled and uncontrolled crossing tactile layout

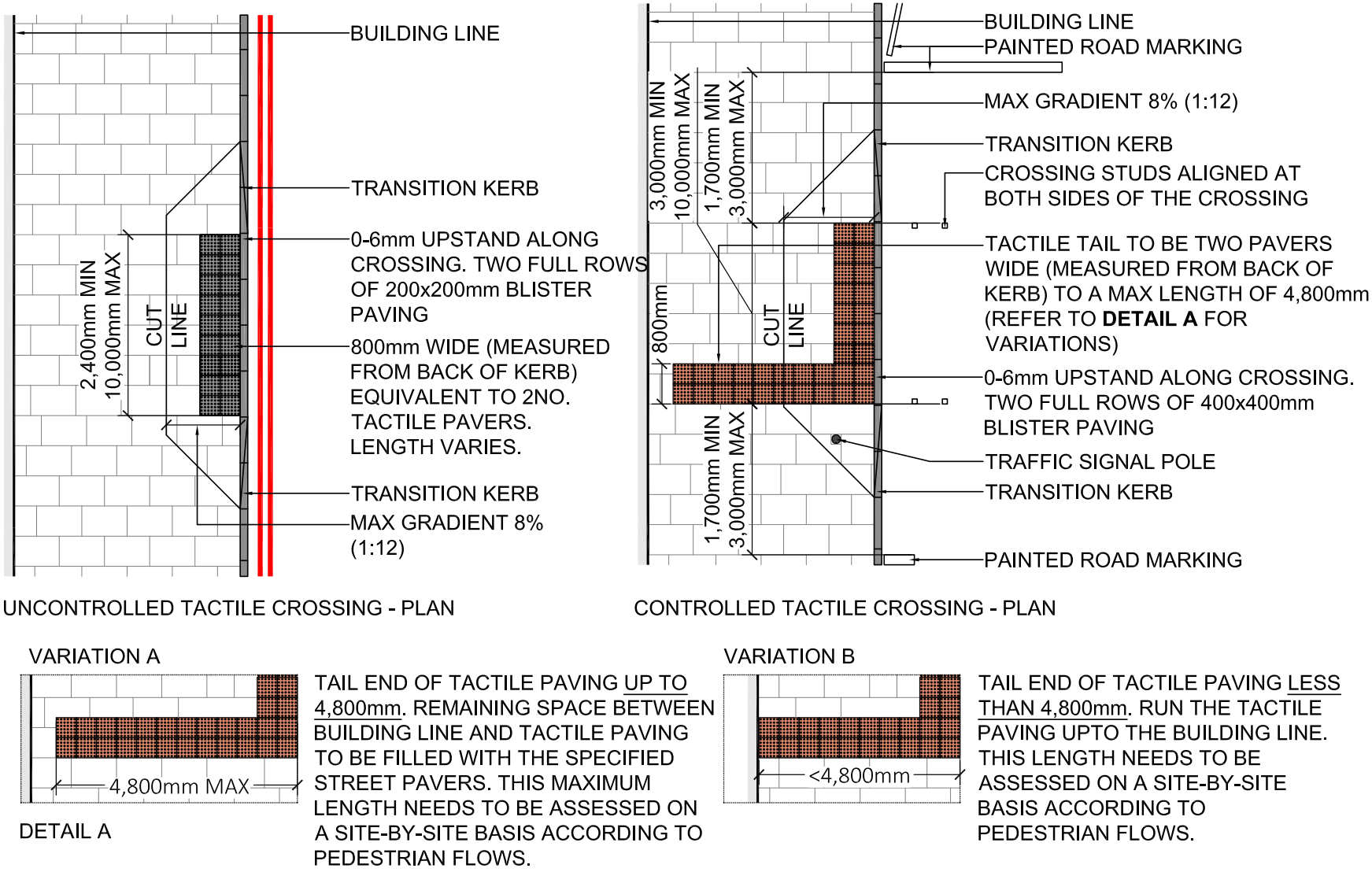
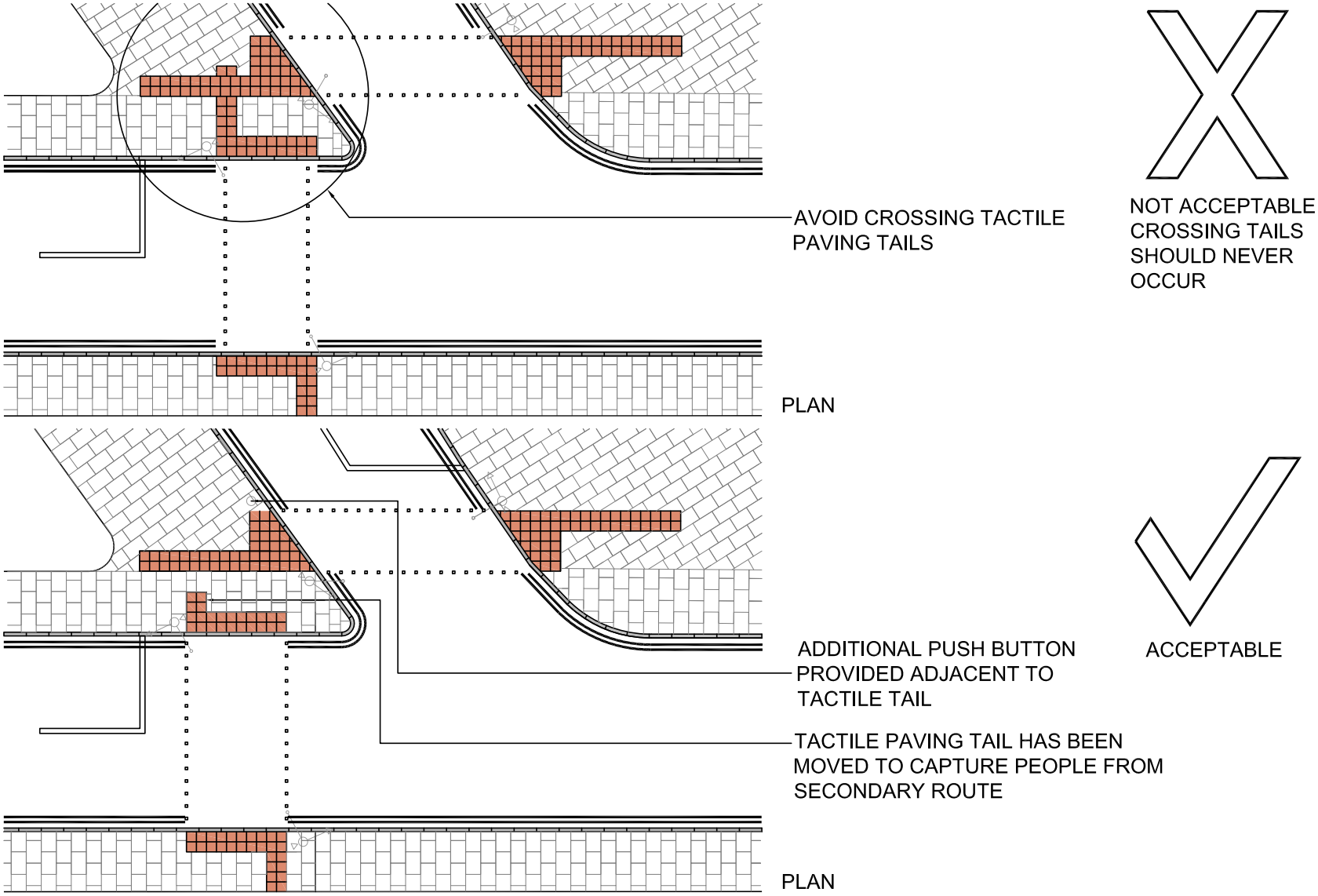


Figure 129: How to resolve a difficult tactile layout



Blister paving at uncontrolled crossings – uncontrolled crossings are used where vehicle flows and speeds allow pedestrians safe opportunities to cross a street without the need for a formal facility such as a signal crossing or zebra.

Layout criteria

Dimensions

- 400x400mm paving unit with series of regular flat-topped blisters (5mm high, 25mm diameter) regularly spaced at 64-67mm across the unit

Placement

- Two rows, 800mm wide at the narrowest point across the full width of the flush crossing
- Blister paving should be oriented to align with the direction of the crossing

Figure 130: Tactile paving should contrast with the surrounding footway material

- Exceptionally, the back of the crossing tactile paving may not need to be oriented at right angles to the crossing, and may be cut to be consistently 800mm from the kerb edge. This must be reviewed and approved by TfL Engineering on a case-by-case basis
- Tactile tails should not be provided
- Tactile paving associated with separate crossings should not join as this impacts on legibility
- Only full tactile slabs should be installed
- The maximum gradient should be of eight per cent (1 in 12) on the direct approach to a crossing and nine per cent (1 in 11) on the flared sides

Colour

- Contrasting grey – charcoal grey is standard on the TLRN for uncontrolled crossings
- Natural stone if tactile paving produced with milled granite/Yorkstone and as approved by SDRG

TLRN departures from national guidance

The following departures from national guidance should be used by designers working on TLRN schemes when designing tactile paving at uncontrolled crossings:

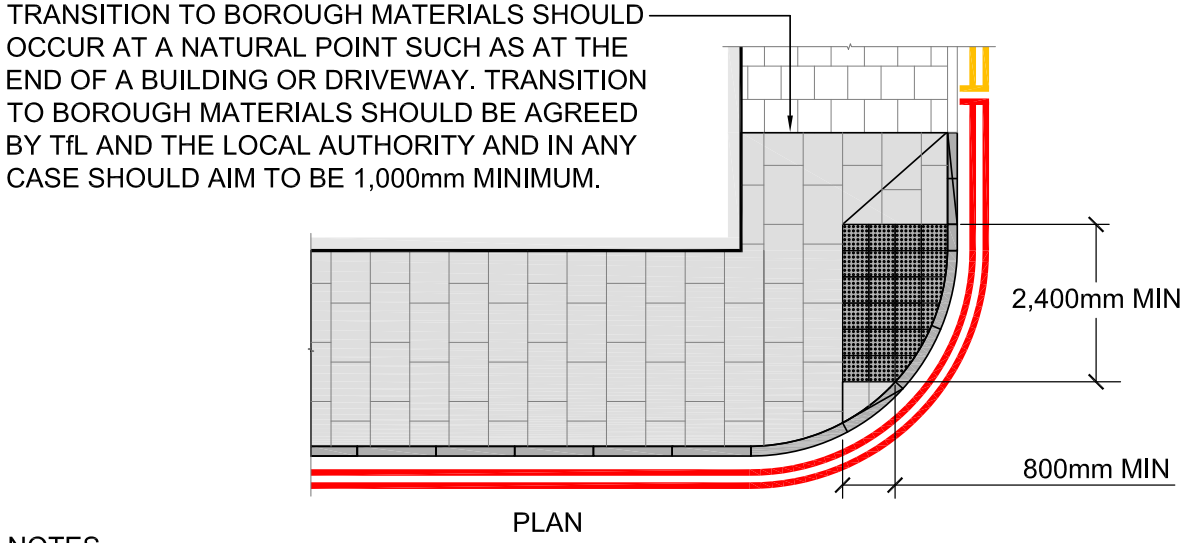
- Exceptionally, where the area covered in tactile paving will be unnecessarily extensive or illegible due to a high radii kerb line combined with an abnormally wide crossing, tactile paving should be cut to be consistently 800mm from the kerb edge. Each location is to be assessed and approved by TfL Engineering individually at the detailed level
- Research shows that partially visually impaired people often use the contrasting colour of tactile paving to guide them through the streetscape. However, there is less evidence that the specific colour used makes the space more legible. As such, the use of alternative contrasting coloured tactile paving will be considered on a case-by-case basis, for instance, in conservation areas or where the 'standard coloured' tactile paving does not contrast with the surrounding paving
- The use of reduced width tactile paving at the kerb edge in all cases (800mm instead of 1,200mm). Research undertaken in 2010 by University College London concluded that 'the blister profile is readily detectable when it is 800mm wide' as it will always capture a person's stride. We have therefore reduced the width used for all tactile paving surfaces from 1,200mm to 800mm; two rows of 400x400mm flags (reduced from three in certain circumstances)

Recording departures from national guidance

Consistency in application is of fundamental importance for legibility and so any deviations from national guidance and the national approach to tactile provision should be carefully justified.

Project files must record the reason for not following the national guidance. This includes recording how Streetscape Guidance has been followed in respect of the aforementioned departures from national guidance.

Figure 131: Uncontrolled pedestrian crossing at a side road



NOTES

1. Flags to be laid with courses set at 90 degrees to kerb and a minimum overlap bond of 150mm.
2. The bonding of paving to be cut around utility service covers unless directed by the resident engineer.
3. Flags should not be cut so that a width less than 300mm remains. Previous courses should be cut to distribute evenly over width.
4. Kerb dropped over approximately 1,800mm to provide a flush kerb (0-6mm upstand) over crossing width.
5. All work to be carried out in compliance with the requirements of the Manual Handling Operations Regulations 1992 (as amended in 2002).
6. All covers within the tactile areas have to be recessed and in-filled with blister paving. It would be desirable for the rest of the covers to be recessed in order to match the footway surface but this needs to be agreed with TfL and the utility companies need to be contacted in order to get an agreement and request appropriate labeled assets.

Corduroy paving

Application – corduroy should be used to identify specific hazardous situations for pedestrians including:

- The top and bottom of steps
- The foot of a ramp to an on-street light rapid transit platform, but not any other ramps
- While national guidance illustrates where the footway is to be shared-use with a segregated path for cyclists, the results of future research should conclude appropriate use
- On the approach to level crossings

Application – corduroy should not be used to:

- Identify segregated routes for pedestrians and cyclists where ladder and tramline paving should be used
- Provide a defined edge of kerb instead of a kerb upstand

Layout criteria

Dimensions

- 400x400mm paving unit with rounded raised ridges 6mm high, 20mm in diameter and equally spaced at 50mm

Placement

- The placement should comply with the DfT's Guidance on the use of Tactile Paving Surfaces (2021); generally 800mm (two paving units) wide, except for the approach to a level crossing and should extend the full width of the steps, ramp or footway

Colour

- Contrasting grey – charcoal grey is standard on the TLRN unless this provides insufficient contrast with surrounding footways

TLRN departures from national guidance

The following departures from national guidance should be used by designers working on TLRN schemes when designing corduroy paving:

- Research shows that partially visually impaired people often use the contrasting colour of tactile paving to guide them through the streetscape. However, there is less evidence that the specific colour used makes the space more legible. As such, the use of alternative contrasting coloured tactile paving will be considered on a case-by-case basis, for instance, in conservation areas or where the 'standard coloured' tactile paving does not contrast with the surrounding paving

Recording departures from national guidance

Consistency in application is of fundamental importance for legibility and so any deviations from national guidance and the national approach to tactile provision should be carefully justified.

Project files must record the reason for not following the national guidance. This includes recording how Streetscape Guidance has been followed in respect of the aforementioned departures from national guidance.

Figure 132: Corduroy paving

Figure 133: Corduroy paving used at stairs to indicate a level change

Ladder and tramline paving

Application – ladder and tramline paving should be used to delineate between segregated cycle and pedestrian surfaces on a shared use route. It should be used at the start and end of a cycle route on and level with the footway, as well as at any junction where pedestrians with visual impairments may unknowingly walk on to the cycle track, and as a repeater marking as required.

Layout criteria

Dimensions

- 400x400mm paving unit with flat-topped bars 5mm high, 30mm wide and spaced 70mm apart

Placement

- Consideration should be given to omitting the ladder (pedestrian) side of ladder and tramline paving, in order to enhance the simplicity and legibility of the pedestrian environment. In all such cases, an Equality Impact Assessment should be completed to ensure this approach is appropriate, and the results clearly highlighted and justified in consultation materials. Where this approach is not appropriate national guidance should be followed and designs brought to SDRG for approval.

Colour

- Contrasting grey or to contrast the surrounding footway material

Figure 134: Ladder and tramline paving 800mm width on Borough Road

TLRN departures from national guidance

The following departures from national guidance should be used by designers working on TLRN schemes when providing ladder and tramline paving:

- Customer research by TfL (2015) has demonstrated that ladder and tramline paving is poorly understood, serves a limited function in informing visually impaired people where they should or should not walk and is difficult to traverse by people who are mobility impaired. The cycle facility should be properly delineated so that all users know if they are walking into it. Consideration should therefore be given to omitting ladder paving (pedestrian side) on segregated footways and only provide tramline paving (cycling side), to enhance the simplicity and legibility of the pedestrian environment. In all such cases, an Equality Impact Assessment should be completed to ensure this approach is appropriate, and the results clearly highlighted and justified in consultation materials. Where this approach is not appropriate national guidance should be followed and designs brought to SDRG for approval.
- While national guidance for ladder and tramline recommends an application 2,400mm depth, 800mm will be accepted based on the findings of UCL's (2010) research which revealed an 800mm depth for blister paving will capture a person's stride.

Recording departures from national guidance

Consistency in application is of fundamental importance for legibility and so any deviations from national guidance and the national approach to tactile provision should be carefully justified.

Project files must record the reason for not following the national guidance. This includes recording how Streetscape Guidance has been followed in respect of the aforementioned departures from national guidance.

Lozenge paving

Application – lozenge paving should be used at tram stops on the open street.

Figure 135: Lozenge paving at a tram stop

Layout criteria

Dimensions

- 400x400mm paving unit, with rows of lozenge shaped rounded raised ridges 6mm high, 150mm in length and 83mm in width and equally spaced at 50mm

Placement

- The placement should comply with the DfT's Guidance on the use of Tactile Paving Surfaces; generally 400mm (one paving unit) wide parallel to the platform edge and a minimum of 500mm back from the edge

Colour

- Buff

Additional information

Department for Transport:

Inclusive mobility – A guide to best practice on access to pedestrian and transport infrastructure, 2021

Guidance on the use of Tactile Paving Surfaces, 2021

Inclusive Design for Getting Outdoors (I'DGO): Design Guide 003 Note: Tactile Paving

9.3 Controlled crossings

To create a high quality walking environment it is essential that where the pedestrian desire lines, pedestrian demand and vehicular flow justify, controlled crossing points are provided to cross the carriageway, typically but not necessarily at junctions.

Provision of formal crossings can partially change desire lines but they will not prove successful if they require a significant deviation in natural pedestrian flow.

On the TLRN several different controlled crossing types are used to provide fit for purpose crossing facilities appropriate to the urban context, including:

- **Signal controlled crossings** – located on busy routes where pedestrians need a formal pedestrian phase
- **Non-signal controlled crossings** ('protected crossings') – the zebra family of crossings are non-signal controlled crossings

The design team should consider the relationship of the crossing to adjacent building entrances and side roads, and coordinate the design with surrounding street furniture and tree planting.

Crossing category	Permitted crossing type
Signal controlled crossing	Ped-X Toucan Pegasus
Non-signal controlled crossing	Zebra Zebra with parallel cycle crossing

Controlled crossings can be further split into:

- Straight-across single stage
- Straight-across two stage
- Staggered two (or more) stage

Figure 136: Controlled crossing on Upper Street, Angel

General crossing considerations

For all types of crossing, the following general design guidance should be followed.

Design

The effective design and layout of crossings requires an understanding of a number of interrelated factors including the road context and proximity to any junctions, traffic and pedestrian flows, existing desire lines, traffic speeds and road safety issues.

Materials

Anti-skid surfacing should not be used on the carriageway surface between the crossing studs as pedestrians with mobility impairments can experience discomfort or difficulty in crossing these surfaces.

Coloured surfacing should not be applied unless approved by the SDRG.

It may be appropriate to continue footway materials across the carriageway where pedestrian priority or a unified space is being promoted.

Drainage

- Ensure drainage gullies are not located within the crossing
- Levels must enable surface water to drain away from the crossing

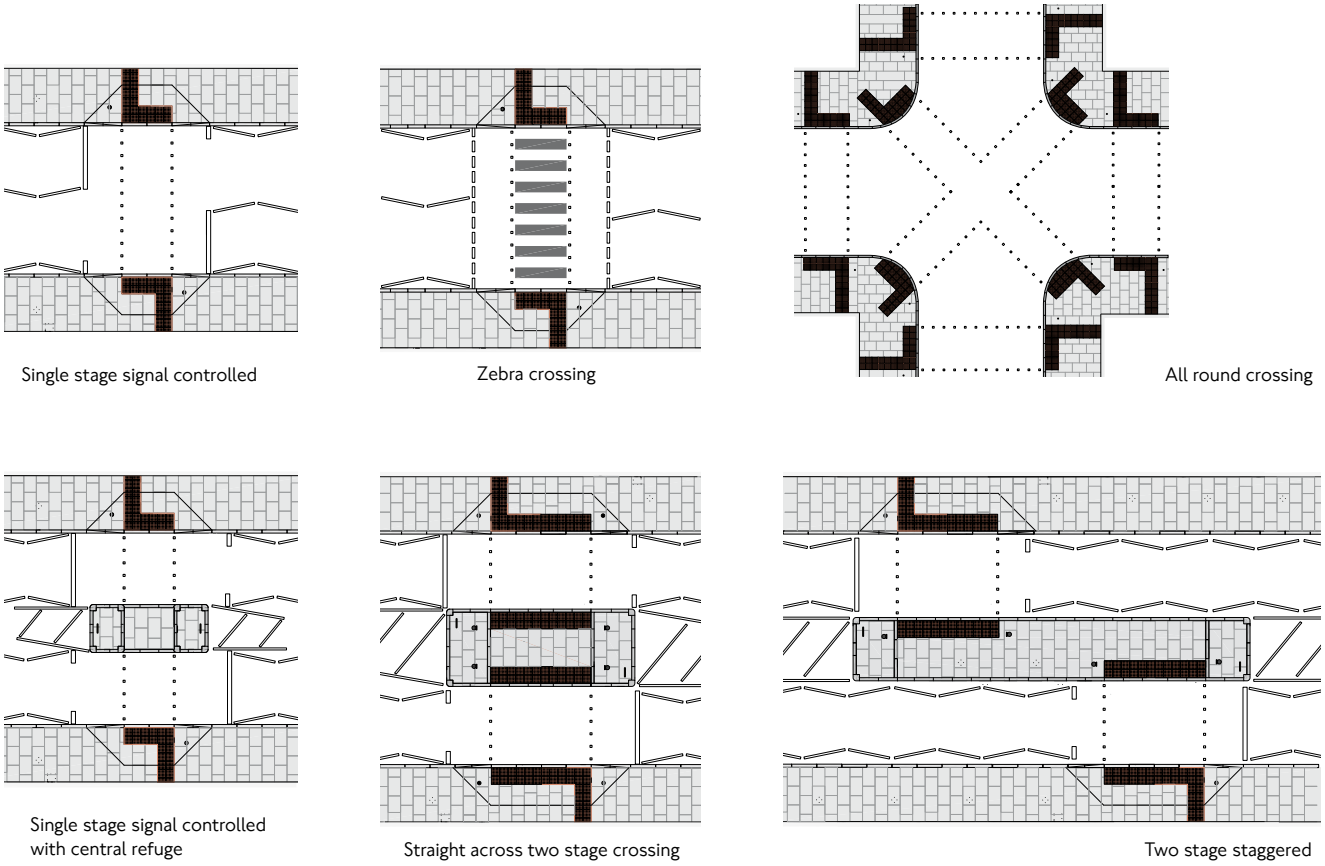
Safety

- Guardrailing should not be used unless there is evidence that pedestrian safety would otherwise be compromised. Please refer to 'Barrier free footways' for further information
- Sightlines at crossings should not be obstructed by street furniture, plantings or parked/stopped vehicles
- Crossings should not be located where sharp bends in the road occur as this may create blind corners and reduce driver awareness to stop within a safe distance

Pedestrian comfort

- Both the footway and the crossing should be fit for purpose such that pedestrians are not overly constrained on the crossing or in the waiting area. Refer to our Pedestrian Comfort Guidance for London (2010) to determine the required levels of service
- A 5,000mm wide crossing or similar is recommended where footways are narrow (less than 3,000mm) to increase waiting space and minimise obstructing pedestrian flows on the footway
- At-grade crossings are preferred to subways and footbridges, to better serve pedestrian desire lines and facilitate greater priority for pedestrians

Figure 137: Controlled crossing types



- At especially busy crossings, for example outside stations, the designer should review the potential for footway widening and the provision of crossings wider than 5,000mm
- Single stage crossings are preferred to staggered arrangements, to better serve pedestrian desire lines and facilitate greater priority for pedestrians

Signal controlled crossings

Pedestrians establish priority over vehicles at signal controlled crossings through the use of signal controlled pedestrian phases. Selection should be based on traffic volumes, speed and pedestrian flows, as well as whether the crossing is at a junction or standalone.

Pedestrian crossing facility (Ped-X)

This is the preferred crossing for all new, modified and modernised signal layouts. The layout appears similar to a pelican crossing with far-sided pedestrian aspects, but the traffic light sequence is as a signalised junction, has no flashing amber vehicle signal and usually includes a countdown timer.

Figure 138: A Ped-X crossing on Harrow Station Road with no pedestrain countdown timer

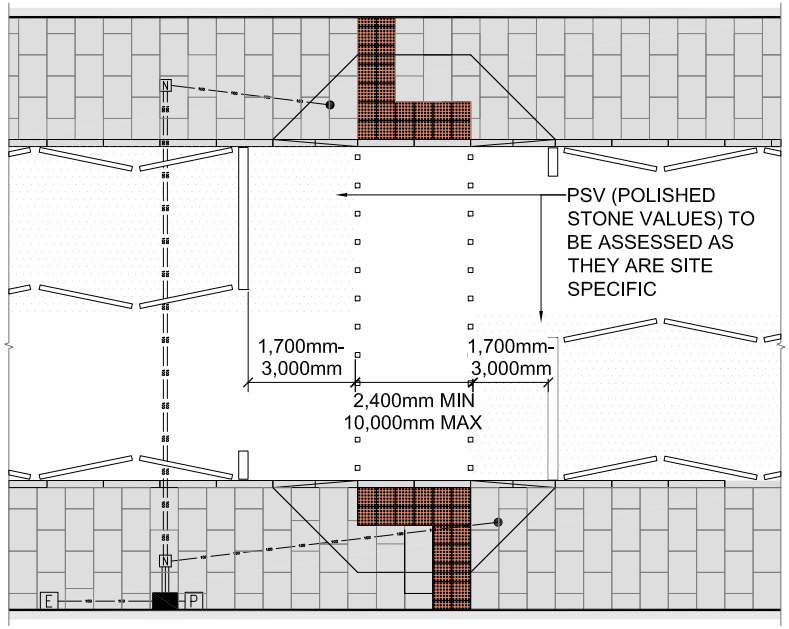
Layout criteria

Straight-across Ped-X crossings	
Preferred minimum crossing width	3,200mm
Maximum crossing width	10.0 metres
Dropped kerbs	1:20 preferred to 1:12 (maximum)
Additional requirements where a central refuge is provided	
Recommended minimum central refuge depth	2,000mm
Recommended minimum central refuge length	7,200mm
Kerb upstand around central refuge	125mm
Additional requirements for staggered Ped-X crossings	
Preferred minimum central refuge kerb to kerb	3,000mm
Minimum stagger distance between crossing points on central refuge	4,000mm recommended. Relaxations may be permitted with SDRG approval
Stagger for all two-way roads	Left stagger to face oncoming traffic, unless otherwise agreed with SDRG
Recommended minimum distance from uncontrolled junctions to primary signal pole	20.0 metres

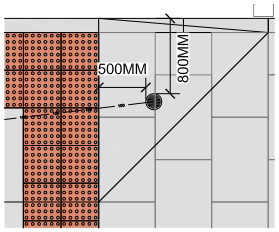
Good practice

- Countdown timers should be considered for all Ped-X crossings
- Signal timings should be appropriate to pedestrian flows and traffic volumes
- All signal schemes are required to have a design and safety check in line with the Design Standards for Signal Schemes in London
- Tactile rotating cones should be fitted to all controlled crossings
- Audible bleepers should be fitted to standalone signal controlled crossings and 'all round' crossings at junctions as detailed in DfT Traffic Advisory Leaflets 4/91 and 5/91

Figure 139: Ped-X crossing



PLAN

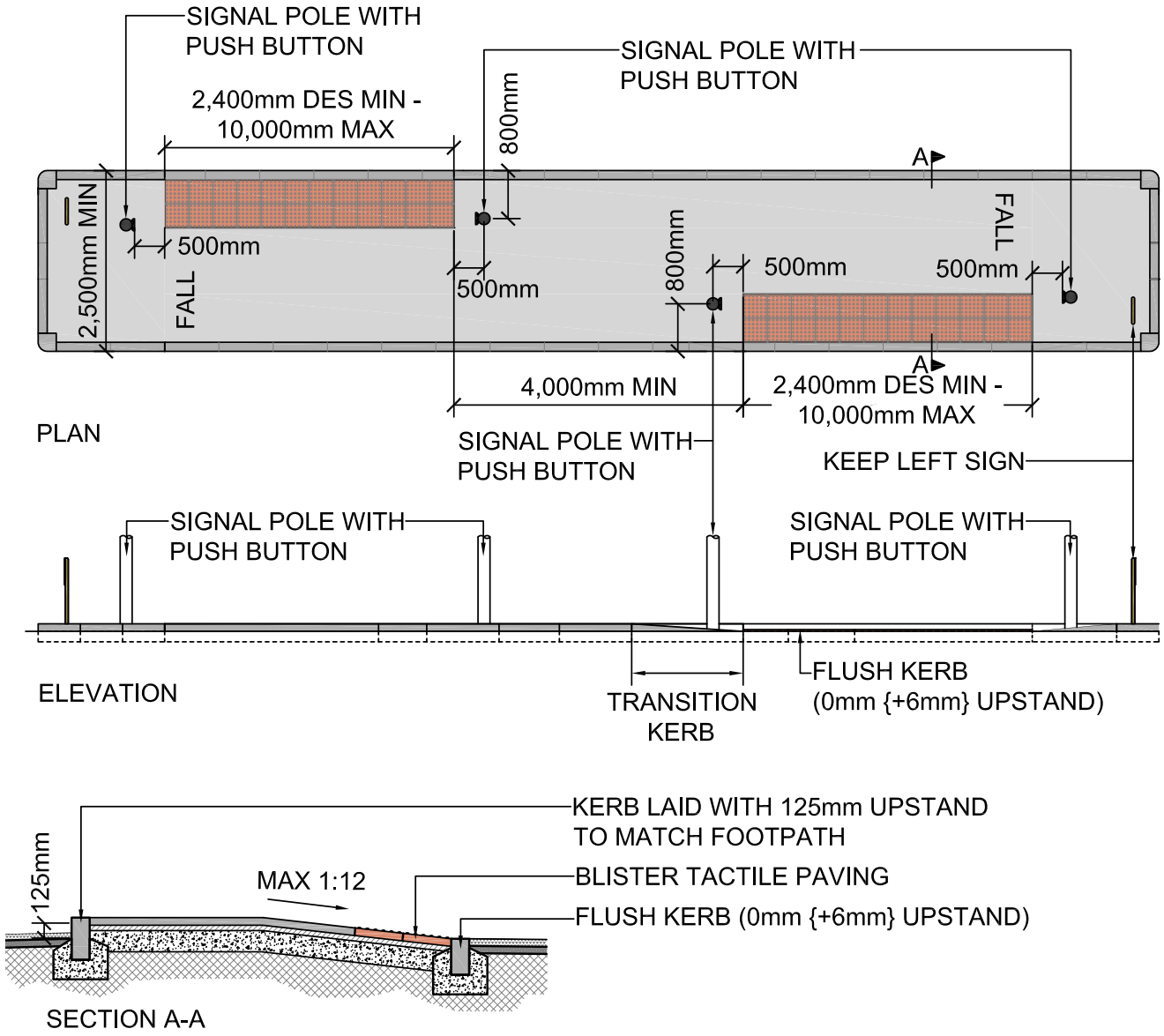


PED-X SIGNAL SCALE 1:50

Notes:

1. All works to be carried out to the relevant tfl specification.
2. Duct layout is indicative only and subject to site conditions.
3. Traffic signal poles must be positioned to provide a minimum lateral clearance of 450mm from all signal equipment to kerb face.
4. All poles to be installed on retention sockets.
5. Pushbuttons to be mounted at 45° to kerb on all poles.
6. Engineer to specify width of crossing (between stud lines). Width should be in increments of 400mm to accommodate exact number of standard 400x400mm blister paving slabs.
7. Ideal tactile arrangement as shown with two rows of blister for the width of the crossing and a tail of three blister slabs wide from the right hand side of the crossing extending to back of footway or to 5,000mm maximum.

Figure 140: Pedestrian refuge islands – staggered crossing



Notes

1. All street furniture must be positioned to provide a minimum lateral clearance of 450mm to kerb face.
2. If a lighting column is required (subject to lighting levels) they should be combined with the signal posts/push buttons where possible.
3. Material in central refuge island to match material on footway.

Toucan crossing facility

Toucan crossings allow both pedestrians and cyclists to cross without segregation. These crossings are typically used in conjunction with shared use footways. Far-sided signals have a green cycle symbol alongside a green/red man.

If a two-stage toucan crossing is required in exceptional circumstances its design should be carefully considered as cyclists may not stop on the refuge.

Figure 141: A busy toucan crossing at Hyde Park Corner

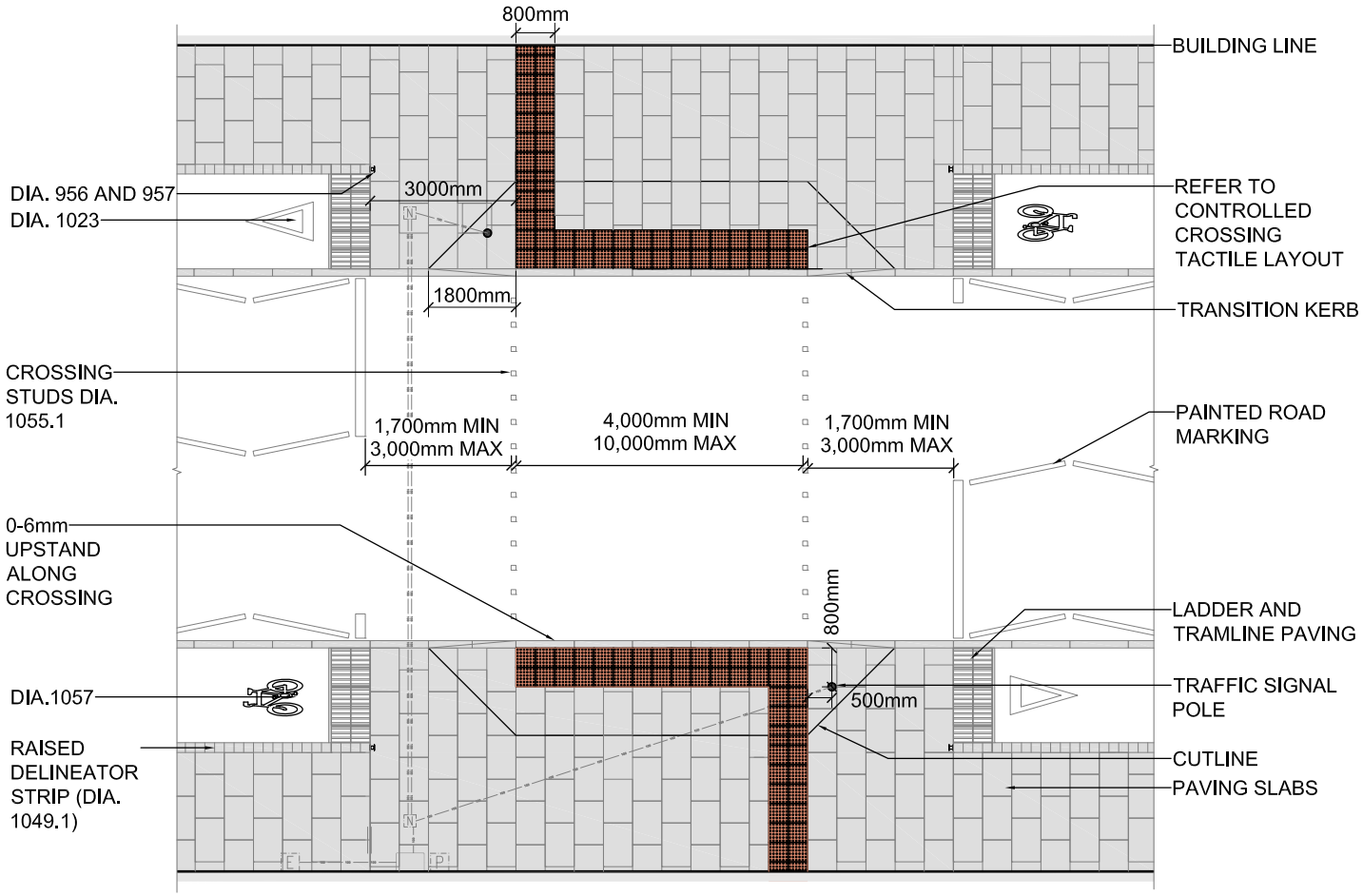
Layout criteria

Straight-across toucan crossings	
Preferred minimum crossing width	4,000mm
Maximum crossing width	10.0 metres
Dropped kerbs	1:20 preferred to 1:12 (maximum)
Additional requirements where a central refuge is provided	
Recommended minimum central refuge width	3,000mm
Recommended minimum central refuge length	8,000mm
Kerb upstand around central refuge	125mm
Additional requirements for staggered toucan crossings	
Central refuge width kerb to kerb	7,000mm recommended 4,000mm preferred minimum
Minimum stagger distance between crossing points on central refuge	4,000mm recommended. Relaxations may be permitted with SDRG approval
Stagger for all two-way roads	Left stagger to face oncoming traffic, unless otherwise agreed with SDRG
Recommended minimum distance from uncontrolled junctions to primary signal pole	20.0 metres

Good practice

- Far-sided toucan crossings are preferred. This permits the addition of countdown signals
- Signal timings should be appropriate to pedestrian and cycle flows and traffic volumes
- All signal schemes are required to have a design and safety check in line with the Design Standards for Signal Schemes in London
- Tactile rotating cones should be fitted to all controlled crossings
- Audible bleepers should be fitted to standalone signal controlled crossings

Figure 142: Toucan crossings



Other cycle facilities

Where safety considerations, traffic flow, speed or demand provide justification, signal controlled cycle facilities can be used to enable cyclists to cross. Cycle facilities can come in the form of a toucan or facilities that treat cyclist as a vehicular movement.

There are a range of cycle facilities available to allow cycle routes to cross a carriageway. Please refer to LCDS or speak to the Traffic Infrastructure team for further information.

Figure 143: A signalised cycle facility next to a pedestrian crossing

Pegasus crossing

Pegasus crossings allow horses and their riders to cross. These crossings are similar to toucan crossings but have a red/green horse symbol and additional push buttons mounted at a greater height.

Figure 144: A parallel toucan and pegasus crossing at Constitution Hill and Duke of Wellington Place

Layout criteria

Pegasus crossing	
Preferred minimum crossing width	4,000mm
Maximum crossing width	10.0 metres
Dropped kerbs	1:20 preferred to 1:12 (maximum)
Additional requirements where a pegasus crossing is adjacent to a pedestrian/cycle crossing	
Minimum separation between crossings	3,000mm
Maximum separation between crossings	5,000mm
Other standards apply as per the relevant pedestrian/cycle crossing type	

Good practice

- For specific design guidance consult with TfL's Traffic Infrastructure team
- All signal schemes are required to have a design and safety check in line with the Design Standards for Signal Schemes in London
- Tactile rotating cones should be fitted to all controlled crossings
- Audible bleepers should be fitted to the adjacent pedestrian/cycle crossing as detailed in DfT Traffic Advisory Leaflet 3/03

Diagonal or 'all red signal' crossings

At a signal controlled junction, a diagonal or 'all red signal' crossing provides an exclusive pedestrian stage to enable pedestrians to use all crossing points simultaneously and enable diagonal crossing movements (which may be appropriate for crossings with high, consistent pedestrian flows across all arms).

Figure 145: Diagonal crossing in Wimbledon

Layout criteria

Diagonal or 'all red signal' crossings	
Preferred minimum crossing width	3,200mm
Maximum crossing width	10.0 metres
Dropped kerbs	1:20 preferred to 1:12 (maximum)
Additional requirements where central refuge is provided	
Minimum central refuge depth	2,000mm
Minimum central refuge length	7,000mm
Kerb upstand around central refuge	125mm

Good practice

- Signal timings should be appropriate to pedestrian and traffic volumes
- All signal schemes are required to have a design and safety check in line with the Design Standards for Signal Schemes in London
- Tactile rotating cones should be fitted to all controlled crossings
- Audible bleepers should be fitted as detailed in DfT Traffic Advisory Leaflets 4/91 and 5/91

Controlled non-signalised crossings

Zebra crossings

Zebra crossings are laid out with alternating black and white bands, marked by zigzag markings on the approach and flashing beacons. Pedestrians only have right of way once they have stepped on the markings designating the crossing. However, pedestrians should remain on the kerbside for safety until approaching vehicles have stopped.

Zebra crossings are therefore only recommended for low speed environments, 35mph or less, provided there are clear sightlines.

Cyclists do not have legal priority over motor vehicle traffic, however it is not illegal, depending on the provision from the footway, to cycle across a zebra crossing.

Zebra crossings are not generally permitted on routes under the Urban Traffic Control (UTC) system, and require SDRG approval.

Zebra crossings with parallel cycle crossing

Unlike a conventional zebra crossing, this design requires motorists to give way to cyclists using the crossing.

- Belisha beacons are required at each end of the crossing
- Zigzag markings are required at each side of the crossing
- Care must be taken to design out conflict between road uses. The cycle crossing should connect at each end to provide clear coherent cycle routes
- This type of crossing can be used on roundabouts with a cycle lane, as shown below
- For detailed information please refer to London Cycling Design Standards (2014)
- Authorisation to use this type of crossing shall not be permitted until such time as it is approved for use within the TSRGD

Figure 146: Zebra crossing

Figure 147: A zebra crossing with a parallel cycle crossing in Milan

Figure 148: Zebra crossing

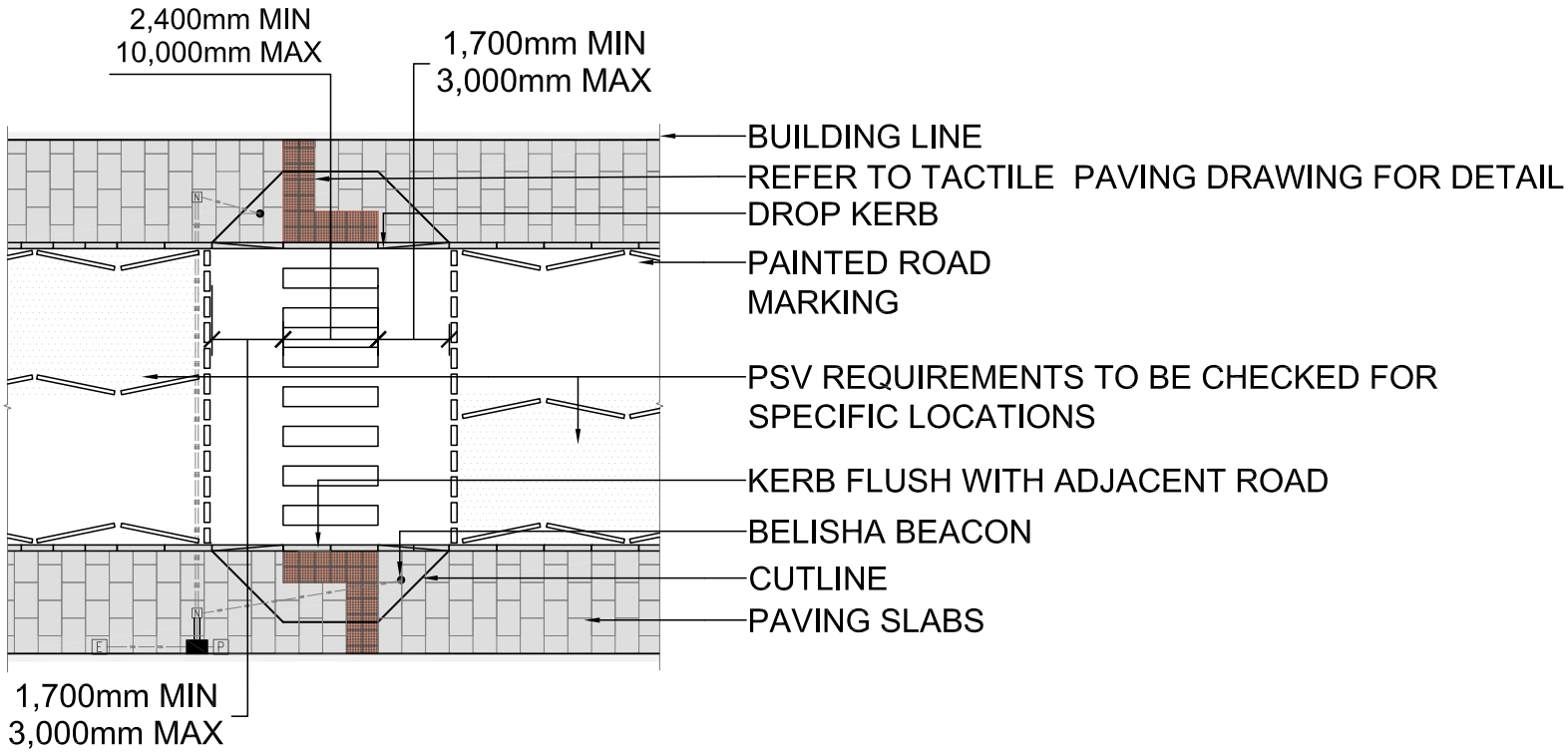
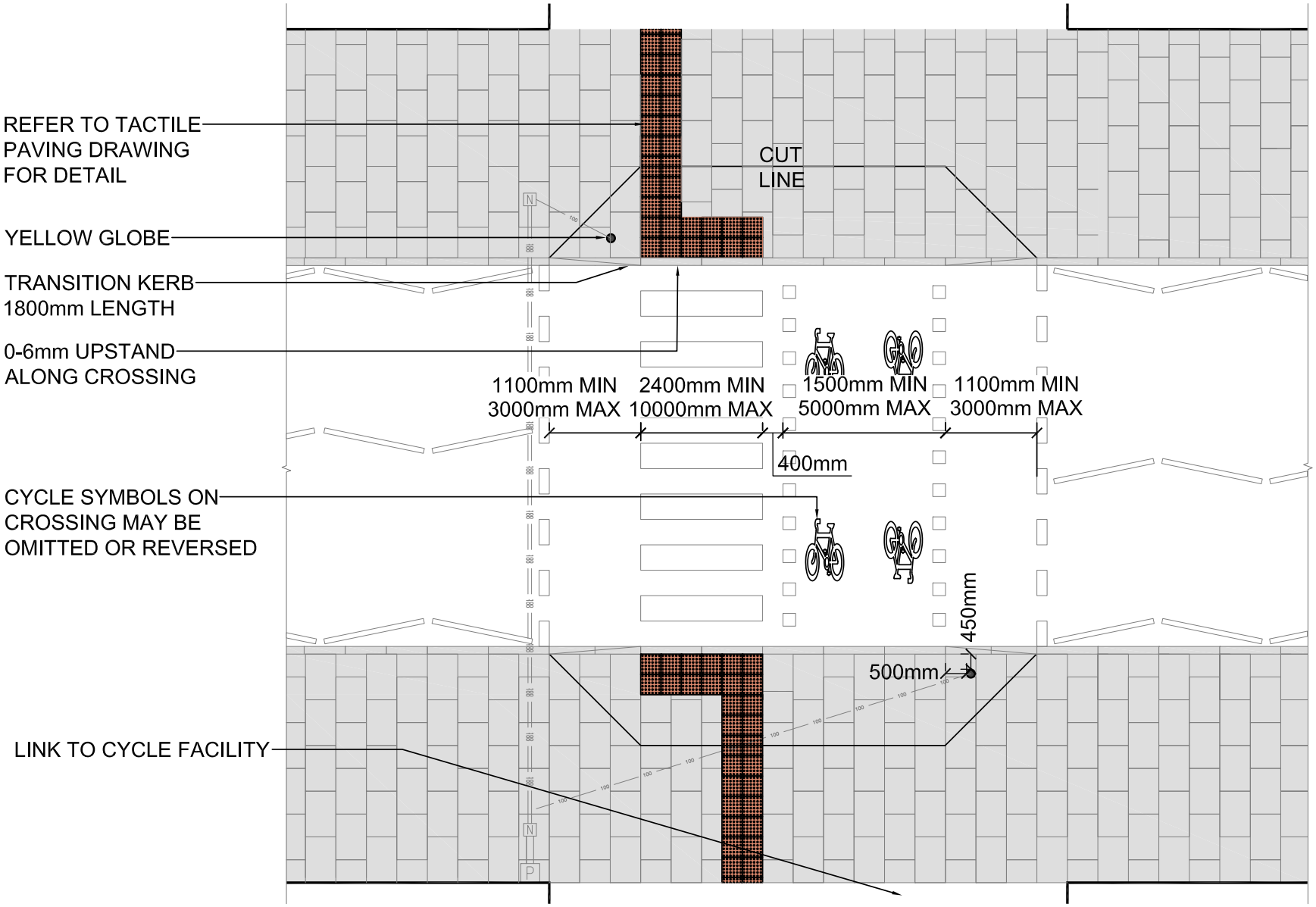


Figure 149: Parallel pedestrian and cycle crossing



Additional information

Department for Transport:

Guidance on the use of Tactile Paving Surfaces, 2021

Local Transport Note (LTN) 1/95: The Assessment of Pedestrian Crossings, 1995

LTN 2/95: The Design of Pedestrian Crossings, 1995

Traffic Advisory Leaflet 3/03: Equestrian Crossings, 2003

Traffic Advisory Leaflet 5/05: Pedestrian Facilities at Signal-Controlled Junctions, 2005

Traffic Advisory Leaflet 5/91: Audible and Tactile Signals at Signal-Controlled Junctions, 1991

Traffic Advisory Leaflet 1/06: General Principles of Traffic Control by Light Signals, 2006

Transport for London:

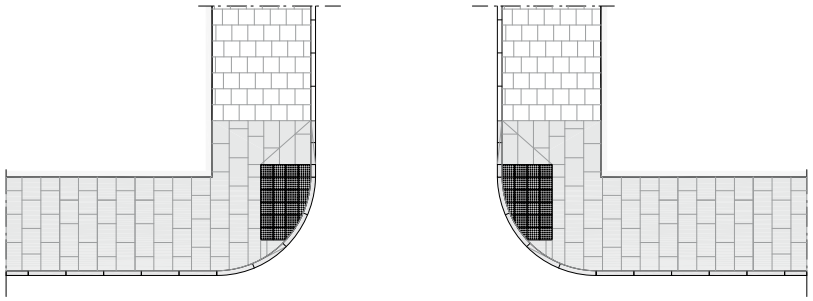
Design Standards for Signal Schemes in London

9.4 Uncontrolled crossings

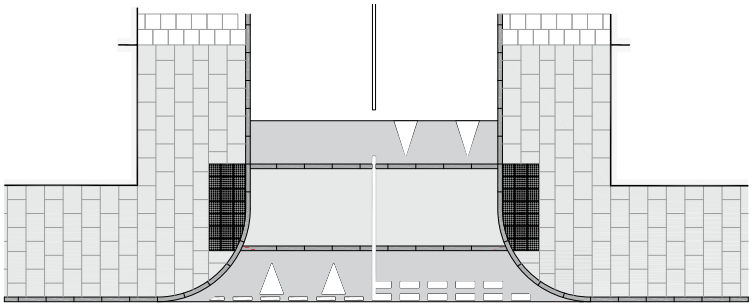
Uncontrolled pedestrian crossings should be located on pedestrian desire lines at side roads or at signalised junctions without pedestrian phases as a 'walk with traffic' facility. The pedestrian does not have priority over vehicles at these crossings and has to seek safe crossing opportunities when traffic is held on a red signal.

Figure 150: Uncontrolled crossing

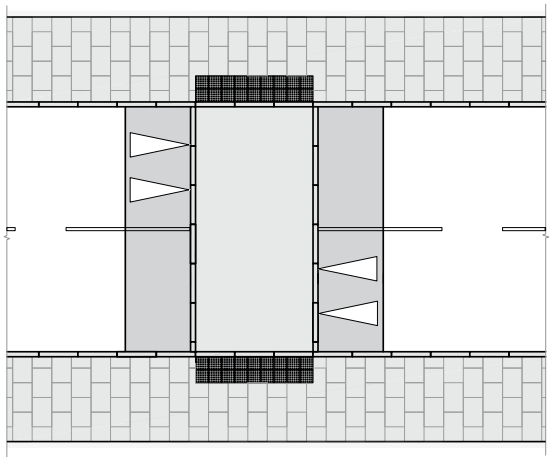
Figure 151: Uncontrolled crossing



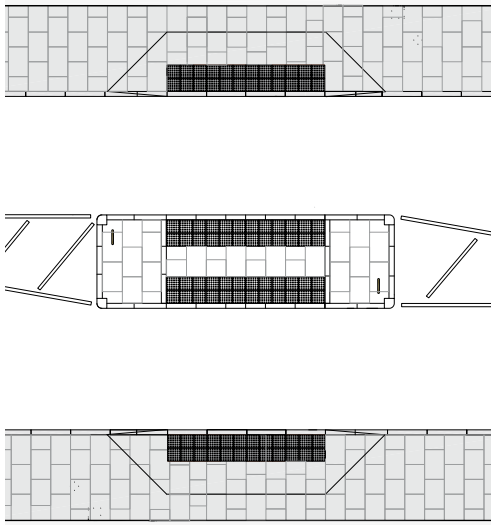
Side road uncontrolled crossing



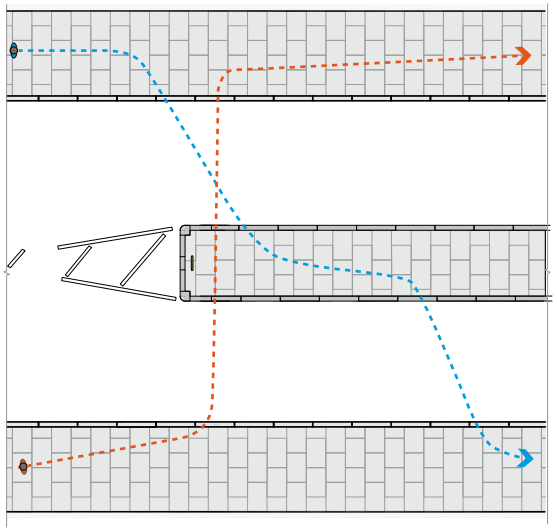
Side road uncontrolled crossing with raised entry treatment



Uncontrolled crossing with raised table



Uncontrolled crossing with refuge island



Typical informal crossing movements supported with central median

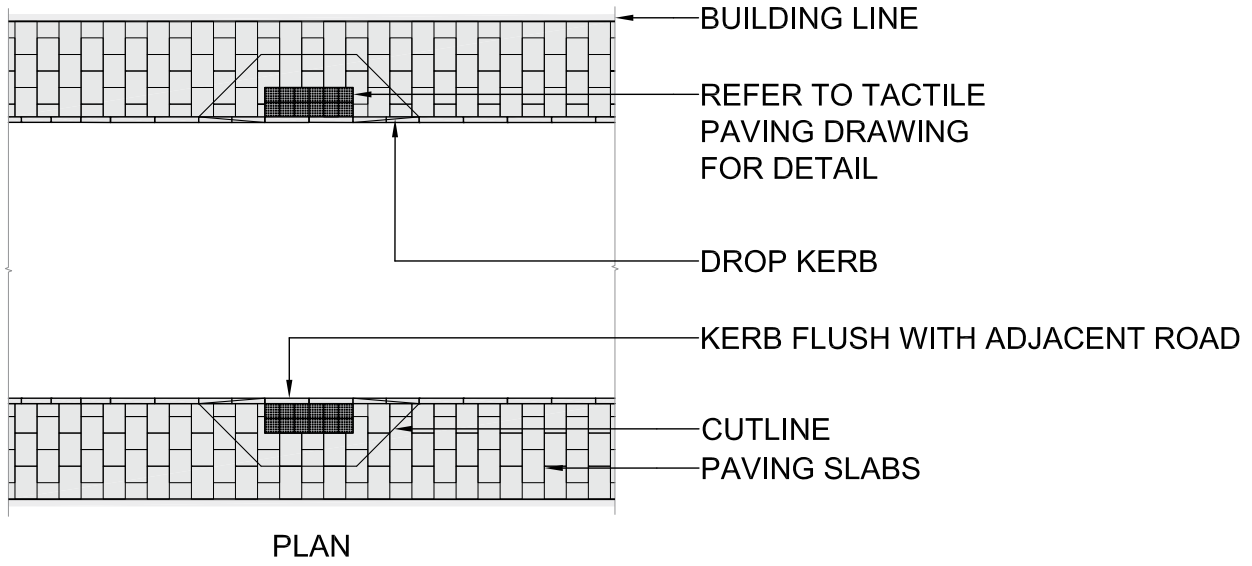
Crossing category	Crossing type	Stages
Uncontrolled crossing types	Uncontrolled	1 or 2
	Traffic island	2
	Dropped kerb	1
	Side road entry treatment	1
	Courtesy crossing	1
	Informal island	1 or 2

Uncontrolled pedestrian crossing design standards	
Preferred minimum central refuge width	2,000mm
Absolute minimum central refuge width	1,500mm
Dropped kerbs	Flush with carriageway
	1:20 optimum gradient to 1:12 maximum
	Provided at least every 100 metres on residential roads
Tactile paving	Contrasting grey/two rows deep/no tactile tail

The provision of tactile paving and a dropped kerb on each side of the road helps to delineate the crossing point. Central refuges may be provided at uncontrolled crossings to facilitate crossing in two stages and protect pedestrians from traffic. Uncontrolled crossings are appropriate where there are moderate to low vehicle flows.

Where traffic capacity at a junction does not allow for a green pedestrian crossing phase in the signal timings, an uncontrolled crossing point may be provided. These arrangements are not recommended for locations where there are moderate to high pedestrian flows with evidence of a crossing desire line.

Figure 152: Uncontrolled crossings may or may not be combined with an island



Side road entry treatments

Entry treatments should be used to emphasise pedestrian priority and as traffic calming devices. Generally they are placed across a minor road at, or within a short distance of a junction with a major road.

Side road entry treatments are generally only used in urban areas and may be implemented in isolation or as part of a series of traffic calming features. They should not be used adjacent to high speed road environments as vehicles turning on to the ramp and raised table are required to move at low speeds. A side road entry may be considered for an intersecting road which is of a lower movement order than the adjoining road.

Entry treatments aim to achieve a combination of objectives relating to safety and user priority, through a series of physical interventions:

Figure 153: A side road entry treatment at Windrush Square, Brixton

Objective	Corresponding design intervention
Denote a change in street character where a side road intersects a major road type and signals to drivers that they are entering or leaving a different traffic condition and should act accordingly	Use materials to suggest greater pedestrian presence and priority on the side road
To emphasise pedestrian movements	Raise carriageway level to footway level Reduce the carriageway crossing distance Use materials to suggest greater pedestrian presence and priority
Reduce vehicle speeds on the approach	Provide a change in surface before the junction Include vertical deflection
Reduce vehicle speeds through the turn	Tighten corner geometries
Improve junction visibility	Provide footway build-outs to deter parking near the junction
Additional site specific objectives	**Corresponding design intervention**
Identify the start of a 20mph zone or traffic calmed area	Use a combination of measures including signage, carriageway surface materials and build-outs

Design

Side road entry treatments should consist of:

- An uncontrolled crossing with appropriate tactile paving treatment
- A crossing width of minimum 2,400mm
- A flush crossing surface raised to footway level through vertical deflection
- Tight corner radii of 3,000mm or less to control vehicle entry speeds, with radius kerbs used
- Footway build-outs where appropriate to reduce carriageway width
- The extent of carriageway narrowing should be based on local traffic flows and classified turning movements.
- The highest point on a flat-topped road hump must be no more than 100mm above carriageway level. Where a standard 125mm kerb is provided, the surrounding carriageway needs to be built up, so that the side road entry does not exceed a 100mm rise above carriageway level
- One-way side roads should provide carriageway widths suitable for single vehicle access, usually in the range of 3,000mm to 6,000mm dependent upon the vehicles expected
- Two-way side roads should ideally be between 5,000mm and 6,500mm wide

Good practice

- Entry treatments should not interfere with vehicle access to properties
- Street furniture may be introduced on widened footways as part of the entry treatment and should be selected in accordance with Streetscape Guidance
- Relocate drainage gullies where necessary and avoid locating within the uncontrolled crossing
- Designers should review the impact of carriageway narrowing on cycling

Figure 154: Uncontrolled raised crossing

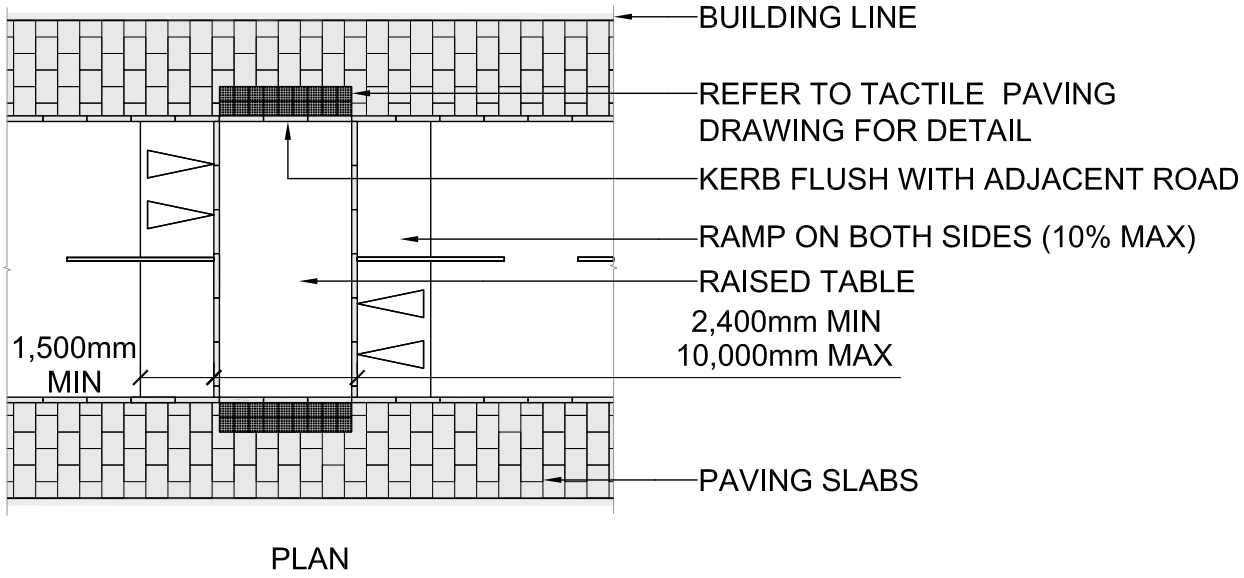
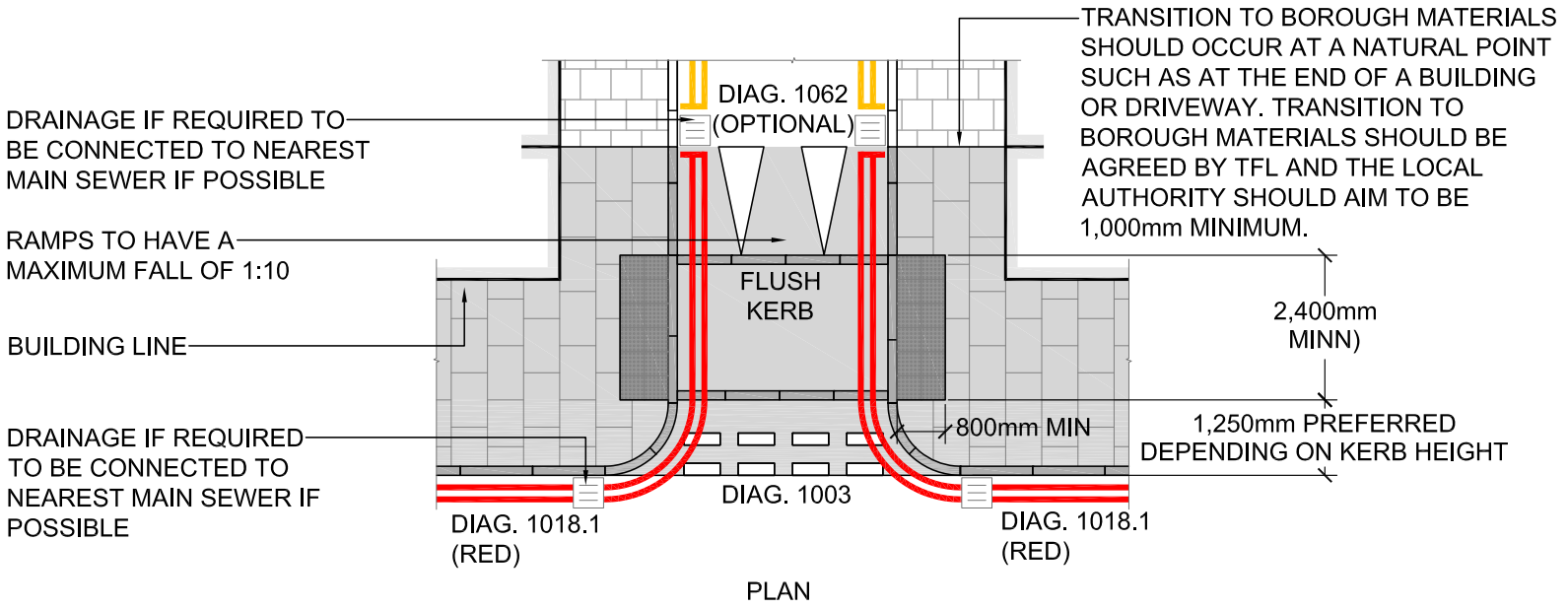
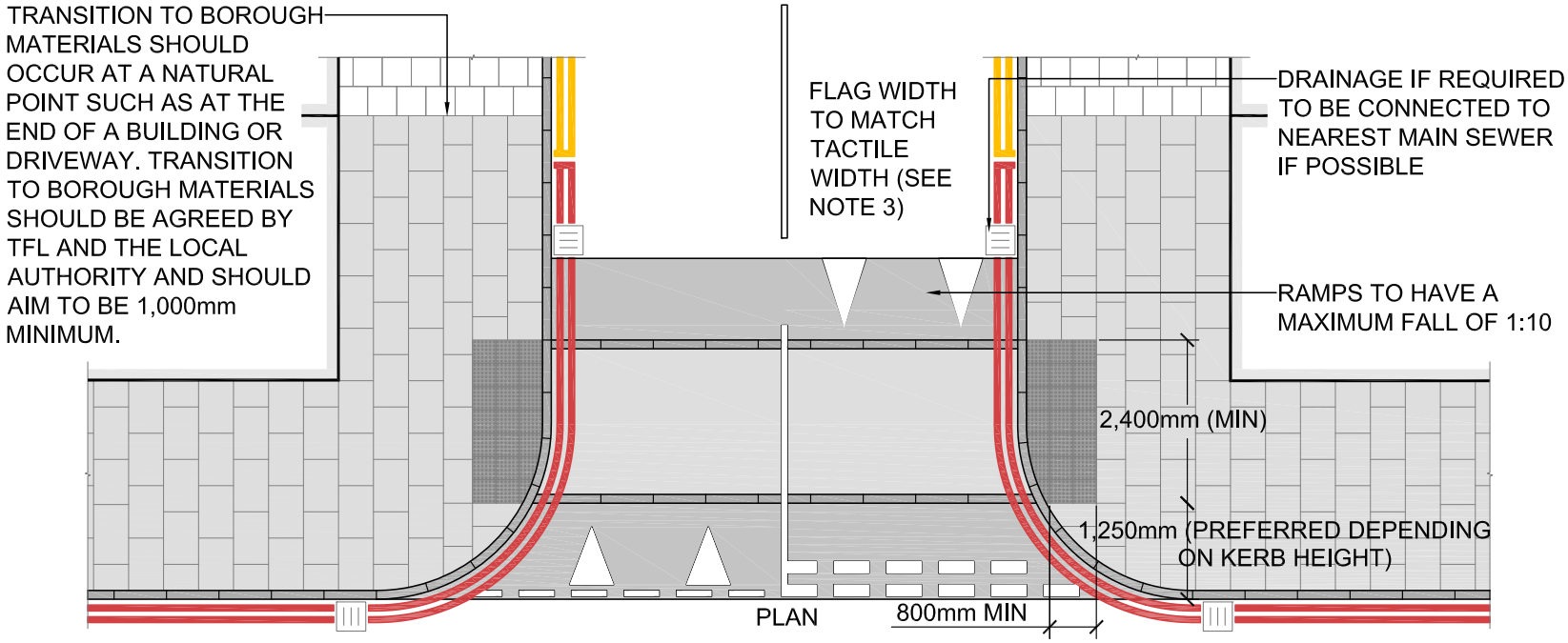


Figure 155: Side road (one-way) raised entry treatment



1. Entry treatments can be constructed using asphalt, setts or blocks. Material selection should be in keeping with the context.
2. The bonding of paving to be cut around utility service covers unless directed by the resident engineer.
3. Cutting materials should be kept to a minimum and should not be cut so that a width less than 300mm remains.
4. All covers within the tactile areas have to be recessed and in-filled with blister paving. It is desirable for the rest of the covers to be recessed in order to match the footway surface but this needs to be agreed with TfL and the utility companies need to be contacted in order to get an agreement and request appropriate labeled assets.
5. Where side road entry treatments are added, and surrounding asphalt is not replaced, kerbs are to be used on the bottom edge of the ramps in order to achieve a clean channel.
6. Drainage locations shown are indicative and should only be used if required.

Figure 156: Side road (two-way) raised entry treatment



1. Entry treatments can be constructed using asphalt, setts or blocks. Material selection should be in keeping with the context.
2. The bonding of paving to be cut around utility service covers unless directed by the resident engineer.
3. Cutting materials should be kept to a minimum and should not be cut so that a width less than 300mm remains.
4. All covers within the tactile areas have to be recessed and in-filled with blister paving. It is desirable for the rest of the covers to be recessed in order to match the footway surface but this needs to be agreed with TfL and the utility companies need to be contacted in order to get an agreement and request appropriate labeled assets.
5. Where side road entry treatments are added, and surrounding asphalt is not replaced, kerbs are to be used on the bottom edge of the ramps in order to achieve a clean channel.
6. Drainage locations shown are indicative and should only be used if required.

Materials

Side road entry treatments are generally provided in one of two conditions:

- In asphalt to indicate traffic calming with continuous footway priority
- In setts to redefine the emphasis of the carriageway as footway (SDRG approval must be sought)

Flush granite edge constraints should be provided at the top of the ramp and at the bottom if the ramp is composed of a different material.

Where pedestrian flows are high relative to motor vehicle turning movements, design teams may consider continuing the footway surface material across the side road entry as a 'blended footway'. No kerb line delineation or tactile paving is required in this instance as pedestrians have priority.

Standard construction for a narrow side road entry treatment with asphalt across the carriageway.

Additional information

Legislation:

The Highways (Road Humps) Regulations 1999

'Continuous footway' treatment Clapham Old Town, London

Bespoke 'continuous footway' treatment, continuing the footway surface across a side road

Key functions

Opportunity

Clapham Old Town in southwest London is largely composed of attractive 18th century buildings. Despite being a conservation area, the surrounding streetscape was in poor condition. The pedestrian environment was unappealing because it was dominated by swathes of empty asphalt.

Benefits

Continuous footways at side roads (previously unseen in the UK) provide a coherent pedestrian environment. Well-chosen materials enhance the historic buildings and sense of place.

Implementation

A collaborative effort by TfL, London Borough of Lambeth, local residents and a specialist consultancy produced a series of design options. These were refined through extensive public consultations to produce an area-wide scheme.

The final result is a step change in the quality of the public realm.

Applying in London

This method should be regarded as experimental in the UK. Further development and research is needed, in consultation with access groups, to determine acceptable approaches, given concerns over the lack of delineation between the footway and the area accessible to vehicles that runs over the entry treatment. Any proposals of this nature are subject to SDRG approval. Any proposal must be subject to an Equality Impact Assessment

Informal crossings

Designers should also acknowledge the significance of informal pedestrian crossing movements as part of the streetscape. An informal crossing point can be any location where a pedestrian chooses to cross the carriageway and is the product of a pedestrian assessing the road conditions before following their desire line.

Although it may not have been explicitly designated as a crossing point in the scheme layout, designers should consider informal crossing demand and whether to provide additional design support to encourage or discourage informal movements. This will depend on the design context, the character of the road, traffic speeds, surrounding land uses and pedestrian flows.

Central refuge islands

- Central refuge islands enable pedestrians to cross the road in two stages, providing a safe standing area to wait to cross. They can be introduced on controlled, uncontrolled and informal crossing types
- Where refuge islands are specified they need to provide a minimum depth of 1,200mm and 2,400mm crossing width. This should be increased for crossings with high pedestrian flows or for straight-across two stage crossings
- Refuge crossing provision should be consistent with the crossing detail on the footway
- Consider the needs of cyclists on the carriageway who require sufficient space adjacent to the central refuge pinch point. This should be either at least 4,000mm where the speed limit is 30mph or greater, or 3,200mm or less where the speed limit is 20mph or lower (subject to site conditions)

Additional information

Department for Transport:

Guidance on the use of Tactile Paving Surfaces, 2021

Local Transport Note (LTN 1/95): The Assessment of Pedestrian Crossings, 1995

Local Transport Note (LTN 2/95): The Design of Pedestrian Crossings, 1995

Traffic Advisory Leaflet 5/91: Audible and Tactile Signals at Signal-Controlled Junctions, 1991

Transport for London:

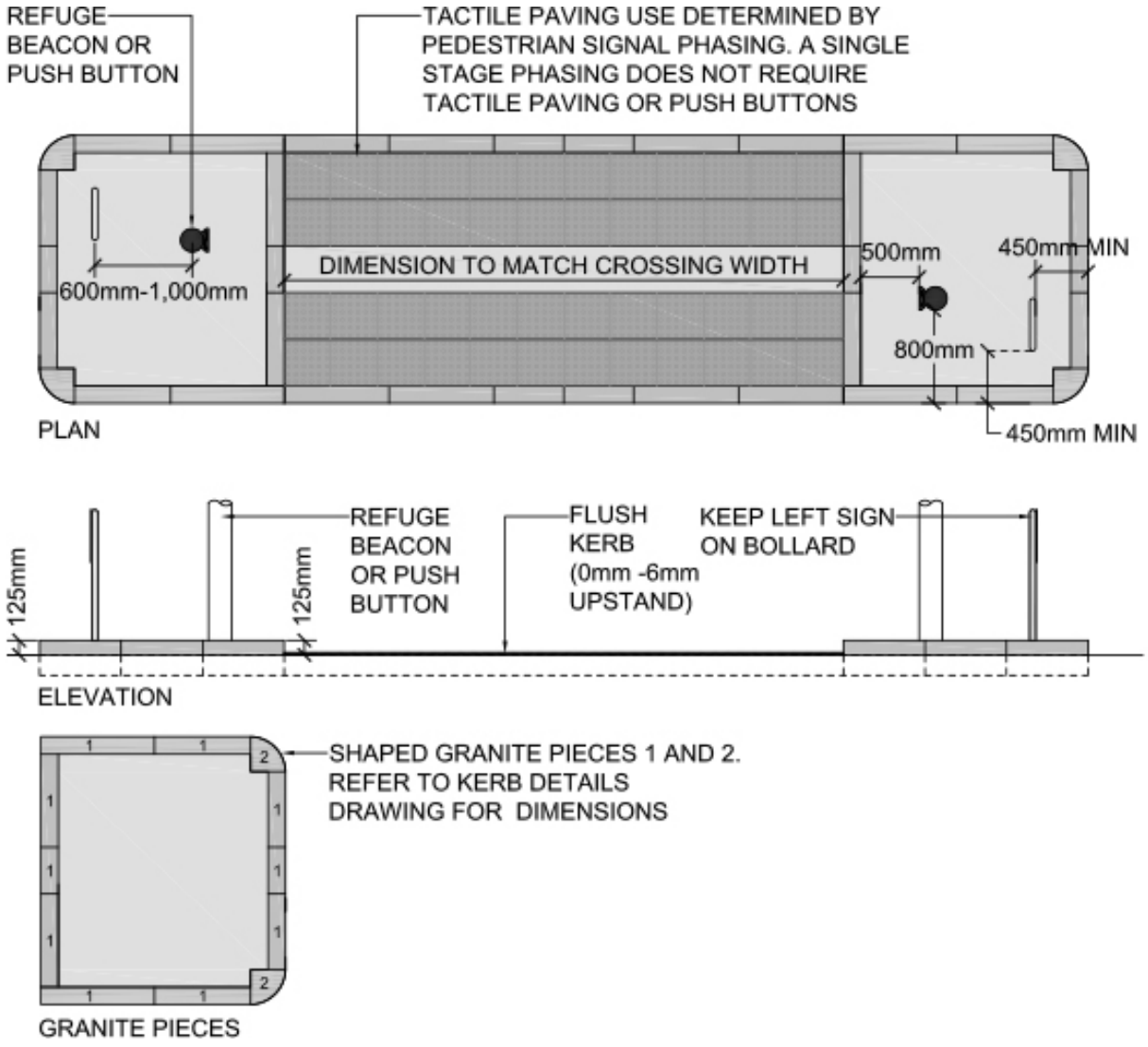
Bus pre-signal assessment and design guidance – Bus Priority Team technical note BP1/05, July 2005

Bus priority at traffic signals keeps London's buses moving – Selective Vehicle Detection (SVD), January 2006

Design Standards for Signal Schemes in London, 2011

Traffic calming measures for bus routes – Bus Priority Team technical note BP2/05, September 2005

Figure 157: Pedestrian refuge islands – straight-across crossing



Notes

1. Granite kerbs to comply with BS 435.
2. Precast kerbs to comply with BS 7263: Part 1.
3. Refer to hooped bollard drawin for keep left sign.
4. Signal poles must be positione to provide a minimum lateral clearance of 450mm from all signal equipment to kerb face.
5. Where a pedestrian crossing phase is limited to permit pedestrians to cross a whole carriageway in one movement, then the width of the refuge in the carriageway could be an absolute minimum of 1,500mm This width should be increased to at least 2,000mm at areas used for pedestrian refuge to permit a pedestrian with a pram or wheelchair to wait in safety.
6. All street furniture to be installe using retention sockets.
7. If a lighting column is required (subject to lighting levels) they should be combined with the signal posts/push buttons where possible.

9.5 Traffic signals and controller cabinets

Streetscape issues

Traffic signals and poles can add unnecessary clutter to the streetscape. In addition, signal controller cabinets and associated equipment can create obstructions on the footway. Any redundant equipment must be removed and the footway reinstated to match the surrounding surfacing.

While ensuring any design is fully compliant with signal design standards, design teams should undertake a streetscape review to ensure that junctions and crossings also conform to current best practice in relation to urban design and accessibility. This should include a priority to reduce street clutter by minimising the number of poles used to deliver a signal scheme, for instance by mounting signal heads on street light columns or by combining multiple signal heads on one pole.

The design and placement of controller cabinets should be in accordance with section 12.7.

Figure 158: Traffic signal for toucan crossing

Design

- Traffic signals must be designed in accordance with TSRGD
- Traffic control systems must be designed in accordance with the specification TR2500
- Design should consider good practice standards outlined in LTN 1/98 The Installation of Traffic Signals and Associated Equipment
- The effective design and layout of signals requires an understanding of a number of interrelated factors including the road context and proximity to any junctions, traffic and pedestrian flows, existing desire lines, traffic speeds and road safety issues

- TfL is the traffic authority for traffic signals across London, including the Strategic Road Network and roads which are managed by the local highway authority. The Traffic Infrastructure (TI) team within our Surface Asset Management is responsible for the design, installation, commissioning, maintenance and decommissioning of traffic signals and associated equipment
- Streetscape Guidance encourages design teams involved in any new or modification of existing signals, to work closely with the TI team to ensure that the scheme will function safely, while minimising the adverse visual and physical impact on the streetscape
- Backing boards are not normally fitted to signal heads in London, except on TLRN roads with speed limits greater than 30mph. They may also be considered in exceptional circumstances when a visibility issue has been raised, such as on east-west road alignments where the sun can impact on drivers' vision, or if surrounding street lighting creates additional glare or by an engineer's judgement
- High six metre poles with additional signal heads may be used where there is a clear design need or a safety issue

Figure 159: Trixi mirrors are used by motorists at junctions to detect cyclists in their blind spot

Smart's 'For More Safety' campaign Lisbon, Portugal

Dancing red man keeps pedestrians safe

Key functions

Opportunity

In Lisbon, a campaign by Smart entitled 'For More Safety' uses the red phase of a pedestrian signal to entertain people while they wait to cross a busy junction.

Benefits

The campaign is reported to have made 81 per cent more people stop at the junction.

Implementation

A video booth near the junction transmits live volunteers who dance to music of their choosing while feeding back reactions of people.

Applying in London

An entertaining pedestrian crossing such as this could be applied to one of London's many busy central junctions.

Additional information

Statutory instruments:

Traffic Signs Regulations and General Directions, 2002 and 2015

Department for Transport, Highways Agency:

Design Manual for Roads and Bridges, Volume 8, Section 1, TA 84/06: Code of Practice for Traffic Control and Information Systems for All-Purpose Roads

Department for Transport:

Local Transport Note (LTN 1/98): The Installation of Traffic Signals and Associated Equipment

Transport for London:

Bus pre-signal assessment and design guidance – Bus Priority Team technical note BP1/05, July 2005

Bus priority at traffic signals keeps London's buses moving – Selective Vehicle Detection (SVD), January 2006

Design Standards for Signal Schemes in London, 2011

9.6 Grade-separated pedestrian crossings

General principles

Where other design approaches are not possible, grade-separated crossings can reduce the severance effect of major highways and other barriers. They need to be designed very carefully, to make them easy to use, direct, safe and attractive. They should always cater for people on foot and on cycles.

Grade-separated crossings on the TLRN are most commonly found on high speed roads (40mph or greater) and at complex junctions. In London these often take the form of subways rather than footbridges to minimise the visual intrusion on the street environment.

Figure 160: This footbridge L01 crossing Ruckholt Road, becomes a landmark through use of bright colours and thoughtful design

Grade-separated crossings should only be considered in exceptional circumstances where high vehicle speeds and traffic capacity need to be maintained and where there is evidence that road safety risks would not support at-grade facilities. This should be prioritised where designated cycle routes meet a barrier in the form of a motorway or topographic constraint, such as a river, and the route needs to continue.

Benefits

- Provides the opportunity for improved connectivity between neighbourhoods severed by a high speed road network
- Separated crossings are considered safer than at-grade facilities for high speed road types
- Enables continuity for cycle and pedestrian routes
- Does not impact on traffic capacity
- Wide land bridges can provide additional amenity and green infrastructure value

Constraints

- Expensive to construct and maintain
- Will only be used by pedestrians if it is situated appropriately on a desire line and does not require negotiating a large number of steps or ramps
- Requires additional space for constructing a landing point and approach ramp
- May pose a personal security risk if not well-lit or with adequate surveillance

Figure 160: A footbridge in Queen Elizabeth Olympic Park in Stratford, London

Grade-separated crossing design standards

Minimum grade-separated crossing width for pedestrian only use	2,000mm
Optimum grade-separated crossing width for shared use with cyclists	Minimum 4,000mm effective width
Minimum subway height for pedestrian only use	2,300mm
Recommended subway height for shared use with cyclists	2,300-3,000mm
Optimum ramp gradient	1:20
Optimum landing dimensions	1,200-1,800mm in depth
Maximum number of steps in a flight	12 steps
Corduroy paving	800mm provided at the top and bottom of each flight of steps
Handrails	Provided on both sides of steps Central handrail required for widths greater than 3,000mm

Melkwegbrug Purmerend, Netherlands

Distinctive, attractive and practical crossing for pedestrians and cycles

Key functions

Opportunity

Whether a bridge is needed to cross a river or a motorway, inspired designs act as icons within the community making it a place in its own right.

Benefits

The creation of the Melkwegbrug in Purmerend, Netherlands was such a project as it connected two communities and reinforced the identity of the area.

Implementation

This double bridge provides facilities for cyclists and pedestrians. The pedestrian arch rewards users with a panoramic view and the 'z' shaped bridge provides an accessible ramp for cyclists and wheelchair users.

Applying in London

New infrastructure in London should seek to enhance or reflect local context while acting as a beacon thereby making it a destination in its own right.

9.7 Subways

Subways can provide high capacity pedestrian and cyclist crossing opportunities in relatively constrained urban environments where carriageway or architectural constraints limit other crossing options. They can, however, provide a low quality environment, lacking natural surveillance and forcing pedestrians to deviate from the surface. This can also cause difficulties for people with mobility impairments. These issues may result in people choosing to cross informally to avoid using the subway.

Removal

Opportunities to provide at-grade pedestrian crossing facilities to replace subways should be explored.

Figure 162: Old Street subway entrance built in 1969 has been recently updated with brightly coloured graphic devices to aid in wayfinding

Where at-grade crossings are implementable, subways should be closed for access (see TfL Surface Transport Panel note on Subways). This may open up new potential uses for the subway space, such as storage, or could enable the creation of additional useable space where the access ramps are infilled.

Figure 163: Bricklayers Arms roundabout subway closure in Southwark, before and after

New subways

New subway crossings should only be implemented in exceptional circumstances where high pedestrian demand cannot be provided for with an at-grade facility.

They need to be located as close as possible to existing pedestrian (and where appropriate, cyclist) desire lines and should be supported with a consistent wayfinding signage to support legibility.

To accommodate cyclists, subways require direct sightlines and avoid sharp corners at their entrances and exits.

Security

- Lighting should be in accordance with BS 5489 (Code of practice for the design of road lighting) within the subway and on the approach, ramps and steps. Walls, floors and ceilings should be designed to reflect light
- Vandal-resistant and sound deadening materials should be used within the subway to minimise echo
- Tiling and artwork produced by the local community should be considered to deter vandalism
- CCTV may be used to promote a sense of personal security, and mirrors should be provided to enhance visibility

Figure 164: A subway entrance acts as a beacon in the streetscape

(Photo courtesy of Marko&Placemakers [FoRM Associates])

Figure 165: Artistic lighting used to illuminate a subway and enhance the character of the place

(Photo courtesy of Raphael Daden)

Additional information

Transport for London:
Surface Transport Panel – Subways (2009)

Department for Transport:
Design Manual for Roads and Bridges, Volume 6, Section 3. TD36/93: Subways for Pedestrians and Pedal Cyclists. Layout and Dimensions

Odenplan piano key staircase Stockholm, Sweden

Musical staircase encourages physical activity at subway entrance

Key functions

Opportunity
Odenplan is a station on Stockholm's T-Bana (metro system). It is a busy station, near the city centre.

Benefits
Physical inactivity is a worldwide problem. On urban metro systems, most people will use an escalator in preference to an adjacent staircase

The piano key staircase led to 66 per cent more people choosing the stairs than had done so previously. By making them fun to use, the extra effort of climbing the stairs was offset by the pleasure of making music.

Implementation
The station's staircase was converted into a large piano keyboard. Controlled by sensors, each stair would play a musical note when stepped on. It was therefore possible to play a musical scale by climbing or descending the stairs.

Applying in London
Technology is relatively easy to transfer – potentially suitable for Tube stations that do not see huge tidal flows.

9.8 Pedestrian and cycle bridges

Existing

Pedestrian and cycle bridges within central London cross railway lines, watercourses and roads and inherently form an important part of the streetscape by integrating routes within the walking and cycling networks.

The palette of materials on the bridge structure itself may differ from the standard palette set out by Streetscape Guidance, but should interface cleanly with the street. This can be achieved through high quality detailing at the transition point between the street and bridge structure.

Figure 166: Footway bridges, such as the Millennium Bridge in central London, provide important links and can also become landmarks in their own right if well designed

Figure 167: One of the Golden Jubilee footbridges

Approaches should be clearly signposted with consistent wayfinding support. Existing footbridges should be inspected regularly to identify surface defects and ensure structural integrity.

Proposed

Proposals for major infrastructure should demonstrate a clear need for improving connectivity by identifying wider community, health and journey time saving benefits.

New layouts should look to support key walking routes and be sympathetic to the surrounding urban character in their architecture and material palette.

Where possible any new structure should use the existing topography to minimise visual intrusion on the landscape and avoid obstructing key views. Layouts should allow for step-free access and accommodate cyclists where appropriate with a coherent route.

Materials should satisfy the same design considerations as footway surfacing materials with good slip resistance qualities, visual contrast at steps and changes in gradient and high durability.

Additional information

Department for Transport:
Design Manual for Roads and Bridges, Volume 2, Part 8

Figure 168: The bright colouring of this bridge acts as a beacon in the streetscape

Figure 169: Necessary structural elements can be designed to be beautiful elements in their own right

Image courtesy of Mark Humphreys

9.9 Road bridges

This section details streetscape design considerations for bridges which support motor vehicle traffic. In most inner city areas, bridges will also provide access for pedestrians on the footway (for pedestrian and cycle bridge design guidance, see 'Pedestrian and cycle bridges').

Figure 170: Tower Bridge is an international symbol of London

From a streetscape perspective, bridges are an extension of the street environment and should be considered a cohesive and integral part of the road network. Bridges differ from a standard street arrangement in that there will typically be no active frontages or intersecting side roads. Most bridges can therefore be considered a linear self-contained link; one where vehicles and pedestrians only enter from either end. For this reason it is important to ensure that a consistent approach is adopted across any bridge structure, in layout and materiality.

Design considerations

- Bridge alignments should be selected to minimise the use of retaining structures, while making the crossing as square as practicable to the existing road geometry
- Footways, cycleways and road widths should be maintained across the full length of the bridge where practicable, with regular kerb alignments. Any change in alignment should consider the potential impact on cyclists
- A preferred minimum footway width of 2,000mm should be provided on both sides of the carriageway
- The needs of cyclists and other non-motorised vehicle traffic must be fully considered in any bridge design
- Street furniture on the bridge itself should be kept to a minimum to maximise footway capacity
- Parking bays should not be implemented within the bridge structure or on the approach
- For bridges located close to non-signalised junctions, any associated infrastructure such as guardrails should be positioned so as not to reduce visibility for motorists and pedestrians
- Designers should look to minimise the use of guardrails on bridges and only consider where there is a proven safety issue
- At-grade pedestrian crossings should be provided within close proximity to either end of the bridge structure
- Utility cabinets and access arrangements may become clustered at either end of the bridge. Design teams should look to ensure that the approach remains as unobstructed and free from clutter as possible
- All bridges in visually important locations shall be given appropriate aesthetic design considerations. This may include artwork and bespoke design treatments, upon approval by the SDRG
- Designers should consider all sides of the bridge aesthetics, particularly the underside and how it relates to other roads and the surrounding architecture

Materials

- The bridge streetscape should be designed to provide a seamless transition from the surrounding street environment
- Surface paving should continue as it is found on the approach to the bridge structure. Paving units may require a consistent cut across the full length of the footway should a change in gradient be required
- Expansion joints should be carefully detailed with respect to any adjoining paving materials
- Trees on bridges should generally be avoided. Consult the Arboriculture and Landscape team for further information
- Lighting should be carefully considered so as to provide a symmetry and quality that enhances the architecture of the bridge structure. In exceptional circumstances, lighting may be incorporated within the bridge structure itself
- Signage should be used on the approach to the bridge but should be avoided on the bridge
- Acoustic protection for adjacent land uses may be required
- Materials for the actual bridge structure are to be selected on a basis of maximising durability, while minimising maintenance requirements
- Timber is only acceptable for use as cladding in exceptional circumstances, where the bridge has a significant role for pedestrians

Additional information

Department for Transport, Highways Agency:

Design Manual for Roads and Bridges, Volume 2 – Highway Structures: Design (Substructures and Special Substructures), Materials

Transport for London:

London Cycling Design Standards (2014)

9.10 Road underpasses and bridges over roads

The density of London's road network frequently creates situations where underpasses and bridges over roads are necessary to provide convenient and direct routes.

Underpasses are a particularly challenging design context for upholding the values of Streetscape Guidance. Underpasses should be carefully considered so as to promote a greater sense of quality, especially for those routes which serve as pedestrian and cycle links alongside the carriageway.

Figure 172: Bridge creating a friendly urban environment under its structure

Figure 171: Euston Circus underpass, clad in metal reflects light

Design

- Footways should preferably be provided on both sides of the underpass where there are local pedestrian links. An unobstructed width of minimum 2000mm should be provided
- For roads with speed limits of 50mph or more, footways alongside underpasses are not appropriate and road restraint systems should be considered on the approach to the underpass

Figure 173: Light installation in the railway bridge at Southwark Street and Redcross Way near London Bridge transforms a drab underpass into a dynamic environment

(Image courtesy of www.piersvan.com/category/travel/)

- Structural constraints may limit the capacity for adequate footway widths to be provided on both sides of the underpass. A wide footway on one side may be considered in these locations, assuming adequate crossing facilities are provided for pedestrians on the approach
- Underpasses should be designed to promote a sense of security. A well-lit and open aspect structure is important, to minimise opportunities for concealment
- The approach slopes to underpasses require special attention such that gradients remain in line with the Equality Act
- Designers should pay particular attention to the integration of utility access chambers, as these must be set flush with finished levels
- On long stretches of an underpass, in excess of 20 metres, the provision of an emergency telephone should be integrated within the wall structure. The telephone must be wheelchair accessible and fitted with an inductive coupler.
- Tiling, artistic lighting and other public realm treatments are encouraged in all underpasses to enhance the pedestrian environment, improve lighting and improve a sense of safety

Materials

- Paving materials should be consistent with either side of the underpass
- Gabions for underpass walls on the TLRN require SDRG approval
- Consider acoustic measures within underpasses to reduce noise pollution and provide a better environment for pedestrians and cyclists
- Guardrailing may be required in exceptional circumstances where there are narrow sections of footway
- Safety containment kerbs should be considered where road speeds are 40mph or greater

Additional resources

Department for Transport:

Design Manual for Roads and Bridges, Volume 2, Section 9

Part E Kerbside activity

10.1 Vision

Kerbside activity seeks to address the allocation of space on carriageway and at the kerb edge on the footway to accommodate the needs of users without detracting from the quality of the environment. This section details how to achieve a high quality interface and serve the needs of various users.

Figure 174: A loading bay in use by a private vehicle and a lorry at one time

10.2 Parking and loading bays

Loading and, where appropriate parking, allocation is important for supporting local businesses and providing for a range of users' mobility needs. Parking and loading bays should be designed to ensure that their use, and turnover of use, best provides for surrounding buildings and the character of the street.

The distribution, placement and type of bay provided should correspond to the surrounding land uses and the dimensions of the street. The arrangement of parking and loading controls should not restrict the free and safe flow of traffic, particularly buses, nor should they adversely impact on pedestrian movement.

Our Kerbside loading guidance provides in-depth advice on loading requirements for the TLRN and should be referred to when designing loading bays. Street Audit: Freight Mode (also known as Freight Environment Review System) is a valuable tool to ensure appropriate delivery and servicing consideration.

This section covers a range of parking and loading bays including on-street and on-footway parking and loading by coaches, freight and private vehicles.

Parking and loading activities

Parking and loading activities exhibit different vehicle use characteristics that will vary at different times of day. These characteristics should be considered when assessing whether to locate parking bays or loading bays, and how these should be managed:

- Parking typically involves the driver leaving the vehicle for any length of time within the defined parking limits
- Loading involves the collection or delivery of goods to a nearby property and is generally conducted over a short period. Loading bays usually have a greater turnover of vehicles, and may have periods where the bay is unoccupied

Figure 175: A parking bay paved in granite setts extends the footway when not in use

Car clubs

Car clubs provide access to shared vehicles to members on a pay-as-you-drive basis, providing a cost-effective alternative to private car ownership. Car clubs are supported by TfL as a means to promoting sustainable travel choices, helping to reduce congestion, and bring about environmental benefits. London already has one of the largest car club markets in Europe and there is considerable potential for growth.

The main model of car club to date has been the round-trip scheme, where the member rents a vehicle from a designated bay (usually on-street and controlled by the host borough) and returns it to the same bay when the rental period finishes. New models are now emerging where the cars can be used for one-way journeys and either returned to one of a number of designated bays or parked within a defined area. Where dedicated bays are required, these should be visible and easily accessible to both private and business users.

Figure 176: Car Club space demarcated with road markings

All public highway car club bays in London are currently located on borough roads and must conform to the local authority's streetscape requirements. Car club bays may be located on the TLRN in future.

Good practice

Parking and loading facilities should be located for the convenience and safety of all road users, not just motorists. Bays that permit people to stop should only be introduced where there is no viable alternative location to stop off the highway.

Figure 177: A sign used to demarcate a car club bay

When locating a loading bay, the designer needs to consider the vehicle type and frequency of use. The type of goods being transported may also influence the design of the bay and the surface materials used. For further information please refer to our Kerbside loading guidance.

Figure 178: Unloading activities occurring next to the delivery door

The distance that a load has to be moved can dictate the length of time that a vehicle will need to remain in the bay. Therefore calculating the time it takes for the driver to walk to deliver the goods must be considered to ensure that the loading bay can operate as intended and that users are able to operate legally.

The location of the bay and its signing should take account of, and coordinate with, other street furniture to avoid clutter (see 'Traffic signs'). Bays must be visible to motorists and pedestrians through the use of appropriate markings. Loading and parking bays should be marked using a contrasting paving where possible rather than paint.

Operation and enforcement

Operation

Restrictions on the permitted period of use can be defined by means of an appropriate Traffic Regulation Order, so that a bay can operate for all or part of the day. The control can additionally restrict the maximum duration of stay for a single vehicle within the bay.

Usage

Changes in use may be required over time. Design and operation teams will need to react to patterns of use that may occur throughout the week as well as throughout the day.

Figure 179: Enforcement sign

Enforcement

A sign detailing restrictions as to the nature of activity, duration and hours of operation must be erected next to the bay for the directions to be enforceable.

Vehicle and user type

Parking and loading bays can be specifically allocated for use by a particular type of vehicle, for example, buses, coaches, lorries, vans or motorcycles will have different requirements (see sections on 'Motorcycle parking' and 'Coach facilities').

Parking bays can be reserved for particular types of user, for example, Blue Badge holders or doctors.

Recommended street context		Minimum bay dimensions
Loading bays	Provide adjacent to commercial or industrial premises which require regular deliveries and collections. Minimise transfer distance by aligning delivery doors with destination doors wherever possible. Minimise proximity to delivery point to minimise lorry dwell time.	No minimum length for standard vehicles but should be related to vehicle demand and manoeuvring requirements. Please refer to Kerbside loading guidance, Appendix 2 for detailed information on loading bay dimensions.
Parking bays (including car clubs)	Can be provided in a wide range of circumstances including residential streets, commercial and industrial streets.	No minimum length for standard vehicles but should be related to vehicle demand and manoeuvring requirements. Absolute minimum width: 1,800mm.
Blue Badge bays	Reserved for Blue Badge holders. Should be located adjacent to local amenities. Always consult a local representative group for people with mobility impairments when considering a Blue Badge bay.	Absolute minimum: 6,600mm Preferred width: 2,700-3,600mm

Types of parking and loading bays

On-carriageway parking bay

On-carriageway loading bay

On-carriageway parking/loading bays

Parking should not be permitted within bus or mandatory cycle lanes during the hours in which the lanes operate. Loading may be permitted in certain circumstances, but must be carefully enforced to ensure that the facility is not compromised.

Designers must consider how permitting a vehicle to stop on the carriageway will affect the sightlines of pedestrian and motorists.

Designers must allow for good access to the footway from the bay, especially when introducing loading or Blue Badge parking bays. The installation of a dropped kerb next to the bay should be provided, particularly where the delivery of wheeled goods or waste is expected.

Disabled parking combined with loading bays shall generally not be permitted.

Inset bay – flush with carriageway

Inset parking/loading bays

Inset bays are on-carriageway facilities, fully recessed into the footway, offering additional protection for parked vehicles by being positioned out of the general flow of traffic.

Only in exceptional circumstances should the introduction of inset bays be considered. Such situations should already have a wide footway and a clear demand for loading.

Where designers are considering reducing footway space through the installation of loading bays, either inset or on-footway, we must be consulted and an agreement made.

On footway – flush kerb

On Footway – chamfered kerb

On-footway – dropped kerb

On-footway parking/loading bays

On-footway loading involves a vehicle mounting the kerb and coming to rest on the footway. On-footway bays enable flexibility in the use of the footway and can be designed to remain clear during peak pedestrian periods.

On-footway bays should be considered as part of any scheme that involves footway widening, where loading, parking or servicing requirements need to be retained and traffic lanes kept unobstructed.

On-footway loading should never be at the expense of pedestrian safety or amenity. Pedestrian Comfort Level assessments should be based on the non-loading part of the footway to ensure it still meets minimum standards when a vehicle is present. Where there are heavy periods of peak pedestrian use it may be appropriate to restrict loading times outside of pedestrian peak flow hours.

Due regard should be given to the construction and material choice to ensure that the footway can support vehicular movement. Designers should ensure that any change in elevation is clearly delineated with a kerb edge detail, and trip hazards are minimised by providing a flush bay treatment where practicable.

Half-on, half-off

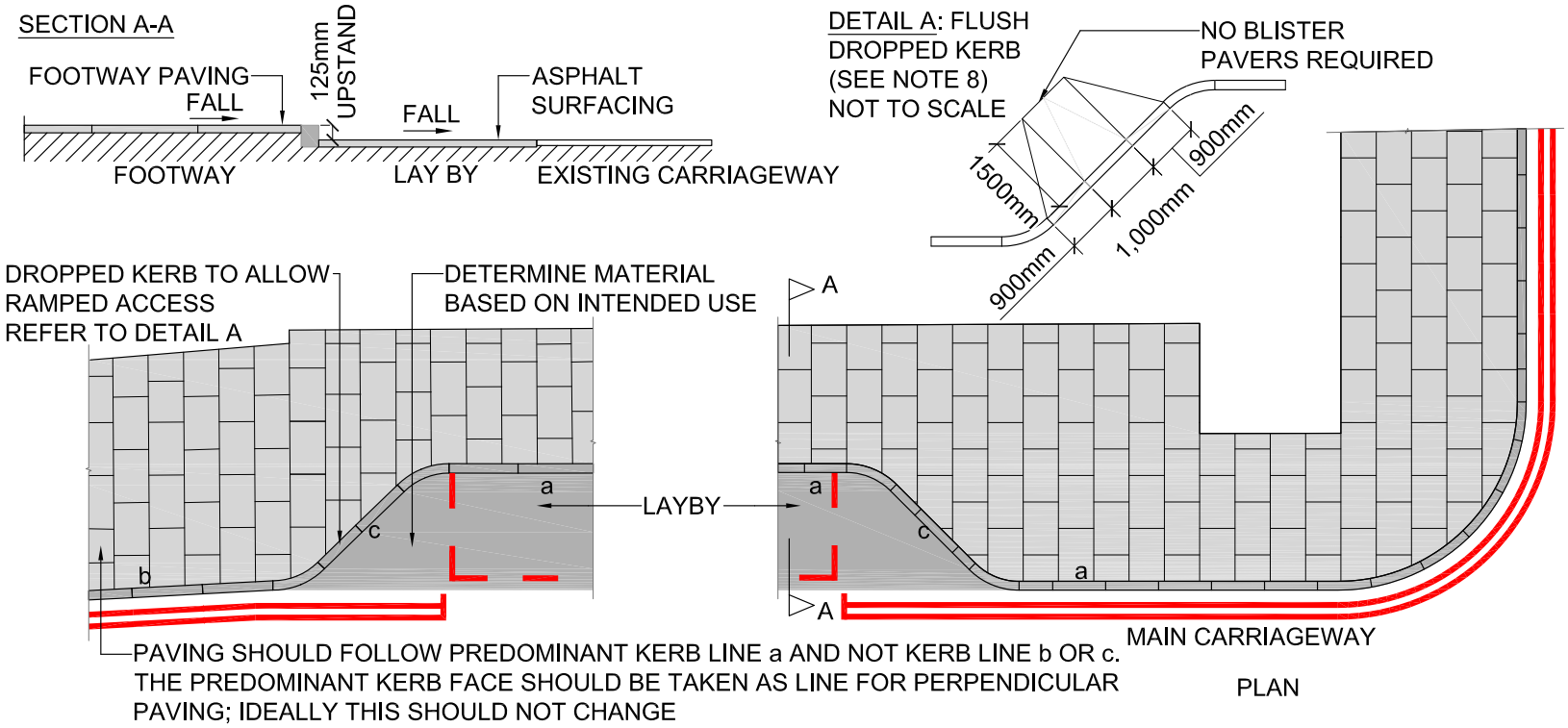
Half-on, half-off loading bays

Some loading facilities are designed to allow vehicles to park with the nearside wheels on the raised footway and the offside wheels on the carriageway. Such facilities should use the same placement principles as inset bays regarding vehicle flows, pavement strength and remaining footway width.

Due to the restrictions this type of arrangement has on movement, this approach will only be considered as a last resort.

As width on-footway loading, half-on, half-off facilities are suitable in some circumstances but are not appropriate where pedestrians would be impeded or damage to infrastructure might result.

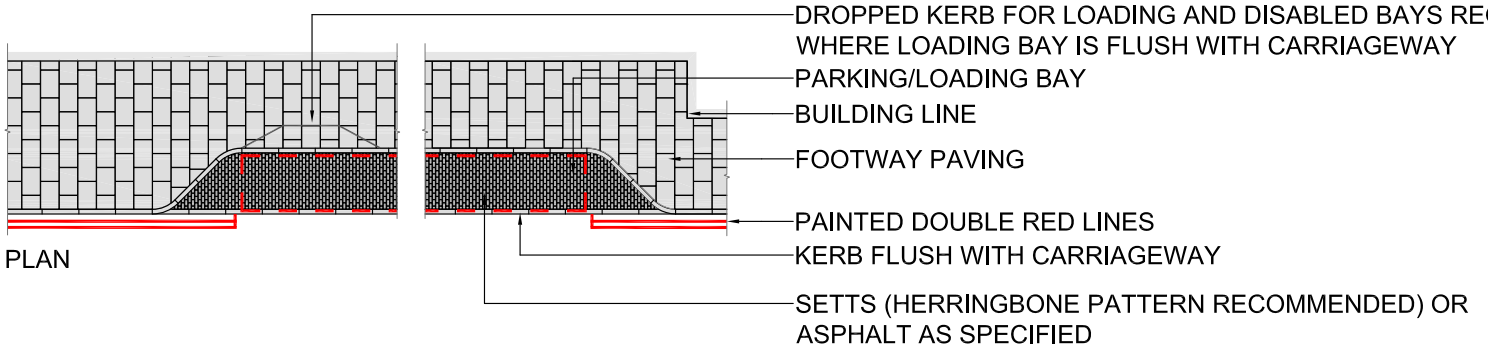
Figure 180: Loading bay



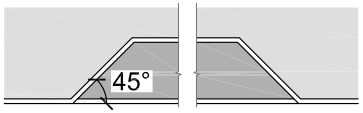
Notes

1. The resident engineer should be advised where the preferred depth of construction cannot be achieved on site.
2. Flags to be laid with courses set at 90° to kerb and a minimum overlap bond of 150mm.
3. The bonding of paving to be cut around utility service covers unless directed by the resident engineer.
4. Flags should not be cut so that a width less than 300mm remains. Previous courses should be cut to distribute evenly over width.
5. All covers within the tactile areas have to be recessed and infilled with blister paving. It would be desirable for the rest of the covers to be recessed in order to match the footway surface but this needs to be agreed with TfL and the utility companies need to be contacted in order to get an agreement and request appropriate labeled assets.
6. Lateral clearance to all street furniture to be 450mm minimum from face of kerb.
7. All work to be carried out in compliance with the requirements of the Manual Handling Operations Regulations 1992 (as amended in 2002).
8. Kerb dropped over approximately 900mm to provide flush kerb (0-6mm upstand) for good transportation and disabled access if applicable.

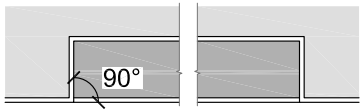
Figure 181: On-footway parking and loading bay



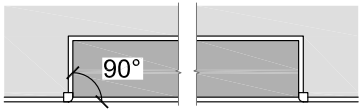
TYPES OF CORNER ARRANGEMENTS



AT 45° ANGLES TO THE CARRIAGEWAY

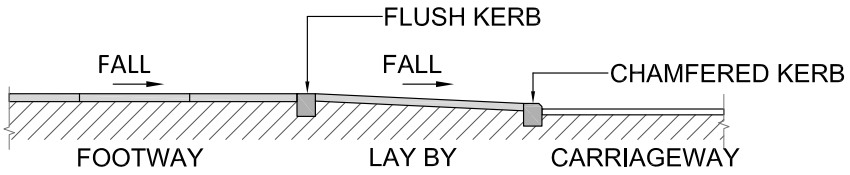


AT RIGHT ANGLES TO THE CARRIAGEWAY

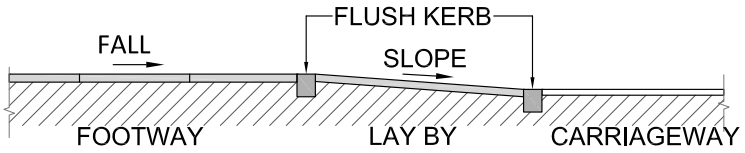


AT RIGHT ANGLES TO THE CARRIAGEWAY WITH BULL NOSE CORNER KERBS

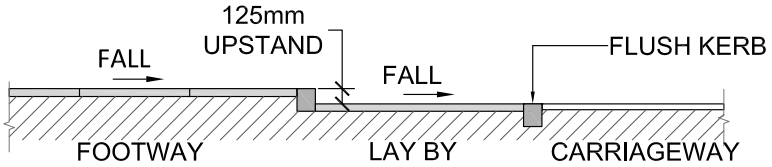
TYPES OF CROSS SECTIONS



BAY SLOPING TO CARRIAGEWAY WITH 20MM UPSTAND



BAY SLOPING TO CARRIAGEWAY WITH FLUSH EDGE



BAY FLUSH TO CARRIAGEWAY

Surface materials

Material design standards

Setting	Material
On-street bay	Asphalt
Inset bay	Asphalt or setts
Half-on half-off bay	Asphalt for carriageway area Setts for footway level
On-footway bay	Continue surrounding footway material across the bay with a flush kerb delineation or provide setts across the full width of the bay

- Inset parking and loading bays should be constructed using radius kerbs with an asphalt finished surface
- A flush kerb should be provided for half-on, half-off bays and on-footway bays
- Paving material choice and construction workmanship should consider the need for smooth and level surfaces to aid the safe movement of cages and palette trucks

Road markings

Signs and markings are a powerful way of representing legally enforceable loading and parking restrictions. Their format and use are controlled by the DfT, and they are disseminated via TSRGD, Traffic Signs Manual and TfL's Red Routes Signing Manual.

Signage

In most cases there will be an associated sign. Loading may also occur where there are no restrictions and it is safe to park.

- Parking/loading signs should be located a minimum of 450mm from the bay edge and should not obstruct the pedestrian clear zone
- The smallest allowable text size should be used to keep the size of the sign to a minimum

Figure 182: Enforcement sign

- Designers should orientate the signs as required by the Traffic Signs Manual
- The colour of the backs of signs and any dedicated poles supporting them should be consistent with other street furniture, ie black or grey in accordance with the palette

Additional information

Legislation:

Traffic Signs Regulations and General Directions 2002: Section 4 and Schedule 6 (Road markings)

Traffic Signs Regulations and General Directions 2015

Highways (Road Humps) Regulations 1999

Department for Transport:

Delivering the goods: Guidance on delivery restrictions, 2006

Inclusive mobility – A guide to best practice on access to pedestrian and transport infrastructure, 2021

Traffic Signs Manual, Chapter 5: Road Markings

Legislation:

Highways Act 1980
Traffic Calming Act 1992

Transport for London:

Kerbside loading guidance, 2009
Parking and loading legally, 2014

10.3 Motorcycle parking

Although the motorcycle/moped mode share of trips by London residents is down since 2005 (TfL's London Travel Demand Survey, 2011), ownership of motorcycles and mopeds has increased. They have become particularly popular for business use in central London. This has increased pressure on ourselves and the boroughs to deliver more motorcycle parking facilities where they are most needed.

Parking reviews along the TLRN, including side roads adjoining the main road, will be used to assess demand and determine motorcycle parking allocations.

Figure 183: Motorcycle parking bay enforced through road markings

Location

Parking facilities for motorcycles are generally provided on the carriageway, within designated bays. Motorcycle parking should be placed:

- As close as possible to trip attractors, such as shops, town centres and transport interchanges
- Where passive surveillance can take place
- Away from any overhanging trees and vegetation
- Away from pedestrian crossings where parked motorcycles may cause visibility problems for wheelchair users
- Where they can be well-lit

Design

Motorcycle parking bays are marked with 100mm-wide broken white lines on the carriageway in accordance with the TSRGD and supported by means of a Traffic Regulation Order.

Parking bays should be sufficiently large to accommodate a number of motorcycles and allow adequate manoeuvring space.

A typical motorcycle parking space width is 1500mm.

Motorcycle parking facilities should offer:

- A well-drained, well-maintained site
- Shallow crossfalls
- Non-slip carriageway surfaces
- An especially rigid surface which does not deform in warm weather and resists point loadings from the stands attached to motorcycles
- Discrete anchor points for securing motorcycles where a need has been demonstrated

Secure motorcycle parking facilities

Secure motorcycle parking facilities should not be provided unless survey data from the Metropolitan Police Service, illumination levels or other information suggests there is a need for a secure amenity.

Figure 184: Motorcycle parking bay

The anchor point must be easy to use and compatible with a wide range of motorcycles and locking devices. Anchor points should be discrete and should not add unnecessary clutter to the streetscape.

Facilities should be simple in design, require little maintenance and must not present a tripping or slipping hazard to pedestrians.

Authorisation

- Section 63 of the Road Traffic Regulation Act 1984 as amended by the Transport Act 2000 (Section 75 [2]), sets out the powers of authorities
- Section 32 or 45 of the Road Traffic Regulation Act 1984, details on-street parking provision

Additional information

Statutory instruments:
Traffic Signs Regulations and General Directions (TSRGD)

Department for Transport:
Traffic Advisory Leaflet 2/02: Motorcycle Parking, 2002

Motorcycle Action Group:
A Guide to the Design and Provision of Secure Parking for Motorcycles, 2002

Transport for London:
Motorcycle Safety Action Plan, 2014

Travel in London, Supplementary Report: London Travel Demand Survey, 2011

Figure 185: Ground level anchor points provide the least visual intrusion when secure parking facilities are required.

10.4 Parking control equipment

Parking controls are introduced to manage kerb space where demand for parking exceeds supply. TfL does not charge for any parking on the TLRN as the majority of carriageway space is dedicated to maximising capacity and enabling essential servicing, loading and maintenance.

Parking meters are being phased out across many parts of London in favour of pay by phone charges.

Location

Payment equipment should be located a minimum 450mm from the kerb edge and within 10 metres of a parking bay to provide convenient access for motorists, without overly impinging on footway space. There should be sufficient footway space to manoeuvre a wheelchair to the machine (1,850mm x 2,100mm).

Design

Paid parking equipment is available in a range of products which vary in size, colour and finish. A consistent application of pay and display machines should be used to ensure ease of operation and maintenance:

- The colour and style should match that of adjacent street furniture
- The mounting height of payment equipment should be readily accessible to wheelchair users, with any message display or instruction centred approximately 1,500mm above the footway
- Pay by phone parking is becoming an increasingly attractive option to minimise the need for on-street equipment. This will require the agreement of the relevant local authority

Figure 186: Parking control equipment

Figure 187: Parking control posted on a lighting column

Signage

The number and size of signs used should seek to minimise clutter while ensuring an appropriate level and size of signs are provided as prescribed by TSRGD. Signs showing tariffs should not be visually dominant and fixed to other items of existing street furniture, such as lamp columns, or mounted on adjacent buildings subject to necessary consents.

Parking bays, single line controls and Blue Badge restrictions must be signed with clear communication of operating times and restrictions. Within controlled parking zones, waiting and loading signs only need to be erected where yellow line controls differ from the hours of operation for the parking zone.

Enforcement

Paid parking is excluded from the red route controls and is enforced by the local authority.

Residential parking zones may extend on to parts of the TLRN and are enforced by the local authority.

Additional information

Legislation:
Traffic Signs Regulations and General Directions (TSRGD)

10.5 Electric vehicle charging points

Vision and purpose

The installation of electric vehicle charging points (EVCPs) is one of several strategies being promoted to reduce vehicle emissions, in order to improve the health of all Londoners and tackle climate change. We need to support the creation of a coherent and safe charging infrastructure for all types of electric vehicle.

We have been tasked with implementing a network of rapid charging points (RCPs) in London to help support the introduction of the Ultra Low Emission Zone (ULEZ) and the requirement for taxis and private hire vehicles (PHVs) to be zero-emission capable.

The rapid charging infrastructure will enable electric taxis, PHVs and commercial vehicles to charge in as little as 20-30 minutes. This will minimise operational downtime and help vehicles operate in zero-emission mode for as long as possible. Many of the RCPs will be available for public use, especially those outside of central London.

Development planning

Planning permission is required for RCPs proposed on TfL highway land. The submission of a planning application means consideration is given to general street design principles – to minimise street clutter and mitigate any negative impact on road users.

Providing a safe environment that does not negatively impact on the street scene is a

Figure 188: Electric vehicle charging point

priority. The following activities can help to ensure we are considering all users in the installation and maintenance of new infrastructure:

- Fire risk assessment
- Environmental risk assessment
- Electrical risk assessment
- Road safety audit
- Equality impact assessment
- Crime and disorder impact assessment
- Heritage and archaeology assessments
- Tree impact assessments

Street design principles

Please refer to our Pedestrian Comfort Guidance (2010) to determine pedestrian flows. The aim is for a level of service no less than B+ rating.

Ideally, footways should be at least two metres wide. Refer to section 11 'footway amenities' of this guidance for general principles and more detailed layout considerations – such as minimum space requirements, footway width and operational access.

All electric vehicle charging infrastructure should be at a minimum of 450mm from the kerb edge and maintain a 'pedestrian clear zone'. Charge points should be placed on footway build-outs where practicable.

All sites will be subject to a full Road Safety Audit and any materials should follow the TfL Highways Technical Approval Authority (TAA) process.

Product specification

RCPs are produced by different manufacturers so designs can vary. However, each unit should have common TfL branding to be recognisable to users.

Feeder pillars

Please refer to section 12 'safety and functionality' of this guidance. Always consult an electrical engineer when locating and specifying a feeder pillar unit.

Additional information

British Standards:

BS 7671: Requirements for Electrical Installations.

BS EN 61851-1:2011: Electric vehicle conductive charging system.

More detailed guidance will be provided. We are currently updating our 'Guidance for implementation of electric vehicle charging infrastructure' (2010).

10.6 Bus stop environments

Bus stops

Bus stops are an integral part of the streetscape and should be recognised as gateways to the wider public realm, not just a location where buses stop.

The provision of bus stops across the network should be consistent. Designers should consider the important role that bus stops play as the 'shop window' for our services and a key part of the journey experience for passengers. Refer to our Accessible Bus Stop Design Guidance (2015) for comprehensive advice.

Figure 189: A bus waiting at a bus stop

Location

The location of bus stops should be based on operational considerations, policy and consultation, addressing passenger convenience, pedestrian and traffic safety, and bus service frequency, such as the following:

- Any new or amended bus stop and shelter layout must seek to design out crime, according to section 17 of the Crime and Disorder Act
- Generally stops should be provided at intervals of between 300-400 metres
- Where bus stop cycle by-pass lanes are planned or exist, specific attention must be paid to the width/adequacy of passenger waiting areas and safe walking routes to and from the bus stop
- Stops should ideally be located close to health centres, places of worship, leisure centres, hospitals and retail areas
- To comply with the duties under the Equality Act, a ramp should be able to be deployed on the kerb from the bus to enable wheelchair access. Further information is available in the Accessible Bus Stop Design Guidance
- Consideration should be given to the impact of the bus stop on commercial and residential land uses. This may include inconvenience to adjacent property users. It also includes the visual impact on sensitive landscape and townscape locations and listed buildings
- Cage lengths are an important factor in appropriately locating bus stops. Cage lengths are described in the Accessible Bus Stop Design Guidance
- In some circumstances it may be appropriate to combine the bus stop flag with street lighting
- Except on wider roads and dual carriageways, stops should be not be sited opposite each other. They should be staggered to allow traffic to pass comfortably and safely
- Stops should be sited clear of central refuges. If located near a pedestrian crossing they should be positioned after the facility, so as to give a clear view of the crossing for oncoming vehicles
- Where possible, stops should be sited back from the crest of hills and bridges, on the approach side. Stops should not be placed at or near sharp bends
- Placing bus stops near shops which stay open late can help to provide natural surveillance for passengers waiting at the stop. However, it may also be advisable to move bus stops away from pubs, clubs, and off-licences to help reduce the risk of passengers becoming targets for harassment and other crimes

Public realm

- The bus stop, passenger shelter and surrounding footway should be well illuminated and maintained
- Street clutter in the boarding/alighting zones should be avoided to allow full accessibility. Litter bins should be placed well clear of the boarding and alighting zones (refer to Bins)
- Bus boarders are beneficial for reducing the amount of kerbside space needed for the bus stop
- Please refer to 'Kerbs' for further information on kerbs at bus stops

Bus boarder design

For TLRN and borough roads subject to a 30mph speed limit or less, bus boarders should be considered at bus stops where:

- Parked or loading vehicles cause operational problems for buses
- Buses have difficulty rejoining the main traffic flow

Kerb heights greater than 140mm upstand should only be used where the bus will not overhang the kerb. Detailed guidance can be found in Accessible Bus Stop Design Guidance.

Cycle lanes at bus stops

Options for cycle infrastructure at bus stops depend on the nature of the general provision for cycling on the corridor, and on bus infrastructure and operation. Factors to be taken into account include:

- Cycle flows, and flow variation during the day and week
- Degree of separation of cyclists
- General motorised traffic volumes
- Volume and frequency of buses stopping (including the frequency with which more than one bus is likely to use the stop at any one time)
- Access for wheelchair users
- The number of bus passengers using the stop at different times
- The pedestrian routes to and from the bus stop
- Pedestrian comfort in using the adjacent footway

Figure 190: A bus boarder used to raise the kerb height to 140mm

Figure 191: A bus stop by-pass for Cycle Super Highway 2 on Whitechapel Road

Our Accessible Bus Stop Design Guidance (2015) should be consulted for further guidance.

Authorisation

The Highways Act 1980 allows local highway authorities to give consent for objects to be sited on the highway.

The safe operation of bus stops signs should be assessed via the Road Safety Audit process.

Section 55(i) of the DfT Road Traffic Regulation Act 1984 provides that a highway authority may cause or permit traffic signs, which includes bus stop signs, to be placed on or near any road in their area.

DfT Traffic Signs Regulations and General Directions 2002 Schedule 5, Signs for Bus, Tram and Pedal Cycle Facilities, diagrams 973.2 and 973.3: Stopping place for buses operated by or on behalf of or under agreement with Transport for London. This describes the TfL LBSL roundel bus stop flag graphics as a recognised road traffic sign; permitted variants enable the face of the sign to be curved, and the word 'STOP' may be varied as 'STAND'.

Bus station Digital Sign London, UK

Providing customers with live bus arrival information in bus station and interchange environments

Key functions

Opportunity

Responding to demand for more live bus arrival information, TfL introduced the award winning Digital Sign in 2013.

Benefits

The Digital Sign provides passengers with access to live bus arrival information away from the bus stops, helping them to make informed travel choices.

Digital Sign technology has been further enhanced for use in bus station and interchange environments where it is often more complex to display bus arrival information than at standard bus stops due to the number of routes and bus stops converging.

Implementation

We have also developed a means of displaying the sign in a robust, secure and weatherproofed structure that is fit for purpose in exposed environments.

Applying in London

The bus station Digital Sign is currently under trial at Vauxhall and Harrow.

Bus flags

Every bus stop in London is equipped with a TfL bus stop flag. Bus flags provide passengers with service information and a location from which to queue, as well as a reference point for where buses will stop.

Figure 192: A coach stop on Buckingham Palace Road for Victoria Station

Location

The post is generally positioned on the approach side of the passenger shelter, but may also be positioned towards the middle of a shelter for 'centre of path' and 'back of path' layouts. The flag should not compete for space or clear visibility of other road signs and equipment.

TLRN bus flag location standards	
Minimum kerb setback	550mm
Recommended distance from bus stop to shelter and existing posts	2,000mm
Recommended minimum distance from adjacent street furniture	2,000mm
Recommended minimum distance from street trees	2,000mm
Recommended flag height	3,500mm

- Bus flags may be affixed to walls or lamp columns, if owner consent is given, to minimise the number of posts on the footway. Stop posts must be sited clear of inspection covers, pillar boxes, trees and similar obstructions
- A restricted foundation plate should be considered where underground obstructions such as drains or cable ducting are expected within one metre of the post

Figure 193: An example of a bus flag at a bus stop

- Overall post design should be provided in accordance with TSRGD, with the flag positioned at a height of 3500mm to ensure good visibility. Flags are fitted with additional timetable and route information to complement the poster publicity in shelters
- The finish should be silver grey in our standard approved palette

Authorisation

Our bus stop flag is a traffic sign as defined by the Traffic Signs Regulations and General Directions 2002, and is erected only after consultation with the highway authority.

Bus passenger shelters

The following should be read in conjunction with section 6.1.3 of the DfT's Inclusive mobility guide (2021) and our Accessible Bus Stop Design Guidance (2015).

Location

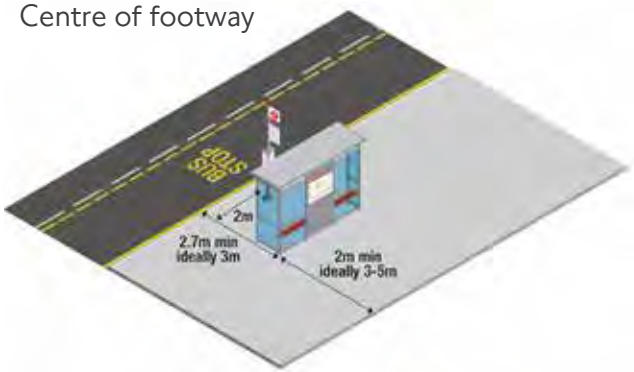
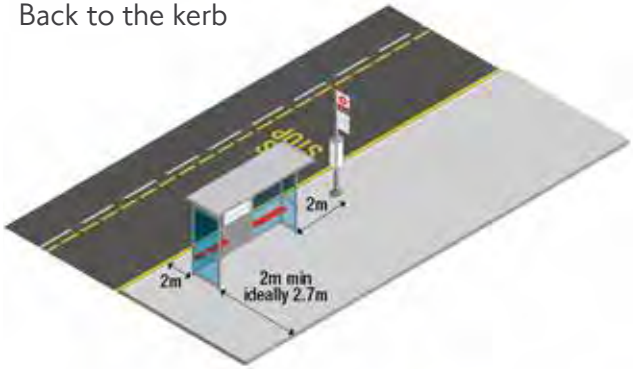
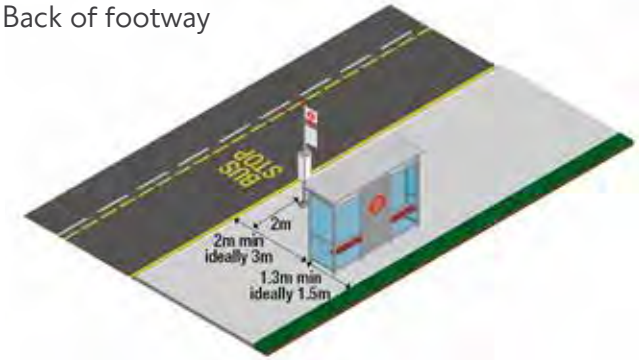
There are three general arrangement options for bus passenger shelter placement based on the footway width, pedestrian flows, required bus stop capacity and adjacent building entrance locations.

Shelters should ideally be positioned a minimum 2,000mm from any other street furniture. Where there is inadequate space for a shelter, a free-standing unit with integral flag, Realtime information (RTI) 'Countdown' and perch seat may be provided.

Figure 194: A new bus stop featuring an interactive touch screen on Westminster Bridge Road

Bins should be provided where space allows, although not sited within 2,000mm of the passenger waiting, boarding or alighting areas.

Figure 195: A bus stop on Oxford Street with the shelter orientated with the back to the kerb

Position option	Application	Minimum setback from kerb	Recommended setback from kerb
Centre of footway 	Preference for wider footways (4,700mm or more)	2,700mm	3,000mm
Back to the kerb 	Preference for narrower footways (less than 4,700mm)	550mm	550mm
Back of footway 	Preference for footways between 3,300-4,500mm, with no adjacent active frontage and large volumes of pedestrians at peak periods (500mm clearance at back of shelter for maintenance; 450mm clearance of roof from kerb to avoid asset damage)	2,000mm	3,000mm

Design

- The choice of style, size and configuration of bus shelters must be agreed with us
- The shelter design must be able to accommodate the numbers of intending passengers and bus information products
- Shelters generally consist of one to four panels (known as a 'bay'); each bay being 1,300mm in width
- Where footway widths allow, bus shelters should be fitted with either a full or half-end panel to provide greater protection from the elements
- See-through panels have advantages for visibility, security and safety including interactions between pedestrians and cyclists if there are adjacent cycle paths or tracks

Responsibility

TfL Bus Infrastructure supplies and maintains shelters for London Buses, taxis and coach services within Greater London. TfL London Buses is responsible for providing bus services throughout London in a safe, efficient and economic manner, while encouraging the use of buses and public transport, aligned with the Mayor's Transport Strategy.

Authorisation

TfL has powers under Section 104 of the London Passenger Transport Act 1934 to erect passenger shelters on the public highway with the consent of the highway authority. In addition to the provisions of the London Passenger Transport Act 1934, local authorities may themselves provide passenger shelters where we are unable to do so, granting licences to erect and maintain them.

Commercial advertisements on bus passenger shelters require the owner to apply for consent under the Town and Country Planning (Control of Advertisements) (England) Regulations 2007.

Additional information

Department for Transport:

Inclusive mobility – A guide to best practice on access to pedestrian and transport infrastructure, 2021

Traffic Signs Manual 1982, Chapter 1: Introduction

Transport for London:

Accessible Bus Stop Design Guidance, 2015

Bus pre-signal assessment and design guidance – Bus Priority Team technical note BP1/05, July 2005

Bus priority at traffic signals keeps London's buses moving – Selective Vehicle Detection (SVD), January 2006

Traffic calming measures for bus routes – Bus Priority Team technical note BP2/05, September 2005

Statutory instruments:

Section 104, London Passenger Transport Act 1934 – power to erect a bus shelter given to the local authority or highway authority

Section 64, London Passenger Transport Act 1937 – adds a requirement to give frontagers notice of TfL's intention to build a shelter

Greater London Authority Act 1999

Bus intelligence technology

Realtime information (RTI) Countdown displays

Passenger shelters can be fitted with RTI Countdown displays, which show the arrival predictions in minutes for approaching buses as well as indicating which routes are running. The displays also have the functionality to scroll special messages to passengers regarding information on traffic delays, forthcoming roadworks and major events impacting the network.

The displays are hardwired into the shelter power supply and data transfer is carried via a 3G network.

Location

The RTI display is usually attached to the underside of the shelter roof at the arrival end. It can also be fitted in a void above the information panel on a Landmark London type shelter model. In a small number of exceptional locations it may be provided as a free-standing unit (FSU), however, at the time of print there is currently a programme underway to upgrade the estate of eight FSUs with single bay narrow roofed 'info' shelters.

Figure 196: Bus countdown displays

Interactive bus stop London, UK

Assisting wayfinding and functionality of London's bus stops

Key functions

Opportunity

Real-time information is increasingly perceived as necessary for public transport users in London. TfL and Clear Channel have developed the UK's first interactive bus shelter.

Benefits

The interactive bus stop addresses the needs of commuters and visitors alike. Piccadilly Circus was chosen for the initial trial because it is one of London's most popular destinations.

Implementation

A large colour touchscreen was installed in a shelter at Piccadilly Circus in 2014. Rather like a smartphone, the screen can display Tube status, weather forecasts, maps and Mayor's Cycle Hire Scheme locations. It also provides information on local tourist attractions and walking routes. It has USB charging ports and a free WiFi connection.

Applying in London

If the trial proves successful, interactive bus stops could be deployed across much of central London.

Pepsi MAX bus stop London, UK

Surprising and delighting customers at a London bus stop

Key functions

Opportunity

A 2014 advertising campaign by PepsiCo used a specially designed London bus shelter to surprise and amuse passengers waiting at the stop.

Benefits

The Pepsi MAX bus stop shows how augmented reality can provide stimulation and surprise as part of a person's journey.

Implementation

The end panel of the bus shelter was fitted with high-resolution camera and screen. From within the shelter, the panel resembled a window; however, this view was augmented by giant robots, flying saucers and an enormous tentacle plucking a hapless pedestrian off the street.

Applying in London

The technology has numerous potential applications, for information, entertainment and commercial purpose

Additional information

Transport for London:
Guidance on bus intelligence systems, 'Countdown for London'

10.7 Coach facilities

The demand for tourist coaches is forecast to increase as the population of London increases and our population ages. Facilities to pick up and set down passengers and park are important for the coach industry but must be done in a way to minimise impact on the streetscape and

Figure 197: Coach parking bays demarcated with road markings

Figure 198: A row of coaches parked on the Albert Embankment

other road users. Please read this section in conjunction with 'Bus stop environments' and Accessible Bus Stop Design Guidance.

Overview

Any motor vehicle containing eight or more seats (exclusive of the driver) can park in an on-street coach bay. This may require hourly payment as set out by the borough. Some coach parking bays (for example, in Westminster) may not be used between 00:00-08:00.

On-street coach parking is found throughout London. It is concentrated in central London, where most coach activity takes place. This type of facility is typically, but not exclusively, used by the tourist coach sector. A number of places – including Madame Tussauds, Shakespeare's Globe Theatre, Tate Modern, Natural History Museum and some hotels in Cromwell Road – have 20-minute set down and pick up bays outside or nearby.

Within the central London boroughs there are 214 on-street facilities. Of these, 44 per cent are located on the TLRN. Long-stay parking and coach stations are located off the public highway.

Facilities

The following types of on-street coach facilities exist in London:

Type	Description
Pick up and set down (PUSD) – on red routes	Coaches are allowed to stop at certain locations while passengers are boarding or alighting. These sites include dedicated facilities and red route bus stops where the sign plate indicates 'except buses'.
PUSD – on yellow lines	Coaches are allowed to set down and pick up passengers on single and double yellow lines. Some highway authorities allow up to 10 minutes waiting time when no loading restrictions are in operation. Where a bus stop sign plate indicates 'except local buses', tourist coaches are not permitted to stop.
Short-stay parking	Mostly dedicated on-street facilities – maximum stay of 20-30 minutes depending on location. Charges apply in some cases.
Medium-stay parking	Mostly on-street – maximum stay of one to four hours, however, a few locations permit up to 12 hours. A charge applies to the majority of these dedicated facilities. Overnight parking is not generally permitted.

Design

Coach disabled ramps require 3000mm of space. Pick-up/set-down locations need to incorporate footway space.

Additional information

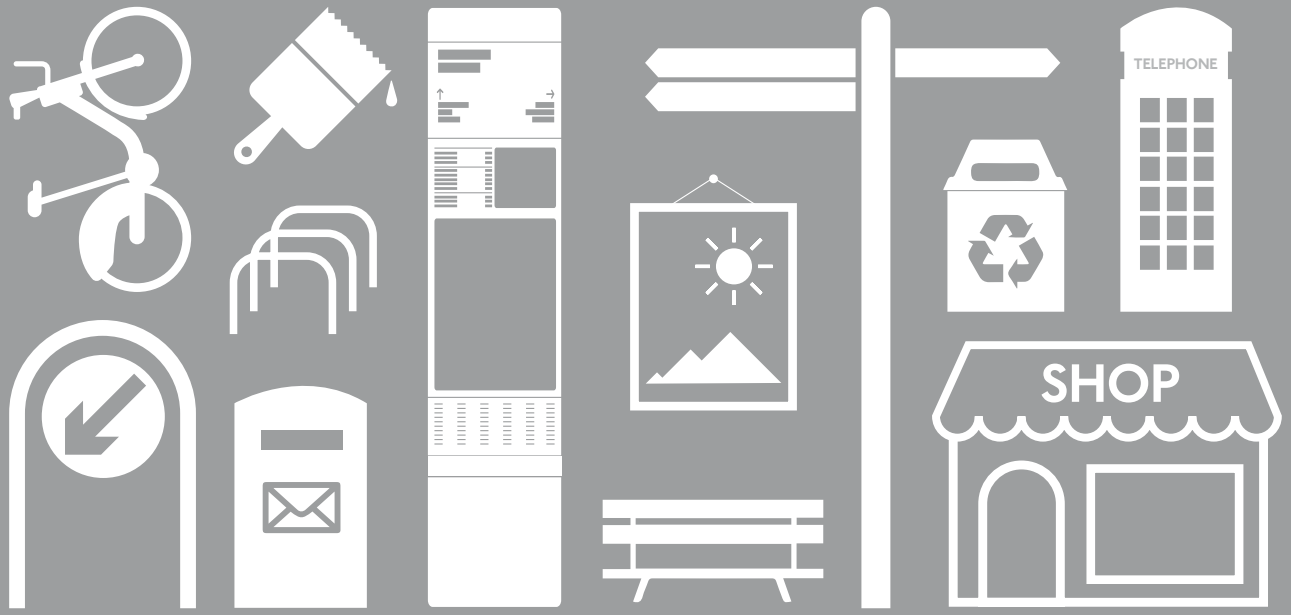
Transport for London:

Tourist Coach Action Plan, 2013

http://www.tfl.gov.uk/cdn/static/cms/documents/tourist-coach-action-plan.pdf

Figure 199: A coach stop flag

Part E Footway amenities



11.1 Vision

The immediate impression and character of any modern city is often determined by the quality and aesthetic appeal of its street furniture design. This can help to animate the public realm and signals to users what and where certain behaviour is desirable and appropriate. A specific location can often be recognised by simply referring to its street furniture design. However, poorly placed or excessive street furniture can create a cluttered environment resulting in obstructions, reduced legibility and a blighted character. Successful public spaces have had every piece of street furniture rationalised and creatively placed to achieve multiple aims.

There is no 'one solution fits all' when selecting and applying street furniture. Material selection and layout must be contextually appropriate. Some settings may require street furniture that quietly complements the character of the area, provides structure, or adds surprise and delight.

We value exceptional detailing to ensure that street furniture is beautiful, robust and maintainable, complementing the surrounding streetscape with 'the right product in the right place, done right'.

General principles

The term 'street furniture' applies to any vertical piece of equipment placed within the highway, to provide a practical function. Most components are located on the footway and provide functions relating to traffic management, safety and amenity. Products include signposts, signals and enforcement equipment to inform motorists, as well as pedestrian oriented elements such as seating, wayfinding signage and kiosks.

The palette of materials selected for the TLRN reflects our ambition to provide a consistent high quality streetscape. The street furniture components shown in this section emphasise design intent rather than prescribing specific products. Dimensional requirements are mandatory and have been specified based on advice from best practice.

Design teams should check specifications with manufacturers and select products that satisfy the criteria. Options are given where there may be an opportunity to reflect local character be it stylish and contemporary or historic. Design teams may recommend alternatives to the standard palette that are in keeping with the spirit of this guidance. Alternative street furniture will require SDRG approval for any TLRN route.

Figure 200: A street furniture zone of cycle parking and trees located at the back of the footway

Figure 201: A street furniture zone located at the front of the footway

Coordinating street furniture

Streetscape Guidance advocates using a coordinated approach for designing and maintaining the layout of street furniture to:

- Minimise cluttering footways with unnecessary furniture
- Maximise unobstructed widths for comfortable pedestrian movement
- Satisfy network operational requirements
- Ensure that the product is appropriate for the location in function and style
- Merge or combine street furniture components on a single post where practicable to further reduce clutter

In identifying locations for street furniture within the footway, a number of related factors should be considered which will impact on appropriate placement. These factors determine how to integrate street furniture.

Designers should consider:

- **Footway and verge widths** – location, orientation and quantity
- **Vehicle speeds** – speed limits will govern minimum set backs from the kerb line
- **Pedestrian flows** – refer to Pedestrian Comfort Guidance for London (2015) to determine these
- **Parking and loading requirements** – street furniture should not be located where it is at risk of damage from vehicle movement or where access to the street furniture poses a safety risk to pedestrians except where street furniture has been placed to discourage vehicle movement
- **Street Types** – the material and layout of furniture should contribute to the function, performance and character of the street
- **Adjacent land uses** – furniture should satisfy a need as well as reflect the character of the setting without causing an obstruction or reducing the functionality of the surrounding buildings or land uses
- **Street furniture size and location requirements** – individual components should satisfy designated criteria to ensure a minimum standard is attained
- **Security** – furniture must not create a situation which compromises the safety or security of any user
- **Maintenance** – street furniture placement does not restrict standard cleansing regimes

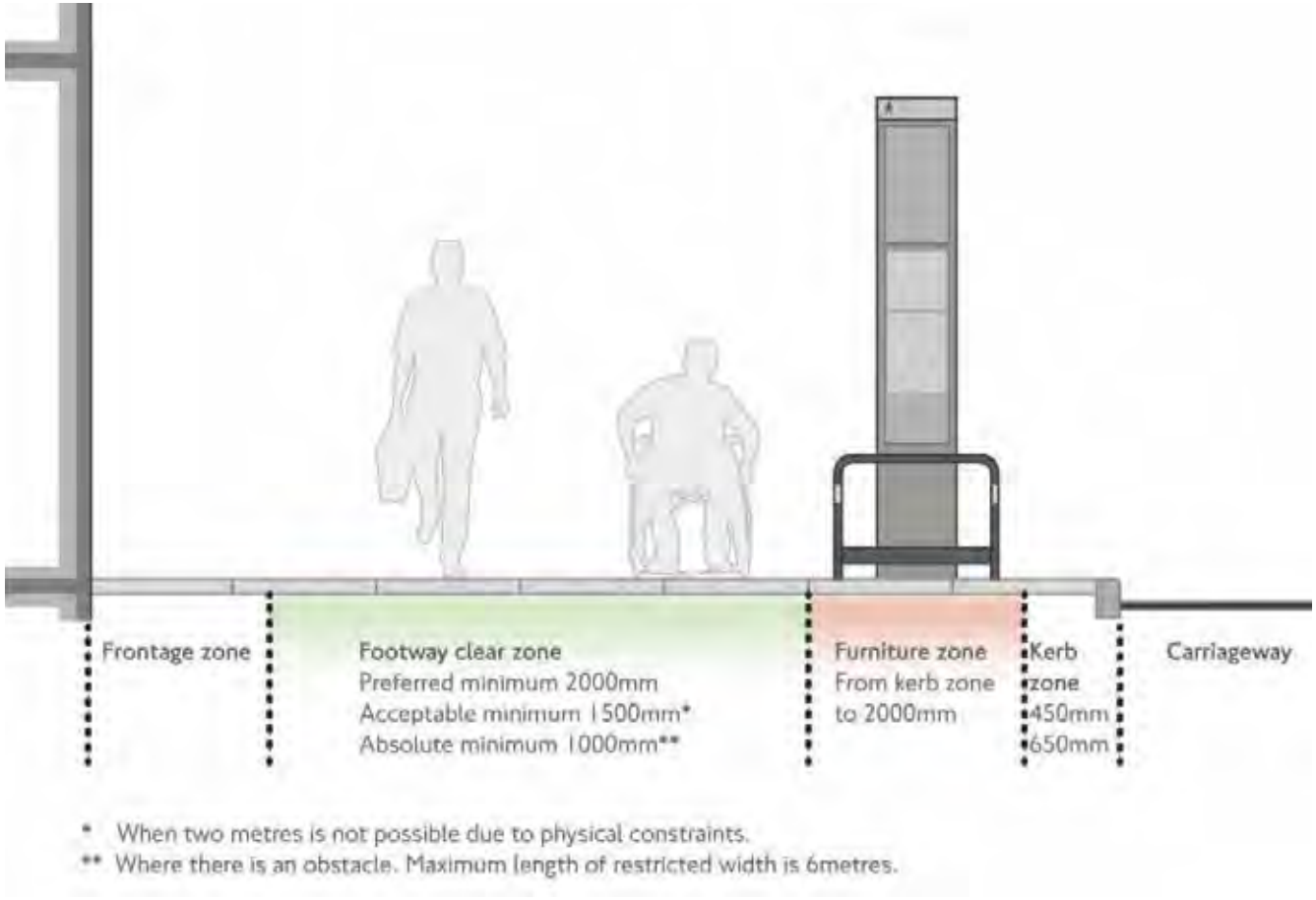
11.2 Footway zones

The area between the kerb line and the highway boundary can be divided into four zones, which serve distinct functions within the streetscape:

- Kerb zone
- Furniture and planting zone
- Footway clear zone
- Frontage zone

The relative importance, scale and treatment for each of the zones will vary according to the context.

Figure 202: Footway zones



Kerb zone

A kerb zone should be kept completely free of street furniture to prevent damage from vehicles overhanging the carriageway edge. Each piece of street furniture and equipment has a minimum distance it must be placed away from the kerb edge. Please refer to each streetscape element to determine the specified distance from kerb edge.

It is essential to consider the camber of the road to allow for high-sided vehicles leaning over the footway.

Figure 203: Street furniture and bus stops aligned towards the front of the footway in Barking

Furniture and planting zone

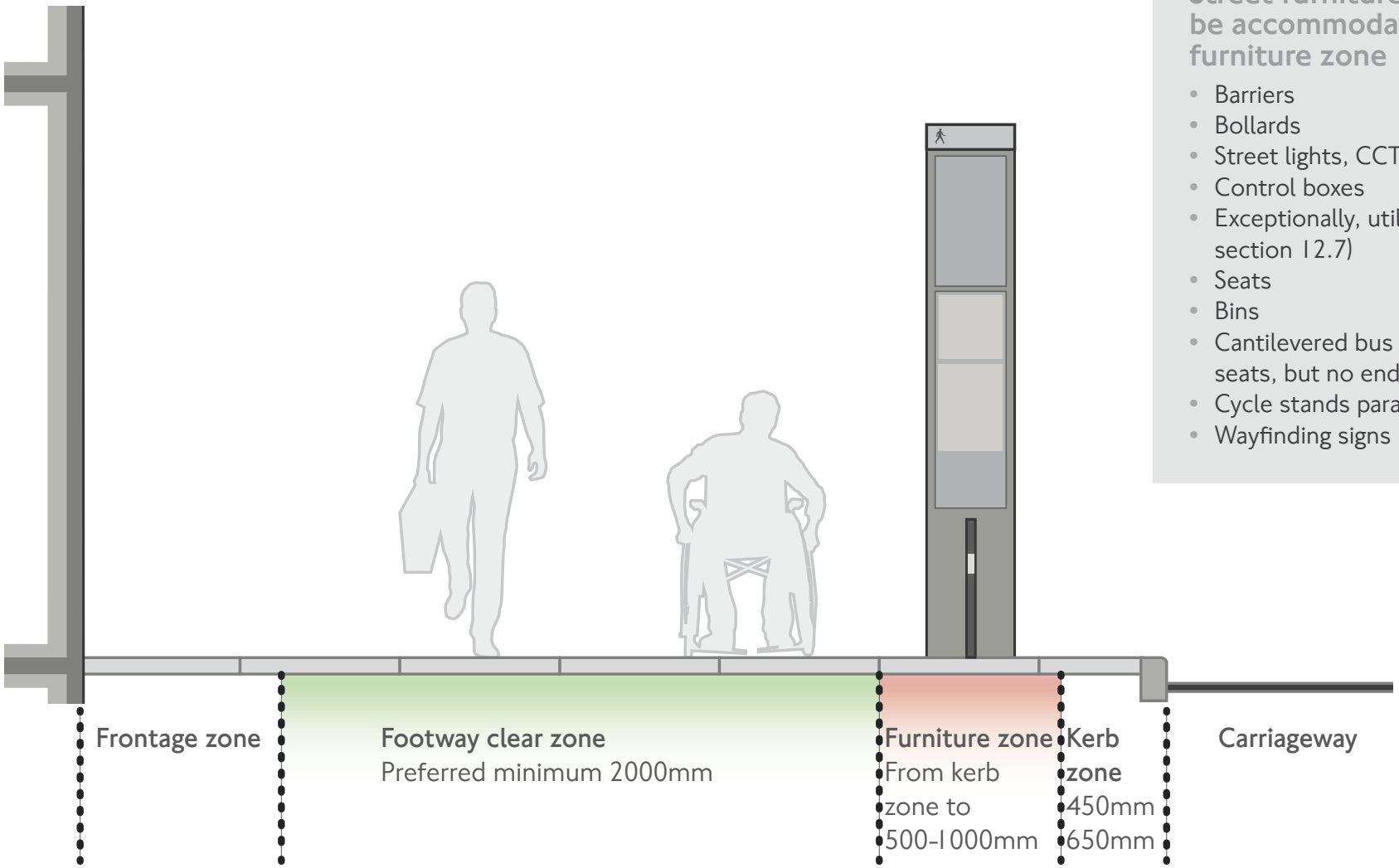
The furniture zone is provided adjacent to the kerb zone to coordinate street furniture in a consistent arrangement which maximises the unobstructed width of the footway for pedestrian use. Features such as lighting and signage should be located in this zone, along with on-footway cycle parking, seating and other amenity elements.

Furniture should only be provided where it serves a specific function and is appropriate for the location. A furniture zone should therefore not exist where there is no need for street furniture.

Design teams should acknowledge that the requirements for the footway clear zone will ultimately determine how much space can be afforded to street furniture.

A furniture zone should only be provided where suitable clear footway widths and kerb zone widths are deliverable. The width of the furniture zone should be selected based on the footway constraints, which in turn will impact on the street furniture that can be used:

Furniture zone design standards



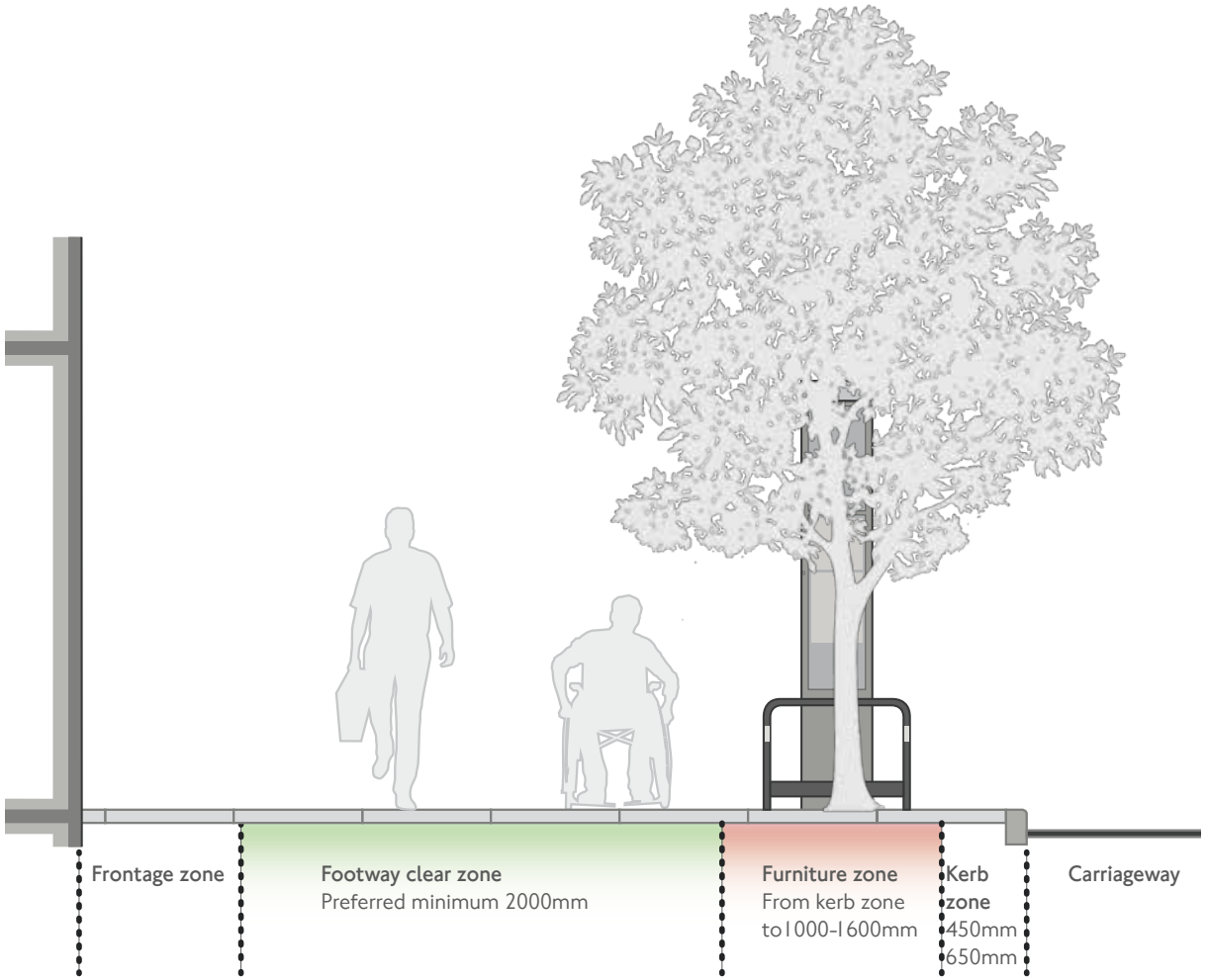
Furniture zone width

500-1,000mm wide

Street furniture that can be accommodated in the furniture zone

- Barriers
- Bollards
- Street lights, CCTV, traffic signals, signs
- Control boxes
- Exceptionally, utility cabinets (see section 12.7)
- Seats
- Bins
- Cantilevered bus shelters with perch seats, but no end panels
- Cycle stands parallel to the kerb
- Wayfinding signs

Furniture zone design standards



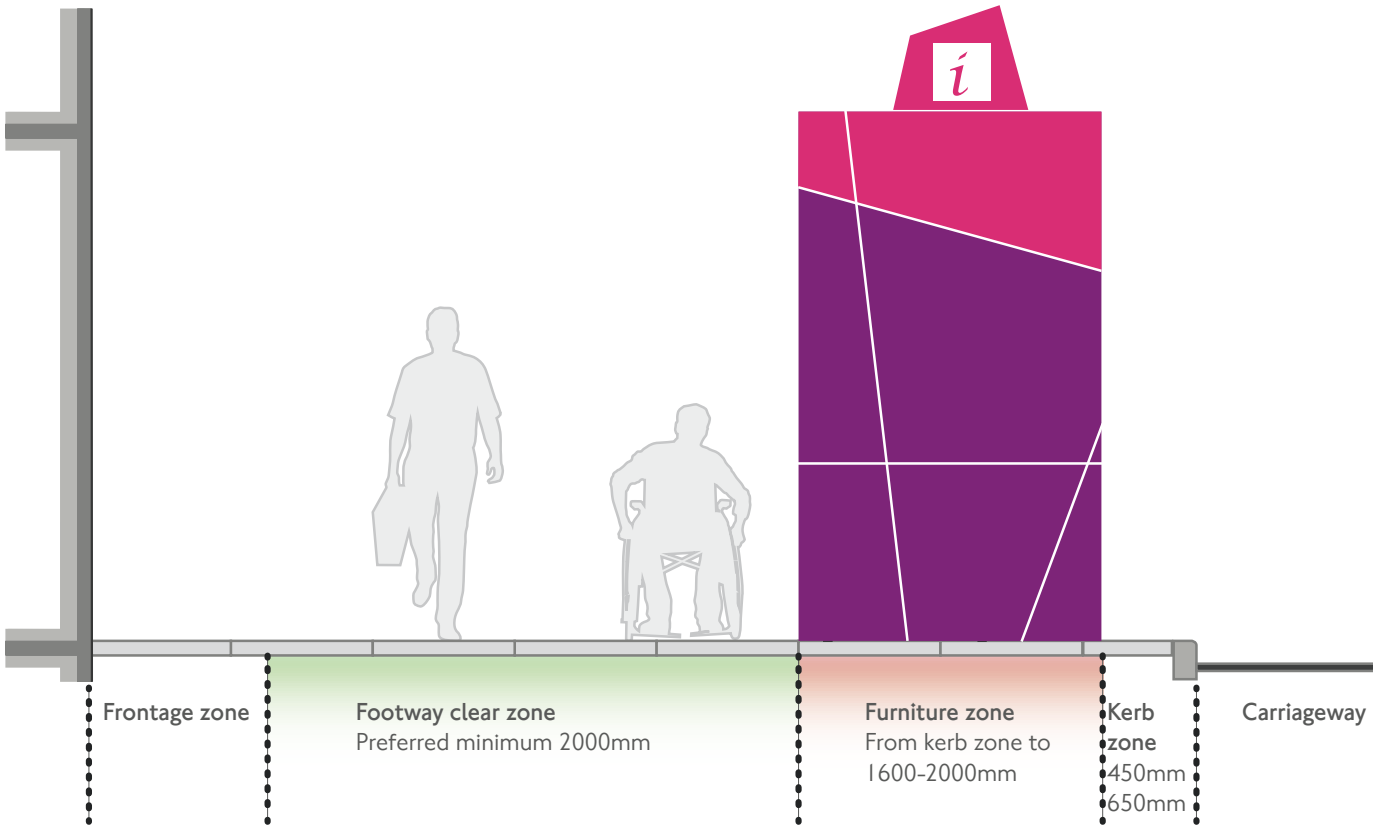
Furniture zone width

1,000-1,600mm wide

Street furniture that can be accommodated in the furniture zone

- Barriers
- Bollards
- Street lights, CCTV, traffic signals, signs
- Control boxes
- Exceptionally, utility cabinets (see section 12.7)
- Seats
- Bins
- Cantilevered bus shelters with perch seats, but no end panels
- Cycle stands parallel to the kerb
- Wayfinding signs
- Telephone boxes and other larger items
- Cycle stands angled at greater than 45 degrees to the kerb line (echelon cycle parking)
- Street trees

Furniture zone design standards



Furniture zone width

1,600-2,000mm wide

Street furniture that can be accommodated in the furniture zone

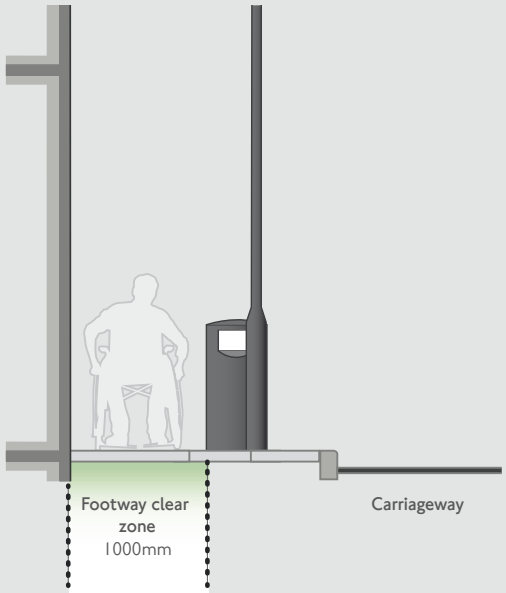
- Barriers
- Bollards
- Street lights, CCTV, traffic signals, signs
- Control boxes
- Exceptionally, utility cabinets (see section 12.7)
- Seats
- Bins
- Cantilevered bus shelters with perch seats, but no end panels
- Cycle stands parallel to the kerb
- Wayfinding signs
- Telephone boxes and other larger items
- Cycle stands angled at greater than 45 degrees to the kerb line (echelon cycle parking)
- Street trees
- Cycle stands can be provided at 90 degrees to the kerb line, although echelon parking remains the preference
- Kiosks and other large structures
- Bus shelters with half and full end panels
- Larger street trees

Footway clear zone

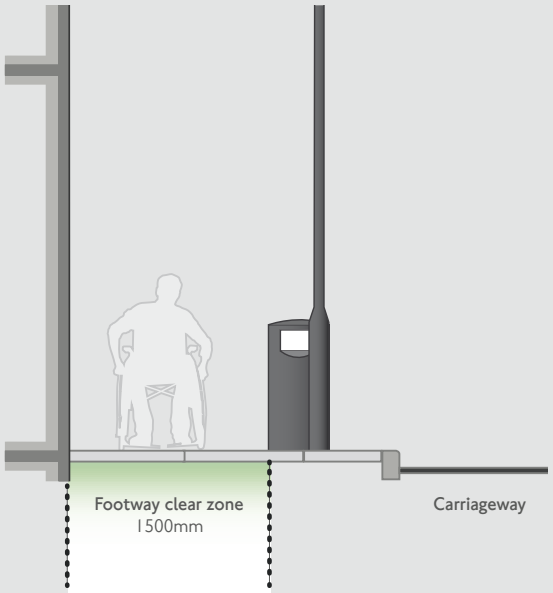
The clear zone should be entirely free of obstructions to allow for unhindered pedestrian movement along the footway. The width of the clear zone provided should relate directly to the character and use of the street, and in particular the volume of pedestrians. The footway clear zone should be designed to comfortably accommodate peak pedestrian demand and satisfy acceptable levels of service (refer to DfT's Inclusive mobility, 2021, and to our Pedestrian Comfort Guidance for London, 2010, for further information).

Footway clear zone design standards

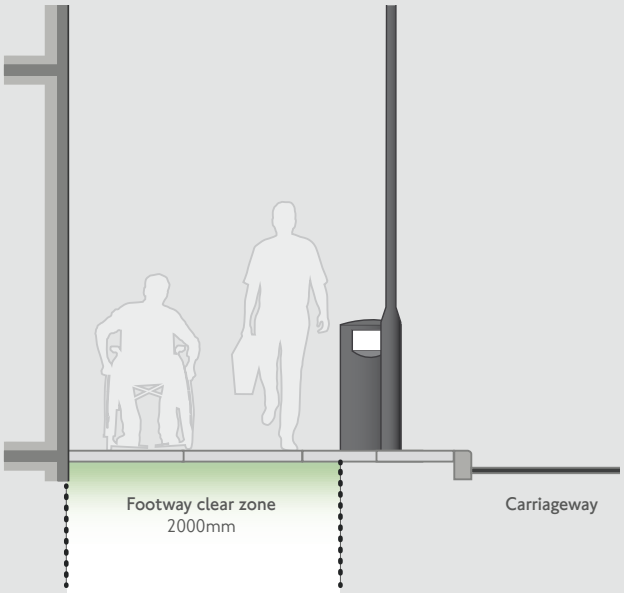
Unobstructed width	Design criteria
1,000mm wide	• Absolute minimum unobstructed width • Where a minimum width is provided, it should not be continued for more than 6,000mm along the length of footway



Unobstructed width	Design criteria
1,500mm wide	• Minimum acceptable unobstructed width. Allows for a wheelchair user and person walking to pass one another



Unobstructed width	Design criteria
2,000mm wide	• Preferred minimum unobstructed width. Allows for two wheelchair users to comfortably pass one another



Frontage zone

The frontage zone is the area adjacent to the property line and highway boundary. Wherever possible this zone should be kept free of street furniture to:

- Enable visually impaired people who use canes to navigate the street using the building line
- Minimise obstructing retail frontages to encourage window browsing

Where footway widths are narrow, essential street furniture may be located tight against the property boundary to minimise street clutter within the kerb zone. The maximum recommended distance is 275mm away from the building line for positioning street furniture within the frontage zone. Building overhangs, shop signs, awnings, banners, planters, and drain pipes may encroach upon this zone and require statutory approval from the highway authority.

Approval for extension beyond the frontage zone into the footway zone must only occur where minimum clear headroom of 2,400mm is maintained. A 2,100mm clearance below suspended signs is allowed where cyclists are not permitted on the footway.

In certain areas, the frontage zone may be occupied by café seating. In these instances it is important to ensure that clear boundaries are defined so that café furniture does not obstruct the footway clear zone.

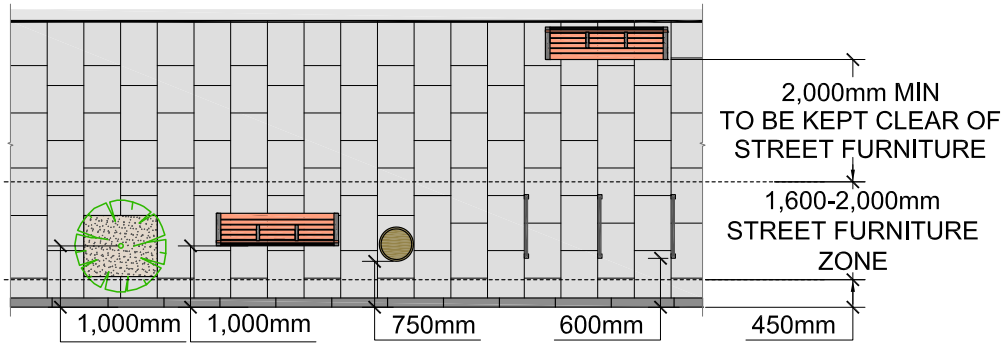
Alternative solutions

If the existing situation and/or the scope of the project makes it difficult to create a furniture zone, larger furniture objects will be difficult to incorporate within the streetscape.

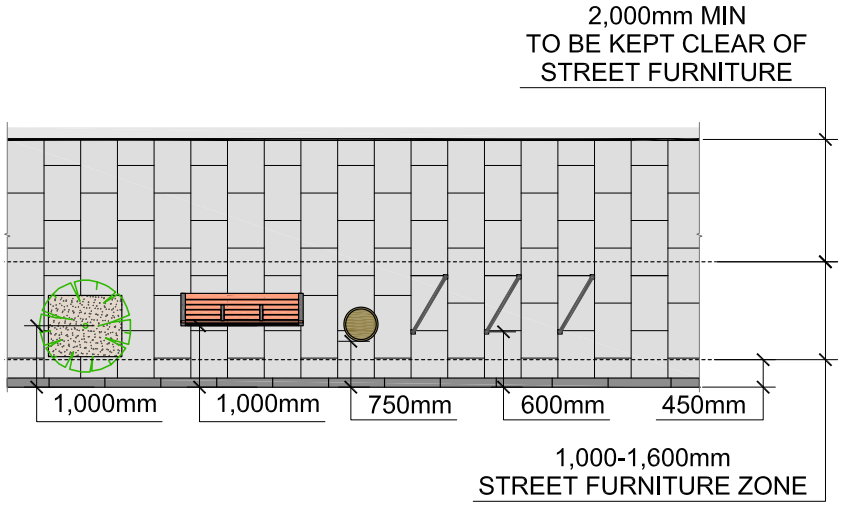
Alternative solutions may be to:

- Locate street furniture on side roads, with due consideration for operational requirements
- Locate service boxes, signal controllers or telephone kiosks in building recesses
- Integrate post boxes and cabinets, where practical, into the building structure with appropriate access (wayleaves required)
- Negotiate with adjacent landowners the location of street furniture beyond the highway boundary
- Consider locating specific furniture on the central median or carriageway, such as cycle parking

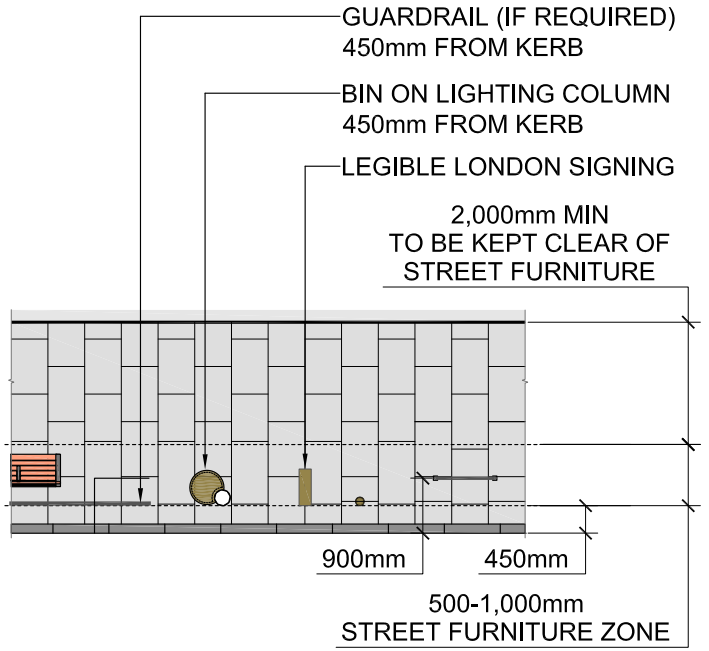
Figure 204: Street furniture placement



PLAN - FURNITURE ZONE 1,600-2,000mm



PLAN - FURNITURE ZONE 1,000-1,600mm



PLAN - FURNITURE ZONE 500-1,000mm

11.3 Working with businesses

Many controllable on-street activities contribute directly to the economic viability of the local community, the vibrancy of the place and/or the safety of the surrounding structures. London's road network provides, in select locations, the opportunity for a variety of services to be offered to Londoners in the form of a kiosk, market stalls and outdoor café seating. Business opportunities are provided in a range of forms from retail opportunities to providing information, exhibitions, or public engagement.

Figure 205: A local market on the carriageway

Like all elements of the streetscape businesses must sit comfortably within their environment, be well designed and provide a benefit to Londoners. The following section presents standards for the siting, design and maintenance of kiosks, market stalls, pop-ups and outdoor café seating in their various forms to create flourishing and welcoming spaces. Many of the activities listed are controllable by the issue of consents or licences issued by the highway or local authority. When working on the TLRN, in most cases TfL's consent should be sought.

Kiosks and pop-ups

Retail kiosks and pop-ups are owned and managed by companies to assist in the sale and distribution of their products or to provide information and are most often located at stations or transport interchanges. These areas are the busiest and most congested parts of London so footway space is especially valuable for ensuring adequate pedestrian comfort. Newspaper stands should therefore be carefully managed to reduce their visual and physical intrusion within the street environment

Newspaper kiosks

Permanent and temporary kiosks which are operated by local traders can have a positive impact on the street environment if they are well managed and do not spill out across the footway. Kiosks should be provided so as to minimise the visual intrusion within the streetscape and allow adequate space for pedestrians on the footway.

Designers should consider the impact that pedestrians gathering around a stall can have on footway capacity and should ensure that any existing kiosk is not overly impacting on the quality and comfort of the walking environment.

Kiosks should be removed where situated in a position that adversely impacts on the quality of the streetscape, or where poorly managed and maintained by the leaseholder.

Figure 206: A permanent newsagent kiosk located towards the front of a wide footway

Design

Designers are encouraged to work with the newspaper companies to use a limited colour palette for stands placed on the road network to reduce their visual intrusion. The design of newspaper kiosks should reflect the local context in materiality, colour and form. The preference is to provide temporary facilities that are removable. Designers should consider using metal studs to demarcate agreed locations for newspaper stands and to aid enforcement.

Enforcement

Greater enforcement of newspaper kiosks is required to minimise the encroachment of stands on to the footway. As a general principle, a newspaper kiosk is not acceptable where it impacts on sightlines at corners or crossing places, nor where it impacts on the free flow of pedestrian traffic.

Location

- Stands should be located in an agreed location upon consultation with London Underground, the borough and the relevant newspaper companies
- Newspaper stands are typically located against a building wall in close proximity to a station entrance, and should be placed to minimise obstructing pedestrian desire lines
- They may be positioned temporarily during peak periods and removed when all papers have been sold, or larger units can be a permanent fixture in the streetscape
- Newspaper stands should not back on to guardrails as it increases the visibility and visual intrusion of the stand, with fixings visible from all sides
- Where multiple newspaper stands are located in close proximity, the stands should be located directly next to each other to minimise the footprint size

Licensing

The borough's licensing requirements must be met for street trading. On any section of the TLRN our approval is required unless evidence exists that the local authority had passed a 'designating resolution' for the street (or part of the street) in question prior to July 2000, under section 24(1)(a) of the London Local Authorities Act 1990, or under such equivalent provisions repealed by the 1990 Act. In those circumstances designation would be continued by section 24(2) of the 1990 Act without further express designation. Any such designations will have been made by formal resolution of the local authority. No presumption of designation can be made without the support of appropriate contemporaneous records. When considering new designations then the general principles of this guidance relating to safe passage around licensed areas will apply, as will the requirement to remove receptacles and other equipment from the highway at the end of each trading session and not to retain it on the highway overnight.

Pop-up kiosks

Pop-up kiosks provide a temporary service. Examples include retail, information, exhibitions and public engagement. They were used extensively during the 2012 Games.

As with permanent kiosks, pop-ups must not have an excessive impact on the quality and comfort of the walking environment. Given their association with large-scale events, the requirement for an unobstructed pedestrian environment may be even more acute.

Figure 207: Temporary or pop-up kiosks offer short-term services

Design

The main design characteristic of pop-up kiosks is that they are flexible. They will also need to be distinctive, attractive and appropriate to their context. They are typically single-storey and need to be quick to assemble/disassemble, while maintaining a high-quality appearance throughout the duration of their use.

Location

The location of pop-up kiosks will vary depending on their function and associated events. The procuring authority should follow the guidelines for permanent kiosks as far as is necessary to ensure a functioning streetscape.

Licensing

Consent should be sought from the local authority and ourselves.

Market stalls

Design considerations

Market pitches may be delineated and numbered using paint, paving materials, or studs depending on the context. Market stalls may be owned by individual traders, supplied by the local authority or by stall contractors. Market stalls must not cause interference or inconvenience to street users.

Licensing

Market stalls are usually licensed by the relevant local authority which grants a street trading licence, however, our consent is also required when working on the TLRN. The local authority can also grant licences for various street activities or street trading to control the type and scale of activity.

Dealing with waste

Market traders are responsible for keeping their stall and surrounding area clean and free of litter and rubbish during hours of trading. Traders are also responsible for removing and disposing of their rubbish.

Despite these requirements, litter and waste often blight market stalls. Local authorities and market stalls should aim to reduce the total space taken by waste. Waste should be managed and kept out of sight until ready for collection, as well as limiting the amount of waste produced by market activities.

Figure 208: A woman shopping at a market stall

Wastewater is also an important consideration. Drains in market stall areas are susceptible to blockages from wastewater, fat and refuse. Provision of foul water sewers (not gutter gullies) helps to prevent this.

Outdoor café seating

Outdoor cafés and dining can provide a sociable and attractive addition to the streetscene when located appropriately and successfully managed. Outdoor café seating will be promoted where space allows and where it will animate and add character to the street. Wider footways make this more achievable.

Figure 209: Outdoor café seating may be located on wide footways

Design considerations

Pedestrian movement must be taken into consideration when outdoor café applications are received, ensuring that acceptable footway widths are maintained. Clearance for access to adjacent properties and for emergencies must also be maintained. The footway adjacent to the café seating should provide a minimum unobstructed width of 2000mm.

Materials and layout

- Areas can be demarcated by a variety of means; the most common and visually acceptable is through the use of metal studs
- Metal studs can be retrofitted to most paving surfaces by drilling and secured with a high strength adhesive
- Stainless steel studs in chrome or bronze should be bevelled and not exceed six millimetres in height, so as to avoid posing a potential trip hazard when no seats are laid out
- Temporary barriers to cordon off the seating should have a plain style and be within the height range of 700-1,000mm, so as to not visually obstruct views down the street or pose a trip hazard
- Awnings should be free of advertisements and should not exceed the width of the designated seating area
- Planters may be used where adequate drainage can be provided and upon agreement with the SDRG, as these constitute permanent structures
- Outdoor furniture or appliances are not permitted to be stored on the road network

Licensing

- Outdoor cafés are usually licensed by the relevant local authority which grants a Highways Act S115E licence in accordance with set criteria for the purposes of providing refreshments. Licensed areas on the TLRN must have our prior consent to be valid
- Local policies provide the management principles for licensing and managing commercial activities on or adjacent to the highway
- Seated areas that are located on private forecourts or to the rear of buildings and in private courtyards do not generally require a licence if they are an extension of an A3 or A4 commercial use; however planning permission will be required for any permanent structure
- It is the local authority's duty to ensure that access along the footway and to the seating area is compliant with standards outlined in the Equality Act 2010
- The local authority can also grant licences for various street activities or street trading to control the type and scale of activity

Additional information

Department for Transport:

Inclusive mobility – A guide to best practice on access to pedestrian and transport infrastructure, 2021

Highways Act:

Guidance on the application of powers under Section 115, Highways Act 1980

Advertising boards

An objective of the MTS is to make it easier for cyclists, pedestrians and disabled people to get about. In support of that objective, we have removed miles of unnecessary pedestrian guardrail and thousands of unnecessary traffic signs and bollards.

Figure 210: This advertising board is obstructing the footway and should be removed

We have also set a priority for the removal of unauthorised obstructions from our roads as such items can cause inconvenience to pedestrians, present a hazard – particularly for people with poor eyesight – and make the street feel unnecessarily cluttered.

We will serve removal notices and issue a fixed penalty notice to businesses that obstruct the public footway with advertising 'A' boards. 'A' boards constitute any type of free-standing advertisement, directional or information signage placed within the highway.

TfL policy

- Planning authorities are responsible for regulating and approving advertising in the public highway as detailed in the Town and Country Planning (Control of Advertisements) (England) Regulations 2007

Figure 211: Advertising boards correctly placed on Station Road in Harrow

- 'A' boards placed without permission within the highway authority's jurisdiction should be removed. Authorities are able to issue fixed penalty notices for unauthorised obstruction of the highway
- Boards positioned on private forecourts do not require planning permission, however, local authorities are encouraged to engage with shopfront owners to adopt a regime of minimum clutter and conform to the design standards outlined below

Unacceptable placement

The following placements are unacceptable, regardless of property ownership considerations:

- Where the board constitutes a hazard as identified by the local authority or ourselves
- Where any form of vehicular access is required
- 'A' boards fixed to street furniture, trees or the public highway
- Boards leaning against walls
- Partial placement on the public highway and private forecourt
- Boards on grass verges; these can create a road safety hazard

Ownership of subsoil does not necessarily negate an area being public highway. Highway authorities should ensure that any 'A' boards on the highway are removed and have powers to do so, provided by the London Local Authorities and Transport for London Act 2003.

Additional information

Department for Communities and Local Government:

Outdoor advertisements and signs: a guide for advertisers, 2007

Legislation:

Highways Act 1980, Section 132

Town and Country Planning Act 1990

Town and Country Planning (Control of Advertisements) (England) Regulations 2007

London Local Authorities and Transport for London Act 2003

11.4 Colour of street furniture

The colour of metal components for any piece of street furniture should comply with the following colour criteria:

- Black street furniture is preferred as a default for the TLRN with the exception of higher speed routes that do not provide for pedestrian movement
- Signal grey is the standard colour for higher speed non-pedestrian roads
- A stainless steel finish should be considered as non-standard and requires SDRG approval
- Contrasting band

Colour of metal street furniture	Application	Finish	Contrasting visibility band
RAL 9005 Black	TLRN in most boroughs, town centres and low speed roads	Matt micaceous iron oxide	White (RAL9010)
RAL 7004 Signal grey	High speed non-pedestrian roads and by exception as approved by the SDRG	Matt micaceous iron oxide	Black (RAL9005)
Stainless steel	By exception as approved by the SDRG	Stainless steel or aluminium finish	Black (RAL9005) if required

Visibility

Black furniture can provide better colour contrast for visually impaired pedestrians. Visibility bands are required on all street furniture with the exception of guardrails and seats.

Bands should be provided to contrast with the colour of the main body of the stand: white or white reflective banding on black furniture; black banding on stainless steel (an exception to the standard colour palette).

Special finishes and coatings

Requests to use alternative colours to black, to match borough, town centre or historic palettes will be treated as exceptions and should be submitted for approval by the SDRG. Special coatings for flyposting and graffiti prone areas can be applied up to a height of 3,000mm on lighting columns.

Additional information

Legislation:
The Equality Act 2010

Department for Transport:
Inclusive mobility – A guide to best practice on access to pedestrian and transport infrastructure, 2021

Figure 212: A 'keep-left' hoop bollard illuminated by carriageway lighting

Figure 213: A 'keep-left' hoop bollard which is internally illuminated

11.5 Cycle parking

We are supporting the Mayor's Vision for Cycling, published in March 2013, by planning for growth in cycling and making safer and better streets for all. The provision of fit for purpose, well-located and secure formal cycle parking facilities is vital for supporting the cycling growth targets for London. A lack of appropriate parking is often cited as a barrier to cycling and cycle ownership.

The number and the quality of cycle parking spaces must not only keep pace with the growing use of cycles, but allow for the substantial future growth set out in the Mayor's vision. It must also allow for all types of cycle to be securely parked, ensuring that any cycle user with a physical, sensory or cognitive impairment should enjoy access to good quality cycle parking. Please refer to LCDS for further information.

Figure 214: A row of Sheffield cycle stands at Euston Circus

Location, demand and security

Cycle parking facilities on the TLRN are generally located on the footway within the furniture zone. London Cycling Design Standards (2014) should be referred to for further information on assessing demand for cycle parking and ensuring that provision:

- Meets current and likely future demand
- Supports different uses
- Is appropriately located
- Has step-free access
- Is secure, well-overlooked, and well-lit at night
- Is well integrated with the public realm
- Includes some provision for larger models, such as cargo cycles and tricycles

Placement

Cycle parking is best positioned where it is not visually or physically intrusive, yet is sufficiently overlooked for security purposes. The visual impact of cycle stands can be reduced if placed between other street furniture, such as tree planting, bus stops and seating, as part of a coordinated furniture zone. Cycle parking may also be useful in discouraging pedestrians from crossing at certain points.

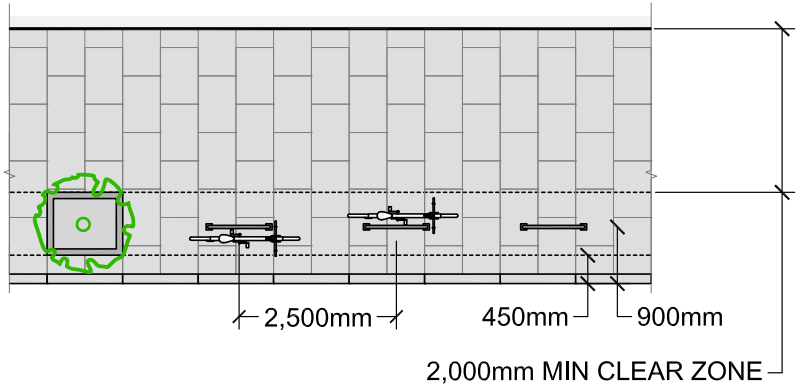
Echelon and perpendicular arrangements offer greater capacity than parallel layouts. In addition, echelon arrangements take up less width than perpendicular arrangements. Please be aware of the following when selecting locations for cycle parking:

- Cycle parking facilities may be provided on the carriageway alongside the kerb but require a traffic order
- Locations under overhanging deciduous trees may require additional maintenance
- A minimum clearance of 450mm between any part of the cycle and the carriageway should be retained when a cycle is parked on the stand
- Leaving a large gap (1,500mm or more) after the last stand in each run is a good way of ensuring that spaces for larger cycles are available
- Cycle parking placed on the median strip can help to reduce clutter on the footways, but should be carefully considered with regards to access, safety and pedestrian crossing visibility
- Tactile paving should not be provided around the base of cycle parking stands on the TLRN

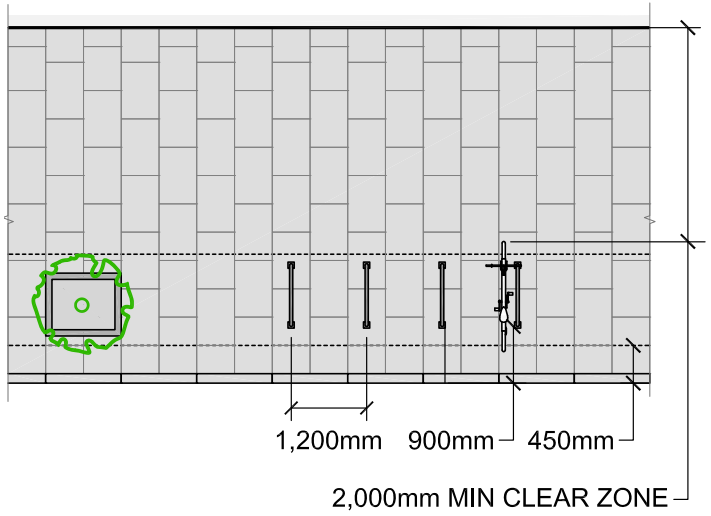
To consolidate furniture placement and facilitate integrated transport, cycle parking should be considered at stations, tram stops and bus stops, particularly outside central London.

Easy, step-free access to the facility should be provided through the use of dropped kerbs, crossings and sufficient space to manoeuvre. Dropped kerbs should be located as close to the cycle parking as possible.

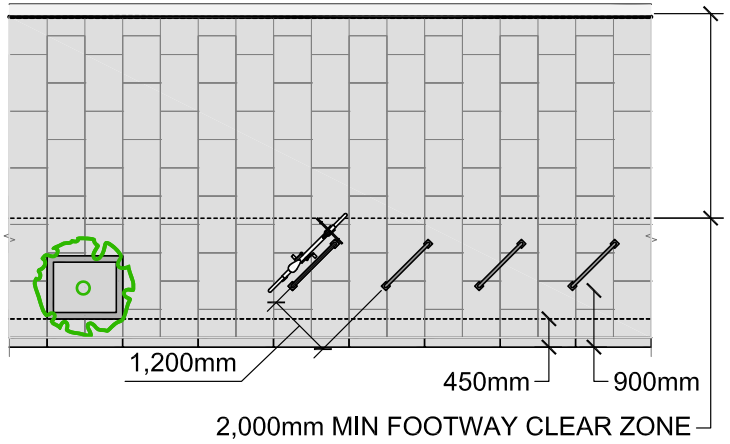
Figure 215: On-footway cycle parking arrangements are dictated by the amount of footway space



PLAN - CYCLE RACKS PARALLEL ARRANGEMENT



PLAN - CYCLE RACKS PERPENDICULAR ARRANGEMENT



PLAN - CYCLE RACKS ECHELON ARRANGEMENT

Figure 216: Sheffield cycle stand

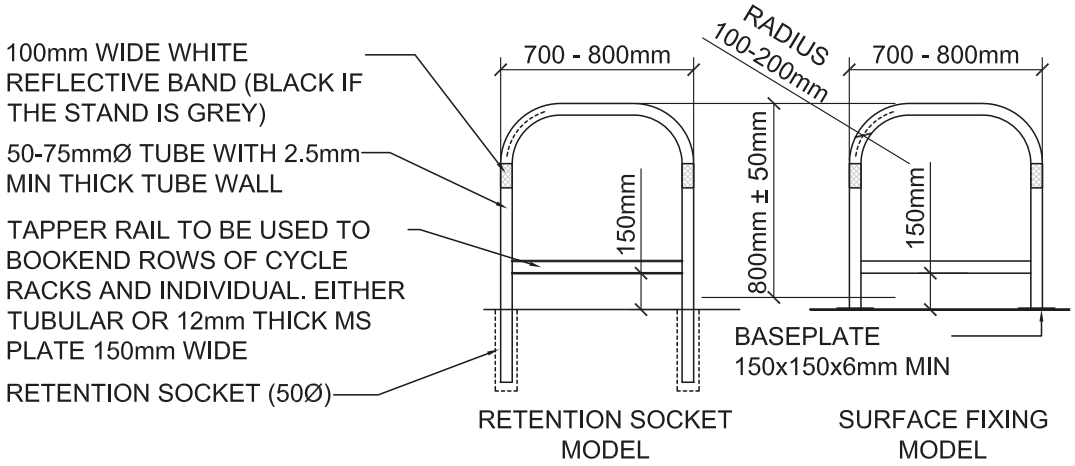


Figure 217: Cycle stands must have a contrasting visibility band

M-profile stands are also now accepted for use on the TLRN, but should not be considered the default option as they have a more intrusive presence within the public realm than the Sheffield style.

Product specification

Short-stay parking in the form of footway-mounted cycle parking stands is the standard facility for the TLRN.

The Sheffield (or inverted U) stand offers a simple, durable and cost effective tubular design, enabling the frame of the cycle and both wheels to be secured. These stands are the default option for the TLRN, assuming the following criteria are satisfied:

Cycle parking stand design criteria	
Distance between legs	700-800mm
Crossbeam height	700-800mm
Tube diameter	50mm
Tapping rail height above footway	100mm±25mm
Tapping rail width	Equal to the tube diameter of the stand up to a maximum of 75mm

Colour

The colour of the cycle stand should generally match the street furniture standards: black nylon-coated stands are standard on the TLRN, and stainless steel may be used following approval from the SDRG. However, there is some flexibility with regards to selecting cycle stands that are deemed appropriate for the context, such that stainless steel may be considered for areas adjacent to stations or new developments.

Visibility bands should contrast with the colour of the main body of the stand: white reflective banding on black stands; black banding on stainless steel.

Accessibility features

A tapping rail should be provided on the end stands where stands are placed in a row perpendicular or 45 degrees to the kerb or building, but are to be omitted for intermediate stands. Stands placed parallel to a kerb or on a curve require a tapping rail.

- Parking symbols on the tapping rail are not required to reduce visual clutter
- Stands should be root fixed within the footway and surface materials carefully cut or drilled to provide a round hole that minimises the visibility of concrete infill
- At locations where vandalism is anticipated, demountable bolt-down fixings may be used

What if I want to do something different?

Tubular stands other than the Sheffield model, which fulfil the design criteria, may be considered for use on the TLRN but require SDRG approval.

TfL-branded cycle stands recently introduced at stations require SDRG approval for use on the TLRN.

Long-stay facilities such as lockers, cycle hubs or two-tiered racks should be provided at transport interchanges, but again require SDRG approval when considered for the TLRN. Covered structures require planning approval from the local authority.

Paperclip cycle rack Minneapolis, USA

Cycle racks that speak to urban contex

Key functions

Opportunity

Customised street furniture can enhance the character of a local area, emphasise a unique local history, or speak to the purpose of neighbouring businesses

Benefits

The innovative design of the cycle racks combine utility and style; alterations to basic cycle racks were made to improve their appearance while preserving their functionality.

Implementation

The customised cycle racks on the Minneapolis Art Institute's campus have added a surprising twist to a necessary element of the public realm

Applying in London

Customised designs can reinforce an element of the local context. For occasions where there is a particular need for bespoke cycle parking, such an approach can work well. At other locations, Sheffield stands are best.

ECO-Cycle system Tokyo, Japan

Automatic underground cycle parking system

Key functions

Opportunity

The ECO-Cycle system is a space-saving and secure solution for cycle storage in cities.

Benefits

By removing ground level storage and placing cycles underground, station entrances can become obstacle free and increase pedestrian capacity in and out of the entrances and exits.

Implementation

It takes 15 seconds to insert or retrieve a cycle from 11 metres underground. Each unit can hold up to 144 cycles, thereby freeing up space in the public realm. The underground garage protects cycles from theft and bad weather. Like all Japanese structures, it is designed to withstand earthquakes.

These subterranean cycle parks have been successful and have been rolled out across Tokyo and currently hold 800 of Tokyo's cycles.

The system owes its success to the speed and ease at which it operates. The units are also located in areas adjacent to metro stations for commuter convenience

Applying in London

High demand for cycle parking in London gives this system significant potential.

Additional information

Transport for London:

London Cycling Design Standards, 2014. Chapter 8: Cycle parking

Cycle Security Plan, 2010

Department for Transport:

Traffic Advisory Leaflet (TAL) 5/02: Key elements of cycle parking provision

Figure 218: A cycle hire docking station on Albert Embankment

11.6 Cycle hire docking stations

Vision and purpose

The Mayor's Cycle Hire Scheme is a public scheme for London, launched in July 2010 as a standalone mode. It was the first TfL mode to be sponsored and it provides more than 10,000 bicycles for hire from more than 730 docking stations and 20,000 docking points within a central London area of 100km2. The scheme was expanded to east London in March 2012 and launched in southwest London in December 2013.

The scheme has become a renowned part of London's streetscape since its inception in 2010, with its distinct look and stylised bicycles and docking stations. It is a self-service, bike-sharing scheme, designed as an affordable, alternative option to conventional public transport for short journeys.

We are keen to see that the network continues to serve our customers and will be looking for new opportunities for intensification of the existing network where appropriate. Where new docking stations are proposed, the design and layout of the station should be carefully considered to complement the overall composition of the streetscape.

Cycle hire scheme

The scheme comprises of physical on-street assets, namely bicycles which can be hired from, and returned to, docking stations placed around various locations within central and inner London. Each docking station comprises of at least one terminal that customers interact with for setting up access to hire. Each terminal is connected to docking points where the bicycles are physically docked for hire and return. Supporting the scheme are back office and on-street systems and operations.

As part of a Mayoral initiative to develop the customer offering for cycle hire, a TfL mobile application for Apple and Android users was released in May 2015. All the functionality of a terminal at a docking station has been replicated along with options linked to TfL journey planner. The real-time data feeds have been made available to commercial developers and a number of apps are now available which provide real-time information about docking stations locations, bike availability, free docking points and more.

The Mayor's Cycle Hire Scheme provides an effective way to add transport capacity to the network and helps relieve congestion for peak trips in central London. As an active, self-powered, emissions free and almost silent mode of transport, the scheme delivers important health benefits and contributes towards reducing CO_2, harmful local air pollutants and urban traffic noise.

The Mayor's Vision for Cycling commits to future enhancements of the scheme. It recognises the hire scheme as one of the world's most successful, playing an important role in normalising cycling in London by enabling customers to try cycling for a minimal outlay and encouraging them to adopt cycling as a lifestyle choice. This commitment is reflected in the cycle hire vision as stated below:

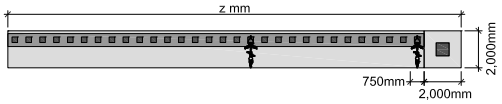
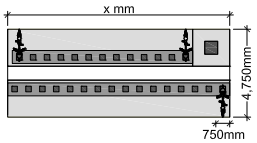
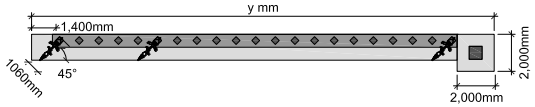
'To deliver a service fit for the future, enabling Cycle Hire to adapt and grow.'

Detailed layout considerations

The following is an indicative checklist of things to consider when identifying a potential docking station location. Please note consultation with, and agreement by ourselves and the local planning authority will be required prior to final station location.

Docking station layouts

There are three types of docking stations layouts, detailed below:

Layout name	Layout	Docking point formula	Example picture
Linear docking station		DPS= [length (x) 2,000mm]/750mm	
Double row		DPS= [length (y)-2,000mm]+[length (y)]/750mm]	
Echelon		DPS= [length (z)-2,000mm-1,400mm]/1,060mm	

Detailed layout considerations

Consideration	Detailed information
Space	A rough guide is 25 metres by 2,000mm as the minimum space required for a viable docking station of 27 docking points (see above indicative layouts).
Operational access	Redistribution vehicles must be able to legally stop within 15 metres of the station to maintain it and distribute bicycles. Line of sight must be maintained between station and vehicle. Loading and parking bays are the preferred location for stopping.
Footway width	A preferred minimum clear footway of 2,000mm in width must be maintained. Clearance of 450mm must be maintained from the carriageway.
Utility covers	Docking points or terminals cannot be installed over utility covers however bicycles can be docked over covers.
Drainage	Site footprint is required to have sufficient drainage to prevent ponding.
Vertical clearance	A vertical height clearance of 2,800mm is required for terminal and installation.
Existing vegetation	No loss of trees or grassed areas.
Existing street furniture	Minimal relocation of existing street furniture, including existing cycle stands.
Pedestrian/cycle/ vehicular flows	Sufficient space to maintain clear pedestrian/ cycle/vehicular paths.

Consideration	Detailed information
User safety	Safe and secure areas with good natural surveillance and street lighting.
Existing usage	Avoid areas of high pedestrian congestion and areas known to be unsuitable for cyclists.
Public access	Docking stations must be accessible to the public 24 hours a day, 365-days-a-year, ie they must be on public highway or land where the public have a right to unfettered access.
Terminal power	Terminal power is obtained from UK Power Networks (UKPN) via a feeder pillar located near the docking station. Typically feeder pillars are installed on the public highway and trenched to the terminal.
Foundations	The maximum foundation depth required for a docking station is 450mm and maximum width is 700mm.
Road safety audits	All sites will be subject to a full road safety audit.
Lease	A lease/agreement is required between TfL and the landowner, ideally at nil cost.
Connecting to existing cycle routes in the area	Sites should be located near existing cycle routes for users to continue their journey.

Infrastructure

Each docking station consists of at least one terminal and should have a minimum of 27 docking points, which can be provided in a number of layouts to fit the local circumstances. Based on our five years of experience operating Mayor's Cycle Hire Scheme in London, it has been found that 27 docking points is the best operational number at the majority of locations. Stations of this size require much less redistribution and have higher bike and space availability for users' convenience.

Please note there is a six-month lead time for all infrastructure to be manufactured and delivered.

Terminal

Each docking station has a payment and registration terminal which allows users to:

- Print a record of their journey
- Print cycle release code
- Find other docking stations if one is full or empty
- See a local street map, costs and code of conduct
- Buy 24-hour access for up to four cycles
- Get extra time if user needs to return their cycle to another docking station should the docking station be full

The terminal displays Legible London style mapping to assist wayfinding for cyclists and pedestrians. Legible London mapping is the only mapping used to ensure uniformity across the scheme and maintain ease of use.

Docking points

- Docking points release and secure bikes
- Members insert key to release bikes
- Non-members must retrieve a code and enter the digits into the keypad

Terminal

- Height: 2400mm
- Width of wide face: 500mm
- Width of slim face: 350mm

Figure 219: A cycle hire payment and registration terminal

Docking point

- Height: 792mm
- Width of bottom: 300mm
- Width of top: 225mm

Figure 220: Docking points without bikes

Foundations

There are three types of foundations as described below:

Standard

One foundation per docking point set into a concrete base. This is our preferred method of reinstatement as it is adaptable, allowing docking stations to be constructed on slopes or in a curved arrangement. In addition reinstatement around the docking points can aesthetically match existing, surrounding material. This foundation type requires 350mm depth and can be used on either the carriageway or footway.

Inset

Steel plate set into a concrete base, shallower dig required. Inset foundations can be used in circumstances where there are shallow utilities running underneath the docking station footprint. These are to be used on the footway only and require 150mm depth.

Surface mounted

No excavation required. Surface mounted foundations are used when there is significantly limited depth. However, the surface must be completely level and straight.

Figure 221: A cycle hire docking point in a concrete base and paved to match the carriageway

Figure 222: An inset cycle hire docking point on a steel plate

Figure 223: Surface mounted docking points

Procedures

There are various consents and approvals required as part of the delivery process. Such as:

Stage	Requirement
Pre-planning consent:	• Archaeological impact assessment (where relevant) • Arboricultural assessment (where relevant) • Ground radar survey • Topographical survey • Planning permission • Stage 1/2 Road Safety Audit • Planning permission from the relevant local planning authority
Prior to construction:	• Traffic Regulation Order (for carriageway sites) • Permit for construction works • Parking suspension (where relevant) • UKPN install feeder pillar for electricity supply • Watching briefs arranged (where relevant) • S8 agreement/private lease completed • Area reinstated around foundations • Install appropriate TSRGD traffic signs and line marking
Prior to installation:	• Permit for works • Parking suspension (where relevant) • Mapping updated on local docking stations
Post-installation:	• CAT/LAT test completed • Health and safety documentation completed • Stage 3 Road Safety Audit is required as soon as possible once live, wherever possible within three months of becoming operational. Please refer to TfL SQA-0170

Additional information

Transport Trading Limited:

London Cycle Hire Scheme Agreement, 2009:

Schedule 2 – On-Street Infrastructure Statement of Requirements Lot 1

Schedule 37 – Docking Station Implementation and Traffic Management

11.7 Seat

Functionality, comfort and accessibility are key requirements of seating, but equally it provides the opportunity to delight users through creative designs and thoughtful placement. The material choice, composition and form offer a multitude of opportunities to select or design a seat that improves the user experience.

We are eager to raise the ambition of seating choice and placement within the streetscape. Functionality is no longer considered the only criteria to satisfy.

Seating can perform many functions within the streetscape besides providing a place for people to rest. Designers should consider how seating can: reflect the character of the space; create a sense of whimsy; provide social cues about the purpose of the space; reinforce the design intent; or encourage socialisation. Whatever the intention, seating provides one of the most effective ways to enhance or reflect the character of an area and add to the vibrancy of the space.

Figure 224: Seating at Holborn Circus with arm and back-rests

Placement considerations

Formal seating should be provided according to the following criteria:

- A clear space either side of the seating should be provided so that wheelchairs/scooters/ prams can be positioned alongside
- Adjacent to or visible from a pedestrian route
- Where pedestrian flows will not be impaired
- Where provided near walls, the seatbacks should be against a wall to reduce the likelihood of damage from skateboards
- In an open aspect that enables approaching pedestrians to be seen
- In areas of natural surveillance to minimise antisocial behaviour
- So as to avoid impeding access to buildings
- In public spaces that are attractive and in sunlit areas where possible, as these areas are more likely to be used
- Away from wind tunnels, for example between tall buildings, which could make use uncomfortable
- Where possible a continuous run of seats should be provided where high use is anticipated. However, seating should not be placed directly opposite to one another.

Seat placement standards	
Recommended set back from kerb for inward facing seat	1,000mm
Recommended set back from kerb for outward facing seat	2,000mm
Maximum recommended spacing interval for seating on high streets, city places and steep inclines	50 metres

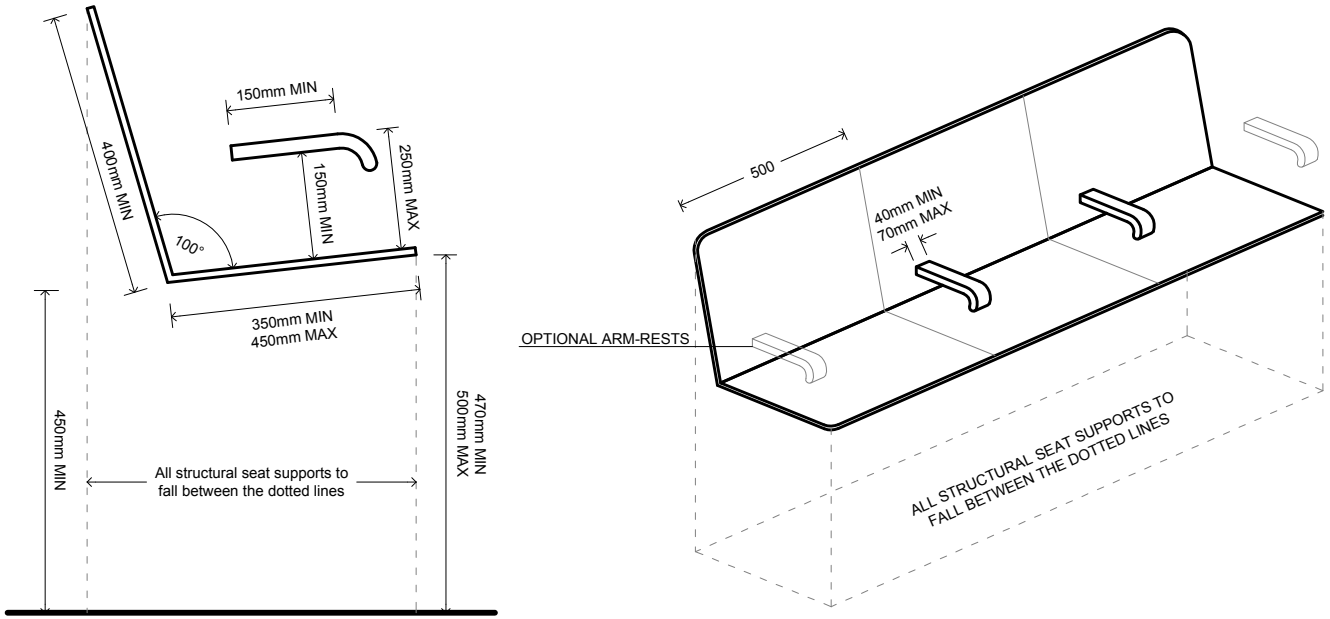
Product design standards

Seating should be selected which combines comfort, ease of maintenance, durability and resistance to vandalism.

Figure 225: A bench with arm and back-rests offers a range of options for users

The following design criteria should be used to assist in selecting an appropriate product:

Figure 226: Minimum bench requirements



Seat material standards	
Timber	Preferred material for where people may wish to sit for longer periods To be compliant with GLA's responsible procurement policy and accredited to Forest Stewardship Council (FSC) standards or equivalent Is preferred where the seat will be well maintained and vandalism is rare
Stainless steel	May be considered for areas where vandalism is anticipated Concealed ground fixings should be used
Natural stone	Non-standard. May be used as an alternative to security bollards, large natural stone blocks may be used upon approval by the SDRG

Authorisation

Seats may be provided by the local authority or adjacent landowner subject to the approval of the highway authority.

Wharf Green, Swindon, UK

Seats may be provided by the local authority or adjacent landowner subject to the approval of the highway authority. High quality Streetscape Guidance compliant bench planter

Key functions

Opportunity

This project took place in Wharf Green, central Swindon. Traditionally a commercial area, this was a catalyst project aimed at regenerating the local area and reinforcing a sense of place.

Benefits

Wharf Green has subsequently transformed into a popular space that hosts regular events.

Implementation

This seating planter was built from durable hardwood with stainless steel corner edge detailing and feature lighting. It was designed as an innovative piece of street furniture to enhance the newly created events space.

Image courtesy of Woodscape Ltd

Applying in London

Beautifully detailed and durable street furniture should be encouraged everywhere in London.

The High Line, New York, USA

A family of benches as a unifying element

Key functions

Opportunity

New York's High Line is a world-famous redevelopment of a disused heavy rail viaduct into a public park, with high quality materials throughout.

Benefits

The 'peel-up' bench is an integral repeating element in High Line Park. These benches create a 'family' of design elements which are used not just for seating but as play elements and picnic areas.

The family of benches acts as a unifying element that ties disparate spaces together and reflects the historic use of the High Line.

Implementation

A family of benches have been created through the use of a similar form and a consistent palette of materials, ie wood, stainless steel and natural stone.

Applying in London

Street furniture families should be used in London to enhance local character and to connect disparate spaces. The proposal for a family of benches should be reflective of the local character and identity.

Images courtesy of Aleksandra Grabowska

Additional information

Department for Transport:

Inclusive mobility – A guide to best practice on access to pedestrian and transport infrastructure, 2021

Greater London Authority:

The GLA Group Responsible Procurement Policy, 2008

11.8 Art

The use of public art on the TLRN may be considered for an area where a special or decorative design feature or landmark will help to define a particular place and enhance people's daily experiences. We will prioritise designs in which the promoter can demonstrate that the installation will make a positive impact on the quality and distinctiveness of the local setting.

Design considerations

Public art is often designed to provide a landmark which people can identify and use to navigate. Artwork may therefore be appropriate in areas which lack other recognisable features.

Public art should not be limited to single objects or expensive finishes. The best design response is often the most simple: a repeated single element across a wider area, or a well-conceived adjustment to the 'standard'.

Public art should be delivered in accordance with the Equality Act 2010 and should not pose a health and safety risk, restrict sightlines or pose a trip hazard.

Temporary art installations may be considered for certain situations, such as during the construction of wider street improvement works, or as part of a temporary wayfinding strategy and, in exceptional circumstances, to promote major events.

The maintenance and management of public art must always be taken into account as part of the design process.

All art installations (temporary or permanent) should be detectable at ground level by a symbol or a long cane. Any projections from art installations should not present a collision hazard to those using the footway.

Designers should aim to support local artistic talent. In some cases, it may be appropriate to involve the local community in judging a design

Figure 227: Playful artwork

Figure 228: A sculptured granite bench in Windrush Square

competition through the local authority's arts coordinator.

Public art does not necessarily need to be expensive or complex. A simple transformation of everyday objects can be just as effective.

Location

Design teams should ensure that the placement of the artwork complies with our Streetscape Guidance general location principles and that any structure does not overly impinge on footway space and impede pedestrian movement.

Public art may be considered across a wide range of settings including, but not restricted to: public areas where people gather, such as transport interchanges or public squares; highly visible traffic corridors and routes, for example on roundabouts; and distinct urban structures, such as bridges or subways.

Delivery

Planning consent may be required from the local planning authority. Design teams wishing to commission art for the TLRN should liaise with one or more of the following contacts:

The relevant local authority's arts coordinator.

Our Art on the Underground team – for projects relating to London Underground station forecourts.

Art in the Open – support organisation for additional public realm art commissioning guidance.

When working on the TLRN, design teams or external promoters of public art should forward their recommendations to the SDRG.

Figure 229: Winning sculpture: Goat atop packing crates in Spitalfields

Maintenance

Any proposed intervention should not require significant changes to the existing maintenance regime. The standard of maintenance depends on many factors including the location, condition and function of the area or feature.

Additional information

Greater London Authority:
All London Green Grid SPG, 2012
The London Plan, 2011

11.9 Bins

The regular and convenient provision of bins on footways provide an important contribution towards supporting a litter free environment, but can also impact on the general appearance and quality of the streetscape.

Limited provision of bins in litter hotspots, where people congregate or near tourist attractions, can help to manage the problem of litter, assuming bins have sufficient capacity and are regularly serviced.

Figure 230: Bins which combine functionality to separate several types of waste are encouraged

We acknowledge the distinct character of different areas on the road network and so a single style of bin cannot be used across all environments. Streetscape Guidance recommends a restricted range of styles which relate to the surrounding context and the anticipated level of use, while ensuring that efficient cleansing regime standards are maintainable.

There are three types of bins that typically occur on the road network: the litter bin, recycling bins and trade refuse bins. This section details the types of bins, their placement, appearance and coordination with the local authority who generally provides and maintains them.

Figure 231: Cigarette bins may be located on poles if approved by SDRG

Litter bins

Litter bins should have a simple aesthetic which is robust and functional. Conservation and special areas require heritage bin designs which better reflect the character of the area and should be finished in black.

Bins should be freestanding, however, wall-mounted bins may be considered in exceptional circumstances where there are footway constraints. Bins should be bolted down to discourage antisocial behaviour. The use of integrated cigarette disposal units may be considered.

The capacity of the bin needs to take account of the intensity of use to avoid contents spilling on to the surrounding footways.

Litter bins on the TLRN should be covered and have open-sided access, sufficiently wide for convenient disposal of litter. Bins should not have an open top, as they allow rainwater to collect and litter can blow away when full. Fully closing lid designs should also not be used as these can discourage use by being less sanitary and have additional maintenance issues.

Location

Bins should be placed according to the following standards:

- Litter bins should be placed a minimum of 450mm from the kerb edge and within the streets furniture zone (see pages 203-210)
- Bins should be positioned so as not to cause an obstruction on the footway
- Access to adjacent properties should not be constrained
- Visibility should not be obstructed
- Maintenance and access requirements should be considered

Ensure footway width is not reduced below 2,000mm.

Bin placement should be coordinated with other street furniture, such that bins may be positioned adjacent to seating. Bus Infrastructure should be consulted regarding any proposal for bins near to bus stops.

Bins may be attached but not mounted on to lamp columns as they are prone to leaking and can pose a hazard for white cane users who cannot detect them.

Materials

The colour and finish should be consistent with other street furniture on the TLRN; black as standard.

- Cast iron or plastic bins are the preference on the TLRN
- Stainless steel should be treated as an exception to the palette. Designers should note that stainless steel bins with solid sides can stain and deteriorate quickly and are prone to flyposting

- Timber may be used in exceptional circumstances, adjacent to parklands or in rural areas, but requires SDRG approval
- Plaques and ornate labelling are acceptable where approved by the borough
- Where graffiti and flyposting are a problem, a chemical-resistant low adhesion anti-graffiti finish should be applied to the surface of the unit
- Litter bins on the TLRN which provide advertising space require SDRG approval

Planning

The placement of litter bins needs to be carefully considered, so that any provision is aligned to demand where there is a proven issue of littering. This is especially relevant to surrounding land use; for example, shops such as takeaway restaurants will likely require additional litter bin facilities.

Local authorities have borough specific policies regarding the provision of bins and the standards that are acceptable within the borough. Bins on the TLRN should be provided which align with both the borough standard and Streetscape Guidance. Design teams need to liaise with the relevant local authority to ensure that the design of the bin allows the local authority to carry out standard cleansing regimes.

Security

In high security areas, the use of blast-resistant litter bins with concealed ground fixings will be required. Advice should be sought from our transport community safety managers within the Enforcement and On-Street Operations team.

Trials

Where routine monitoring of the TLRN identifies a lower level of cleansing standards than normal, the introduction of litter bins may be considered as part of a trial.

During the trial period the condition of each bin and the remaining capacity should be noted regularly to establish how the bin is being used and whether permanent provision would make a long-term contribution towards enhancing the quality of the streetscape.

Additional information

British Standards:
Publicly Available Specifications (PAS) 68 and 69, 2005

Figure 232: A combined rubbish and recycling bin uses bold colour to emphasise proper use

Recycling bins

Recycling bins are provided to encourage Londoners to recycle waste. Recycling bins can be combined with litter bins. However, when recycling bins are not combined, the design of the bins should be similar yet distinctive enough to differentiate its purpose from other litter bins.

Recycling bins do not offer disposal facilities for commercial or retail establishments. The provision and management of recycling bins is the responsibility of the local authority, and governed by local policy. The demand for recycling bins is likely to increase in line with sustainability policies, the United Nations' Agenda 21 and growing public awareness.

Location

Recycling bins should be located to provide convenient, safe access for residents, as well as adequate space for collection and emptying. Representatives from the local authority and TfL must agree a suitable location.

Recycling bins should not be installed where the footway width would be reduced to less than 2000mm. Bins should conform to Streetscape Guidance's furniture zones and not be placed in special areas or where they detract from listed buildings or heritage features.

Care is required to ensure that traffic flows are not impeded by collection vehicles. Access to adjoining properties should be maintained.

Where collection vehicles are anticipated on the footway, the structural strength of the surface materials must be reinforced to avoid damage.

Best practice

The functional design of each bin is generally related to the type of material being recycled.

Recycling bins should be robust, fire-resistant and contain explanatory graphics where required. Bins should be leak-proof to avoid the staining of surface materials. Recycling bins should be secure to deter antisocial behaviour.

Smart recycling bin London, UK

Recycling bins with liquid crystal display (LCD) screens for information, advertising and data collection

Key functions

Opportunity

Recycling bins are an essential item of street furniture; however, they are inherently large and can be obstructive. The smart bin uses its bulk to provide useful information via a large screen.

Benefits

This design was an attempt to get more out of the infrastructure of street furniture. The recycling bin also doubles up as a public billboard displaying everything from the weather and news to transport information, adverts and stock prices.

Implementation

A trial of eight bins have been placed in the City of London.

Image courtesy of Control Group

Applying in London

Street furniture that provides enhanced functionality to customers is encouraged.

Trade refuse containers

Trade refuse containers are high capacity bins which ensure the safe storage of large quantities of waste from commercial properties. They are required by a wide range of commercial properties and so should be carefully arranged and managed to minimise their visual impact. Bins should preferably be located away from the TLRN, in servicing alleys and back streets.

The provision and management of trade refuse bins is the responsibility of the local authority and/or private contractors.

Location

Where unavoidable and upon agreement with ourselves, trade refuse bins may be located on the TLRN, assuming safe access can be ensured. They should be positioned where parking for collection and delivery vehicles can be provided and traffic flows are not impeded. The following criteria must be met:

Figure 233: Trade refuse bins can be detrimental to the character of the streetscape and should be kept out of sight where possible

(Image courtesy of STE Waste)

- They should only be placed on footways if the footway clear zone is to remain 2000mm or more
- Visibility sightlines must be maintained
- Metal refuse corrals may be used where a number of moveable bins are located together and need to be aligned and contained for safety and aesthetic reasons
- Bins should be located where access to adjacent properties will not be hindered
- Where collection vehicles are anticipated on the footway, the structural strength of the surface materials must be reinforced to avoid damage

Product specifications:

Trade refuse bins should be robust and fire-resistant, and contain explanatory graphics where required. Integrated discreet graphics are preferred to stick-on labels which tend to peel off.

Bins should have wheels to manoeuvre to collection vehicles and incorporate a facility to allow them to be lifted using modern lifting equipment. Bins should be of a uniform style and colour where possible and coordinated with other street furniture.

Consideration should be given to the use of higher quality bins or screening when located in or near special or historic areas.

In high security areas, the use of lockable or sealed bins will be required. Advice should be sought from our transport community safety managers within the Enforcement and On-Street Operations team.

Implementation and maintenance

A licence from the local authority may be required before installation. Installation is the responsibility of the local authority or a private contractor. Regular collection and maintenance is required to ensure that overflow waste does not pile up next to the refuse container.

Subterranean bins London, UK

Large underground containers to store household waste

Key functions

Opportunity

This system is designed to meet the waste disposal needs of a highly populated city in an efficient manner.

Benefits

By placing a street's rubbish in a large bin, refuse agencies need to make far fewer trips. Sensors in the bin alert the waste company when the bin is getting full. Rubbish collectors can plan the most efficient way of collecting; minimising the use of dustcarts, noise pollution and traffic build-up from the process. Placing the bins underground removes them from the streetscape where they are an eyesore and take up room in the public realm.

Image courtesy of Justine Ancheta

Implementation

The containers take up minimal space on the surface level and store waste in a large container below ground. The system uses WiFi and radio frequencies to transmit information on the waste levels from the sensor.

Applying in London

These are already being used in the London Borough of Lambeth.

11.10 Letter and pouch boxes

Letter boxes

Post letter boxes are a distinct and recognisable feature within the streetscape which perform a daily operational use as well as being an iconic piece of street furniture.

There are several forms of letter box including the pillar box, wall box and small lamp-post boxes.

Pouch boxes

Pouch boxes are used to store mail for onward delivery and are not accessible to the general public. The standard pole mounted design is functional but unsightly and creates significant additional street clutter.

When streetscape improvement projects are being undertaken, the Royal Mail should be contacted with a view to removing any linked post pouches within the scheme.

Design

- Typically 400mm deep and 450mm wide, pouch boxes are usually pole mounted
- Wall-mounted letter boxes reduce street clutter and are the preference where practicable
- Pillar boxes have greatest capacity and have preference over multiple smaller lamp boxes

- All Royal Mail boxes will be painted in standard red and black livery

Location

- Letter boxes should not be installed where the footway clear zone will be less than 2,000mm wide
- They should preferably be placed within the furniture zone and should not obstruct sightlines to crossing facilities
- Post boxes should be placed on a hard surface to allow for easy emptying

Responsibility

Post and pouch boxes are the responsibility of the Royal Mail.

Authorisation

Royal Mail has a statutory right to place and retain letter boxes in the street under paragraph 1, Schedule 6 of the Postal Services Act 2000. Ownership remains with Royal Mail. Although consent is not required, Royal Mail will liaise with the highway authority to obtain agreement for the location and placement.

Planning consent is not normally required for a post box or self-service stamp machine. Listed building consent is required where there are proposals to alter or remove a listed post box, or those set in or adjacent to a listed building. Refer to Planning (Listed Buildings and Conservation Areas) Act 1990.

Additional information

Legislation:

Postal Services Act 2000 c.26, Schedule 6 – Power to place post-boxes etc in streets, section 1. http://www.legislation.gov.uk/ukpga/2000/26/schedule/6/paragraph/1

English Heritage:

Royal Mail Letter Boxes: A Joint Policy Statement by Royal Mail and English Heritage, October 2002.

Figure 234: Post boxes should be located in the furniture zone

11.11 Telephone boxes

Telephone boxes are a common and recognisable feature across the London streetscape, with several distinct modern and traditional styles in operation.

Relocation or removal

Where more telephone boxes exist than deemed necessary, or where a unit or units adversely impact on the quality and functionality of the streetscape, the highway authority should work with the operator to reach an agreement to relocate or remove the structure, while retaining adequate service coverage.

The highway authority may remove a telephone box when it has been disconnected from the network. This means that the operator is

Figure 235: A historical telephone box in Westminster

no longer satisfying the requirements of the electronic communication code and the unit can be construed as an obstruction.

Application for new boxes

The impact of any new telephone box on the coherence and quality of the streetscape should be considered. Locations need to be assessed on their own merits, with due consideration for available footway widths, the impact on pedestrian and cycle desire and sightlines, existing footway demand from surrounding activities and buildings, availability of ATMs, and an analysis of local antisocial behavioural issues.

Telecommunication companies should provide details on location and placement so that we can make a robust and informed decision on the application. Under the Highways Act 1980, any shopfront affected by the unit should be consulted and their views taken into consideration.

Location

- Telephone boxes should not be installed where the footway clear zone is less than 2,000mm wide
- They should not be installed if doing so would create an obstruction which could pose a safety hazard ie at the front of a kerb in close proximity to a junction or side road
- They should be located away from loading bays, service access points and crossovers The doors should not open into the path of pedestrians
- The box should be no less than 450mm from the kerb face
- Boxes should be positioned to ensure that there is sufficient space to allow mechanised cleaning

Products

Telecommunication operators may use their own telephone box style and branding where deemed appropriate, but should be encouraged by the highway authority to coordinate the colour and placement of the box with other street furniture in the local area. The most common units in operation include:

K2 and K6

Traditional red telephone boxes are retained in many central and conservation areas of London. A large proportion of these are heritage-listed structures. They are no longer in production but can be moved to locations to replace other models as they are preferred by TfL to the KX or ST6 series in central areas.

Figure 236: A traditional telephone box, many of which are heritage-listed

KX series

The KX series was rolled out across London in the 1980s and 1990s. A small proportion of these have listed status. They allow for advertisements and are designed to be easier to maintain and better protect against vandalism than older structures. Multiple units may be considered for replacement with an ST6 in specific approved locations.

Figure 237: An example of a KX series telephone box

ST6

New open-sided units, such as the ST6, are now in use and include a 1.36-metre wide illuminated advert on one side. ST6 units should be fitted so that the advertisement faces the flow of traffic. The width of the unit can significantly impinge on footway space and so should not be fitted on streets where footway unobstructed widths would be reduced to below 2,000mm. A footway width of minimum 4,200mm is required but designers should also consider pedestrian flows to determine appropriate placement. They are not appropriate for conservation areas and require planning consent for illuminated advertisements.

Figure 238: An example of an ST6 telephone box

Advertisements

Class 16 of Schedule 3 of the Town and Country Planning (Control of Advertisements) (England) Regulations 2007 [as amended by the Town and Country Planning (Control of Advertisements) (England) (Amendment) Regulations 2011] gives deemed advertisement consent for an advertisement displayed on the glazed surface of a call box, other than a kiosk of type K2 or K6.

The following types of display of advertisements did not receive deemed consent:

- Illuminated advertisements
- Advertisements in conservation areas or where special advertisement controls are enforced
- Advertisements placed on more than one face of a single telephone box (other than the operator branding)
- Where three units or more are located next to each other, advertisements can only be provided on a maximum of two faces

Responsibility

Telephone boxes are the responsibility of the telecommunication operators. Service providers have a duty to provide an appropriate number of working phone boxes where most needed, under the Universal Service Obligation (USO). The Electronic Communications Code (Schedule 2 of the Telecommunications Act 1984) gives operator companies the power to install and retain electronic communications equipment on the public highway. They should be adequately maintained by the operator to ensure good working order and cleanliness.

Authorisation

Telecommunication operators have to seek approval from the relevant local planning authority to determine whether prior approval is required for the siting and appearance of a new unit.

Telecommunication operators with a licence under Section 7 of the Telecommunications Act 1984 may install public call boxes on the public highway.

The Highways Act 1980 provides that the local highway authority has to give consent for objects on the highway.

Listed building consent is required where there are proposals to alter or remove a listed telephone box, or those set in or adjacent to a listed building. Refer to Planning (Listed Buildings and Conservation Areas) Act 1990.

LinkNYC internet pylons New York City, USA

Replacement of payphones with internet pylons

Key functions

Opportunity

With an ever increasing use of smartphones and reliance on the internet, free public WiFi is an increasing priority in New York.

Benefits

The LinkNYC programme aims to replace old payphones with a free public WiFi infrastructure, available across New York. The kiosks will also have a touchscreen interface where members of the public can research locations and public amenities and it will provide capacity for advertisements.

Implementation

As LinkNYC is scheduled to be built during 2015 the results of its success are not yet determined.

Image courtesy of Control Group

Applying in London

These internet pylons would be appropriate for areas in London which are popular tourist destinations and in busy office and retail areas.

11.12 Pedestrian wayfinding

Vision and purpose

Walking is a great way of getting around London; it is free, healthy, environmentally friendly, and often the quickest option. Yet many people are put off by inconsistent signage and confusion about distances between areas.

We have developed 'Legible London' to tackle these issues and help residents and visitors walk to their destination quickly and easily. This award-winning map-based system is integrated with other transport modes so when people leave the Underground, for example, they can quickly identify the route to their destination.

Location

Design teams should provide wayfinding guidance to aid navigation and encourage people to walk rather than seek out public transport, while aiming to minimise the total number of pedestrian signs used to reduce additional street clutter.

Signs should be located where users start their journey as a pedestrian, at key decision points and landmark destinations.

Signage should be located to minimise physical intrusion within the streetscape, but should be sufficiently visible so as to serve its intended purpose.

Figure 239: Pedestrian wayfinding systems such as Legible London offer a consistent and recognisable system of maps across our city

Where pedestrian routes cross the TLRN and are signposted using local authority signs, the signage strategy may be continued on the TLRN subject to compliance with TSRGD.

Wayfinding signs do not need to be illuminated by internal or external lighting, or retroreflective materials.

Legible London

Since its introduction in 2007, the Legible London signage system has become the TLRN standard for pedestrian directional signage.

The system provides a consistent and connected approach to the design and layout of pedestrian wayfinding across London.

Scheme designers should follow a systematic approach to locating Legible London signs in the urban realm by drafting a placement strategy based on the Legible London Design Standards (2010).

Figure 240: Legible London temporary foundation cover plate

A range of approved signage products are available including free-standing map-based totems and fingerposts. Selecting an appropriate product from the family of wayfinding signs available will depend on the scheme objectives and footway space available.

On-street 'liths' include finder maps (a five-minute walk) and planner maps (a 15-minute walk) taken from the Legible London basemap, complete with 3D buildings, walking circle, 'you are here' marker and off-map tabs along with a panel for directional information.

'Liths' should typically be located within the furniture zone, with the map face oriented down the street. Placement should be a minimum 450mm from the kerb edge, and increased to 800mm on flush surfaces or where road speeds are 40mph or greater. Designers should avoid locating signage where vehicle overrun is likely, such as near inset loading bays or on tight street corners.

Sufficient space should be provided on both sides of the sign for pedestrians to view the 'lith' from either side. 'Liths' should not be placed facing a wall, and this placement will only be approved in exceptional circumstances.

A temporary on-street cover should be provided once the placement has been agreed and the foundation has been installed. Heads-up mapping artwork can then be produced from this location and the sign installed once manufactured.

Figure 241: Legible London's wayfinding 'liths'/map-based totems product range

Fingerposts

Fingerpost signs may be used in particularly complex urban environments at junctions, or as a simple route confirmation sign. However, map-based Legible London products are to be prioritised over fingerposts. Fingerslats can be installed on existing lamp columns where possible, or at low level on pedestrian guardrails.

Designers should ensure that the sign allows for a minimum clearance of 450mm away from the kerb edge for any part of the sign, including the fingers. This can mean that the pole for the sign needs to be mounted more than 1,000mm from the kerb edge, which will not be appropriate in many situations.

Figure 242: Legible London's finger post

The use of fingerposts is limited to areas with a sufficiently wide footway such that the post does not impede the footway clear zone or the sign overhang the carriageway.

Blue TSRGD approved fingerposts exist on parts of the TLRN and should be maintained until replacement is required. When replacement is required, Legible London branded signage should be used to maintain consistency across the TLRN, unless it forms part of a wider borough route signage strategy.

Information signage:

- Any third party information signage proposed for the TLRN which does not follow the Legible London template, requires Legible London programme team consent
- Non-standard products may be considered in exceptional locations for heritage areas, landmark sites, or to fit with adjoining signage strategies
- All information boards must be in accordance with TSRGD, Schedule 4

Authorisation

Only TfL has the authority to erect pedestrian signs on the TLRN. Permission should be sought from the property owner for erecting signs on to building frontages.

The safe operation of wayfinding signs should be assessed via the Road Safety Audit process to ensure the installation does not hinder visibility and sightlines.

Additional information

Legislation:

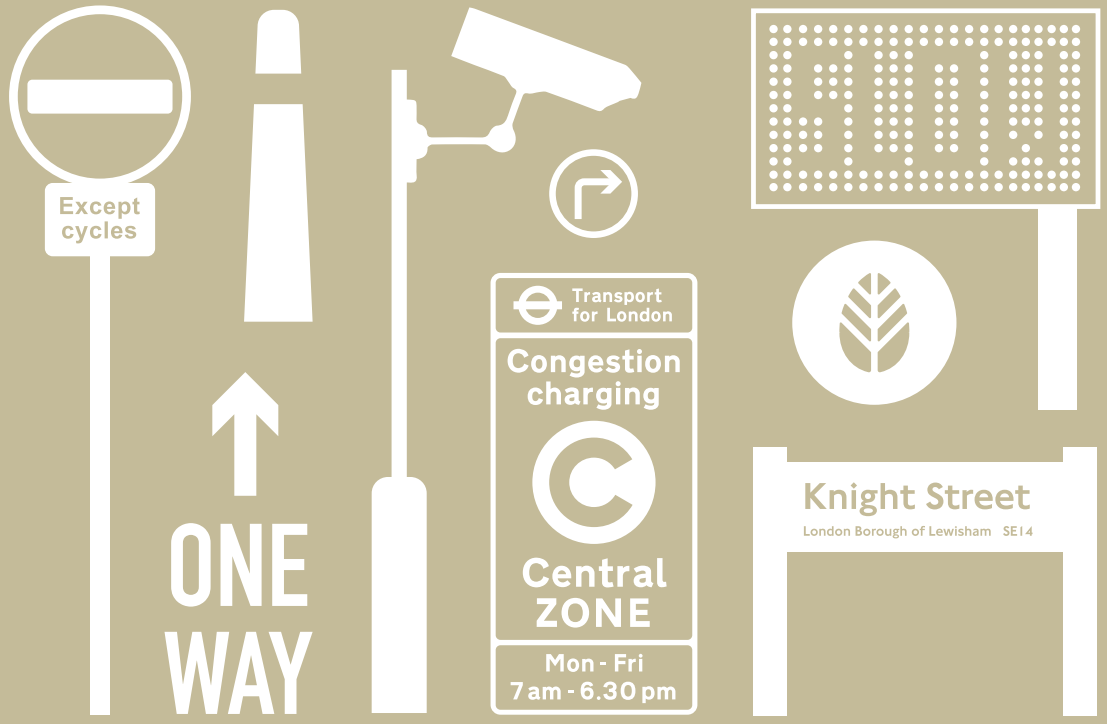
Traffic Signs Regulations and General Directions (TSRGD)

Transport for London:

Legible London Design Standards, 2010

Legible London: https://tfl.gov.uk/info-for/boroughs/legible-london

Part E Safety and functionality



12.1. Traffic signs

Ensuring the safe and reliable operation of London's road network for all users while reducing congestion and clutter is our prime focus. The quality and consistency of traffic sign design and their placement is vitally important for communicating a clear message to all road users, providing reliable directional information, traffic regulations and the warning of hazards.

Traffic signs referred to in this section have a fixed legend (directional and informatory signs) and/or a fixed symbol (warning and regulatory signs).

Technically, traffic signals and road markings can be described as traffic signs but are detailed separately:

- Road markings
- Traffic signals and control boxes
- Variable message signs
- Pedestrian wayfinding

Figure 243: The quality and consistency of traffic signage is imperative to communicating effectively to all users

Key streetscape aims

Design teams should aspire to implement a traffic sign system that embraces the significant innovations in traffic engineering and policy. Therefore all unnecessary signage should be removed from the network, especially where identified as a roadside distraction or visibility hazard. This will ensure that the road network is better managed and will enhance the quality of the streetscape.

The purpose of signage is to provide clarity for the user, it should have a clear purpose and convey necessary information.

Signage strategy

Signage is one of the main causes of clutter on our footways and where possible should be reduced. A well-designed strategy can be created by:

- Regularly conducting traffic sign audits to review the effectiveness of existing signage and identify signs that are obsolete or unnecessary. TSRGD should also be considered within the auditing process. For example, the ability to reduce the provision of regulatory signage required in certain situations. Where road widths are less than 5000mm, a single regulatory sign is now recommended, rather than providing a sign on both sides of the carriageway (note this does not apply to speed limit signs)
- Warning signs should only be provided where there is a specific safety issue or hazard
- In general we have a presumption against the provision of place name signs. However, should a convincing case be made for the need for a place name sign they should be simple and discreet. It is important to retain national consistency while developing bespoke solutions for local issues, such as place specific signs

In addition, signs can be combined with other street furniture, signals or mounted on buildings which can reduce clutter on the footway. However expert engineering advice should be sought as not all columns/structures are suitable for mounting signage on. The TSRGD and Traffic Signs Manual provide standards and guidance on what signs can be combined.

Post mounted signs

Design teams should minimise the number of posts used for each sign.

- Round posts are preferred with designers encouraged to use simple but robust support structures for the sign face
- Larger posts should be fixed within the footway using a bracket, while smaller posts should be installed with minimal infill between the post and the footway surface material
- Cantilevered signs from a single post can be used to maximise unobstructed footway widths. When cantilevering, the post should be located at the front, rather than the back of the footway with the sign towards the footway.
- Single posts are usually of greater diameter to ensure sufficient strength to accommodate additional wind loading

Alternative fixtures

To reduce the number of posts which contribute to street clutter, the design team should explore opportunities for mounting traffic signs on other highway furniture, structures or building frontages. Where traffic signs are not erected on dedicated posts, the adequacy and suitability of support must be checked.

Lighting columns and signal mounting

- Expert engineering advice should always be sought for any large sign, 600 square millimetres or above, that is proposed for attachment to a lighting column
- Smaller diameter 'no entry', 'no left' or 'right turn' and some other restrictive signs are allowed to be mounted on traffic signal heads
- Where practicable, smaller traffic signs (up to 0.3 square metres) should be mounted on lighting columns

Figure 244: Post mounted loading restriction signage

Figure 245: Signage and bus flag mounted onto existing street furniture

Figure 246: Signage mounted onto building facade

Building mounted signs

Before affixing a street lamp or traffic sign to a building, the authority will have to serve notice in writing on the building's owner no less than 56 days before the date on which they intend to commence the works. For further information please refer to the Code of Practice for Affixing Traffic Signs and Street Lighting to Buildings in London (2015) for exercising the powers set out in section 45 of the Public Health Act 1961 and section 74 of the Road Traffic Regulation Act 1984 as amended by clause 4 of the London Local Authorities and Transport for London (No. 2) Bill.

Low level signage

- Design teams should consider how to minimise the visual and physical intrusion of low level signage such as traffic bollards
- Integrating pedestrian and cycle signage within bollards can be an effective way of reducing the need for larger post mounted signs
- 'Keep left' signs should be provided only where a road safety audit has identified the need

Figure 247: Integrated bollard mounted cycle signage

Location

Placement standards	
Horizontal clearance width between sign assembly and the carriageway kerb edge	
Absolute minimum for roads subject to a 30mph speed limit or lower	450mm*
Absolute minimum for roads subject to a 40mph speed limit or more	650mm
Absolute minimum for flush surfaces (no kerb upstand)	800mm
Vertical sign clearance height above pedestrian only footways	
Absolute minimum	2,100mm*
Preferred minimum**	2,400mm

** Please refer to LCDS for guidance on sign placement next to cycle tracks*
***Clearance heights may be increased to discourage vandalism*

Repeater signs on posts should be mounted at uniform height across a given length of road.

Sign design

Sign dimensions

Design teams should refer to the Traffic Signs Manual and TSRGD to select the current size of regulatory or warning sign appropriate for the traffic speed. Refer to Appendix A of the Local Transport Note 1/94: Design and Use of Directional Informatory Signs for further information on directional sign heights and siting distances.

Illumination

Signs should not generally be illuminated unless legally required to, as specified in TSRGD.

Fonts

The smallest text size appropriate for the traffic speed should be used, to keep overall sign sizes to a minimum.

Figure 248: Signage content should be clear and legible for users

Content

Design teams should consider how signage can be simplified to include only essential information and optimise legibility, subject to any strategic or local signing requirements.

Finish

The finish of sign posts and the sign reverse should coordinate with lighting columns and similar street furniture within a given locality. The use of grey or yellow 'backing boards' behind signs should be avoided unless considered absolutely vital to road safety.

Legislation, statutory powers and consents

On the TLRN, only TfL has the statutory power to permit traffic signs to be erected or removed.

Figure 249: TLRN traffic restriction

All signs installed on the TLRN must comply fully with the standards outlined in the TSRGD. Expert advice should always be sought from a specialist to ensure compliance.

Statutory requirements and detailed guidance on the design of signing for the public highway are provided in the TSRGD. For sign legends not covered in TSRGD, separate special sign authorisation is required from the DfT. The proposals put forward in the DfT's policy paper, Signing the Way, give greater local flexibility and discretion in the design of non-standard signing and provide a framework for the removal of traffic signals. Further guidance is given in the TSM and the Local Transport Note (LTN) 1/94.

Signs requiring legal backing by road traffic orders can take up to three months to process and adequate time must be allowed in programmes to accommodate this.

Additional information

Legislation:

Traffic Signs Regulations and General Directions (TSRGD)

Department for Transport:

Traffic Advisory Leaflet 01/13 (2013): Reducing Sign Clutter

Signing the Way 2011: Traffic Signs Policy Paper

Traffic Signs Manual 1982 and 2013

Local Transport Note 1/94: Design and Use of Directional Informatory Signs

12.2. Bollards and low level traffic signs

Bollards tend to be overused or inappropriately located which can create clutter and pose a hazard for those with visual impairments. Bollards are used to discourage vehicles from encroaching on to pedestrian or cycle space, preventing vehicles from running over hidden basements, preventing damage to footway surfaces, street furniture and buildings while reducing the risk of pedestrian injury.

Bollards should be treated as a last resort solution and should only be used when all other alternatives have been exhausted. Other necessary street furniture or equipment should be reviewed to identify if it could be used instead to perform the same role as a bollard. Enhanced enforcement may also be a preferable solution to bollards to deter vehicles from encroaching on the footway.

Please consult the local authority conservation team when considering the removal or reuse of historic bollards.

Figure 250: Bollards protecting footway space

Alternatives

Design teams should consider where appropriate:

- Using street furniture or equipment to create a barrier using cycle racks, tree planting, seating, etc
- Using containment kerbs or high edge kerb upstands (140mm or more)
- Local strengthening of the footway where vehicles are known to mount the kerb

Layout considerations

For instances where it has not been possible to provide alternatives to bollards:

- Bollards should be arranged to minimise physical clutter while maintaining an appropriate defensive line; this may not necessarily be a straight line but could involve setting back bollards to align with other street furniture such as tree planting
- Filtered permeability, whereby motor vehicles are blocked but cycle access remains, can be achieved through the appropriate placement of bollards or street furniture across the carriageway
- Bollards are not required at side road entry treatments as they create additional clutter and do not provide protection for pedestrians

Safety

- Formal risk assessments may be required for the provision or retention of bollards
- Design teams should question any pre-existing arrangement of bollards and consider removal subject to safety advice

Bollard placement standards	
Minimum distance from kerb face	450mm
Recommended distance between bollards to prevent vehicle access	1,200mm (except for 'keep left' bollards)
Recommended distance between bollards for stopping vehicles from mounting the footway	At 3,000mm centres across width of footway
Bollard design standards	
Minimum bollard height	1000mm (except for keep left bollards)
Visibility bands	150mm band of contrasting colour

**Please note that these standards do not apply to security bollards which have their own defined manufacturer's specification and placement requirements*

Types of bollard

Bollards are available in a wide range of materials; where possible we have a general preference for bollards made with polymers that pass Head Injury Impact and Chest Impact tests.

Bollard designs should be selected based on the function they need to fulfil:

- The design should be appropriate for the character of the area
- Removal bollards may be appropriate for areas which are largely pedestrianised to restrict general vehicle access but allow for servicing vehicles
- A number of traditional historic bollards exist on the TLRN, some of which are listed, and should be retained
- The method of ground fixing should be detailed to minimise damage to the surrounding footway, should a vehicle collision occur, allowing for easy replacement of the bollard
- Bollards should not be linked with chain or rope

Options	General on footway	Removable posts	Security bollards
Image			
Application	Preferred design for urban areas	Where a street requires temporary vehicular access for servicing or maintenance	Station and building security
Dimensions	1,000mm height ±100mm Tapered Round	Minimum 1,000mm height	Must be specified and fixed in accordance with Publicly Available Specifications (PAS) 68 and 69 Round domed top
Colour	RAL coated black RAL signal grey	RAL coated black RAL signal grey	Silver grey
Material/finish	Flexible polymer	Flexible polymer	Stainless steel
Lighting	Unlit with white visibility bands	Unlit with white visibility bands	Unlit with visibility bands

Traffic bollards

Bollards can also be used as a mount for displaying traffic signs, but there is no legal requirement for a bollard to have a sign. Those which have a sign are classed as 'traffic bollards' and provide low level traffic signage through the use of permitted directional and pedestrian/cycle signs.

Low level signs permitted for use on bollards, DfT, TAL 03/13: Traffic bollards and low level traffic signs.

Options	'Keep left' – hoop bollard	Bollards with additional signage	Bollards with additional signage
Image			
Application	Preferred design for central urban areas and town centres	Preferred design for urban areas	Rural, suburban and conservation areas only
Dimensions	800mm height ±200mm 400mm width ±100mm	1,000mm height ±100mm Tapered Round	Recommended 1,000mm height Square diamond top
Colour	RAL coated black RAL signal grey	RAL coated black RAL signal grey	
Material/finish	Flexible polymer	Flexible polymer	FSC accredited wood
Lighting	Unlit	Unlit	Unlit with etched visibility bands

Figure 251: Signage types. Traffic signs are Crown copyright

'Keep left' bollards

There is no highway authority requirement to provide a 'keep left' bollard (TSRGD diagram 610) on a traffic island. Designers should assess whether a traffic bollard is required on a site-by-site basis.

Self-righting retroreflective 'keep left' bollards should be used as an alternative to illuminated bollards on the TLRN to improve safety and reduce maintenance.

Retroreflective coating, or coloured panels, should not be used on the rear face of bollards.

The luminance requirements for traffic bollards are set out in BS EN 12899-2:2007.

Additional information

Department for Transport:

Traffic Advisory Leaflet 03/13: Traffic bollards and low level traffic signs

Legislation:

Traffic Signs Regulations and General Directions (TSRGD)

Equality Act 2010

British Standards:

Publicly Available Specifications (PAS) 68 and 69

BS EN 12899-2:2007 Fixed, vertical road traffic signs. Transilluminated traffic bollards (TTB)

12.3. Street nameplates

The effective design and installation of street nameplates is essential for assisting the general public in navigating the road network, while also ensuring more efficient functioning of postal and emergency services.

This guidance is directed at local authorities to ensure a high standard of application for a feature that is present on almost every street in London.

Placement

Street nameplates should be positioned as near to street corners as possible to be easily read by all street users. Recommended placements should consider the context of the street and the relationship of adjoining streets.

Street nameplates should be mounted on to walls, buildings or other boundaries at the back edge of the footway where practical. Nameplates at major junctions should be positioned so as to receive illumination from adjacent street lights.

Post-mounted nameplates should only be used in exceptional circumstances where the sign would otherwise be obscured.

Figure 252: A street name plate

Acceptable mounting height	600-3,600mm
Preferred height	1,000mm
Preferred height where low level obstructions are likely	2,500mm
Major crossroads	Fixed at each street corner
Minor crossroads	One plate on each side of the street adjacent to the emerging traffic
T-junctions	Main street nameplate positioned directly opposite side road
Change in street name on same street	Sign both street names with arrows if desired
Long stretches without an intersection	Repeater signs at reasonable intervals and opposite entrances to places such as rail stations

Design

Street nameplates are commonly viewed from an acute angle and so the size and choice of font and spacing should be as legible as possible. Lettering is recommended to be at a height of between 75mm and 90mm. The minimum spacing between words should be approximately 50 per cent of the height of the lettering. Top and bottom borders should be approximately 40 per cent of the lettering height.

Street nameplates should provide strong visual contrast between the lettering and the sign background. The most effective colour contrast is black lettering on a white background. The preferred material for the plate is box-formed vitreous enamel.

Figure 253: Street name plates should provide strong visual contrast between lettering and the background

Most local authorities have a particular style of nameplate that they adopt for the majority of streets in their area. In many boroughs a coloured postcode and borough name has been introduced to provide additional information. The postal area and direction of house numbers may also be included to assist navigation. If district names are to be included on the street nameplate, reduced lettering heights should be used.

Where historic signage contributes to local character these should be retained and refurbished wherever possible.

Authorisation and maintenance

Local authorities are responsible for the installation and maintenance of street nameplates. Any proposal to move or erect street nameplates, should involve the relevant local authority.

It is recommended that the London boroughs regularly monitor the quality of street nameplates and building numbering in their area to ensure they are of a good standard, prioritising street nameplates at junctions.

Renaming

Any proposal to rename a street as part of a major streetscape improvement project requires authorisation by the local authority. Where approved, the old name should be crossed out and remain clearly legible below the new name. It should be retained for one to two years, before being considered for removal. Street nameplates with historic interest should be preserved wherever possible.

Additional information

Legislation

The Local Government (Miscellaneous Provisions) (Northern Ireland) Order 1995. No. 759 (N.I. 5). Part 11: Street names and numbering of buildings

Sections 64 and 65 of the Towns Improvement Clauses Act 1847 (TICA)

Sections 17-19 of the Public Health Act 1925 (PHA)

Local Government Act 2003

Joint Mobility Unit:

Sign Design Guide, 2000

London Transport Users Committee:

Where am I? Street name signs in London, 2003

12.4. Barrier free footways

Pedestrian guardrails

Pedestrian guardrails are known to give the impression of vehicle dominance, clutter, reduce kerbside activity, increase maintenance and block major pedestrian desire lines.

We have a presumption against the use of pedestrian guardrails in new schemes and will investigate removal where safe to do so.

The Local Transport Note LTN 2/09 – Pedestrian Guardrailing (PGR) notes that, 'there is no conclusive evidence that the inclusion of PGR at any type of pedestrian crossing or junction has any statistically significant effect on the safety record'.

Designers are encouraged to look at our Guidance on the Assessment of Pedestrian Guardrail for additional advice.

Figure 254: Guardrailing often restricts free movement by non motorised users

Guardrail removal

Streetscape Guidance promotes the removal of existing guardrails where a proven safety requirement cannot be demonstrated. Road safety audits should be undertaken in any guardrail removal assessment to determine the safety implications.

Partial removal of guardrails may be recommended to alleviate pedestrian pinch points. Guardrails on side roads adjacent to the TLRN may be located within the borough boundary, and so approval with the borough should be sought when requesting removal.

A cycle parking audit should be undertaken before removal to ascertain if the guardrail is used for cycle parking. Sufficient replacement cycle parking stands should be included accordingly as part of the removal process.

Monitoring

Periodic reviews should be undertaken to record any problems with guardrail removal, especially relating to collision numbers. This should be entered into the Traffic Accident Diary System (TADS) for long-term collision monitoring.

Guardrail retention

- The reinstatement of existing guardrails requires SDRG approval. Guardrails may be retained where a road safety audit confirms that pedestrian desire lines put pedestrians at risk, or on signalised pedestrian crossings. Please refer to the Guidance on the Assessment of Pedestrian Guardrail for additional advice.

Figure 255: Junction of Lancaster Place and the Strand before and after guardrail removal

New provision of guardrail

We will not support the installation of new guardrails except where a road safety audit has demonstrated a clear need. SDRG approval must be sought for any new pedestrian guardrails. Any new guardrails must be black.

Additional information

Transport for London:
Guidance on the Assessment of Pedestrian Guardrail, 2012

Department for Transport:
Local Transport Note (LTN 2/09): Pedestrian Guardrailing, 2009

12.5. Barriers

Vehicle restraint systems in the form of safety fences and barriers are installed on major arterial routes where vehicles travel at high speeds to contain vehicles on-carriageway and prevent collisions with oncoming traffic or roadside hazards.

Safety should always be the primary factor in deciding whether to install restraint barriers; however, the design, scale and build of the barrier should also be carefully considered to minimise the detrimental visual impact this kind of infrastructure can have on the overall streetscape.

Location

Designers should be conscious of streetscape considerations relating to the character of the road network and how road restraint systems create a visual and physical barrier between either side of the street.

Designers should acknowledge pedestrian desire lines and aim to reduce unnecessary severance caused by barriers by implementing alternative means to complete their journey.

Figure 256: Barrier provision is essential on certain roads across the network

Figure 257: The correct placement of barriers within the streetscape should be carefully considered

Design

Many types of safety fences and barriers are available to provide containment of vehicles. These include tensioned and untensioned corrugated beams, open box beams and concrete safety barriers; concrete providing the most robust treatment. A safety expert should always be consulted to select an appropriate product and detail the placement to best meet the requirements for the road environment and the hazard.

Safety fences and barriers are usually galvanised and should not be finished in black.

Where a safety barrier is provided in a busy pedestrian setting, designers are encouraged to provide a treatment on the reverse face which conceals fixings and has a smooth textured finish.

The placement of safety fences on grassed verges on higher speed roads should take account of the need to cut vegetation around the fence supports. It may be appropriate to incorporate a hard surfaced strip to remove the need to cut around the fence supports.

Where equipment is located behind a barrier, adequate vehicle access must be provided to give a position behind the barrier to allow safe operation of a mobile elevating work platform (MEWP). Alternatively, consideration must be given to changing a fixed CCTV column to a trolley head column where only a car size vehicle is required for maintenance.

Assessment process

A Road Restraint Risk Assessment process should be conducted on all trunk roads with speeds of 50mph or more, as detailed in DMRB Volume 2, Section 2, Part 8: Requirement for Road Restraint Systems. The assessment is also required on trunk roads with lower speed limits, where a potential roadside hazard has been identified.

The assessment process provides a framework to support designers in making the optimal site specific design decision on restraint requirements, while using a robust safety methodology.

Additional information

Department for Transport, Highways Agency:

Design Manual for Roads and Bridges: Volume 2, Section 2, Part 4, TD19/85: Safety Fences and Barriers

Design Manual for Roads and Bridges: Volume 2, Section 2, Part 8, TD19/06: Requirement for Road Restraint Systems

Manual of Contract Documents for Highway Works, Volume 1, Series 400: Road Restraint Systems (Vehicle and Pedestrian)

Manual for Streets (2007)

British Standards:

BS 7669-3: Guide to the installation, inspection and repair of safety fences

12.6. Utility cabinets

Utility cabinets (including signal controller cabinets) are generally located above ground to minimise installation costs and provide convenient access for maintenance.

We recognise the necessity for utility companies to have safe and efficient access to services; however, the proliferation of utility equipment within the street environment increases the visual impact on the streetscape and, if unchecked, can create additional unnecessary obstructions on the footway. Therefore, utility cabinets should be kept to a minimum.

Figure 258: Utility boxes placed at the back of the footway

Location

When utility companies seek to introduce a new cabinet on the road network, clear footway width must satisfy footway clear zones as described in Streetscape Guidance.

Cabinets should preferably be located at the back of the footway, away from windows or walls where they could assist in unlawful entry into properties. Cabinets must not physically or visually obstruct loading bays, service access points or crossovers. Exceptionally, if a utility cabinet is to be installed adjacent to the kerb, it must be positioned within the furniture zone.

Where a utility cabinet is to be located within a planted or grassed area, a minimum 500mm wide hard surface must be provided around the cabinet to allow for adequate access and to facilitate the maintenance of shrubs and grass.

Where a cabinet cannot be located against the back of the footway, doors should open so that utility operatives face towards the carriageway or oncoming traffic

Design

- Utility companies should be encouraged to use cabinets of a consistent and simple design
- The colour of the utility cabinet should be a black finish throughout London. Consideration may be given to the provision of non-standard finishes, such as green or beige, where there is an alternative palette of surrounding street furniture or if the utility cabinet is situated next to a listed building or structure
- Low-profile clear matt anti-graffiti finishes should be applied to facilitate the removal of graffiti and flyposters
- In exceptional circumstances and upon approval from both the utility company and the SDRG, bespoke covers or finishes can be provided to reduce the visual impact of the utility cabinet

12.7. Feeder pillars

Electrical feeder pillars are cabinets located within the highway boundary, designed to manage and distribute power to local electrical assets such as traffic equipment.

Always consult an electrical engineer when locating and specifying a feeder pillar unit. For instance, where the nearest supply source is not readily accessible it may be necessary to install additional isolating pillars.

Location

Pillars should be located at the back of the footway, adjacent to a wall or fence, where the likelihood of damage from vehicular collision is reduced, but away from locations where they could assist in unlawful entry into properties. They should be positioned to avoid creating a trip hazard, obstructing private property, doorways, accesses, shop windows or footways. All pillars should be oriented so that the door is easily accessible for a maintenance engineer.

The distance from a feeder pillar to the equipment it serves should generally not exceed 20 metres, due to electrical and fusing requirements. More than 20 metres can be used, but needs careful consideration by a suitably qualified electrical engineer.

Figure 259: Pillars should be placed away from pedestrian desire lines

Feeder pillars within grass verges should have a hard standing paved surround to enable convenient access.

Design

- Designers are encouraged to use cabinets which minimise the visual and physical intrusion of the feeder pillar in the street
- The size and type of pillar should be selected based on its functional requirements: small pillars for where a site supply is not metered, large pillars where it is metered, and generator connect pillars where supported by an external generator
- The colour of the feeder pillar should be a black finish throughout London. Consideration may be given to the provision of non-standard finishes, such as green or beige, where there is an alternative palette of surrounding street furniture or if the utility cabinet is situated next to a listed building or structure
- All hinges and locks should match the colour and finish of the main unit
- Pillar doors must be fitted with standard keys to allow distribution network operator (DNO) and maintenance engineer access
- Where equipment is fixed to a shared column and systems contain low voltage circuitry, for electrical safety reasons this will require the power for all equipment to be supplied from the same source, with each having a separate isolator
- A large feeder pillar may have to be used to accommodate the extra equipment

Additional information

British Standards:

BS 7671: Requirements for Electrical Installations

12.8. Variable message signs

Variable message signs (VMS) are designed to provide greater flexibility than standard road signs to inform users of changing network conditions. The display of temporary information can be used to alter customer behaviour, assist in improving traffic flow and network operation, alerting customers to:

- Congestion conditions along a corridor
- Construction and maintenance schedules
- Special event notifications
- Weather warnings
- Incident notifications

The variable messaging system is controlled remotely and enables the sign to show mandatory and/or advisory information depending on local, real-time requirements.

VMS are now being installed as permanent structures across major arterial routes and high roads. They may also be installed on a temporary basis during roadworks or planned events.

The installation of these signs can positively influence behaviour and may assist them to achieve quicker and safer journeys.

Figure 260: Variable message sign (VMS) when not in use

They are particularly effective for roads which provide an important strategic function on the network, helping to maintain good network performance by offering useful information.

Location

VMS are generally large units which can significantly impact on the visual character of the streetscape. Design teams should consider the scale of the signage relative to other streetscape elements and identify whether the network performance benefits of integrating a VMS into the street are outweighed by the impact on quality of place. When locating signs in conservation areas please consult with the local authority conservation officer.

VMS are costly to install and should be prioritised where issues of safety have been identified on the network. In conservation areas the use of VMS should be limited. On arterial motorway routes, with road speeds of 40mph or more, two VMS signs displaying the same legend should be implemented where possible.

The location should be selected based on site specific data collection requirements regarding safety, traffic speeds, existing signage, road capacity and the location of utilities. VMS units can be attached to existing structures.

Design of unit

- The material and finish of signposts should coordinate with other street furniture
- The sign face should be black when a message is not being displayed
- Controller cabinets should be located within 30 metres of the VMS display and should be black, positioned at the back of the footway or adjacent to the VMS
- Cantilevered signs are preferred to two post footway mounted signs on high roads, to minimise the number of poles used
- Gantry signs are large, overhead structures that should only be considered on high capacity arterial roads. The overhead position is more readily visible and legible for high speed roads; however, the large size of the structure is only appropriate for wide carriageway dominant settings
- Consideration should be given to combining VMS with electronic advertising boards with reference to statutory limitations on the use of VMS signs for this purpose
- Footway mounted sign heights should be increased to 3000mm where signs are adjacent to cycle or equestrian routes

The design of the unit and the mounting position determines the separation standards for placement of VMS on the network:

Mount	Height	Context
Overhead gantry sign	Minimum 5,500mm from carriageway surface	Arterial routes only
Cantilevered sign	Minimum 2,400mm from footway surface, 600mm from the kerb edge to any point on the sign	Arterial, high roads, city hubs
Verge sign/footway mounted	Minimum 2,400mm from footway surface	Arterial, high roads, city hubs

VMS placement standards	
Minimum distance between two verge mounted signs	200 metres
Minimum distance between two gantry mounted signs	300 metres

Types of display

Three types of display may be considered for use on the TLRN, with certain pros and cons for each medium. It is possible on larger signs to combine technologies within the same sign. Designers should select the display type based on how the sign is anticipated to be used, the type of information to be displayed, and if a wide range of information is required with symbols:

- Electro-mechanical – rotating planks with two or three faces or prisms can be used to give additional versatility to a standard fixed-faced traffic sign
- Reflective flip-disk – matrix of disks, one side black, the other fluorescent, flipped magnetically by electrical current. These signs are well suited to showing combinations of letters or symbols as a message
- Light-emitting – fibre optic or light-emitting diode technologies. The major advantage of these signs is that a greater range of messages can be displayed than for reflective technology signs

Sign design considerations

Sign designers need to consider a number of factors including:

- Sign sizes
- Character height
- Legibility
- Contrast and viewing angle
- Ambient illumination levels and expected approach speeds

Messaging

- Messages, symbols and abbreviations used on VMS shall conform to Regulation 58 and Schedule 15 of the TSRGD
- Standard messaging shall be from the Transport alphabet typeface prescribed in Regulation 13 and illustrated in Schedule 13 of the TSRGD
- Signs should never contain more than 10 words nor provide conflicting messages on any one sign
- When VMS are used as warning signs, it is usual for them to be fitted with four amber-flashing lanterns, subject to the provisions of Regulation 58
- Where a second sign is provided on a central reservation, it should only ever duplicate the message displayed on the verge sign

Authorisation

The appearance and legend of VMS signs should conform to Regulation 58 and Schedule 15 of the TSRGD. Sign designs and formats not conforming to the TSRGD are required to be authorised by the Secretary of State.

Applications for authorisation should in the first instance be addressed to the relevant government regional office or Highways England for trunk roads in England.

Additional information

Legislation:

Traffic Signs Regulations and General Directions (TSRGD) (Regulation 58)

Department for Transport, Highways Agency:

Design Manual for Roads and Bridges (DMRB), Volume 8, Section 2, Part 2 TD 33/05 The Use of Variable Message Signs on All-Purpose and Motorway Trunk Roads

12.9. Environmental monitoring equipment

Monitoring of local environmental conditions is important for quantifying the quality of the environment across the network. TfL and other authorities capture air quality and other environmental data to help inform policy and drive environmental improvements.

While environmental monitoring equipment may be necessary, it is vital that the placement and design of the equipment does not detract from the quality of the streetscape, safety or functionality.

Location

The position and size of the monitoring equipment will generally be determined by data collection requirements. Roadside monitoring is most common for emissions analysis; however, there are many considerations in locating environmental equipment within the street environment. From a strategic perspective, analysers must be suitably distributed to capture the data required for the study. They should not be located at point sources of high pollution unless that is a particular aspect to the study.

Smaller equipment should be mounted on existing columns and can be powered by batteries. Larger units will require a direct power supply, which may be able to be drawn from a nearby facility without extensive ducting. A broadband line may also be required to monitor data capture remotely.

The physical and visual impact of the unit should be considered such that any larger units avoid obstructing footways and sightlines. Special consideration should be given to the location of the equipment if it is required within a conservation area.

Units do not necessarily need to be located directly next to the carriageway and so may be installed at the back of footway, within building recesses or integrated with another facility. Site operators should be able to access all parts of the unit.

Designers should acknowledge the impact that the duration of study will have on siting the monitoring equipment. In certain situations, indicative monitoring may be sufficient over a few months, but in other cases more detailed monitoring will be required for a year or more.

Design

- A range of analyser types are available to capture data for different kinds of particulates and pollution
- To minimise the impact on the streetscape, a simple, clean, modern design of housing unit is preferred, matching the colour of adjacent street furniture
- Anti-graffiti and flyposting finishes should be applied, as used for control boxes and other utility cabinets
- The equipment being used determines the size and type of housing unit
- In most situations, monitoring equipment would benefit from being in an enclosed temperature controlled unit. This will however increase costs and the size of the unit required
- It may be useful to install meteorological sensors to capture local conditions and complement other datasets
- Planning consent may be required by the local authority for larger monitoring units

Additional information

Department for Environment Food & Rural Affairs:
Local Air Quality Management: Technical Guidance, 2009

Figure 261: Discrete monitoring equipment

12.10. Roadside cameras and CCTV

Introduction

Cameras are used by TfL and other authorities for several purposes:

- To enforce traffic regulations such as speed limits
- To enforce bus lane restrictions
- To enforce the central London Congestion Charge scheme
- To provide information on traffic congestion
- To assist the police with enforcement duties
- To monitor journey time

We share some cameras with London local authorities to reduce proliferation by promoting sharing and multitask equipment. When installing or replacing cameras a priority should be given to renewing or creating partnerships between suppliers to work towards reducing clutter.

Placement

The type and location of cameras is almost entirely governed by the function they are required to perform and the area of view they are required to cover. All cameras impact on the streetscape when mounted on columns. Wherever possible, cameras should be combined with lamp columns or attached to adjacent buildings or structures to reduce clutter, however, expert advice must be sought from an engineer prior to undertaking the work.

Prior to installing a camera on a building, the owner must first give consent and planning and listed building consent must also be sought if necessary. Installing a camera on a building may also require associated legal costs, annual rentals, maintenance agreements and bespoke mounting devices.

When mounting CCTV cameras on existing lamp columns it is vital to ensure that columns are capable of accommodating the additional load and are sufficiently rigid to minimise camera shake.

Where new lamp columns are being installed, consideration should be given to combining lighting with CCTV and roadside cameras. This will require a more rigid column (240mm diameter standard) than is typically installed for lamp columns and mechanical separation of the electrical supply. Designers should also consider the impact of light flare from the adjacent lighting unit

Where CCTV and roadside cameras are located on columns, the control equipment should be located separately in a cabinet on the footway, in accordance with the guidance on traffic signal control cabinets. Camera columns should be aligned in the furniture zone, especially in urban areas.

Figure 262: Enforcement cameras

A standard column height is eight metres, but poles also come in six, 10, 12 and 17 metre heights, however, safety cameras have their own requirements – please speak to our Traffic Infrastructure team for further information.

Design criteria

While some CCTV cameras may be attached to buildings or structures, many are located on high masts. CCTV cameras should be mounted on the most slender poles possible but must not be subject to camera shake.

When placed on grass areas there must be adequate hard stand around the column and a hard access route across the grass area, this must also be provided for the cabinet and power supply.

Roadside cameras require an electrical supply and a clear, unimpeded view of the highway. Safety cameras also require associated carriageway markings to support information recorded by the camera.

Fixed safety camera housings must be coloured yellow either by fully painting the front and back of the housing, or fully covering both with retro-reflective sheeting. The location of low level roadside cameras for speed, traffic signal or bus lane enforcement also needs to be conspicuous to avoid any claims of entrapment.

Materials

The function that the camera must perform often dictates the type of camera chosen

- **Shoebox camera** – allows for high optical zoom therefore best used when monitoring from greater distances. Shoebox cameras are commonly used for enforcement duties and perform better in low light conditions. They tend to be more expensive than a dome camera
- **Dome camera** – uses digital zoom therefore best used when monitoring areas of shorter distances. It is commonly used for monitoring traffic conditions and is less expensive than a shoebox camera
- **Automatic number plate recognition (ANPR) camera** – used to capture detailed shots of licence plates and the vehicles that have committed traffic violations. Also used to measure average vehicle speeds over several points
- **Safety camera** – used to capture traffic violations

Dome camera

Shoebox camera

Automatic number plate recognition (ANPR) camera

Safety camera

There are several types of column that can be used to mount a camera. The location, maintenance requirement and the speed and volume of traffic will influence the type of column used. Please contact our Traffic Infrastructure team for further information.

Fixed column

- Cheaper installation costs but more expensive to access and maintain
- Carriageway may need to be closed to access and service the camera
- Can be combined with other street equipment more readily therefore reducing clutter

Wind down trolley head

- Eliminates the use of mechanical lifts for servicing thereby reducing maintenance costs
- Area required to service the camera is reduced

Mounted on buildings

- Visual impact is reduced
- Require the permission of the building owner to access
- Require a maintenance agreement with the building owner
- Installation and operation costs can be more expensive

Figure 263: Mounting options

Fixed pole

Wind down trolley head pole

Combined with lights

Mounted on buildings

Data collection

Most street improvement projects will require some degree of on-street data collection, which may include pedestrian flow counts and classified vehicle counts. While some of this process can be conducted manually, more extensive data collection will require the temporary installation of cameras to capture movement data.

Cameras should be fixed securely to existing columns and should not obstruct the footway or impair roadside operational requirements. Contractors should ensure that any fixtures will not damage the adjacent street furniture. The temporary equipment and the mounting stands should match the colour of the surrounding street furniture.

Figure 264: Data collection cameras

Authorisation

Legislation:

Section 63 of the Road Traffic Regulation Act 1984 as amended by the Transport Act 2000 (Section 75)

Additional information

British Standards:

BS 7671 Requirements for Electrical Installations

12.11. Planned events infrastructure

Designing in permanent infrastructure to support planned events may be considered in exceptional circumstances for the delivery of certain key services on roads which regularly serve as a focus for significant citywide events. This may include reinforcing designated areas of footway for planned HGV overrun or for locations where generators will be accommodated during events.

As a general principle, streets should be designed for flexible use so that they can serve as focal points for activity when required.

In all cases we have a duty to 'assert and protect the rights of the public to the use and enjoyment of any highway for which they are the highway authority' (Section 130 of the Highways Act 1980) and so any temporary or permanent infrastructure to support a planned event should uphold this bond.

Other permanent event infrastructure

Design teams may wish to include additional services such as power sockets and fixtures to assist in the hosting of major events. Post mounted banner arms may be considered for lamp columns on roads which serve as major event routes.

Any other non-standard permanent item of street furniture should be approved by the SDRG. Bespoke features should be integrated with the streetscape palette to minimise the visual impact.

Additional information

Legislation:
The Highways Act 1980

Licence application:
http://www.tfl.gov.uk/info-for/urban-planning-and-construction/

Transport for London:
Highway Licensing and Other Consents, 2011
Network Operating Strategy, 2011

Figure 265: Some of London's streets regularly serve as a focus for major events

Part E Street environment

13.1 Street environment

London's street environment is influenced by a range of features which contribute significantly to the creation of distinctive and successful places. These features shape the look and feel of our streets, and vary between more obvious streetscape items, such as lighting columns and trees which should be positive attributes of the streetscene, to largely unnoticed or hidden structures such as drainage systems which are critical in the operation and management of it.

The importance of these features cannot be understated as they often 'set the scene' for life to take place on a street. They can also improve the experience of the street by providing tangible benefits such as pleasant, green social spaces for the enjoyment of local communities, and by improving surface runoff and water quality through an integrated sustainable urban drainage system (SuDS) network; to more intangible benefits such as enhancing the perception of safety in an area during the evening.

Figure 266: Trees can reinforce movement patterns and also provide a comfortable place to wait for the next bus

13.2 Growing a greener London

Vision

Much of the green infrastructure (GI) in London – including street trees, woodland, planted areas, grass and wildflowers – can be found alongside the road network. It is hugely important that these assets are properly planned, maintained and managed by the relevant arboriculture and landscape professionals. Delivering a cleaner, greener streetscape is central to achieving the

Figure 267: All public realm schemes should contribute to increasing the amount of green infrastructure across London

strategic goal of tackling climate change and enhancing the built environment.

Our vision is to ensure that the greening of our streets is an integral part of scheme development, optimising the potential of our streets for contributing to the GI agenda. There are a wide range of benefits associated with GI including improving air quality and human health, surface water runoff, mitigation of the urban heat island effect, increased biodiversity and ecosystem variety, and amenity value through creating beautiful and visually interesting streets and spaces for people to enjoy. All schemes within London – ranging from footway renewal to the wholesale redesign of a street – should ensure that all opportunities for improving and introducing new GI elements are fully explored.

Trees

New tree planting should be considered wherever appropriate within schemes. Working with trees means that designers are using a living organism that will grow, change and develop over time, it is therefore vital that the relevant arboricultural specialist is engaged at all stages of a scheme involving proposed trees.

Location

It is important that a range of considerations are taken into account when determining the location of a new tree. In some instances, trees have been planted in locations inappropriate for the development or lifetime maintenance of the tree, or without considering alterations to its immediate surroundings over time. Factors to consider when locating new trees include (but are not limited to):

- Street signs and traffic lights
- Proximity to dropped kerbs
- Footway width
- Proximity to carriageway

Figure 268: Working with trees requires taking into account the growth, development and maintenance of the tree over its lifetime

- Designated parking bays
- Proximity to other existing GI
- CCTV splays and equipment
- Proximity of buildings
- Heritage features
- Risk of subsidence
- Underground/overhead utilities
- Advertising hoardings
- Accessibility for future maintenance

Where possible, trees should be located within the furniture zone so as to provide the maximum footway clear zone for pedestrian movement (refer to 'Footway zones' in this guidance for further information). As with many street furniture items, the placement of trees should also help to reinforce public realm design elements such as:

- Strengthening movement patterns and corridors
- Connecting spaces and providing visual continuity across them
- Aiding the reinforcement of space and boundaries
- Providing character and a sense of place
- Enhancing architectural elements
- Screening to vehicle corridors and undesirable views

Figure 269: It is important that careful consideration is given to providing the optimum location for trees within the public realm

Species considerations

Once a suitable location has been identified, the relevant highway authority arboricultural specialist must be engaged to determine the appropriate tree species and specification to be used. The tree species planted should take account of existing trees and the long-term aspirations for the area, and should give due consideration to:

- Ultimate height, crown spread, stem diameter and habit
- Honeydew from aphids
- Fruit fall
- Ability to cope with a changing climate
- Pests and diseases
- Maintenance requirements
- Water requirements
- Scale of setting; Wildlife and Countryside Act 1981 Schedule 9
- Climate change adaptation benefits, including shade

Tree pits and surface specification

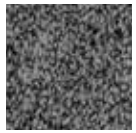
There are many different tree pit specifications of varying complexity, but no one design will be suitable in all situations and options should be agreed with the highway authority's arboricultural and landscape officer. Elements of the tree pit which must be considered include:

- Pit dimensions
- Soil specification
- Anchoring method
- Edging material
- Use of root cells/root barriers

While organic bark mulch is typically used as a surface material around newly-planted trees in hard landscapes, there are a range of surface materials which can be used depending on individual circumstances.

It must be remembered that newly-planted trees require an appropriate programme of irrigation to establish and thrive. This might involve hand watering or an automatic system; the relevant arboricultural and landscape specialist must be

Figure 270: A range of tree pit and surface materials are available and should be chosen based upon the location and specific requirements of the tree

								
Selection criteria	Gravel: Resin bound	Gravel: Self binding	Grilles	Mulch: Inorganic	Mulch: Organic	Rubber crumb	Soil	Asphalt
Tree criteria								
Permeability for air and water to reach the rooting medium if correctly maintained	**High**	**Medium**	**High**	**High**	**High**	**High**	**High**	**Low**
Flexibility of material	**Medium**	**High**	**Low**	**High**	**High**	**High**	**High**	**Medium**
Risk of damaging young tree health if incorrectly installed	**High**	**High**	**Medium**	**Low**	**Low**	**Medium**	**Low**	**High**
Risk of damaging established tree health if incorrectly installed	**Low**	**Low**	**High**	**Low**	**Low**	**Low**	**Low**	**Medium**
Risk of damaging young/established tree health if unmaintained	**Medium**	**Low**	**High**	**Low**	**Low**	**Medium**	**Low**	**Medium**
Potential to improve soil fertility	**Low**	**Low**	**Low**	**Low**	**High**	**Low**	**Medium**	**Low**
Suitability for installation up to the base of a young tree	**Low**	**Medium**	**Low**	**High**	**High**	**Medium**	**High**	**Low**
Site criteria								
Tolerance to regular pedestrian traffic	**High**	**Medium**	**High**	**Low**	**Low**	**High**	**Low**	**High**
Resistance to street sweeping machines/animal excavation	**High**	**Low**	**High**	**Low**	**Low**	**High**	**Low**	**High**
Effectiveness at suppressing weed growth	**Medium**	**Medium**	**Low**	**High**	**Medium**	**Medium**	**Low**	**High**
Availability of different colours/styles	**High**	**Low**	**High**	**High**	**Low**	**High**	**Low**	**Medium**
Installation and maintenance criteria								
Suitability for installation immediately after tree planting	**Medium**	**Medium**	**High**	**High**	**High**	**Low**	**High**	**Low**
Likelihood of requiring a subbase prior to installation	**High**	**Low**	**High**	**Low**	**Low**	**High**	**Low**	**High**
Level of experience/competence required to correctly install and maintain	**High**	**Medium**	**High**	**Low**	**Low**	**High**	**Low**	**Medium**
Expected lifespan of material	**Medium**	**Medium**	**High**	**Low**	**Low**	**Medium**	**Low**	**High**
Whole life cost of material, including purchase, installation, maintenance and disposal	**High**	**Medium**	**Medium**	**Low**	**Low**	**High**	**Low**	**Low**

engaged to determine what system/specification is most appropriate. Further guidance concerning irrigation can be found in the London Tree Officers Association (LTOA) guidance document Sustainable Water Management: Trees are part of the solution.

For existing trees, a range of surface materials can be used including (but not limited to):

- Gravel: Resin bound
- Gravel: Self binding
- Mulch: Inorganic
- Mulch: Organic
- Rubber crumb

Each surface material has its advantages and disadvantages and no one surface treatment is suitable for all situations. Guidance for material selection can be found in the LTOA document 'Surface materials around trees in hard landscapes'. The table (below) from the LTOA document should be read in conjunction with it.

If planting trees directly into the ground is not possible then it might be appropriate to use raised planters. Many different designs of planter are available and the relevant arboricultural and landscape specialist must be consulted in the selection of the appropriate product. It should be remembered that using planters could have implications on tree health, may attract litter/vandalism, require a higher degree of maintenance and will constitute an increased irrigation burden.

Maintenance

Trees differ from other assets in that they often appreciate with age and have less predictable life spans and maintenance regimes than built assets. They must be adequately protected when worked around in accordance with the principles set out in the documents National Joint Utilities Group Guidelines 4 (NJUG4) and British Standard 5837 – Trees in relation to design, demolition and construction.

In cases where tree roots are conflicting with footway materials the relevant arboricultural specialist must be consulted to find a suitable solution. This may involve extending the tree pit or manipulating or pruning the roots, although the latter is only to be undertaken on instruction from the relevant arboricultural specialist.

Removal of any item of green infrastructure is to be considered only when all other

Figure 271: Mature trees on Victoria Embankment

practicable solutions are not viable. If removal is considered necessary, this must only be undertaken with the consent of the arboricultural and landscape officer and may require planning permission, permits and licences, or senior management approval.

Lights in trees

The installation of lights in trees can be problematic and is generally not encouraged. However, if unavoidable then a suitable design must be developed which does not damage the tree. The relevant arboricultural and electrical specialists must be involved in this process.

Lights may require regular removal to inspect or maintain the tree. When installing lights in trees consideration must also be given to the location and installation of any feeder pillars. These must not have a detrimental impact on either the tree and in particular the root system, or pedestrian movement through the area.

Figure 272: Tree lighting should be carefully considered with relevant arboricultural specialists

Trees on the TLRN

Trees on the TLRN are the responsibility of TfL's arboriculture and landscape maintenance managers (A&LMM), who work in accordance with our Green Estate Management Plan (GEMP).

We require a minimum three-year guarantee on all new trees planted on the TLRN. Advice on planting of new trees, irrigation and maintenance must be sought from the A&LMM.

Tree removal on the TLRN is taken very seriously and is subject to a robust tree removal procedure. The removal of healthy trees is generally considered a last resort and should only be considered when appropriate to do so.

All trees on the TLRN are inspected on an annual basis for defects with work undertaken as necessary in accordance with the GEMP and best industry practice. Data pertaining to trees on the TLRN is held on the Network Asset Management System (NAMS) database.

All street trees on the TLRN have been assigned a monetary value using the Capital Asset Value for Amenity Trees (CAVAT) system as hosted by the LTOA. TfL will seek to secure compensation based on the CAVAT valuation for any damage which is caused to our trees.

Planted areas

Planted areas include woodland, shrub beds and hedges which can comprise a variety of deciduous and evergreen, native and non-native species. Each is managed according to function, species mix, age, condition and location. Species choice is vital to the success of any planting scheme and must take account of site factors and management requirements, including the following aspects:

- Function, for example screening
- Maintenance (access and frequency of operations)
- Tolerance to pests and diseases
- Tolerance to drought
- Tolerance to pollution and the ability to trap particulate matter
- Tolerance to road salt
- Tolerance to light or shade
- Life expectancy
- Seasonal interest (flower, fruit, foliage, stem colour)
- Biodiversity and wildlife objectives
- Ultimate natural size of plants
- Habit/form
- Antisocial considerations, as advised by the community safety officer

The ability to cope with a changing climate is also essential for all new planting schemes. Fixed irrigation systems are generally not sustainable due to ongoing maintenance and costs, and often cannot be used during hosepipe bans.

Green infrastructure may provide a sustainable urban drainage system function where surface water is dispersed through the soil rather than discharged into the highway drainage system. The replacement of hard surfaced areas with new grassed or planted areas can also contribute to SuDS, landscape integration, enhancing the built environment and visual amenity, nature conservation and biodiversity, and providing areas to support larger trees. Where new grassed or planted areas are proposed over old hard surfaces, such as footway or carriageways, it is essential to break out the old roadbed. Unless specifically designed as a SuDS measure, planted and grassed areas should not be relied upon as the main measure for the discharge of surface water.

Planted and grassed areas must be designed with consideration of existing and proposed pedestrian desire lines. Shrubs with thorns and spikes can act as a deterrent but must not be relied upon as the main measure to stop inappropriate access and can collect litter.

Planted areas should be designed with careful consideration of the realities of urban life and avoid the creation of concealed places close to pedestrian areas. Raised planted areas close to seating can become hotspots for needle disposal and litter accumulation. Raised planted areas are also discouraged in new schemes as they may require more regular watering over the lifetime of the planting scheme.

Occasionally, some areas of herbaceous and bedding plants or special horticultural features will require special maintenance operations. Hanging baskets are permitted, subject to appropriate licence approval.

Grassed areas

Grassed areas comprise highway verges, embankment and cutting slopes, central reserves and traffic islands. Some grassed areas have significant biodiversity interest and habitat value, supporting protected species of flora and fauna.

Any works on or around grassed areas must be in accordance with industry best practice. If it is necessary to track over a grassed area for construction or maintenance purposes, protection is required to limit the impact of heavy equipment to the satisfaction of the highway authority's arboriculture and landscape officer. Full reinstatement will be required to make good any damage.

Reinforced grass (plastic or concrete) measures may be used, following approval by the highway authority's arboricultural and landscape officer, to aid in reinforcement of grassed verges where residential off-road parking or access to properties is permitted.

The following are essential design considerations for newly grassed areas:

- Achieve the intended maintenance regime and required permits
- Avoid placing street furniture in grassed areas as additional trimming will be required
- Maintain sightlines, visibility and access where low frequency and wildflower grass verges are proposed
- Planting of seeds or plants of local provenance where existing habitats and wildflower areas might be compromised by the introduction of non-local species
- Should be of sufficient width to allow effective maintenance and avoid edges and corners becoming easily degraded
- Ensure that grassed areas are located away from strong pedestrian desire lines to avoid the grass becoming downtrodden
- Choose more drought tolerant grass species to limit irrigation regimes

Grassed areas on the TLRN

There are three broad grass maintenance regimes used on the TLRN:

A. Regular cut grassed areas with a high, medium or low frequency depending on the location. High frequency areas are high profile spaces and include 'town streets' and 'city places'. A medium frequency maintenance regime is usually more appropriate for verges in locations characterised by slower speed and higher residential populations such as 'local streets' and 'high roads', while a low maintenance regime is appropriate for higher speed road verges and central reserves on 'connectors' and 'arterial roads'.

B. Grassed areas with bulbs add seasonal interest and local colour. They are maintained as regular cut grass with the exception that the areas containing bulbs remain uncut for six weeks after flowering to allow energy reserves to return to the bulb underground. During this period the verge can appear unmanaged, but regular cuts to adjacent verges indicate that maintenance is active.

C. Wildflower (species-rich) grasslands have historically been limited to high-speed arterial roads but improved establishment and maintenance techniques have led to an increase in popularity and use in higher profile urban areas. They can add long periods of flowering and create habitat for insects, but the lower maintenance regime leads to longer grass which can appear unsightly if not carefully designed for succession flowering. Wildflowers grow best on nutrient-poor soils where competition from weeds is reduced. Understanding the soil conditions before sowing wildflowers is essential as weed control on fertile soils can be very difficult and expensive.

Figure 273: Planted areas form a large part of London's green infrastructure

Wildflower areas require one or two visits per year which reduces the need for permits and the emissions from cutting machinery. Litter collection, usually by the local authority, is a more difficult task in longer grass but is essential to ensure that the site is safe and litter-free before grass cutting.

Our A&LMMs are responsible for the management of all aspects of the Green Estate including planted areas in accordance with the GEMP. They must be consulted and approve all works and proposals which may affect it.

Passeig de St Joan Boulevard Barcelona, Spain

Creating a vibrant urban green zone using permeable paving and tree planting

Key functions

Opportunity

A wide, hazardous and unsightly footway in Barcelona has been transformed into a sustainable and vibrant green zone that better uses the available space.

Benefits

Through unobtrusive intervention this development has revitalised the social value of the boulevard, catalysing commercial and recreational use of the area while improving biodiversity.

Implementation

The poor condition of the Passeig de St Joan Boulevard was becoming a hazard for pedestrians. Instead of resurfacing the footway, an ambitious remodelling was undertaken. Space was allocated between pedestrian, recreational and cycle use. This was achieved by reducing the space allocated to traffic and by segregating the cycle lanes. Two new rows of trees were planted to improve the aesthetic quality of the boulevard. Adequate drainage into subsoil was an issue; this was facilitated through the use of a permeable pavement system which added to the appeal and sustainability of the site.

Images courtesy of Adrià Goula

Applying in London

Where wide footways allow, shared space can be created for pedestrians, cyclists and those wishing to stop and sit.

Chelsea Fringe London, UK

Making the most of existing infrastructure

Key functions

Opportunity

The Chelsea Fringe is an open source and largely free festival that runs for about three weeks every year from mid May to early June.

Benefits

The open access principle of the fringe ensures that almost anything goes from temporary to permanent installations, community-led garden initiatives, exhibitions, events, experiences, exhibits and talks and walks across London.

Implementation

The Chelsea Fringe, although independent from the RHS Chelsea Flower Show, runs with its support. The fringe is largely volunteer run and hosts a wide range of events. These are generally free and centred on plants and gardens.

Applying in London

With such a broad scope of potential events, the Chelsea Fringe has the ability to reach more Londoners than many other events. TfL has provided a platform for some Chelsea Fringe events that are sponsored by a third party or the applicant. All future events are subject to approvals from asset owners and the SDRG.

Additional Information

British Standards:

BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations (BSI)

BS 4428: Code of practice for general landscape operations

Forestry Commission

Right Trees for a Changing Climate: (www.righttrees4cc.org.uk)

Greater London Authority:

Greenspace Information for Greater London (GiGL) (www.gigl.gov.uk)

Highways Agency (HA):

Design Manual for Roads and Bridges (DMRB): Volume 10, Environmental Design and Management, HA, Section 3: Landscape Management

DMRB: Volume 10, Environmental Design and Management, HA, Section 0, Part 2: Environmental Functions

DMRB: Volume 10, Environmental Design and Management, HA, Section 0, Part 3: Landscape Elements

London Tree Officers Association (http://www.ltoa.org.uk/):

Surface materials around trees in hard landscapes

Sustainable Water Management: Trees are part of the solution

National Joint Utilities Group:
NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees, 2007

Susdrain (http://www.susdrain.org/)

Transport for London:
Green Estate Management Plan

Trees and Design Action Group:
Trees in Hard Landscapes: A Guide for Delivery, 2014

UK Roads Liaison Group:
Well-maintained Highways, 2013

New York City Department of Transportation:
Street Design Manual

13.3 Keeping London dry

Intense rainfall puts London at risk of localised flooding from surface water running off ever increasing impermeable surfaces. Effective rainwater management is vital to the functioning and enjoyment of London's road network.

With greater focus on the need to manage surface water runoff, we encourage designers to consider water-sensitive design principles and to explore opportunities for incorporating sustainable urban drainage systems as an approach to managing rainfall. For highway runoff, we will consider SuDS measures designed in accordance with the SuDS Manual (CIRIA C697) on a site-by-site basis.

Overview

London's drainage system is a complex interconnected arrangement of private and public drains and sewers, with public ownership in the hands of multiple highway and drainage authorities. Much of London's drainage assets are out of sight, hidden deep beneath our streets, but are nevertheless critical to keeping Londoners' feet dry. If these assets are poorly designed or not maintained in optimum condition, the effects can be devastating to local communities, disruptive to traffic flow and damaging to other highway assets.

Highway drainage systems must be designed to ensure minimal maintenance and a long life in terms of hydraulic and structural requirements. In addition, designers need to account for the potential impacts of extreme weather events, take steps to assess the risk of flooding, and take every opportunity to increase resilience.

The remainder of this section will focus on surface water drainage at the local level.

Types of drainage systems

There are many types of drainage systems available to manage rainwater. The size, shape, gradient and geology of a catchment area are all factors which can influence the type of system and materials used. London's highway drainage systems include:

- Attenuation tanks
- Balancing ponds
- Drainage pipes
- Filter drains
- Grassed surface water channels
- Kerbs and gullies
- Oil and petrol interceptors
- Soakaways
- Surface flow wetlands
- Surface water channels

Figure 274: A typical highway drainage system. There are features visible on the surface, such as covers and gratings as well as those buried and out of sight such as pipes and chambers

Typically drainage systems on the road network will consist of kerbs, channels, road gullies, and drainage pipes. The profile of the road surface forms an important function of this type of drainage system by guiding water towards gullies, minimising aquaplaning and splashing and maximising the longevity of the pavement and its associated earthworks.

Layout

Within the highway there are multiple elements which may influence layout and material choices. These include available outfalls for new systems, surface profile and steepness of gradients, pedestrian desire lines, constraints resulting from the location of utility services, the likelihood and impact of systems becoming blocked by detritus, trees and street furniture. All of these elements have knock-on effects to drainage systems above and below ground, so will influence the drainage design. For example, road gullies should be sited to intercept surface water immediately before a pedestrian crossing point and drainage pipe runs should avoid tree root systems.

Drainage systems need to have a minimal physical impact on the carriageway or footway. A well-designed and maintained road drainage system ensures:

- Safe conditions in all weather
- Minimal nuisance to pedestrians via splashing
- Minimal environmental impact
- Durability and robustness of the carriageway surface
- Minimal disruptions caused during regular maintenance

Where possible, drainage and possibly utility apparatus should be laid in 'corridors' in the footpath. This will improve ride quality and facilitate the future maintenance of the services with minimum impact on road closures. Refer to the NJUG Guidelines on the Positioning and Colour Coding of Underground Utilities' Apparatus (2007) for further information.

Cyclic maintenance activities are generally carried out without road space permits, hence thought needs to be given to positioning of gullies based on access and traffic flows.

Design criteria

The following is an overview of the requirements for typical drainage systems on the highway:

- New or upgraded drainage relating to highways shall be designed in accordance with the Design Manual for Roads and Bridges, the Specification for Highway Works, and Sewers for Adoption
- The principle adopted for all highway drainage should be the use of straight sections of pipe serving trapped gully pots. Pumping of surface water should be avoided
- Where it is not possible to install a gully pot due to depth of construction, a catch pit connected to a gully is permissible
- Designers should avoid the practice of connecting gully to gully as a means of transferring flows. Each gully pot should ideally have its own connection to the carrier pipe
- In exceptional circumstances short lengths of highway rider sewer will be allowed
- Preference should be given to flexible jointed pipes
- All access chambers shall be designed and constructed in accordance with Sewers for Adoption 7
- Gully pots shall be constructed in accordance with the appropriate standard detail and be of high performance concrete

- Gully covers shall be hinged, not lift out
- Cyclic maintenance activities are generally carried out without road space permits, hence thought needs to be given to positioning of gullies based on access and traffic flows

Trees and drainage systems

Trees, like drainage, are an essential element of any good street. Care must be taken when working with planting and drainage infrastructure to ensure that one does not affect the other causing increased maintenance requirements.

Tree roots are attracted to moisture leaving drainage infrastructure through defects, cracks and displaced joints. Slow flowing drainage and standing water at the surface may indicate a blockage due to root infiltration. If the defects are not detected and addressed by routine maintenance the roots will continue to grow, expand and exert pressure at the crack or joint where they entered the pipe. The force exerted by the root growth will over time break the pipe and may result in its total collapse, attracting a higher cost to bring the asset back to an acceptable level of service. Therefore all new drainage systems near existing or newly planted trees must be designed to prevent root infiltration.

Topography of carriageway profiles

The size and shape of a drainage area, as well as the length and gradient of the surface have an effect on the surface water runoff. CCTV surveys may be required to confirm whether existing drainage facilities are underperforming and whether new drainage facilities are required. Topographic surveys will need to be provided along with a localised gully catchment plan for any required remedial works as well as to support the positioning of new drainage assets.

The combination of topographic surveys and local gully catchment plans can be modelled to show how effective the spacing of features such as gullies and carriageway profiles are and used to develop improved layouts to reduce ponding and aquaplaning.

This analysis can be refined when looking at specific locations such a crossing points, turning circles and bus stops where there is a higher potential of ponding and nuisance.

Cambers and falls

Gradients at building frontages should prevent surface water from entering buildings, basements or station entrances. Surface water should be intercepted before bus stops, pedestrian crossings and junctions. Falls should be encouraged to direct surface water into gullies as collection points. Please refer to HD39/01 Footway Design of the DMRB for further information on the design of crossfalls and longitudinal gradient.

Low point should be at the gully and not located at the crossing otherwise localised ponding will occur at the crossing. If the road cannot be profiled to create a gully low point additional/alternative drainage arrangements will have to be made.

Materials and maintenance

Regular maintenance can have a positive impact on the life of assets. For example, well-maintained road drainage will reduce the risk of water-logged foundation layers resulting in improved ability to withstand loading and minimise reactive repairs or premature failures.

It may be false economy to choose materials on cost alone as there may be high maintenance costs if proprietary products or special maintenance activity is necessary to maintain an asset. Key to an excellent drainage system is ensuring that the need for disruptive traffic management during maintenance is kept to a minimum. Therefore it can be cost effective to invest in high performance materials at the outset.

Installation of ironworks and covers needs appropriate consideration and material specification. The following items need to be considered when installing a cover:

- Potential loading and strength of materials
- Manual handling limitations
- Noise generation
- Friction
- Seating
- Differential settlement
- Milling when resurfacing is carried out

The use of traditional covers and their associated construction methods have resulted in a history of failure without any warning, often resulting in lane closures at peak times and significant disruption to journey times. Taking appropriate consideration at design stage reduces the potential for high cost reactive defects and the risk of potential third party claims for compensation.

Grates

A gully grate is a slotted cover to a gully pot. Grates prevent objects from washing into gullies, thereby reducing the risk of blockages and flooding. Designers need to select the correct grating type and positioning of gullies. It is not good practice to position gully gratings adjacent to crossing points where they are a potential trip hazard.

Cycle friendly grates: In any location where there is a possibility that cycle wheels will cross gullies, the grate slots should be at right angles to the direction of travel. Alternatively, non-slot 'pedestrian style' gratings should be provided.

Pedestrian friendly grates: In any location where there is a high likelihood that a pedestrian will walk directly across the gully, this form of grate should be provided. These grates should be slip resistant and also prevent narrow heels from getting trapped. The grate should be at right angles to the direction of travel.

High volume grating: These may be used on the network where cycles are not permitted. High volume grates are at risk of capturing cycle wheels in the grating due to the large gaps required to capture higher rates of rainwater.

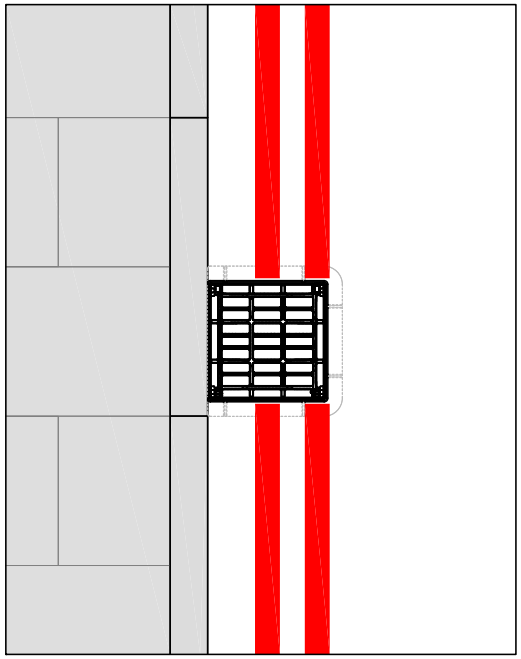
Slot channels: Consideration should be given to the maintenance implications of slot channels which can block with debris unless routinely cleared.

Channels: In some instances designers may need to install channels in the footway. Dished channels should be avoided as they do not provide a level walking surface. Due consideration should be given to their positioning and surrounding surfaces.

Figure 275: Cycle friendly grate on TLRN

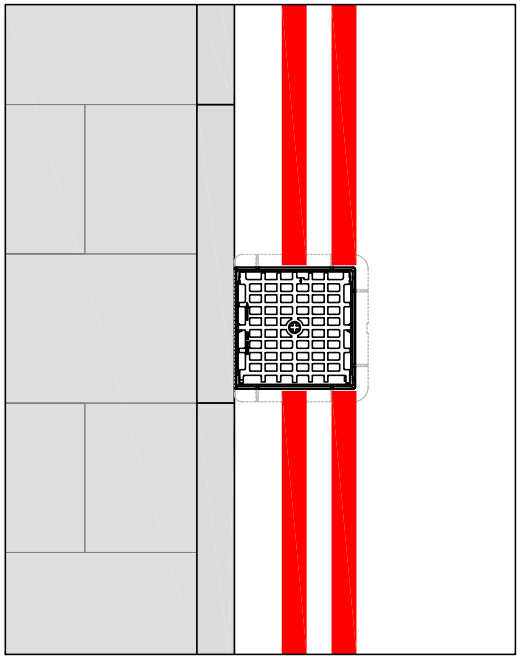
Figure 276: Channel and pedestrian friendly gully

Figure 277: Carriageway gully grate types



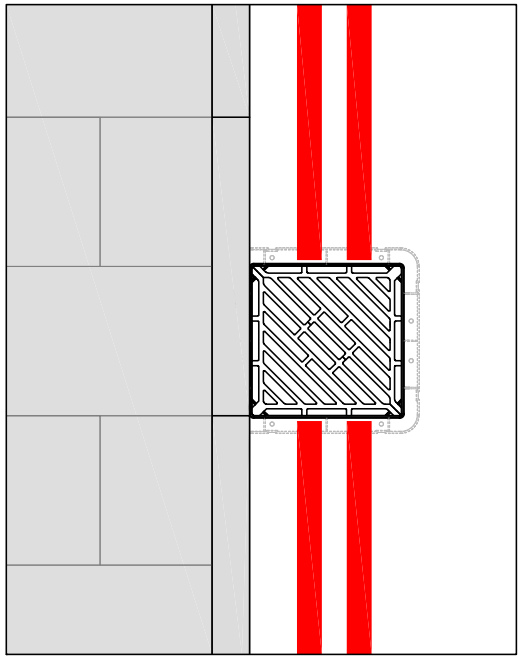
CYCLE FRIENDLY GRATE

Grate slots should be at right angles to the direction of travel.



CYCLE FRIENDLY GRATE

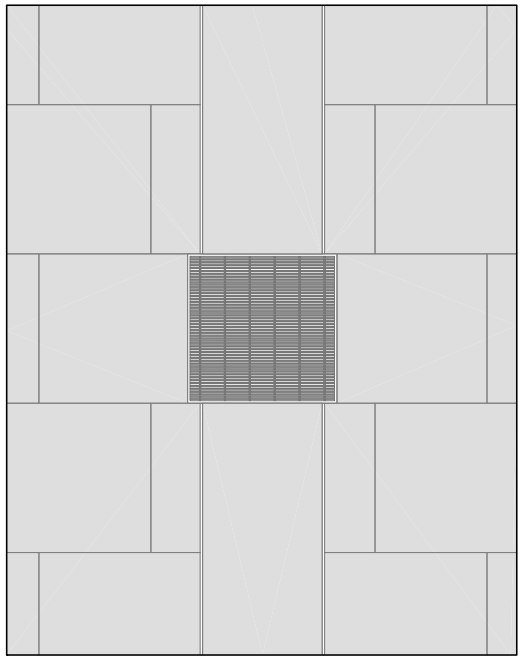
Cycle friendly grates can take several forms, this being another example. These grates should be slip resistant. While they are also pedestrian friendly they should not be in a pedestrian crossing.



HIGH VOLUME GRATES

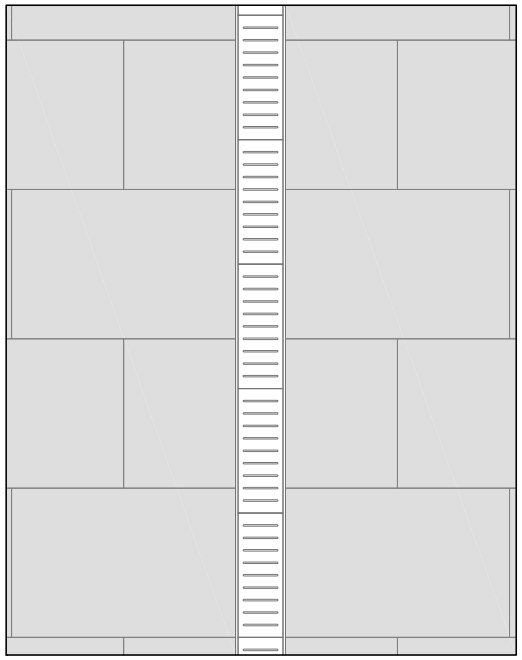
Above is an example of a high volume grating that may be used on the network where cycles are not permitted.

Figure 278: Footway drainage options on footway



CHANNEL

This is an example of a pedestrian friendly gate. Spaces between slots in footway grates should be between a minimum of 6mm and a maximum of 10mm to avoid heels becoming trapped.



LINEAR CHANNEL

Consideration should be given to the maintenance implications of linear channels which can block with debris unless routinely cleared.

Sustainable urban drainage systems and attenuation systems

Sustainable urban drainage systems manage surface water caused by rainfall. Approaches to managing rainfall can address water quantity (flood mitigation) as well as its quality (pollution reduction). SuDS may also provide amenity value when incorporated with green infrastructure.

Sustainable drainage is normally achieved by managing rainwater close to where it falls, by providing areas where rainwater can be stored – normally within natural contours – so that it is allowed to soak (infiltrate) into the ground, evaporate into the atmosphere or be used by vegetation (evapotranspiration) or be released slowly back into the conventional (piped) drainage system.

Designers should not propose options that:

- Cause a negative net effect to the Green Estate
- Do not consider whole life costs
- Are not technically feasible

With the greater focus on the need to reduce surface water runoff, we encourage designers to apply water-sensitive urban design principles so that green infrastructure is not lost, especially to impermeable surfaces, and to explore opportunities for incorporating SuDS measures to hold surface water and to manage its release into the piped drainage system. Where SuDS incorporate plantings, please consult an arboriculture and landscape manager.

Figure 279: Braham Street Park, Aldgate, uses a granular surfacing

Figure 280: Derbyshire Street, Bethnal Green, directs water into planted beds by using gaps in the edging

(Image courtesy of Greysmith Associates)

Permeable and porous surfacing

Porous and permeable surfaces allow rainwater through the surface layer to dissipate into underlying permeable soils. London is underlaid with a foundation of clay, which is ostensibly impermeable. However, there are locations throughout London where the soils are permeable and are able to remove rainfall from the surface. Whether or not the site in question has permeable soils, permeable and porous pavements may offer attenuation solutions which drain into a conventional (piped) system. Permeable and porous surfaces are becoming more readily available commercially. With appropriate consideration these could be incorporated into water collection features.

Proposals should be brought to the SDRG at the initial design stages.

Rain gardens and SuDS

Rainfall can be collected and directed from the footway or carriageway into a planting bed or tree pit, provided the tree is a suitable species. This can be achieved through the use of swales, permeable surfaces, kerb extension planters, street planters, and tree pits. Where space is available and is technically feasible these options should be considered. Please speak to an aboricultural and landscape maintenance manager for species selection when working on the TLRN.

Green walls

Vertical green walls using rainwater runoff from roof systems can play an important part in improving the streetscape. However, there is a high cost associated with the installation and maintenance of green walls. Therefore careful consideration is required at early design stages to whole life costs. All green wall proposals need SDRG approval.

Figure 281: Edgware Road green wall

The Stockholm Solution Stockholm, Sweden

Creating healthier street trees through water attenuation

Key functions

Opportunity

Trees in Stockholm, Sweden, have been used as part of a cost-effective system to manage excessive stormwater runoff.

Benefits

Stormwater tree trench systems reduce the reliance on existing drainage systems, improve safety by removing water ponding from footways and carriageways, and reduce splashing from passing vehicles.

Implementation

The trees are connected by an underground infiltration structure. Under the paving, a trench is created and lined with permeable fabric and filled with stone or gravel. Stormwater runoff flows through a special inlet (storm drain) leading to the stormwater tree trench. The runoff is stored in the empty spaces between the stones, watering the trees and slowly infiltrating through the bottom. If the capacity of this system is exceeded, stormwater runoff can bypass it entirely and flow into an existing street inlet.

Image courtesy of Wolf Paving Company, Inc.

Applying in London

Stormwater tree trenches should be considered in areas that are prone to flooding. This type of infrastructure should be investigated in Opportunity Areas and areas of regeneration.

Porous pavement trial London, UK

Water attenuation for safer streets

Key functions

Opportunity

Porous pavements offer highway authorities and developers a new tool to manage stormwater by allowing it to drain through the pavement surface into a stone recharge bed and infiltrate into the soils below.

Benefits

Porous materials remove excess water from carriageways and footways, improving driving conditions in wet weather and reducing splashing from moving vehicles.

Implementation

Porous pavements work by providing the water with a place to go, usually in the form of an underlying, open-graded stone bed. As the water drains through the porous asphalt and into the stone bed, it slowly infiltrates into the soil or to an attenuation system. The stone bed size and depth must be designed so that the water level never rises into the asphalt. This stone bed, often 450mm to 900mm in depth, provides a tremendous subbase for the asphalt paving.

Image courtesy of Wolf Paving Company, Inc.

Applying in London

Porous pavements are being trialled on the TLRN to determine if their use is appropriate and under what circumstances. We will publish results when the trial is complete.

Attenuation and infiltration systems London, UK

Replicating natural systems to provide easily maintained, aesthetically pleasing drainage capacity

Key functions

Opportunity

New and existing developments disrupt natural drainage of rainfall. While conventional drainage systems reduce flood risk, there are other smaller landscape features that can briefly attenuate or infiltrate rainfall and add visual amenity and ecosystem benefits.

Benefits

Attenuation and infiltration systems can reduce flood risk while also improving the ecology and visual amenity of the site.

Implementation

Following consultation with urban designers and ecologists, the raised kerbs installed in Potters Fields Park, London Bridge, were designed with slots between them to direct water off the kerb and footway into the adjacent gardens. This infiltrates a small amount of the flow and provides the gardens with a plentiful water supply.

Applying in London

Successful attenuation and infiltration systems require early consultation with several professionals to ensure structural, operational and maintenance issues are considered. These systems work well in areas of high footfall and where an opportunity to beautify the landscape exists.

Additional information

British Standards:

BS EN 124: Gully tops and manhole tops for vehicular and pedestrian areas

BS 8301: Drainage

BS 7903: Guide to selection and use of gully tops and manhole covers for installation within the highway

Department for Transport:

Design Manual for Roads and Bridges: Volume 4 – Geotechnics and Drainage

Department for Environment Food & Rural Affairs:

National Standards for sustainable drainage systems, 2011

National Joint Utilities Group:

NJUG Guidelines on the Positioning and Colour Coding of Underground Utilities' Apparatus, 2007

Construction Industry Research and Information Association (CIRIA):

The SuDS Manual (C697)

WRc Group (Water Research Centre):

Sewers for Adoption (7th edition), 2013

13.4 Lighting the way

Vision and purpose

To enhance night-time use, economy and enjoyment, and to provide safe passage across the Capital for all road users, we choose to provide street lighting across the TLRN. Street lighting provides many benefits to the network, including:

- Reducing night-time accidents and personal injuries
- Reducing crime and fear of crime

Figure 282: Highway lighting column illuminating footway and carriageway

Figure 283: LED lighting recently installed

(Image courtesy of CU Phosco Lighting)

- Promoting personal physical fitness and sustainability by encouraging walking and cycling after dark
- Facilitating social inclusion by permitting the use of streets and amenities after dark
- Supporting the 24-hour leisure economy promoting economic development
- Providing safe access to educational facilities supporting lifelong learning
- Assisting emergency services to identify locations and so reduce response times
- Permitting the effective use of CCTV during the hours of darkness
- Maintaining and/or improving the quality of life and personal wellbeing
- Providing an aesthetically pleasing appearance during the day and night

However, such advantages need to be considered with other benefits. These include their environmental impact, sustainability, the reduction in greenhouse gas emissions, the more efficient use of energy, and the provision of Best Value. Such initiatives are supported by drivers including the Climate Change Act 2008 (to reduce greenhouse gas emissions), the Carbon Reduction Commitment (CRC) Energy Efficiency Scheme (to make more efficient use of energy), and the Mayor's Transport Strategy and Climate Change Mitigation and Energy Strategy. We therefore embrace innovation and the latest technological advances to provide these outcomes and these include the implementation of a lighting Central Management System (CMS) and use of the latest light source technology.

Street lighting central management system

The current British Standard for road lighting recognises that road use often changes throughout the hours of darkness and with modern technology lighting levels on the carriageway can be adapted to meet those various requirements without compromising safety. We have therefore introduced a street lighting central management system to control and monitor each lighting point. This flexible approach to lighting and energy use supports the aforementioned aspirations.

This flexibility needs to be applied with London borough lighting policies in mind to ensure a consistent approach to road lighting across all of London's roads. Any proposed lighting installation on the TLRN will need to be CMS compatible.

Latest light source technology

For many years high intensity discharge (HID) lighting has been the mainstay of UK road lighting but advances in technology mean that the capability of solid state lighting now offers more energy efficiencies. We have trialled and are now installing LED technology across our road network. However, we are not committed to the use of only one technology since we aspire to the Institution of Lighting Professionals' (ILPs') mantra: 'the right light, in the right place, at the right time, controlled by the right system'. Where appropriate other sources might be preferred such as induction lighting. With an eye on the future perhaps it will be plasma light sources next.

Design process

The role of the lighting designer is to understand specific requirements and to detail lighting levels accordingly to maintain a consistent character and style across London.

When working on the TLRN, expert advice should always be sought from TfL Engineering to ensure the lighting design is appropriate for the street, conforms with the relevant British Standards, our own particular requirements, and industry recognised codes of safe and or best practice (for example, ILP and HSE guidance).

Lighting levels

Lighting schemes will be designed to BS 5489-1:2013 and CIE115 or later revisions and include a site specific risk assessment. Junction side road entry areas should also be similarly designed. This is anticipated to result in the majority of our roads being lit to lighting classes of ME3 and profiled to ME4 during the hours of darkness. Profiled lighting levels will be uniformly applied within 'logical groups' which will be managed over time by our CMS. Each logical group will predominantly lie between significant junctions, have consistent physical characteristics, and carry similar traffic volumes (including pedestrian traffic). Colour temperature (correlated) will be 'neutral white' (4,000K).

New street lighting on the TLRN

- Must be compatible with our CMS (incorporating digital addressable lighting interface, DALI, or wireless management and control, WiMAC, ballast)
- Must meet our standards and expectations
- Footbridges and subways should also be illuminated in accordance with BS 5489, BS EN 13201 and CIE115. The use of 'blacklights' in subways to deter drug misuse is not advocated

Materials

It is an objective to rationalise the range of luminaires installed, acknowledging that a Best Value lighting solution for the network as a whole should take priority over the Best Value solution for any individual location as a too localised view can result in management of the lighting asset as a whole being over complex. We therefore look to limit the number of products used and deploy just those with best overall performance.

Materials used on the TLRN must be compatible with the TfL Highway Specification. Functional but aesthetically pleasing equipment is preferred. Designers may request an exception to the palette in special circumstances such as in conservation areas. We do not recommend 'mock heritage' styles but wherever practicable will endeavour to maintain all genuine heritage lighting units. However, consideration to special lighting requirements based on the local context will be given on a case-by-case basis.

Lighting columns

Lighting columns may be conical or stepped tubular (site specific basis), must conform to BS EN 40 and as a standard be specified to accommodate a sign plate of 500 square millimetres. However, consideration for the column specification will be necessary if additional attachments such as banners, hanging baskets, CCTV cameras, etc. are required. Stepped tubular columns are generally confined to higher speed roads. Steel columns are to be finished in accordance with G2a or similar approved with generally a final coat of black (RAL9005) or in some locations signal grey (RAL7004). Aluminium columns are to be left bare or anodised where required.

Columns in vulnerable locations or where foundation difficulties are encountered may be installed in retention sockets subsequent to approval. Retention sockets may also be approved for some illuminated signs and are generally used to secure hooped bollards.

The recommended column set-back from the carriageway kerb face is defined by speed limits:

- Speed limits up to 30mph – column set-back 450mm minimum
- Speed limits above 40mph – column set-back 650mm minimum
- Alternative set-backs according to site specific requirements

Lighting column layouts should be in accordance with the site specific design risk assessment, be sympathetic to the local environment, and include considerations for illumination and maintenance requirements. Street clutter should be reduced by minimising the number of assets across a scheme.

The lighting design risk assessment may conclude that raise-and-lower columns provide the best option.

At puffin and toucan crossing locations lighting columns should be positioned to enable primary signal heads and associated pedestrian head pushbuttons to be mounted on the column to reduce street clutter and provide good illumination at the crossing point.

Lighting columns should be positioned away from mature and newly planted trees and roots in accordance with NJUG guidance and also to

Figure 284: Heritage lighting should be preserved

Figure 285: Example of a stepped tubular column

Figure 286: Example of a conical column

maintain lighting performance. The location of luminaires and column mounting height should be adjusted where tree canopies are low or designed away from trees where possible.

Where proposed lighting schemes are within residential areas lighting columns are to be located at property boundaries and gable centres of properties where possible.

When working on the TLRN:

- Where foundation difficulties necessitate the use of other non-standard foundations these should be in accordance with HSE guidance and again, only after approval from ourselves
- Columns should not be located in central reserves unless agreed otherwise with ourselves

Bracket arms

Bracket arms should only be fitted when required to achieve photometric performance or aesthetic objectives. They should coordinate with the form and proportion of the column with no change of size or 'step'. The outreach length is to be no more than 15 per cent of the column mounting height.

Wall-mounted lighting

Where the highway layout and building facades are appropriate wall-mounted lighting should be considered to minimise street clutter. However, wall-mounted lighting and columns should not be mixed on any street section. Please refer to the Code of Practice for Affixing Traffic Signs and Street Lighting to Buildings in London (2015) for further information.

- Wall-mounted equipment and electrical cables are to be discreet and in keeping with the building character
- For listed buildings consultation with the local planning authority is essential and adequate lead-in time must be programmed for Listed Building Consent
- Feeder pillars should be positioned in line with buildings or with the back of the footway to avoid visual and physical obstruction
- Please refer to the London Local Authorities and Transport for London Act (2003) for further information

High-mast and catenary lighting

Specialised mounting arrangements such as high-mast lighting and catenary lighting must be discussed and approved by TfL Engineering.

Luminaires

Luminaires must conform to the relevant British Standards (for example, BS EN 60598 and BS EN 62722, etc) and demonstrate optimum performance for their intended use.

The luminaire form and shape should not be obtrusive nor out of character with the general street scene.

Any electrical load installed on the TLRN such as a luminaire must have an appropriate ELEXON charge code to permit correct energy settlement.

Figure 287: CMS is used to control lighting levels throughout the hours of darkness

The luminaire must be oriented in accordance with the manufacturer's recommendation (for example to avoid glare). Our preference is for luminous intensity classes of G6 unless otherwise agreed by TfL Engineering.

Control of light pollution

Light pollution or obtrusive light must be avoided. The following lighting conditions are to be avoided:

- High light intensity in an inappropriate location
- Poorly positioned or oriented luminaires
- Undesirable highway lighting spilling out on to the surrounding environment
- Uplighters – uplighting may only be used with the specific consent of TfL
- Tree or invasive building illumination

Intrusive glare should be controlled by complying with BS 5489 and BS EN 13201 standards.

All street lighting on the TLRN should comply with obtrusive light limitations for exterior lighting contained in the Guidance Notes for the Reduction of Obtrusive Light published by the Institution of Lighting Professionals.

Electrical

Where lighting columns are serviced by a distribution network operator (DNO) supply, a secondary isolator is to be fitted in the column base compartment in order that electrical isolation can be safely achieved without the need to touch the DNO cut-out.

Independent connection providers can be used to help reduce delays in scheme works, approvals may be obtained via TfL Engineering.

All electrical installations must be installed and maintained in accordance with BS 7671 and BS 7430.

Good practice and the reduction of street clutter

We are determined to reduce the amount of street furniture that might confront all road users, therefore street lighting columns might also be employed in supporting, for example:

- Traffic signals
- Crossing controls
- Footway luminaires
- Trixi safety mirrors
- CCTV cameras
- Bus flags and timetables (subject to approval of TfL Buses)
- WiFi communications

Litter bins

Any requirement to mount such equipment on a TfL lighting asset first needs to be approved by ourselves to ensure that the specification and structural integrity of the asset is suitable to support the additional load and windage. Requests to mount equipment such as banners, flower baskets and festive lighting are covered by our highway licence arrangement.

Traffic control equipment such as signals and CCTV are placed in specific positions to ensure that the aspects are readily visible and that pedestrians can access push button units or the necessary view is provided. For these reasons, where it is proposed to install traffic control

Figure 288: Trixi mirrors are used by motorists to see their blind spots at junctions

equipment on lamp columns the street lighting designer should contact the relevant system designer to first determine the position of lamp columns and then locate the remaining street lighting around these positions.

Banners and advertising

Banners attached to existing street furniture and equipment such as lighting can provide an effective way of providing temporary signage or advertisement with minimal additional clutter and is controlled by licence.

The banner may be provided where the promoter can demonstrate that:

- The existing column can take the weight of the banner
- The fixings match the colour of the column
- The banners and fixings are removed within an agreed timeframe and with no damage caused to the permanent street furniture
- The banner and fixings do not cause road safety or visibility concerns

Advertising should be integrated within the urban realm so as to not impinge on pedestrian movement or impact on the overall quality of the streetscape.

The content of the advertising should comply with our conditions for the acceptance of advertising. These conditions are also used to control the artwork displayed on London Underground and buses.

Figure 289: Lamp columns can be used as a wayfinding assistant or to add to local character

Figure 290: Combined lighting column and signal head

Illuminated signs and bollards

Illuminated signs and bollards are to be specified and installed in accordance with current TSRGD requirements.

Feature lighting

Although the primary purpose of TfL road lighting is to illuminate the carriageway and the footpaths, consideration is also given for ensuring a pleasing aesthetic appearance. Requests for additional feature lighting will be considered on a case-by-case basis.

Silent Lights by Urban Matter New York City, USA

Playful lighting that responds to sound as vehicles pass overhead

Key functions

Opportunity

The challenge for Urban Matter was to transform the area under the Brooklyn-Queens Expressway in New York.

The underpass sits in a semi-industrial landscape surrounded by heavy motorway traffic. The pedestrian path is empty, dark, intimidating and avoided by locals.

Benefits

The spectacle provides a playful way of lighting the space and also gives a sense of safety at night. The 'gates' act as a wayfinding device to define a pathway at human scale across what would otherwise be a non-place.

Implementation

To create Silent Lights, a series of sensory gates were installed. These use sensors to respond to the noise of the traffic above. Coloured lights illuminate sequentially as vehicles pass overhead.

Image courtesy of Flickr/triebensee

Image courtesy of Urban Matter Inc.

Applying in London

This has the potential to be delivered in similarly forgotten urban underpass locations, such as the A12 through Hackney.

Hyde Park Corner subway London, UK

Redevelopment of vandalised subway using innovative lighting systems

Key functions

Opportunity

The Hyde Park Corner subway is located near the Lanesborough Hotel. Repeated vandalism of existing wall-mounted lights meant that a new vandal resistant lighting solution was needed to re-establish a safe environment.

Benefits

Careful detailing and well-placed lighting led to an atmosphere that was simultaneously calm and safe. The new lighting is attractive, discreet and much less susceptible to vandalism.

The handrails were painted bronze to match surrounding street furniture. Stonemasons were commissioned to replace the damaged stonework using artificially aged stone to ensure the new stone did not look out of place.

Despite its relatively high cost, this redevelopment was very well received.

Image courtesy of DW Windsor ©

Implementation

LED lighting was fitted under handrails; the heat from LED lighting made the handrails pleasantly warm. The lighting levels were adjusted to be brighter leading into the subway, creating an aesthetically pleasing atmosphere.

Applying in London

The usual preference in London is to remove subways; however, when they are retained, this example shows how they can be made calm, attractive and safe.

Blackfriars Underpass London, UK

Using innovative lighting technology to reduce maintenance costs

Key functions

Opportunity

Closing the Blackfriars Underpass for lighting maintenance every 18 months was an expensive and disruptive affair that damaged TfL's reputation.

Benefits

The ingress protection combined with the reduced maintenance of LED lighting makes the new system significantly more robust, and has reducing planned and unplanned maintenance.

Implementation

Using the limited space available, a new LED lighting system was installed; a system used previously in Australian train carriages and extremely resistant to dirt and water ingress.

A specialised diffuser was made to control the lighting within the underpass and ensured compliance with highway regulations.

Applying in London

The technology would be advisable anywhere where maintenance is a costly and complicated issue.

Additional Information

British Standards:

All lighting schemes on the TLRN must meet the relevant British Standard requirements including but not exclusively:

BS 5489: Code of practice for the design of road lighting

BS EN 13201: Road lighting

BS EN 40: Lighting columns

PD 6547: Guidance on the use of BS EN 40-3-1 and BS EN 40-3-3

BS 7671: Requirements for Electrical Installations

BS 7430: Code of practice for protective earthing of electrical installations

Department of Energy & Climate Change:

CRC Energy Efficiency Scheme (Amendment) Order, 2014

ELEXON:

Charge codes and switch regimes: https://www.elexon.co.uk/reference/technical-operations/unmetered-supplies/charge-codes-and-switch-regimes/

Greater London Authority:

The Mayor's Transport Strategy, 2010

The Mayor's Climate Change Mitigation and Energy Strategy, 2011

Health and Safety Executive:

Avoiding danger from overhead power lines

Avoiding danger from underground services

Risks associated with working on or near lamp columns with non-standard roots during excavation works, 2010

International Commission on Illumination:

CIE 115: Lighting of Roads for Motor and Pedestrian Traffic, 2010

Institution of Lighting Professionals:

All lighting on the TLRN should meet the requirements of industry-recognised codes of best and/or safe practice such as those recommended by the Institution of Lighting Professionals' Technical Reports and Guidance Notes including but not exclusively: Guidance Notes for the Reduction of Obtrusive Light

Bats and Lighting in the UK

Code of Practice for Electrical Safety in Highway Electrical Operations

Code of Practice for Variable Lighting Levels for Highways

Guidance Notes for the Reduction of Obtrusive Light GN01, 2011

Managing a Vital Asset: Lighting Supports

Legislation:

Climate Change Act 2008

London Councils

Code of Practice for Affixing Traffic Signs and Street Lighting to Buildings in London (June 2015)

Transport for London

Highway Licensing and Other Consents, 2011: https://www.tfl.gov.uk/info-for/urban-planning-and-construction/highway-licences

13.5 Leftover spaces

Unplanned leftover spaces can have a significant detrimental visual impact on London's streetscape. These neglected spaces may emerge organically as marginal underdeveloped pockets of land at the interface of planning boundaries, or can be the by-product of major developments which failed to integrate well with the surrounding urban fabric. In London this is most common where major highways cut across the landscape and leave fragmented areas adjacent to the roadside or beneath flyovers.

Often visible from the road network these spaces may not be easily accessible or become fenced off as unattractive residual spaces that have been designed as an after thought or not designed at all.

Figure 291: Spaces on the network which appear to be uncared for should be targeted for reinvigoration

They are not so much forgotten urban spaces, as areas of land that were never used in the first place.

Typically these spaces are not managed by the highway authority and can become overgrown, strewn with litter or may exist in isolation as an unattractive and polluted urban void.

Unplanned and poorly maintained spaces can create negative spatial implications, similar to the broken window effect. We recognise that while these spaces may currently exist as areas of neglect, many of them offer considerable potential as places of opportunity.

Strategy

Spaces should be identified adjacent to the road network which may be able to provide additional amenity, environmental or aesthetic benefits for the local area and the network as a whole. Uplift of leftover spaces should not be planned in isolation, but should encompass a wider strategy of improving leftover spaces along a designated route.

Designers are encouraged to establish baseline conditions to ascertain how the space is used, if at all, and identify opportunities which can contribute to wider environmental and socio-economic strategies in the All London Green Grid framework and London Plan. Assessments may include using the Pedestrian Environment Review System (PERS) auditing process to establish how the leftover space adversely impacts on the walking environment. Please contact our streetscape manager when these spaces are located on the TLRN at streetscapeguidance@tfl.gov.uk.

Context

Many of these leftover spaces are not readily accessible by foot and so designers should consider the role that these spaces can provide at a local and citywide level.

As new developments come forward in adjoining parcels of land, leftover spaces may emerge as viable opportunity spaces; as potential links or in some cases, new public spaces or development sites.

Where major street improvements are proposed, designers should be conscious of the surrounding boundary interface to ensure that any new surfacing or planting treatment is integrated with adjoining areas.

Design interventions

All identified spaces should be mapped, regardless of whether an intervention is to be proposed. Any space which has been identified as leftover should be assessed to determine the potential for intervention.

Together with the local authorities, we are encouraged to work in partnership to strategise and deliver site specific design interventions which look to support wider economic, social and environmental strategies.

Design teams should respond to the constraints of the existing space and provide opportunities which are site specific. Interventions may include, but not be limited to, the following options:

1. Improve management and maintenance

Some of the most dramatic changes to the quality of our roads can be achieved by simple changes to existing maintenance regimes.

2. Improve access

Public space is just that. It is by definition open and accessible to all. There should therefore be a presumption in favour of public ownership and adoption. Unless there are specific reasons against this for safety or other concerns.

3. Improve amenity

Greening

All highway landscape improvement proposals should be practical, feasible and sustainable and promoters should work with our arboriculture and landscape team to identify opportunities and management strategies for the Green Estate.

Scrubland can provide a valuable ecological function in the urban landscape. Existing areas of green infrastructure planting should generally be retained, except where a safety inspection identifies a need for remedial work.

Lighting

Improvements in lighting should be considered for spaces which have existing problems in visibility and perceived security. Good lighting can encourage more people to use leftover spaces and can complement other connectivity and aesthetic improvements across the area.

Temporary art installations

Public art may be considered for leftover spaces which are well overlooked and relatively well connected with a reduced risk of vandalism. Installations that are locally resonant or support local talent are preferred.

4. Reimagine the space

A suite of measures could be introduced together to help transform a space into a destination in itself. This may include creating new uses for the space, such as community and play facilities, places to live or commissioning artwork. Proposals of this nature will require community support, such that any design for a new public space provides for the local area.

Figure 292: Wild flowers planted next to the carriageway

Figure 293: A bridge undercroft beautifully clad in metal sheets and gabion cages

Figure 294: Anthony Gormley public exhibition 'Event Horizon'

St Paul's Churchyard London, UK

Repurposing space for public use

Key functions

Opportunity

A large part of St Paul's Churchyard was once a coach park but has since been transformed into a vibrant public square.

Benefits

The churchyard has been transformed into an open, inviting green space, designed to reflect the curved transept of the cathedral and provide a high quality welcoming setting for the new City Information Centre.

Implementation

A section of Carter Lane, between Godliman Street and Cannon Street, was closed, and a larger public space was provided by relocating the coach parking and replacing it with green space.

Applying in London

Schemes such as this could easily be implemented in other locations as part of a wider project.

Underpass Park Toronto, Canada

Transforming derelict space under and around three flyovers into a vibrant community space

Key functions

Opportunity

Toronto is dominated by elevated motorways. These create physical and psychological barriers between neighbourhoods. To reconnect communities and create more public space, land underneath a flyover was used to create a park.

Benefits

This project has embraced the concrete beams and columns of the surrounding flyovers to create a welcoming environment. It connects two adjacent neighbourhoods and has the potential to act as a catalyst for regeneration in the area.

Implementation

The park was designed to appeal to all elements of the community through the inclusion of a playground, skate park, basketball courts, trees and public art. A large, flexible community space is the focal point for the park and is used for public events, such as markets and festivals.

Applying in London

This has potential for urban areas which are well-connected but bleak and underused.

Images courtesy of Waterfront Toronto

13.6 Pocket parks

The term 'pocket park' can be used to describe small spaces in the public realm that can be greened to offer an area for rest or recreation. Pocket parks can challenge the common perception of what a park can be. They can range from the traditional town centre green, to making better use of unusual spaces, such as underused parking spaces, roof tops, canal banks, or uninspiring green spaces associated with bus stops or road junctions. Pocket parks can also be created as 'meanwhile spaces' giving a temporary use to an otherwise underused piece of land, perhaps in the early stages of the development process. They can often be created at relatively low cost and with short delivery times.

The key principles of pocket parks are that they are:

- Publicly accessible
- Provide opportunity for local communities to enjoy outdoor space
- Encourage healthy living
- Help build social cohesion through providing opportunity for community gardening
- Recreational
- Volunteering

In 2012 the Mayor of London launched a two-year Pocket Parks Programme with the aim to create or improve 100 pocket parks across London. The programme promoted the principles of pocket parks through provision of grants to local authorities, housing associations, and community groups, to enable them to identify, create, design, and deliver 100 parks.

The Mayor's pocket parks are enhancing underused amenity green space that often provides little ecological or social value. Improvements on these sites include creating food growing spaces, reimagining play facilities, and creating new landscapes that promote sustainable urban drainage and improve the local ecology.

The concept of pocket parks has been embraced by the public and community groups and their creation should be considered as integral to public realm improvement projects.

Additional information

Greater London Authority:
Pocket Parks Prospectus:
http://www.london.gov.uk/sites/default/files/Pocket%20Parks%20Prospectus_1.pdf

Pocket Parks Programme:
http://www.london.gov.uk/priorities/environment/greening-london/improving-londons-parks-green-spaces/pocket-parks

Figure 295: Van Gogh Walk

The Edible Bus Stop®
London, UK

Making the most of spaces through urban greening

Key functions

Images courtesy of © 2014 The Edible Bus Stop®

Opportunity

There are many small underused public spaces across London, that if enhanced through urban greening, could help to make London a more pleasant city in which to live and work. The Edible Bus Stop®, an urban design group, saw an opportunity to transform a small poorly managed patch of amenity grass, into a new public garden maintained and managed by the community. In 2013, with help from London Borough of Lambeth and funding from the Mayor of London, the group designed and delivered the Mayor's first pocket park on Landor Road, Lambeth.

Benefits

Changing underused grey spaces into dynamic green spaces through clever design and planting can improve public perception of the public realm, and foster community cohesion and civic pride. Other benefits can include food growing and enhancing biodiversity. There are also well-documented links between making the public realm greener and more pleasant and boosting the local economy.

Implementation

The Edible Bus Stop® undertook extensive community outreach at every stage of the project, galvanising support from the outset. The group reimagined the entire area; creating large robust planting beds out of discarded granite kerbstones; adding new bespoke oak seating, and with the community planted edible plants, including herbs, strawberries, five fruit trees and rainbow chard. It has given local residents a space to come together and enjoy, and has encouraged them to take ownership, volunteer to help maintain the space, and grow what they wish. It has given the street an asset, making the space a place and the streetscape more pleasant and friendly.

Applying in London

One of The Edible Bus Stop's® ambitions is to create a series of small green spaces along transport routes starting with the length of the 322 bus route. Working with other local community groups, it has already applied the concept in spaces in West Norwood and Crystal Palace, on the 322 route. It hopes to set a precedent with its Edible Bus Route and roll out the concept across London's transport network and beyond. The approach is transferable to thousands of other underused, amenity spaces scattered across London's streetscapes. Small-scale improvements, as demonstrated at Landor Road Pocket Park, have created positive impacts on the local community's wellbeing and contributed to a cleaner, greener and friendlier city.

Parklets
San Francisco, USA

Introduction of small urban parks in underused car parking spaces

Key functions

Opportunity

The distribution of public open space is often unequal in urban contexts. Where there a shortage of public open space or the quality of the public realm is poor the creative use of space, such as parklets, should be encouraged.

Benefits

San Francisco's Parklet Program works to convert underused parking spaces into publicly accessible open spaces called parklets. These are generally installed next to the footway thereby extending the area of useable space for pedestrians as well as providing a range of facilities including seating, cycle racks and landscaping.

Implementation

The programme has sought to install parklets where there is a notable lack of public open space or where existing footway width is highly constrained. Parklets are designed to be permanent, temporary or seasonal structures which are financed and maintained in collaboration with local councils, business owners and non-profit community organisations.

Applying in London

London's Pocket Parks Programme has already transformed underused or derelict spaces and repurposed them for increased green space. The introduction of parklets could seek to improve constrained footways.

Derbyshire Street Pocket Park London

Creation of small urban parks in underused streets and public realm

Key functions

Opportunity

Providing access to quality open space is always a challenge in the most densely developed parts of the urban environment. There are many competing pressures on the public realm and creating green space requires thoughtful design and creative use of space. The eastern end of Derbyshire Street, Bethnal Green, was a dead-end road with only one function – space for 12 car parking bays. These were used infrequently; consequently the space created conditions that encouraged antisocial behaviour and fly-tipping.

Benefits

London Borough of Tower Hamlets sought to provide environmental and social benefits by transforming the underused space into a pocket park. The design incorporated a cycle path, new seating, green-roof covered cycle racks and bin stores, a rain garden and a defined area for café tables and chairs. Bespoke planters to capture rainwater from the roof of Oxford House, a popular community and arts centre, were designed and provided by Thames Water.

Images courtesy of Greysmith Associates

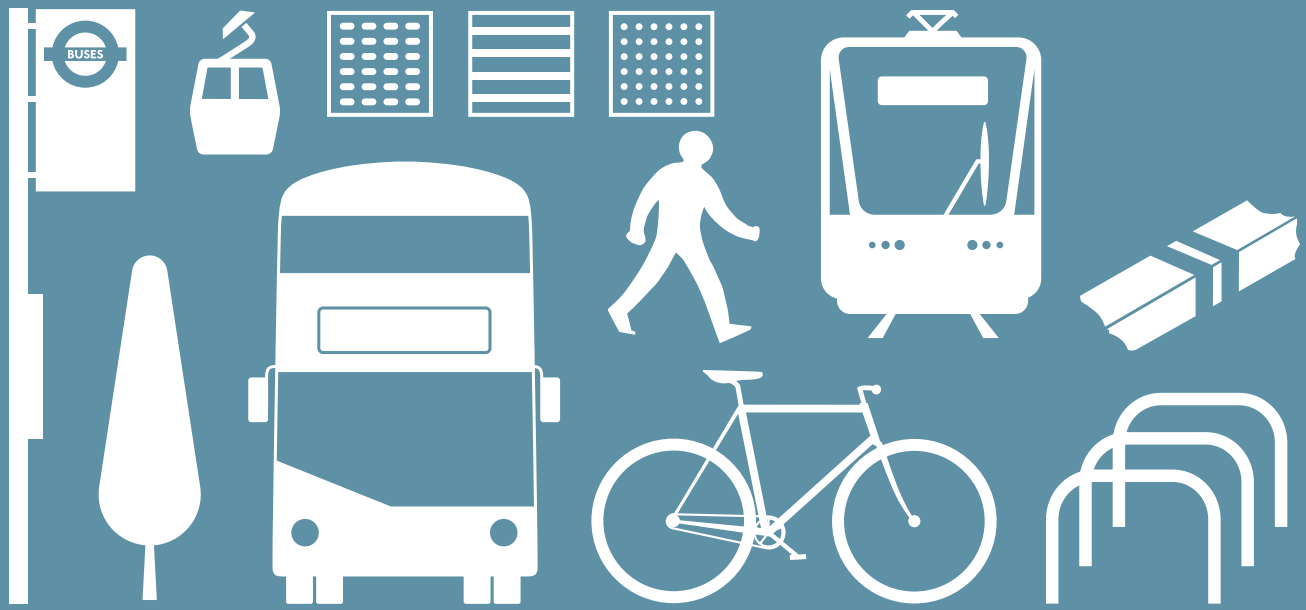
Implementation

The aim was to recreate an important node for pedestrians and cyclists within a thriving network of streets creating an active place from an unused space. A small section of the adjacent park was also incorporated into the design of the scheme, increasing connectivity as well as improving the opportunity to provide sustainable urban drainage. Funding for the project was provided by the Mayor of London's pocket park initiative and London Borough of Tower Hamlets.

Applying in London

Derbyshire Street Pocket Park is an excellent example of how the conversion of an underused grey space into a quality green one can provide a suite of improvements that address issues affecting many parts of London, for example, tackling antisocial behaviour or coping with areas prone to flooding. Each of the interventions delivered here can be applied in similar spaces across London, creating a mosaic of small urban spaces which are valued by local people and deliver more strategic environmental benefits through cumulative impact.

Part E Transport interchanges



14.1 Vision

The interface between a transport hub and the street is an essential part of the streetscape experience. It needs to provide a seamless journey and a clear transition for passengers using transport facilities, accommodate the needs of the station and demonstrate good practice streetscape design principles.

Figure 296: Wapping station interchange between buses and the station entrance

14.2 Street interchanges

The street almost always acts as an interchange zone, an area encompassing one or more interchange facilities creating a multi modal hub, and public space. It needs to fulfil several functions to provide a clear transition for passengers. Interchange zones need to facilitate convenient and safe pedestrian movement between different transport modes and allow for the efficient operation of public transport services.

Stations within the context of Streetscape Guidance are defined as any transport hub used to access public transport, which may or may not include infrastructure located directly on the road network. This includes:

- Rail stations – London Underground, London Overground, Docklands Light Railway and National Rail
- Bus stations – infrastructure which is provided on-carriageway
- Tram stops – operated by London Trams
- Piers – operated by London River Services or others
- Taxi ranks
- Cycle parking hubs

Our Interchange Best Practice Guidelines (2009) should be referred to as a general guide to improving quality and efficiency, and Station Public Realm Design Guidance (2015) referred to when defining the design approach for the station's public realm. Streetscape Guidance should be referred to when detailing the materials and their application from any station entrance that directly faces the street.

Station public realm

Stations and the spaces around them are important focal points for an area with the potential to become a destination in its own right, so any design should look to embrace the local character and sense of place, while providing a legible and consistent streetscape, linking effectively with the surrounding street network.

Figure 297: Wimbledon station forecourt provides seating, cycle parking, public art, taxi rank, and bus interchange

Not every station will include these spaces, generally referred to as a forecourt, a defined area which connects the station entrance to the streetscape, however, where they do occur the following should be accounted for:

- The space should be flexible such that it can respond to daily trends in pedestrian flows and accommodate different uses at different times. This may include temporary uses of space during quieter periods. The station forecourt should work as a cohesive and legible whole, with clear sightlines and well-defined transport entrances
- Designers should consider the context, proportions of the space and the degree of enclosure, when selecting materials and placing furniture within the forecourt. Please refer to the section 'High quality footways' in this guidance for further information
- Where retail units front on to the forecourt, frontages should be visually cohesive, with outdoor seating managed in designated licensed areas

Figure 298: Temporary table tennis installation at King's Cross/St. Pancras station

Figure 299: Legible London signage should be placed near an interchange point

Wayfinding

Information requirements vary depending on the stage in the passengers journey. The provision of comprehensive and consistent wayfinding information across the interchange should be provided to assist navigation. Please refer to Station Public Realm Design Guidance (2015) for further information. Consideration should be given to:

- Appropriate placement of transport infrastructure, such as bus stops, tram stops, kiosks and cycle hubs should aid natural wayfinding and minimise the need for signage when onward travel infrastructure is located within a direct line of sight from an alighting area
- Where direct line of sight to an onward journey mode is not achieved, routes should be simple with signage provided at key decision points. Signage should be rationalised to reduce clutter. Refer to 'Pedestrian wayfinding' and 'Traffic signs' in this guidance, and London Underground Signs manual (Issue 4, 2002) for further information

Footways

Surface materials can be used as a navigational tool and to communicate a change in use. A change in surface materials helps to demarcate the limits of the interchange zone or highlight where there will likely be a greater or different type of pedestrian presence. Each design response should be site specific and consider its function, performance and context. The following examples are potential approaches to the treatment of the footway:

- A consistent approach to paving the footway in front of the station should be used to maintain visual continuity with the surrounding streetscape. Where designers are looking to extend forecourt paving across the footway SDRG approval is required

Figure 300: Green Park Tube station entrance paving has a distinct design used as a 'welcome mat' into the station

- Non-standard surface materials require SDRG approval but may be considered for use on the footway outside a station if the design intent is to visually unify the street and interchange zone. This may be useful in larger forecourt settings where a consistency of material can reinforce the station setting and better relate to the surrounding architecture
- Footways should be designed to accommodate peak pedestrian flows, but be flexible so that they also work at quiet times. Refer to Pedestrian Comfort Guidance for London (2010) for further details

Carriageways

- Special consideration to surface materials is required at interchange points due to frequent and heavy use. All materials and treatments must be robust and able to withstand anticipated use

Figure 301: Bus interchange with a 140mm kerb upstand

- Clear delineation in surface materials and kerb heights are recommended in interchange zones between footways and carriageway. An upstand of 140mm is recommended in most cases
- Containment kerbs may be required where a safety audit has identified a risk of vehicle overrun on to the footway. Please refer to 'Kerbs' for further information
- Signalised crossings should be provided on primary pedestrian desire lines at the entrance to the station to allow people less confident to cross. Please refer to 'Crossings' for further information

Street furniture

Street furniture can be used to reinforce different public realm functions, particularly with regard to pedestrian movement: stationary activity can be encouraged by providing seating away from major desire lines; or trees can be used to reinforce primary walking routes towards the station.

The placement of street furniture on the footway adjacent to an entrance or forecourt area should allow for complex pedestrian movements, as pedestrian desire lines will likely not just be along the street. It should also be recognised that people will need more space to stop, orientate themselves and wait for others.

- The standard Streetscape Guidance furniture placement design principles still apply (refer to 'Footway amenities' and 'Safety and functionality'), however, back of footway furniture should be carefully considered to ensure adequate permeability between kerb edge services, such as buses and taxis, and the station entrance. The placement of street furniture should not hinder maintenance activities
- Large cycle hubs may be required to support station facilities and these should be sited in a convenient location which does not impinge on footway space. For normal cycle provision please see 'Cycle parking'. Designers should consider how cyclists will access cycle parking facilities if not at the kerb edge, to ensure that they do not inadvertently create a shared space to the detriment of pedestrian movements. Cycle parking must not create a barrier therefore short strips of no more than six racks should be provided
- Passenger information, street furniture and signage should all be coordinated in furniture zones, with structures or at the back of footway to minimise clutter

Figure 302: Emirates Air Line Greenwich Peninsula station where stone plinths are used as a security measure and a seating feature

Security

The approach to security should be to firstly design out the likelihood of crime through passive measures and good quality design. The layout should ensure good natural surveillance, be well-lit and promote a high sense of personal security by avoiding the creation of blind spots or dark corners. Careful design, selection and placement of street furniture can create passive measures that prevent and discourage crime from occurring without affecting the overall character of a place. All aspects of the design must comply with Section 17 of the Crime and Disorder Act.

Overt use of CCTV can help in some situations to deter crime, but should not be relied upon in itself due to its relation to fear of crime. Cameras should be placed and merged with adjacent street furniture to minimise visual clutter. Refer to 'Roadside cameras and CCTV' for further information.

Where security bollards are required other furniture such as reinforced seating should be considered to provide greater multifunctional value and help to reduce street clutter. Please note that where street furniture is intended to be used as a security measure, it must first be approved by the Centre for the Protection of National Infrastructure. Security bollards should be considered as a last resort where vehicle incursion may occur and carefully detailed to minimise their use. Refer to 'Barrier free footways' for further information.

- Footways and waiting areas should be visually permeable to enable adequate passive surveillance

Additional information

Transport for London:

Accessible Bus Stop Design Guidance, 2015

London Underground Signs manual, 2002

Pedestrian Comfort Guidance for London, 2010

Station Public Realm Design Guidance, 2015

London Underground Station Design Idiom, 2015

14.3 Transport mode specific design considerations

The following section outlines mode specific design considerations that should be read alongside Station Public Realm Design Guidance.

14.4 Rail interchanges

A large number of major rail stations front directly on to the TLRN including London Euston, London King's Cross and Waterloo, as well as numerous London Underground, London Overground, Docklands Light Railway and National Rail stations.

Designing the interface of the street with these stations is crucially important to maintaining the quality and continuity of the streetscape at some of London's busiest transport nodes.

Detailed guidance

Footways

There are several general approaches to surface treatments typically used at station entrances that treat the entrance as:

An 'entrance mat' – using a visually different paving material directly surrounding the station entrance to highlight the entrance. This approach tends not to be used in new stations, but is commonly seen at stations that are listed or in a conservation area. If considering this approach please seek the approval of the SDRG.

A distinct space – using a distinct urban realm treatment in the forecourt of the station to distinguish it as a separate space from that of the street. This approach can be extended across the footway or stop at the edge of the footway.

Figure 303: King's Cross station forecourt uses stone plinths as a security measure

If considering this approach please seek the approval of the SDRG.

Part of the street – using the same material as the footway up to and perhaps into the station entrance. This is a common approach when the station entrance is directly on the street and there is little or no forecourt space.

Streetscape Guidance seeks a consistent approach to footway paving as seen in 'High quality footways' and 'Footway amenities'. When considering an alternative approach, please seek the approval of the SDRG.

Street furniture

- Station Public Realm Design Guidance provides detail on when and where it may be appropriate to locate street furniture. If street furniture will be included at the station entrance or forecourt, please follow the guidance set out in:
- 'Ambience'
- 'Footway amenities'
- 'Safety and functionality'

Large cycle hubs, refer to 'Cycle parking hubs', may be required to support rail station facilities and these should be located in a convenient location which does not on impede on footway space. Designers should consider how cyclists will access the cycle parking facility if it is not at the kerb edge, to ensure that they do not inadvertently create a shared space to the detriment of pedestrian movements.

Additional information

Transport for London:

Station Public Realm Design Guidance, 2015

Interchange Best Practice Guidelines, 2009

London Underground Station Design Idiom, 2015

Department for Transport:

Security in Design of Stations (SIDOS) Guide, 2012

14.5 On-highway bus station interchanges

Most of London's major bus stations are integrated with other public transport modes, in particular London Underground. The interchange experience is therefore a key consideration in delivering an efficient and beautiful public realm which acts as a pleasing transitional space between transport modes.

Streetscape Guidance does not provide specific details on bus station design; rather it identifies the key design considerations for ensuring successful urban integration of the bus station with the adjoining road network, and clarifies the aspirations for maintaining the quality and character of the streetscape across the bus station frontage.

Figure 304: Bus interchanges happen both on and off the highway

Figure 305: On-street bus interchanges need to provide for the safe passage of cyclists and vehicles

General considerations

Bus interchanges accommodate a high frequency of buses and a large volume of people. Therefore, bus interchanges should aim to provide clear delineation between waiting areas and movement corridors to avoid congestion and ensure the safety of all users.

Provision for cycling is a priority that should be designed in for both on-carriageway facilities and cycle parking. Different regulations apply to bus station that are off-highway.

The design of the station buildings and the configuration/provision of bus stops will depend on site-specific operational and spatial characteristics, and will always require specialist architectural and highways advice. Our Bus Infrastructure team should always be consulted regarding any street improvement project adjoining a bus station or any aspect of a TfL bus station.

Detailed guidance

Many major bus interchanges will occur on the highway road network where passengers can transfer to another mode of transport like rail or Tube. Brixton, Waterloo, King's Cross and Paddington stations are just a few examples of where buses stop on the carriageway at frequent intervals to allow passengers to interchange.

These interchanges are often constrained by narrow footways and active frontages. However, the following considerations can help relieve congestion and create a smooth interchange:

Footways

- Consider the provision of a centre median along the length of an on-carriageway interchange zone to assist passengers with informal crossings. The median should be paved in the same material as the footways and no street furniture should be placed on it
- Provide frequent and wide formal crossings on desire lines; refer to Crossings for further information
- Design teams should use a consistent approach to paving the footway and it should match the material of surrounding footways to maintain visual continuity with the surrounding streetscape
- When designing a forecourt as part of an interchange that is public space, designers should first consider the opportunity to create a place when reviewing the approved

palette of materials in this guidance. Bespoke materials should only be considered where a strong case can be made as to their value in responding to the character of the space and the surrounding architecture. This will require approval by the SDRG

- Where a non-standard material has been specified, designers should be especially careful in detailing the intersection of the bespoke treatment with the standard footway materials used on the TLRN

Street furniture

- Street furniture should be kept to a minimum and equipment and signs should be combined where possible; refer to 'Footway amenities' and 'Safety and functionality' for more information
- Passenger information and bus stop signage should all be coordinated in furniture zones to minimise clutter. Consideration of adjacent frontages when siting bus infrastructure is important and will influence the layout and format of bus stop shelters. Please contact our Bus Infrastructure team and refer to 'Kerbside activity' for further information

Carriageway

- Carriageway surfacing should be carefully considered so as to ensure durability
- Containment kerbs may be required where a safety audit has identified a risk of vehicle overrun on to the footway
- Please be aware of DfT guidance on highway marking

Additional information

Transport for London:

Interchange Best Practice Guidelines, 2009

Accessible Bus Stop Design Guidance, 2015

Station Public Realm Design Guidance, 2015

14.6 Tram interchanges

Tramlink provides 28km of rapid, street level and off-carriageway services across central Croydon, from Wimbledon to New Addington, Elmers End and Beckenham Junction. Tramlink is a fully integrated public transport service and connects with numerous bus routes, seven mainline rail stations and the London Underground.

Powered by electricity, trams do not emit fumes and so provide a greener public transport solution than motor vehicles. They do however require extensive infrastructure for operation including rail tracks within the carriageway, overhead power lines and raised platforms. Any proposed extension or changes to the route should consider the visual impact on the streetscape, in particular, where possible building fixings should

Figure 306: Elmers End tram stop

be used to support the overhead. Where this is not possible special consideration should be given to the visual impact that the overhead line supports may have on the urban environment.

London Trams, a division of London Rail, is responsible for maintaining the infrastructure and the vehicles, overseeing the operations of the Tramlink network and for future enhancements to the system. We are committed to maintaining and improving the tram network by providing higher frequency services, without compromising the road network capacity.

Location

- Tram stops may be located within the street environment or off-carriageway and consist of a raised platform, ticket vending machine, Oyster reader, emergency help point, information boards and shelter and seating where space allows
- Tram routes that run within the carriageway either run in mixed traffic or within their own dedicated lanes
- Highway arrangements at on-street stops shall be designed to minimise the speed of traffic through or around the stop. The layout of on-street stops must be designed to minimise the risk of vehicles mounting the platform or hitting the platform edge

Detailed information

Platform widths should be designed to cater for the anticipated volume of pedestrian use.

- The minimum width between tramway edge and any structure should be 1,500mm
- The nominal minimum platform width will be 3,000mm for side platforms and 5,000mm for island platforms
- Side platforms with absolute minimum width of 2,000mm may be considered where pedestrian demand profiles are sufficiently low and designs agreed with London Trams on the basis of risk and value management assessments
- Along the full length of the platform, a single row of lozenge tactile paving should be used to delineate the edge with a contrasting colour
- The kerb height needs to be raised in most instances to 350mm to provide step-free access for boarding the tram

Figure 307: Tram and bus interchange at Centrale shopping centre, Croydon

- Poles to support overhead lines should be setback at least 450mm from the kerb edge. These poles should be considered for mounting other signage or street lighting to reduce clutter, while taking into account the maintenance requirements as strict access arrangements are in place due to overhead lines carrying high voltage
- Signalised pedestrian crossings across the carriageway are not generally required at each end of each platform, however, an uncontrolled crossing point should be provided where the desire lines dictate it
- The provision of a signalised crossing will be dependent on pedestrian desire lines, sightlines and vehicle flows and will be determined using risk assessment and industry guidelines/standards
- Tree plantings should be considered where possible

Additional information

Department for Transport:
Inclusive mobility – A guide to best practice on access to pedestrian and transport infrastructure, 2021

Office of Rail Regulation:
Guidance on Tramways: Railway Safety Publication 2

Transport for London:
Trams Customer Environments

14.7 London River Services interchanges

The road network and London Underground stations are often adjacent to a number of our piers, including Victoria Embankment adjacent to Blackfriars, Embankment and Westminster piers, and New Ferry Approach and Pier Road serving the Woolwich Ferry terminals.

The design of the public realm in these locations generally requires minimal alterations to standard arrangements. For most pier locations, the majority of the supporting infrastructure is provided off the highway and on the river.

Figure 308: London River Services' totem and ticket kiosk

Off highway infrastructure includes walkways, waiting rooms and boarding ramps on floating pontoons. Design guidance for these components is detailed in our London River Services: River Infrastructure Guidelines (2014).

Highway provision is generally limited to a single free-standing ticket kiosk, overhead pier signage, free-standing poster frame units and a Legible London wayfinding totem.

Ticket kiosk

- Ticket kiosks should be located in close proximity to the pier entrance on a highly visible stretch of footway, line of sight should ideally be maintained to any nearby London Underground stations, bus stops or other major interchanges
- The placement should be a minimum 450mm from the kerb edge, facing in towards the footway so as to encourage queuing away from the carriageway

Figure 309: River pier ticket kiosk

- The building should meet current building regulation requirements
- A minimum unobstructed footway width of 4,000mm should be provided at the ticket kiosk front desk
- Waiting rooms with seating are provided on some piers; however, additional seating may be provided within the footway furniture zone a minimum of 2,000mm from the kiosk, so as to ensure adequate access to the kiosk door
- Temporary queue management barriers may be erected during opening hours if required. The footway should maintain a 2,000mm unobstructed width. After hours, barriers should be stored on the pontoon

Signage

- Ticket kiosk signage should be clear and concise, to minimise the visual impact on the streetscape, while providing sufficient information for passengers
- Tamper proof vinyls and anti-graffiti overlays should be used in all exterior applications where signage is required
- Designers should refer to the bespoke treatments and approved standards in our London River Services: River Infrastructure Guidelines (2014)

Additional information

Transport for London:
London River Services: River Infrastructure Guidelines, 2014

14.8 Taxi ranks

We are responsible for the regulation of taxis and private hire vehicles (PHVs). TfL Taxi and Private Hire is responsible for appointing and revoking all taxi ranks within the London boroughs, other than those located in the City. Taxi ranks within the City of London are not under our jurisdiction, but are appointed and managed by the Commissioner of Police for the City of London.

Figure 310: Taxi rank

Designers should consider the contribution that taxis can provide at interchanges for onward travel and ensure that the placement and design of taxi ranks and set down/pick-up facilities do not impede general traffic flows while remaining convenient and accessible for passengers, particularly for those with mobility impairments. Taxi ranks are particularly important to disabled people or those who have difficulty accessing other transport modes. Taxi ranks may only be used by taxis (Hackney Carriages) and not PHVs which must be pre-booked via a licensed TfL operator. Please refer to the Taxi Ranks at Major Interchanges: Best Practice Guidelines (2003) for information on general design principles of taxi ranks.

Location

Taxi ranks should be located close to transport interchanges and major attractions such as retail areas, bars/restaurants, events, sports stadia and hotels. We can also appoint rest and refreshment ranks to provide a designated space for taxi drivers to take a short break.

Ranks should be positioned with due regard to safety, so that passengers can board from or alight on to the footway from the nearside doors of a taxi. Care needs to be taken with respect to cyclists and cycle routes.

Materials and layout

When designing a taxi rank, a length of 5,000mm per taxi is standard. The size, layout and design of the taxi rank will depend upon several factors but must be located within sightline of the venue they serve and at a suitable distance for the passenger. Please refer to Taxi Ranks at Major Interchanges: Best Practice Guidelines (2003) for further information.

- Taxi ranks should be clearly signed and marked according to the TSRGD manual. Set down and pick up areas should have a minimum kerb height of 140mm to allow easier access for those with mobility impairments and luggage
- Footways adjacent to the taxi rank should have an unobstructed minimum width of 2,000mm for alighting and boarding; sufficient for wheelchairs to manoeuvre and to accommodate access ramps and an additional 1,500mm for pedestrians to bypass the rank
- A formal pedestrian crossing with a dropped kerb or raised table should be located near to the taxi rank to allow for convenient, safe access and to discourage informal crossing in-between taxis. However, taxi ranks should not be on the opposite side of the road to the venue they serve forcing passengers to cross the road before being able to access a taxi
- Seating and shelter should be positioned nearby where space allows

Figure 311: Taxi set down and pick up areas should have a minimum kerb height of 140mm

Road markings and regulations

- Taxi ranks are bays marked with 50mm-wide yellow broken lines on the edge or centre of the carriageway surface and signed in accordance with the TSRGD
- Only licensed taxis are permitted to stop in the areas bounded by the road markings
- For all TfL-appointed taxi ranks on the public highway, a taxi rank order must be completed and this is undertaken by TfL Taxi and Private Hire. If the taxi rank is on the public highway then a Traffic Management Order should also be completed to ensure it can be enforced and this will be carried out by the highway authority

Consultation

TfL Taxi and Private Hire must be consulted in all projects involving taxi ranks to advise on location, design and layout.

Additional information

Statutory instruments:

Traffic Signs Regulations and General Directions, 2002 and 2015

Department for Transport:

Inclusive mobility – A guide to best practice on access to pedestrian and transport infrastructure, 2021

Transport for London:

Taxi Ranks at Major Interchanges: Best Practice Guidelines, 2003

Transport for London appointed taxi ranks, 2014

14.9 Cycle parking hubs

This guidance should be read in conjunction with the London Cycling Design Standards, 2014: Chapter 8.5 – Cycle parking to support different uses. It provides guidance specifically for cycle hubs adjoining the TLRN.

Cycle parking hubs are designed to provide a large number of secure cycle parking spaces in areas of highest demand, while also offering a range of related facilities which may include cycle maintenance, secure long-stay parking and cycle hire.

Hubs are most often located near rail stations but may also be considered for major trip attractors such as shopping centres or landmark buildings. Reliable cycle parking facilities and hubs at stations will become an increasingly important way of supporting cycling as a viable interchange mode for onward travel.

The installation of large cycle parking facilities at stations may be complicated by land ownership and commercial relations. Local authorities are encouraged to work in partnership with landowners and ourselves to provide facilities that can accommodate and support the anticipated future growth in cycling.

Figure 312: Ealing Broadway cycle hub

(Image courtesy of H-B Designs Ltd)

Location

- Where the TLRN adjoins a station forecourt, a cycle parking hub may be considered within the road network boundary, as long as complementary measures are put in place to maintain appropriate unobstructed footway widths. This may include footway widening or decluttering of other street furniture
- As a minimum, footway widths of 3,000mm should be provided adjacent to hubs, to allow for a waiting cyclist to gain access to a facility without blocking the full width of the footway
- Cycle hubs should be located within convenient access of the station entrance, no more than 200 metres away, so that cyclists are less inclined to fly park closer to the entrance
- The location should ensure high levels of natural surveillance, supported by CCTV coverage

Design considerations

- Any new structure should aim to accommodate current summer demand for cycle parking and provide an additional 20 per cent of space where practicable
- The placement should not obstruct existing pedestrian desire lines or create unnecessary conflict between pedestrians and cyclists crossing the footway to access the hub. It may be appropriate to provide a shared use area around the hub, with dropped kerbs to allow for safer, more comfortable cycle access
- For any secured facility, designers should carefully consider the management regime, staffing requirements, tariff rates, and access arrangements, so as to maintain a viable and efficient facility

Detailed Information

- Parking stands should provide two lockable points, so the frame and both wheels of the cycle can be securely fixed, as detailed in 'Cycle parking'
- Gated compounds should allow for 24-hour access
- Any covered structure should ensure a minimum head clearance of 2,400mm. This might be an opportunity to create a structure that responds to its context, and act as a beacon or icon
- Roofs should be sloped so as to reduce the accumulation of debris and discourage antisocial behaviour
- Cycle hub surface materials should respond to the local context. The use of setts should be avoided in favour of 900x600mm slabs or asphalt
- Street furniture must be kept to a minimum to allow for regular and numerous pedestrian and cycle movements (refer to London Cycling Design Standards, 2014)
- Where the cycle hub is located on the footway dropped kerbs should be provided and shared use areas should be considered

Additional information

Transport for London:

London Cycling Design Standards, 2014: Chapter 8 – Cycle parking

Part F Appendix

15.1 List of references

Transport for London:

Accessible Bus Stop Design Guidance, 2015

Bus pre-signal assessment and design guidance – Bus Priority Team technical note BP1/05, July 2005

Bus priority at traffic signals keeps London's buses moving – Selective Vehicle Detection (SVD), 2006

Centreline removal trial, 2014

Cycle Security Plan, 2010

Design Standards for Signal Schemes in London, 2011

Green Estate Management Plan

Guidance on bus intelligence systems, 'Countdown for London'

Guidance on the Assessment of Pedestrian Guardrail, 2012

Highway Licensing and Other Consents, 2011: https://www.tfl.gov.uk/info-for/urban-planning-and-construction/highway-licences

Interchange Best Practice Guidelines, 2009

International Cycle Infrastructure Best Practice Study, 2014

Kerbside loading guidance, 2009

Legible London Design Standards, 2010

London Cycling Design Standards, 2014

London Cycle Hire Scheme Agreement, 2009

London River Services: River Infrastructure Guidelines, 2014

London Underground Station Design Idiom, 2015

London Underground Signs manual, Issue 4, 2002

Network Operating Strategy, 2011

Motorcycle Safety Action Plan, 2014

Pedestrian Comfort Guidance for London, 2010

Station Public Realm Design Guidance, 2015

Surface Transport Panel – Subways, 2009

Traffic calming measures for bus routes – Bus Priority Team technical note BP2/05, September 2005

Transport for London appointed taxi ranks, 2014

Travel in London, Supplementary Report: London Travel Demand Survey, 2011

Taxi Ranks at Major Interchanges: Best Practice Guidelines, 2003

British Standards:

BS EN 40: Lighting columns

BS EN 124: Gully tops and manhole tops for vehicular and pedestrian areas

BS EN 1340:2003 Concrete kerbs

BS EN 1341: Provides guidance on the breaking load for setts

BS EN 1343:2012 Kerbs of natural stone

BS EN 1871: For directly laid materials

BS EN 13108: Bituminous mixtures. Material specifications (BSI, 2010)

BS EN 12899-2: Fixed, vertical road traffic signs. Transilluminated traffic bollards (TTB), 2007

BS EN 13201: Road lighting

BS EN 60598: Luminaires

BS EN 62722: Luminaire performance

BS 4428: Code of practice for general landscape operations

BS 5489: Code of practice for the design of road lighting

BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations (BSI)

BS 7430: Code of practice for protective earthing of electrical installations

BS 7533-6:1999: Pavements constructed with clay, natural stone or concrete pavers

BS 7533: Part 12 provides sub-structure advice for pedestrian areas

BS 7669-3: Guide to the installation, inspection and repair of safety fences

BS 7671: Requirements for Electrical Installations

BS 7903: Guide to selection and use of gully tops and manhole covers for installation within the highway

BS 8301: Drainage

BS 594987: Recommendations for the laying of the various asphalts

PD 6547: Guidance on the use of BS EN 40-3-1 and BS EN 40-3-3

Publicly Available Specifications (PAS) 68 and 69, 2005

Commission for Architecture and the Built Environment (CABE):

Paving the way: How we achieve clean, safe and attractive streets, 2002

Health and Safety Executive:

Avoiding danger from overhead power lines

Avoiding danger from underground services

Risks associated with working on or near lamp columns with non-standard roots during excavation works, 2010

Department for Communities and Local Government:

Outdoor advertisements and signs: a guide for advertisers, 2007

Department of Energy & Climate Change:

CRC Energy Efficiency Scheme (Amendment) Order, 2014

Department for Environment Food & Rural Affairs:

Local Air Quality Management: Technical Guidance, 2009

National Standards for sustainable drainage systems, 2011

Department for Transport:

Delivering the goods: Guidance on delivery restrictions, 2006

Design Guide 003 Note: Tactile Paving

Design Manual for Roads and Bridges, Volume 2 – Highway Structures: Design (Substructures & Special Substructures) Materials

Design Manual for Roads and Bridges: Volume 2, Section 2, Part 4, TD19/85: Safety Fences and Barriers

Design Manual for Roads and Bridges: Volume 2, Section 2, Part 8, TD19/06: Requirement for Road Restraint Systems

Design Manual for Roads and Bridges: Volume 4 – Geotechnics and Drainage

Design Manual for Roads and Bridges, Volume 6, Section 3, TD36/93: Subways for Pedestrians and Pedal Cyclists. Layout and Dimensions

Design Manual for Roads and Bridges, Volume 8, Section 1, TA 84/06: Code of Practice for Traffic Control and Information Systems for All-Purpose Roads

Design Manual for Roads and Bridges, Volume 8, Section 2, Part 2, TD 33/05: The Use of Variable Message Signs on All-Purpose and Motorway Trunk Roads

Inclusive mobility – A guide to best practice on access to pedestrian and transport infrastructure, 2021

Local Transport Note (LTN 1/94): Design and Use of Directional Informatory Signs

Local Transport Note (LTN 1/95): The Assessment of Pedestrian Crossings, 1995

Local Transport Note (LTN 2/95): The Design of Pedestrian Crossings, 1995

Local Transport Note (LTN 1/97): Keeping Buses Moving

Local Transport Note (LTN 1/98): The Installation of Traffic Signals and Associated Equipment

Local Transport Note (LTN 2/09): Pedestrian Guardrailing, 2009

Manual of Contract Documents for Highway Works, Volume 1, Series 400: Road Restraint Systems (Vehicle and Pedestrian)

Manual for Streets, 2007

Guidance on the use of Tactile Paving Surfaces, 2021

Traffic Advisory Leaflet 01/13 (2013): Reducing Sign Clutter

Traffic Advisory Leaflet 2/02: Motorcycle Parking

Traffic Advisory Leaflet 03/13: Traffic bollards and low level traffic signs

Traffic Advisory Leaflet 5/02: Key elements of cycle parking provision

Traffic Advisory Leaflet 5/91: Audible and tactile signal controlled junctions, 1991

Traffic Signs Manual 1982 and 2013

Security in Design of Stations (SIDOS) Guide, 2012

Signing the Way 2011: Traffic Signs Policy Paper

Disabled Persons Transport Advisory Committee:

Inclusive projects, 2003

ELEXON:

Charge codes and switch regimes: https://www.elexon.co.uk/reference/technical-operations/unmetered-supplies/charge-codes-and-switch-regimes/

English Heritage:

Streets for All, 2005

Forestry Commission

Right Trees for a Changing Climate: (www.righttrees4cc.org.uk)

Greater London Authority:

All London Green Grid SPG, 2012

Greenspace Information for Greater London (GiGL) (www.gigl.gov.uk)

Pocket Parks Programme:

http://www.london.gov.uk/priorities/environment/greening-london/improving-londons-parks-green-spaces/pocket-parks

Pocket Parks Prospectus: http://www.london.gov.uk/sites/default/files/Pocket%20Parks%20Prospectus_1.pdf

The Mayor's Climate Change Mitigation and Energy Strategy, 2011

The Mayor's Transport Strategy, 2010

The GLA Group Responsible Procurement Policy, 2008

The London Plan, 2011

Retail in London, 2006

Highways Agency (HA):

Design Manual for Roads and Bridges (DMRB): Volume 10, Environmental Design and Management, HA, Section 3: Landscape Management

DMRB: Volume 10, Environmental Design and Management, HA, Section 0, Part 2: Environmental Functions

DMRB: Volume 10, Environmental Design and Management, HA, Section 0, Part 3: Landscape Elements

Inclusive Design for Getting Outdoors (I'DGO):

www.idgo.ac.uk

Institution of Lighting Professionals:

All lighting on the TLRN should meet the requirements of industry-recognised codes of best and/or safe practice such as those recommended by the Institution of Lighting Professionals' Technical Reports and Guidance Notes including but not exclusively: Guidance Notes for the Reduction of Obtrusive Light

Bats and Lighting in the UK

Code of Practice for Electrical Safety in Highway Electrical Operations

Code of Practice for Variable Lighting Levels for Highways

Guidance Notes for the Reduction of Obtrusive Light GN01, 2011

Managing a Vital Asset: Lighting Supports

International Commission on Illumination:

CIE 115: Lighting of Roads for Motor and Pedestrian Traffic, 2010

Joint Mobility Unit:

Sign Design Guide, 2000

Legislation:

Climate Change Act 2008

Construction Design and Management Regulations 2007

Greater London Authority Act 1999

Health and Safety at Work Act 1974

Highway Authorities, Highways Act 1980

Guidance on the application of powers under Section 115, Highways Act 1980

Highways Act 1980, Section 132

Highways (Road Humps) Regulations 1999

London Local Authorities and Transport for London Act 2003

New Roads and Streetworks Act 1991

Equality Act 2010

Section 63 of the Road Traffic Regulation Act 1984 as amended by the Transport Act 2000 (Section 75)

Section 64, London Passenger Transport Act 1937

Section 32 or 45 of the Road Traffic Regulation Act 1984

Section 104 of the London Passenger Transport Act 1934

Town and Country Planning Act 1990 and The Town and Country Planning (Control of Advertisements) (England) Regulations 2007

The Electricity at Work Regulations 1989

Traffic Calming Act 1992

Traffic Signs Regulations and General Directions (TSRGD)

London Transport Users Committee:

Where am I? Street name signs in London, 2003

London Tree Officers Association:

Surface materials around trees in hard landscapes

Sustainable Water Management: Trees are part of the solution

National Joint Utilities Group:

NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees, 2007

NJUG Guidelines on the Positioning and Colour Coding of Underground Utilities' Apparatus, 2007

Construction Industry Research and Information Association (CIRIA):

The SuDS Manual (C697)

Motorcycle Action Group:

A Guide to the Design and Provision of Secure Parking for Motorcycles, 2002

Office of Rail Regulation:

Guidance on Tramways: Railway Safety Publication 2

Sewers for Adoption:

(7th edition)

Susdrain:

(www.susdrain.org/)

Trees and Design Action Group:

Trees in Hard Landscapes: A Guide for Delivery, 2014

Transport Research Laboratory (TRL):

CSS SL1 – Review of the class and quality of street lighting, 2008

Footways and cycle route design, construction and maintenance guide

New York City, Department of Transportation:

Street Design Manual, 2013

Infrastructure Commission:

World class infrastructure for a world city, 2010

University College London:

Effective Kerb Heights for Blind and Partially Sighted People, Accessibility Research Group, UCL, 2009

UK Roads Liaison Group:

Well-maintained Highways – Code of Practice for Highway Maintenance Management, 2013

WRc Group (Water Research Centre)

Sewers for Adoption (7th edition), 2013

15.2 List of revisions

Revision number	Content	Date	Author	Reviewed by	Approved by
2016 Revision 1	Text and content corrections throughout Update to 2.4 Street Types for London Update to tramline and ladder paving policy on page 139	January 2016	Shannon Rice, Streetscape Manager	Matthew Wilson, Highways Manager – Sponsor	Dana Skelley, Director of Asset Management
2017 Revision 1	Text and content corrections throughout Update to Part A – A vision for London's Streets Update to seating/bench policy Update to vehicle crossovers	May 2017	Shannon Rice, Streetscape Manager	Matthew Wilson, Highways Manager – Sponsor	Dana Skelley, Director of Asset Management
2019 Revision 1	Text and content corrections throughout Update to 10.5 Electric vehicle charging points on page 188	March 2019	Jon Hodges – Streetscape Design Manager	Martin McMahon – Asset Management Strategy Lead	Garry Sterritt – Head of Asset Investment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