



City Public Realm Toolkit

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INTRODUCTION

History has left an indelible mark on the City's public realm, composed as a rich tapestry of ancient meandering highways, intimate lanes and alleyways, cherished open spaces and hidden gardens and churchyards. These streets and spaces form the constant backdrop to city life and the ever-changing urban fabric. Since Roman times, they have provided a genuinely public place of trade, residence and ceremony. Today, this varied and dense urban realm provides an array of interconnected routes and opportunities for interaction, commerce and cultural expression.

The furnishing of the public realm, from its paved surfaces to its distinctive furniture livery to the provision of statuesque trees and green spaces, presents a harmonious and identifiable treatment extending throughout the City, reflecting its unique and intrinsic character. This Toolkit seeks to build upon the recent and ongoing public realm enhancement projects and ensure the City's public realm continues to present a safe, inclusive and welcoming sense of place, respectful of ancient heritage and befitting a rapidly evolving world-class city.



City of London extents



6 Bartholomew Close

ABOUT THIS TOOLKIT

The purpose of the document is to provide a coordinated approach to the design and management of the public realm in the City.

The Toolkit promotes high quality design and sets the standards for public realm features that contribute to the experience of using the City's streets, public spaces and private but publicly accessible spaces. It provides advice for professionals and officers with a role to play in the design, construction and management of the City's streets and spaces.

By applying the Toolkit, we will:

- Ensure that the City's public realm adapts to the challenges that face high density urban environments, including creating a high quality, accessible and resilient streetscape for people walking and wheeling, that enables people to choose to cycle and that contributes to climate change mitigation strategies.
- Protect, maintain and enhance the quality of the City's built environment in order to make it an inclusive and attractive place in which to live, work and visit.
- Support the City's position as a leading business and leisure destination, continually improving the street environment in order to accommodate future growth and activation.
- Support delivery of the City Corporation's Transport Strategy, Climate Action Strategy, Destination City initiative and Sport's Strategy.

1

SURFACE MATERIALS

- Considerations for material selection
- Principles for streetscape composition
- York stone paving
- Granite setts
- Bespoke paving alternatives
- Resin bound surfacing
- Asphalt
- Kerbs
- Kerb upstands
- Dropped kerbs
- Loading bays
- Courtesy crossings
- Hazard warning paving
- Inspection covers
- Drainage furniture
- Road markings
- Historic lanes

A connected, inclusive and intuitive pedestrian experience is key to the ongoing success of the City's public realm. There are three principal surface materials used to furnish the streets and spaces within the City - York stone, granite and asphalt.

This section on surface materials outlines the various unit sizes, material finishes and composition of such materials and how they are combined to ensure a distinctive and lasting ground plane is established for the City now and into the future.

A set of guiding principles for surface materials are outlined, supported by illustrative material composition studies. These represent the standard details and layouts expected within the City's public realm.





10 Widgate Street

SURFACE MATERIALS

1

SURFACE MATERIALS

CONSIDERATIONS FOR MATERIAL SELECTION

The distinctive quality surfacing to the City's streets and spaces greatly aids in the reinforcement of the City's identity. Given the extent of the public realm and the need for longevity demanded by intense footfall, it is vital that the correct materials are sourced to ensure their lasting contribution. The following considerations are outlined below as key to successful material use and selection:

<p>ETHICAL SOURCING</p>	<p>The ethical sourcing of natural and manmade materials used to furnish the streets is a pre-requisite of responsible material selection. Transparency in the material supply chain is required as well as adherence to Ethical Trading Initiative (ETI) to ensure comfort and compliance with procurement processes</p>
<p>CLIMATE RESILIENCE</p>	<p>The colour and heat absorption/reflectivity of paved surfaces can greatly affect the comfort within outdoor spaces and can impact on surrounding local microclimate. Materials should aim for a reduction in heat storage and reflection, permeability of paved surfaces should also be considered.</p>
<p>MATERIAL PROPERTIES</p>	<p>Robust material properties such as density, durability, light reflectivity, wet slip resistance and water absorption all affect the longevity and character of surface materials. It is essential that surface material thickness is measured against function and buildup to ensure lasting value is achieved.</p>
<p>MAINTENANCE & CLEANING</p>	<p>Cleaning regimes can impact material properties and performance over time. It is important that materials can cope with regular and occasionally intense cleansing and that joints and bedding remain intact to protect the integration of the surface cover.</p>
<p>EMBODIED CARBON & VALUE FOR MONEY</p>	<p>The use of materials when applied at scale across the City has both the potential for significant carbon footprint yet may also provide an opportunity to reduce embodied carbon that will deliver real impact at scale. Material selection and use should consider comparative embodied CO2 data and impact against budget and requirement of place. Novel materials may be trialled in pilot schemes to assess suitability.</p>
<p>CIRCULAR ECONOMY</p>	<p>Opportunities for reuse of existing materials should always be explored as part of the circular economy principles</p>

SURFACE MATERIALS



PRINCIPLES OF STREETScape COMPOSITION

Surface treatments to streets and spaces within the City are to be informed by the following key principles as illustrated

- 1 Primary street paving runs through.
- 2 Paving is laid perpendicular to the kerb line not building line.
- 3 Raised tables provide courtesy crossings.
- 4 Dropped kerbs at regular crossing points along desire lines.
- 5 Integrated loading bays to maximise pavement widths.
- 6 Surface paving grain and kerb width may be reduced on narrow streets and alleyways.
- 7 General drainage crossfall of 1 in 40 to be observed.
- 8 Mastic infill may be needed against building edges to avoid gap formation with adjacent surface material.





SURFACE MATERIALS

York stone paving

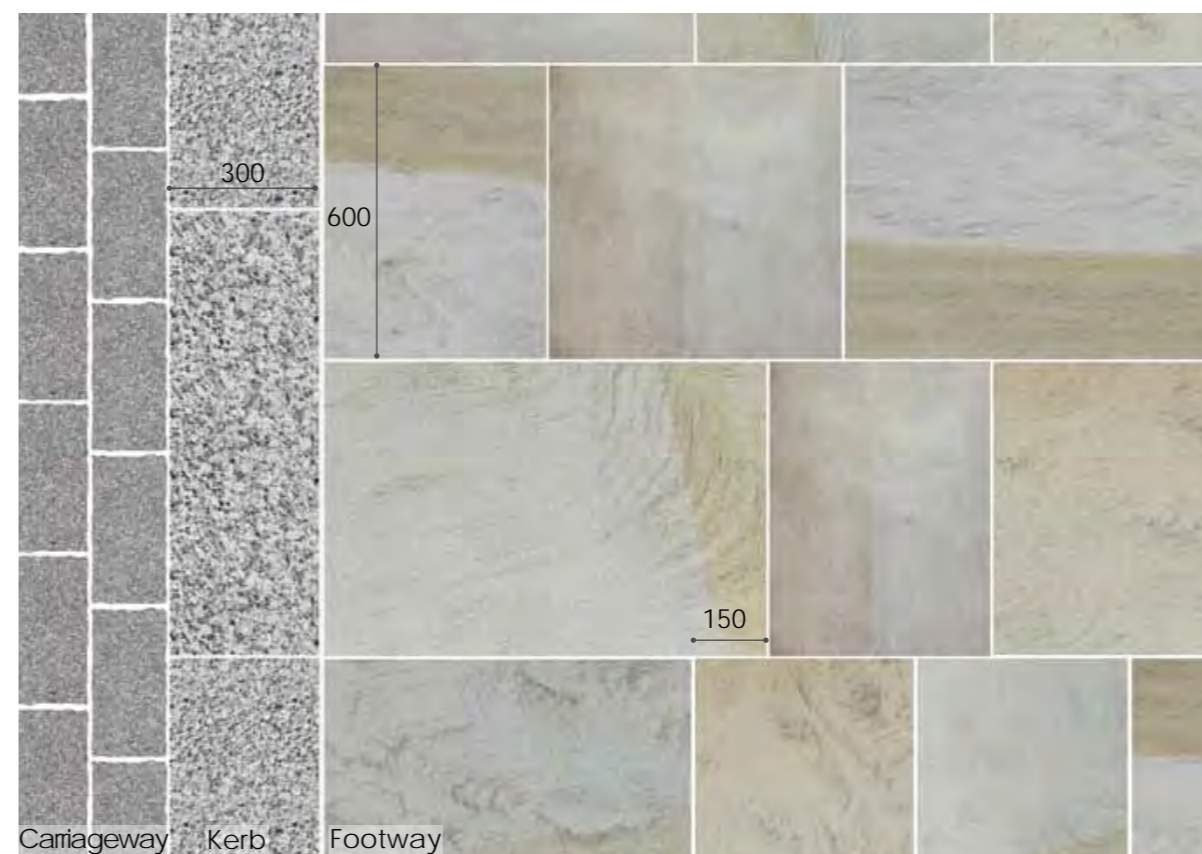


Standard Footway paving

The standard module of York stone paving to be used on the City footways is 600mm wide, cut in random lengths and 50 or 63mm thick with a diamond sawn finish. This paving is to be laid in a random course running perpendicular from the kerb line to the building.

Key Criteria

Material	Scoutmoor
Appearance	Diamond sawn all sides
Unit Sizes	600mm width x varying length x 63/50 mm deep
Jointing	6 mm
Sealant	surface sealant to be applied



York stone paving

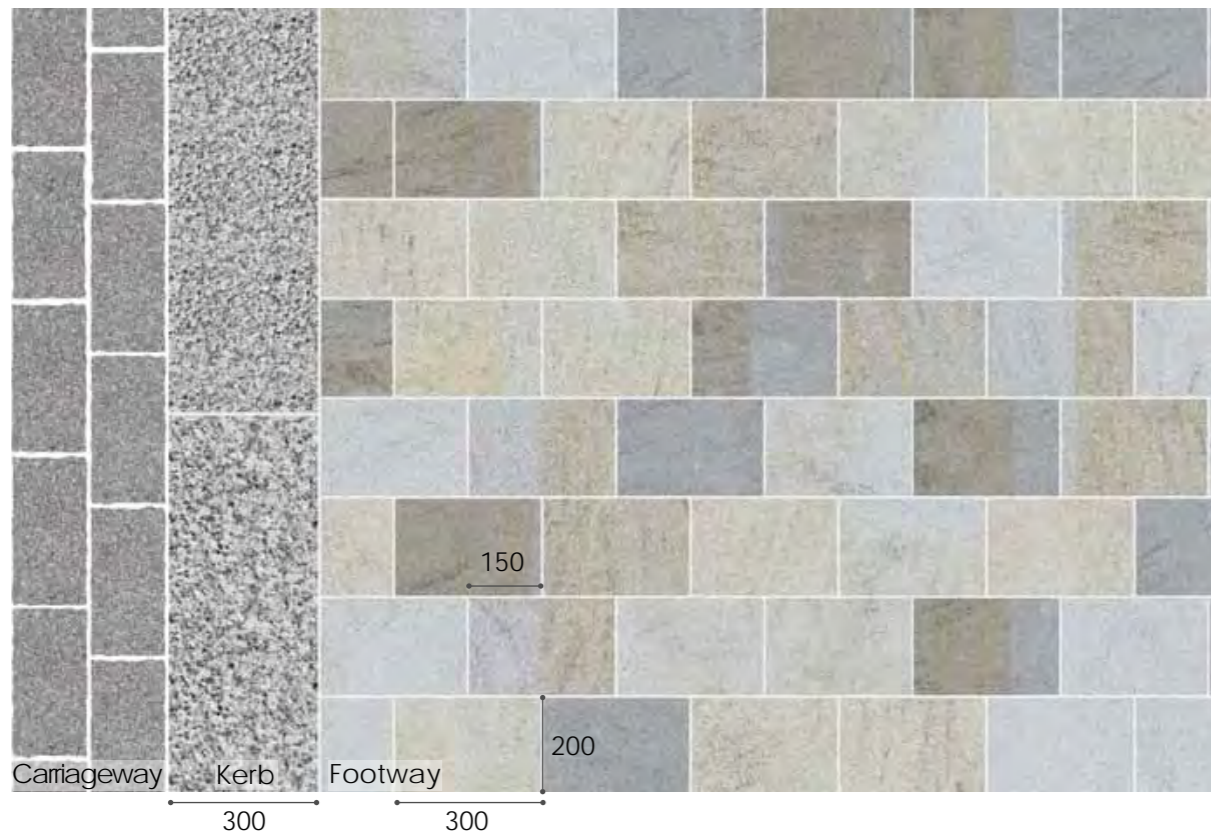


York stone Setts

Smaller unit York stone paving is to be laid only in narrow footways (less than 1500mm wide) where heavy vehicles often mount the footway or in central pedestrian island crossings where paved space is at a premium. Alternate sett proportions of 150 x 300mm may be considered in consultation with the Environment Department.

Key Criteria

Material	Scoutmoor
Appearance	Diamond sawn all sides
Unit Sizes	200 x 300 x 63/50 mm
Laying pattern	Half-lap(staggered)
Jointing	6 mm
Sealant	surface sealant to be applied



York stone paving

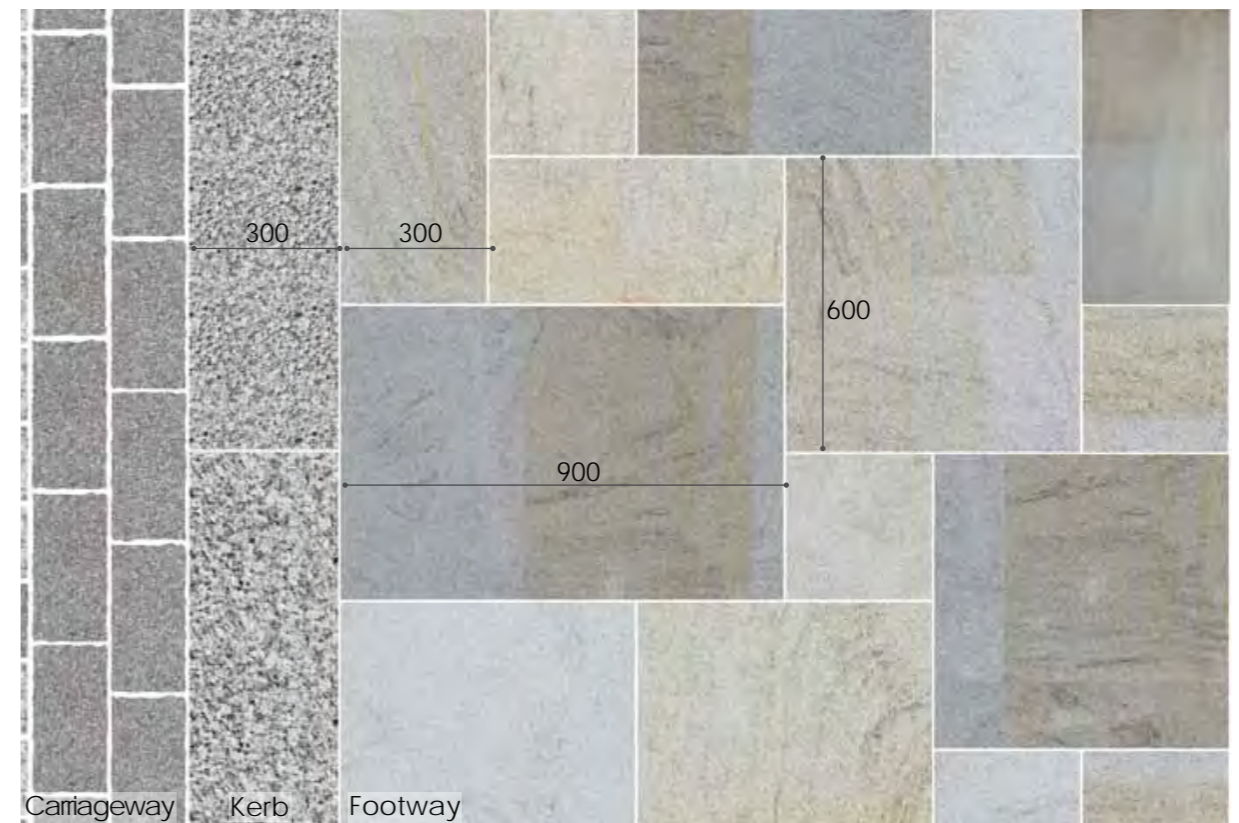


Manchester bond

The use of the more intricate and tessellating Manchester bond may only be considered in special or unique heritage circumstances with agreement from the Environment Department and may include historic streetscapes, landscaped areas or in smaller spaces that are irregular in shape .

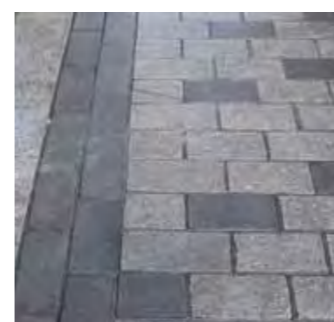
Key Criteria

Material	Scoutmoor
Appearance	Diamond sawn all sides
Unit Sizes	300x300 / 300x600 / 600x600 / 600x900 x 63/50 mm deep
Jointing	6 mm
Sealant	surface sealant to be applied



SURFACE MATERIALS

Granite Setts

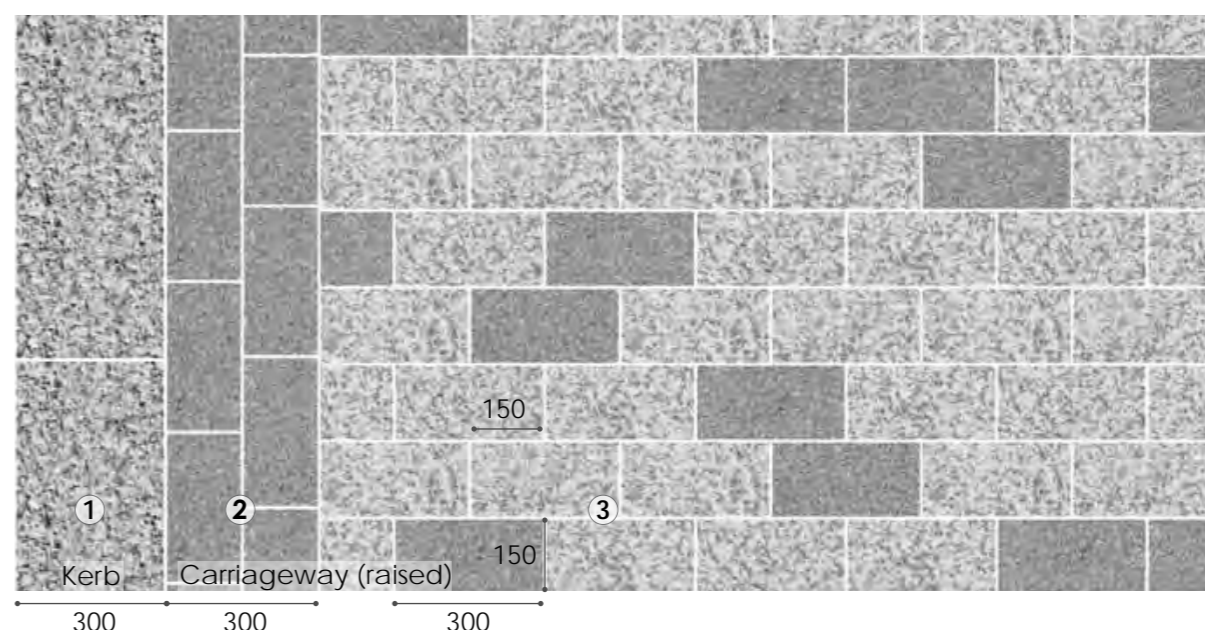
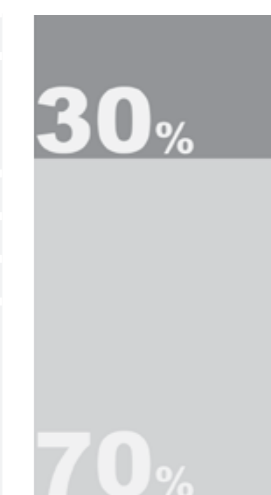


2 Colour mix

Granite setts are to be laid as carriageway surfacing in historic streetscapes where appropriate and for courtesy crossings. The two colour mix of light and mid grey granite is to be laid in a random pattern, with a double mid grey channel against all kerb edges.

Key Criteria

Material	Granite
Appearance	Flamed top surface Diamond sawn all sides
Unit Sizes	300 x 150 x 100/150 mm thick
Jointing	6-8 mm wide, 3mm recessed
Colour	30 % mid-grey / 70% silver grey
Illustrative plan	<ul style="list-style-type: none"> ① Silver Grey Granite Kerb ② Double Mid Grey channel (300 x 150mm) ③ 2 Colour Granite sett mix (300 x 150mm)



Granite Setts

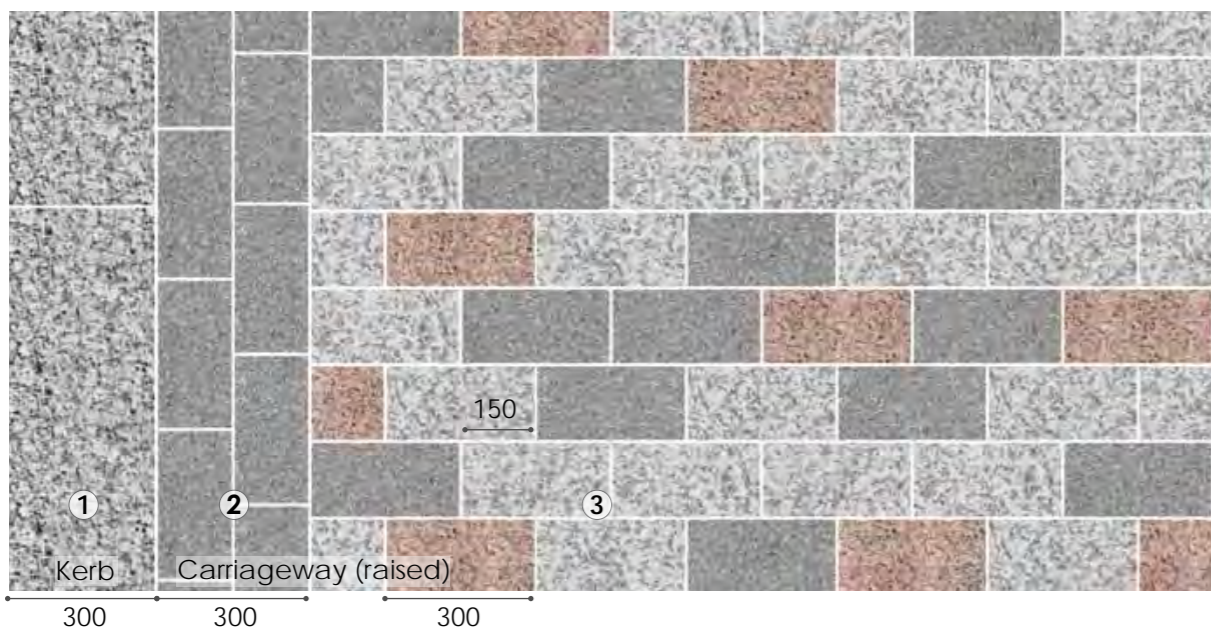
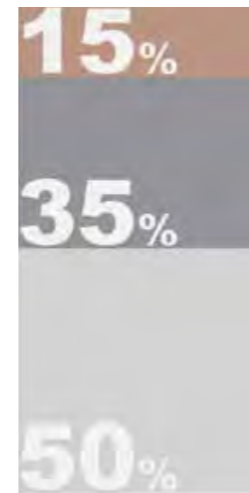


3 Colour mix

The three colour granite mix introduces a pink toned granite to accompany the light and mid grey colours and is to be used in historic settings including conservation areas. To be laid in a random pattern, with a double mid grey channel against all kerb edges.

Key Criteria

Material	Granite
Appearance	Flamed top surface Diamond sawn all sides
Unit Sizes	300 x 150 x 100/150 mm thick
Jointing	6-8 mm wide, 3mm recessed
Colour	15% pink 35% mid-grey 50% silver grey
Illustrative plan	<ol style="list-style-type: none"> ① Silver Grey Granite Kerb ② Double Mid Grey channel (300 x 150mm) ③ 3 Colour Granite sett mix (300 x 150mm)



Bespoke paving alternatives

Certain spaces within the City offer the chance for greater and more distinctive treatments, building upon and extending the rich history of change. In such instances, there may be exceptional opportunities to vary the baseline guidance on material selection and introduce more tailored and bespoke design solutions extending the sense of quality place making within the City. Considerations may include deviations in size and proportion from the normal York stone palette or selection of harder wearing granite paving to cater for envisaged activities. All bespoke paving alternatives must maintain a consistency, continuity, quality and character associated with City of London. Such exceptional circumstances are to be discussed with the Environment Department. The use of flexible, soft rubber crumb or similar materials will also be considered as a paving alternative at appropriate locations to enable play and exercise.



Resin bound surfacing



Resin bound gravel surfacing provides an alternative surface to be used in public spaces and locations with occasional vehicle overrun. The use of bound aggregates ranging from 2-6mm creates a simple, expansive surface which, with appropriate subbase, can create a permeable surface to passively drain surface water as part of a strategic SUDs approach. Localised channels or trims of porous resin bound surfacing may also act as discrete linear drainage channels.

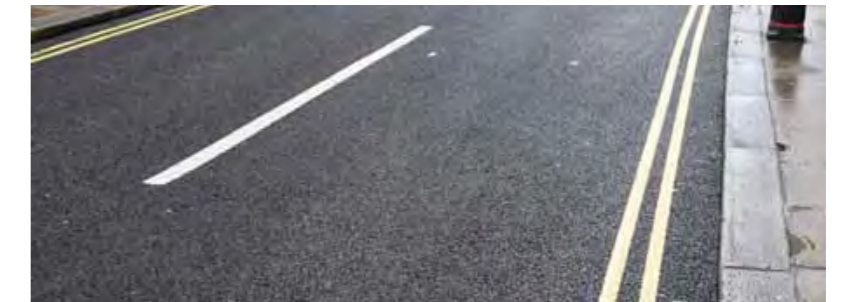
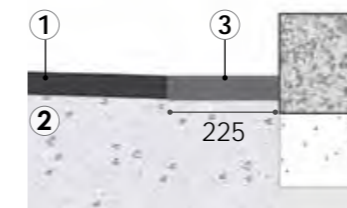
Key Criteria	Asphalt Footway
Surface course	① Resinbound gravel surfacing
Surface thickness	18-24 mm thick
Base	② Subbase varies according to pedestrian or vehicular function to include: Porous asphalt AC20 (for permeable paving) over MOT Type 3



Asphalt

Asphalt is used as the principal carriageway surfacing material throughout the City. It is also used along footways as an alternative surface to York stone. The City of London Highways department should be consulted over its use and full specification with particular consideration given to the management and disturbance caused by service utilities disruption and repair.

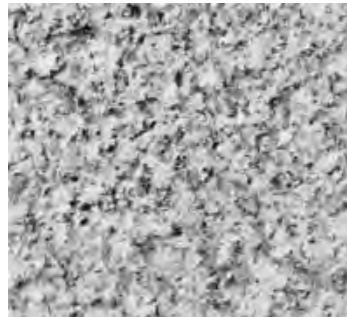
Key Criteria	Asphalt Carriageway
Surface course	① Hot Rolled Asphalt with 0-10 mm chippings or high stone content
Surface thickness	50 mm thick
Base	② 300 mm thick concrete base to Highways standard
Mastic channel	③ 225 mm wide 50mm thick mastic asphalt channel beside kerb



Key Criteria	Asphalt Footway
Surface course	④ Mastic Asphalt
Surface thickness	25 mm thick (minimum)
Base	⑤ 100 mm thick concrete base to Highways standard



Kerbs

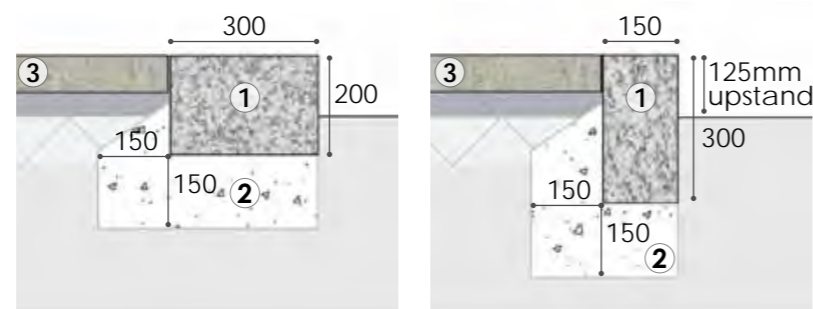


Silver grey granite is to be used for all kerb edges. Kerb width is dependent upon the overall scale of the street but 300mm wide kerb is the predominant width for newly installed kerbs. A narrower 150mm wide kerb may be used for narrow lanes and alleyways as well as for courtesy crossings.

Additionally, narrow York stone edging kerbs (50 x 225mm) may be placed at the rear of footpaths or planted areas to provide a flush transition. These edge kerbs may also be used to mark a change in York stone paving direction.

Key Criteria

Kerb type	Wide kerb	Narrow kerb
Material	Granite	Granite
Colour	Silver grey	Silver grey
Appearance	Flamed finish front and top face, sawn all sides	Flamed finish front and top face, sawn all sides
Dimensions	300 x 200 x 900 mm Straight lengths / radial units	150 x 300 x 900 mm Straight lengths / radial units



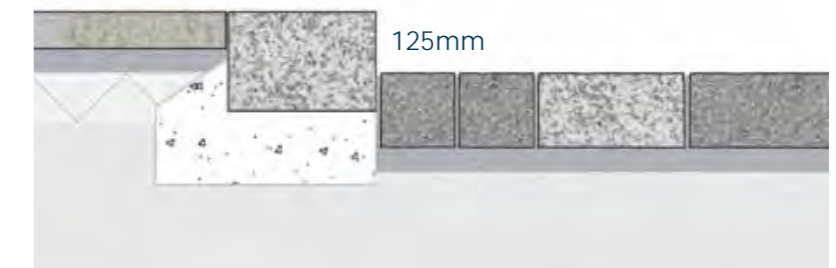
- ① Granite Kerb
- ② Concrete bed & haunch
- ③ Adjacent footway



Kerb upstands

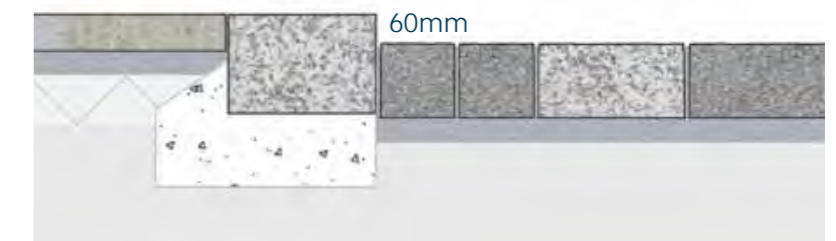
Whilst a standard 125mm kerb upstand is most common within the City's streetscapes, there are instances in pedestrian priority or historic settings where a lesser or no kerb upstand may be considered. Any reduced kerb height will be subject to inclusive design assessment and appropriate detailing undertaken as part of the City's Access and Inclusivity assessment tool CoLSAT (City of London Streets Accessibility Tool).

Standard raised kerb



60mm raised kerb

A reduced kerb of 60mm may be considered in pedestrian priority schemes or where highway movement are considered low.



Raised Carriageway

Flush kerb arrangements may be considered in fully pedestrian priority schemes, to aid surface drainage and to retain historic kerb alignments.

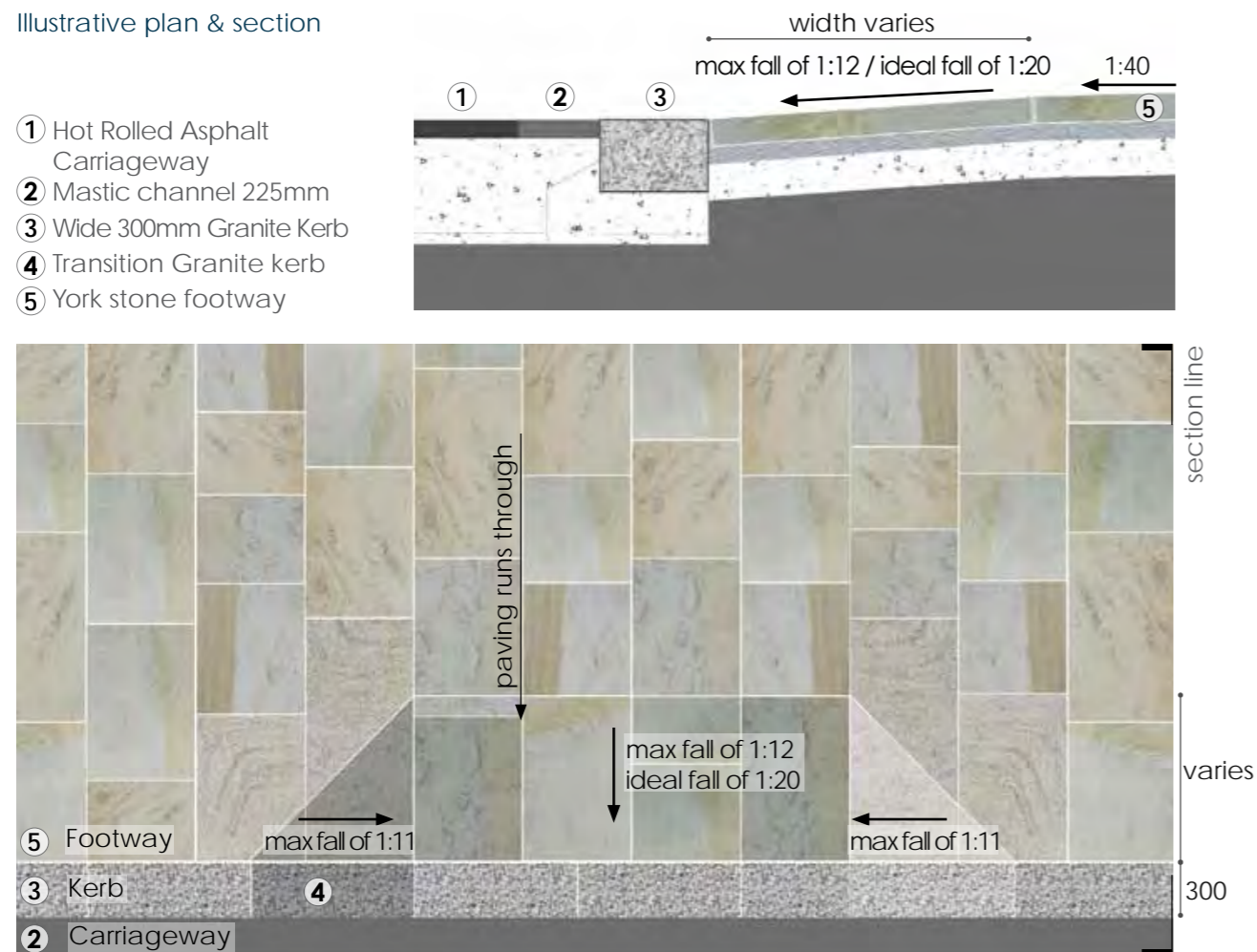


Dropped kerbs



Dropped kerbs, whereby the pedestrian footway is lowered to meet adjacent carriageway, may be used at both controlled crossings and informal, uncontrolled crossings along pedestrian desire lines where raised tables are not feasible. The creation of accessible gradients to the sloped surface should be constructed as a continuation of the surrounding pavement materials, establishing a seamless integration and maintaining pavement continuity. The dropped kerb is generally to be laid flush with carriageway surfacing, with a maximum upstand of 15mm permissible.

Illustrative plan & section



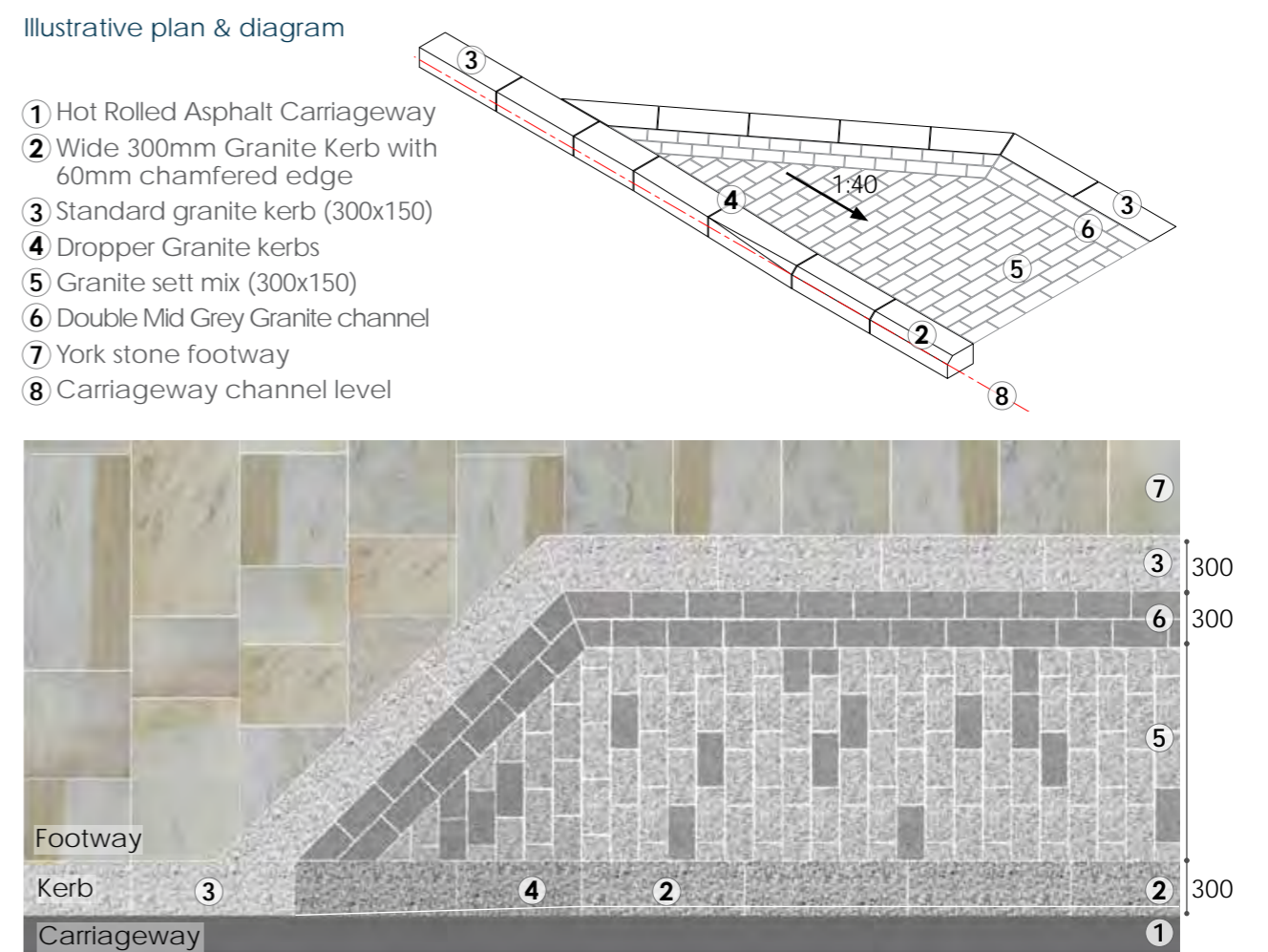
Loading bays



Loading bays incorporated into the pedestrian footway provide a defined area for the delivery of goods, where streetside loading and unloading is necessary. The location, capacity and management of such bays are subject to the Corporation Transportation Team's approval.

Loading bays are to be constructed of granite setts running perpendicular to the kerbline and sloped towards the carriageway held by a 60mm roadside chamfered kerb upstand. When not occupied by delivery vehicles, inset loading bays can provide a step free continuous pavement to accommodate pedestrian flow at peak times. The inclusion of bollards for vehicle control should be considered.

Illustrative plan & diagram



Courtesy crossings



Pedestrian priority over vehicles should be extended through the introduction of raised courtesy crossings where appropriate. Easily negotiable street crossing points consisting of a raised area of carriageway between footways effectively makes the footway continuous and can significantly enhance the walking experience. People should be able to cross streets frequently and in a direct, inclusive and uncomplicated manner.

Granite setts and asphalt surfacing are the principal materials to be used for courtesy crossings within the City. On occasion small unit York stone setts have also been used.



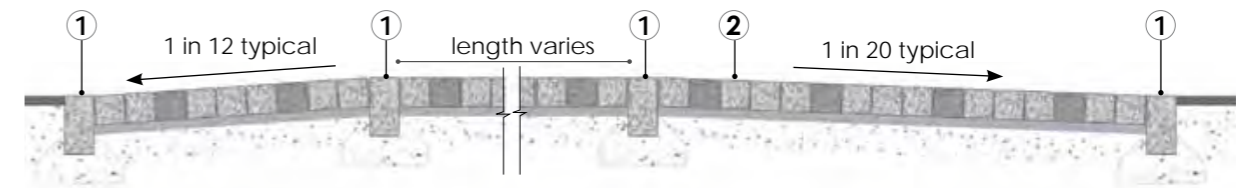
Granite setted courtesy crossing

Courtesy crossings

- ① Narrow flush granite 150mm Granite kerb
- ② Granite sett mix (300x150)
- ③ Double Mid Grey Granite channel
- ④ York stone blister tactile slabs
- ⑤ York stone footway

Raised crossings must provide appropriate tactile hazard warning paving in the form of blister paving slabs on approach. Granite setted courtesy crossings maintain the double mid grey channel beside kerbs, with standard narrow granite kerbs at the top and bottom of the sloped gradient.

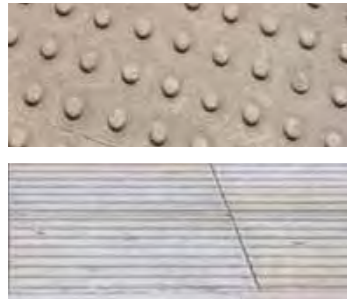
Illustrative section



Illustrative plan



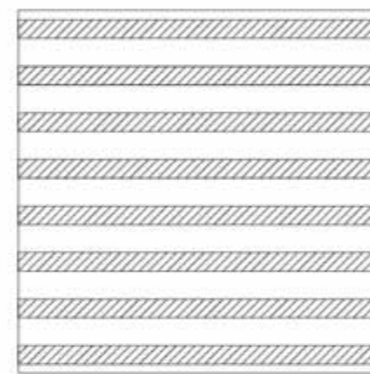
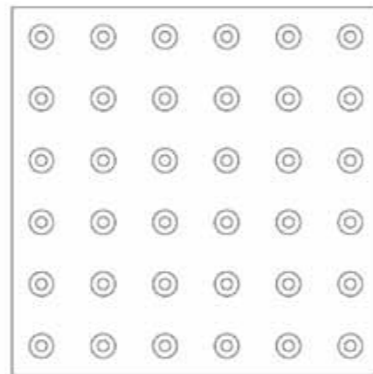
Hazard warning paving



Tactile or hazard warning paving is to be used where pedestrian users will potentially encounter a change in surface continuity or free movement, such as interacting with vehicle cross movements or defined level changes in the form of steps. In general, tactile paving should be formed out of York stone to maintain a continuity with footway materials. The tactile nature of blister or corduroy paving units are described below. The Corporation's Access Team should be consulted on all street enhancement schemes.

Key Criteria

Paving type	Blister paving	Corduroy paving
Description	Blister tactile paving is to be used at controlled crossings and where there is an uncontrolled crossing point across a vehicular route, such as a raised table, to warn users of the danger and minimise risk of inadvertently walking into a vehicle route.	Corduroy tactile paving is used in association with steps or where visually impaired people need to be warned of a hazard and advised to proceed with caution. Corduroy paving should be supplied in the same material as the surrounding paving to provide visual integration.
Unit Size	400 x 400 x 63mm thick	400 x 400 x 63mm thick
Material	Scoutmoor York stone	to match surrounding material
Laying pattern	Stack bond to national guidelines	Stack bond to national guidelines
Appearance	Raised circular blisters to meet technical access standards	Grooved stone to meet technical access standards



Inspection covers



The integration of access and inspection covers within the streetscene will follow the principle to recess the covers and infill to match adjacent paving materials, where possible aligned to the general grain of paving slabs, for both existing and newly placed covers as part of streetscape improvements.



The insertion of recessed manhole covers within the footway will ensure continuity of paving surface material with the expectation that paving joints will run through the recessed cover. Not all covers allow for recessed material, such as fire hydrants and sewer covers, but where applicable 100mm deep inset covers to loading class B125/C250/D400 (location dependent) will be encouraged. The Environment Department is to be consulted for appropriate specification.



Drainage furniture



Drainage Channels

Linear drainage channels are to be used to collect surface water where gullies are not suitable. The width of channel depends upon the drainage capacity needed and two standard cross grooved channel cover widths of either 149mm for pedestrian or 199mm for carriageway may be used. The narrower channel may be used on footways for private boundary definition and localised drainage points. Bespoke drainage channels may only be considered by exception.

Key Criteria	
Product	Hauraton SW100/6 'Heelguard' grating
Supplier	Hauraton
Class	C250 for footways / D400 for carriageway/vehicle crossovers
Channel type	Faserfix Super KS100 channel
Material	Galvanised steel
Dimensions	149 / 199 mm in width with 10mm spacing crosshatch grip

Gully Covers

Gully covers are to be integrated into both footway and carriageway pavement design with detailed consideration given to surface falls and gradients as part of the drainage design.

Key Criteria		
Cover location	Footway	Carriageway
Product	Hauraton City (Class C250)	City (Cycle friendly DU5801M) (Class D400)
Supplier	Hauraton	Durey Castings
Material	Stainless Steel grating & frame, Straight bar, 10mm spacing	Ductile Iron Black painted
Dimensions	300 x 300 x100 mm	450 x 400 x100 mm

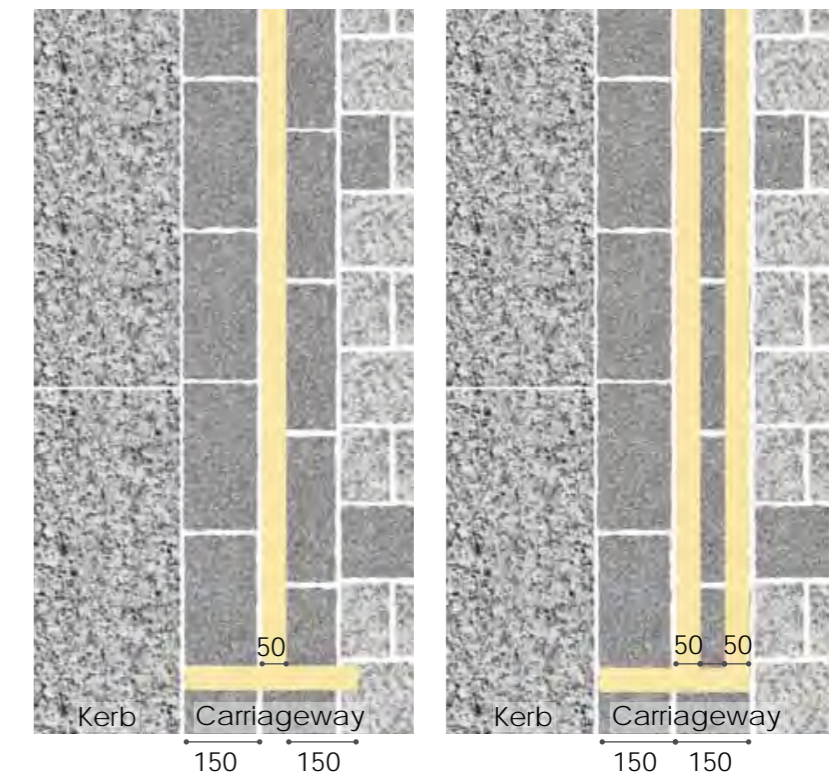


Road markings



Road markings should be designed and laid so as to minimise their visual impact, while still conforming fully to the relevant legal requirements set down in The Traffic Signs Regulations and General Directions 2016 and clearly demonstrating the requirements of the relevant Traffic Management Orders to road users. This can be achieved through using the narrowest line widths, the shortest kerb mark lengths and the smallest wording permissible under the Regulations; and by omitting all unnecessary optional markings. Where road markings are required to be in yellow, the Deep Cream colour should be used. These principles should be applied throughout the City to ensure a consistent approach. Additional markings required on the carriageway, such as the definition of bays for scooters or cycle hire schemes, should be carried out in consultation with City of London Highways department.

Key Criteria			
Colour	Deep Cream		
Material	Thermoplastic paint		
Line width	50mm		
Illustrative plans	<table border="0"> <tr> <td>Single line marking</td> <td>Double line marking</td> </tr> </table>	Single line marking	Double line marking
Single line marking	Double line marking		



Historic lanes



The fine grain of historic lanes and alleyways offer a significant and particularly characteristic contribution to the public realm network of the City.

The alignment, connectivity and often narrow proportions of these routes, allied with historic place names, provide an intricate and important canvas for public realm enhancement. Considerations influencing any design enhancement works and material arrangements should include;

- The individual character and history of each location
- The historic alignment of the street or space
- The level of intensity of pedestrian or vehicle movements
- The available width and proportion of street or space e.g. sufficient safe inclusive width of footway

The above factors should determine the most appropriate design response, in particular the decision whether to lower or raise the carriageway and also the appropriate detailing of carriageway and footway surfaces, such as historic kerb retention and the use of granite setts.



Historic lanes



Retained raised kerb to carriageway



Raised carriageway with flush kerblines

2

STREET FURNITURE

- Considerations for furniture selection
- Principles for furniture placement
- Bollards
- Cycle stands
- Litterbins & recycling bins
- Drinking fountains
- Wayfinding signs
- Steps & handrails
- Boundary demarcation studs
- Seating
- Flexible furniture
- Integrated security measures
- Lighting
- Play and recreation
- Historic markers
- Heritage features

Street furniture provides a range of opportunities to guide, inform, pause and participate with the public realm of the City. This section identifies the elements of furniture that contribute to the street scene and considers their placement and distribution. It is the intention that such items provide a high quality, convenient and comfortable experience to all users who engage with them and do not clutter the public realm or impede movement and activities.

A set of guiding principles for furniture placement is outlined, supported by descriptions of furniture elements and key criteria for specification.





STREET FURNITURE

2

STREET FURNITURE

CONSIDERATIONS FOR FURNITURE SELECTION

The provision of street furniture within the public realm provides the opportunity to reinforce the sense of place and also to offer moments to pause and participate in City life. Selection and placement of street furniture greatly influence the perception offered by the City. The following are a number of key considerations to inform furniture selection.

<p>ETHICAL SOURCING</p>	<p>Many of the materials that make furniture items distinctive, robust and comfortable, such as metal and timber, should be subject to rigorous assessment in terms of responsible and ethical sourcing, extraction, fabrication and transportation.</p>
<p>EMBODIED CARBON</p>	<p>An understanding of the environmental impact of furniture items, captured as an EPD (Environmental Product Declaration), should be gained to ensure all efforts to source products that offer a reduced embodied carbon are promoted.</p>
<p>LONGEVITY & CONSISTENCY</p>	<p>Longevity, consistency of finish and materials that are of high quality are hallmarks of the City and furniture selection should adhere to these goals at all times.</p>
<p>FLEXIBILITY & MODULARITY</p>	<p>Adaptive, responsive, and multi-functional street furniture items can provide a practical response with aesthetic appeal to the public realm. Such items can deliver creative solutions to security and control, whilst offering increased capacity to support the life and activities of the City.</p>
<p>INCLUSIVITY & COMFORT</p>	<p>The provision of a range of seating opportunities of different typologies should be maintained, offering choice and variety in height, width and multi-purpose uses. Comfort criteria for placement should also consider areas of sun and shade.</p>

STREET FURNITURE



PRINCIPLES FOR STREET FURNITURE PLACEMENT

Street furniture opportunities within the City are to be informed by the following key principles as illustrated

- 1 A clear pedestrian width to be maintained along the street and public spaces, free of obstacles and clutter.
- 2 Street furniture should be located in a zone adjacent to the kerbline to maintain unobstructed access to building frontages.
- 3 Where space allows, groupings of street furniture such as seating clusters, may be positioned to reinforce sense of place and destination.
- 4 Items such as wayfinding signage should offer a clear space for gathering around and avoid obscuring the vision and visibility of users when crossing the carriageway.
- 5 The City has unique powers to affix lighting onto buildings. Lighting columns are only considered in exceptional circumstances and historic settings.
- 6 Cycle stands should be located beside kerb lines.
- 7 Traffic Signs should be mounted onto buildings where appropriate to reduce street clutter.
- 8 Bollard placement should be informed by definite need and carefully considered in response to context, security requirements and movement patterns.
- 9 Inlaid boundary demarcation studs to denote ownership.
- 10 Consider kerbside areas for exploring opportunities for temporary uses, including parklets, streetside dining and to provide designated demarcated cycle lanes as part of public realm enhancement trials.



Bartholomew Close
public realm project



Aldgate Square
public realm project

STREET FURNITURE



Bollards



Bollards provide protection to both paving and buildings and offer safety for pedestrians. There are two principal bollard types to be used; the C3 and D3 Type bollards. They should be used where there is a definite need and their placement should be carefully considered to avoid overcluttering the streetscene.

Options exist for either demountable bollards, where required, or upgrading to become crash rated bollards where vehicles may overrun footway eg. C3 bollards. The management of removable bollards should be agreed with Environment Department.

Narrower stick bollards may be used in narrow streets to maximise pedestrian space or where below ground utilities present unavoidable obstruction.

In addition, there are a wide range of historic bollards throughout the city which should be retained and restored wherever possible as they reinforce local character. Historic bollards can also be re-cast for use in street enhancement schemes.

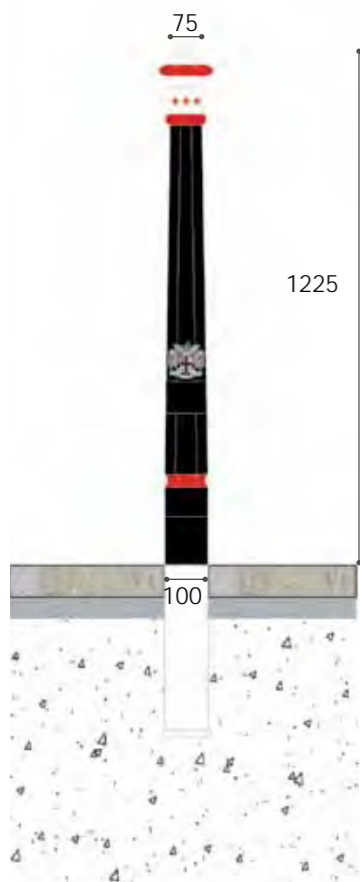


Historic bollard example



Bollard line with C3 demountable bollards

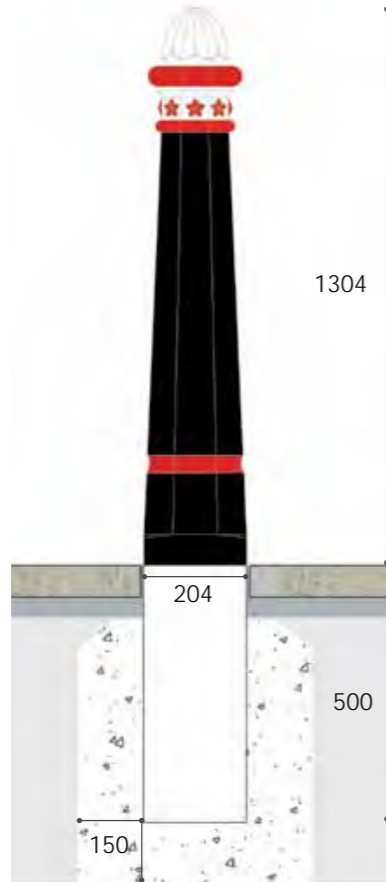
Bollards



Stick Bollard



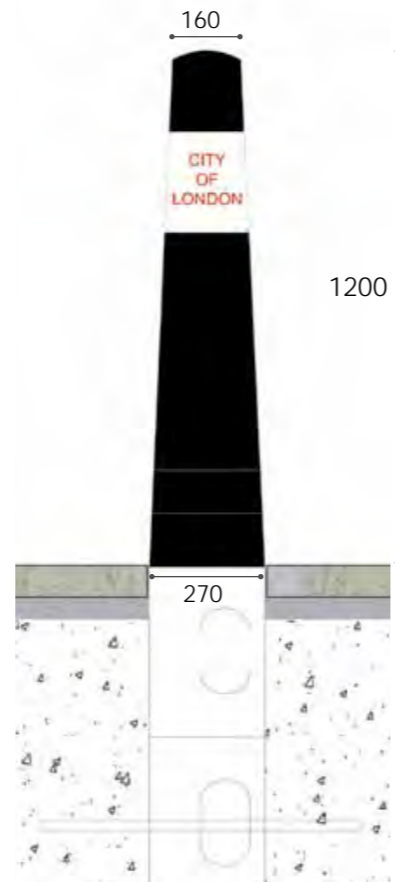
Stick Bollard



C3 Bollard



C3 Bollard



D3 Bollard



D3 Bollard

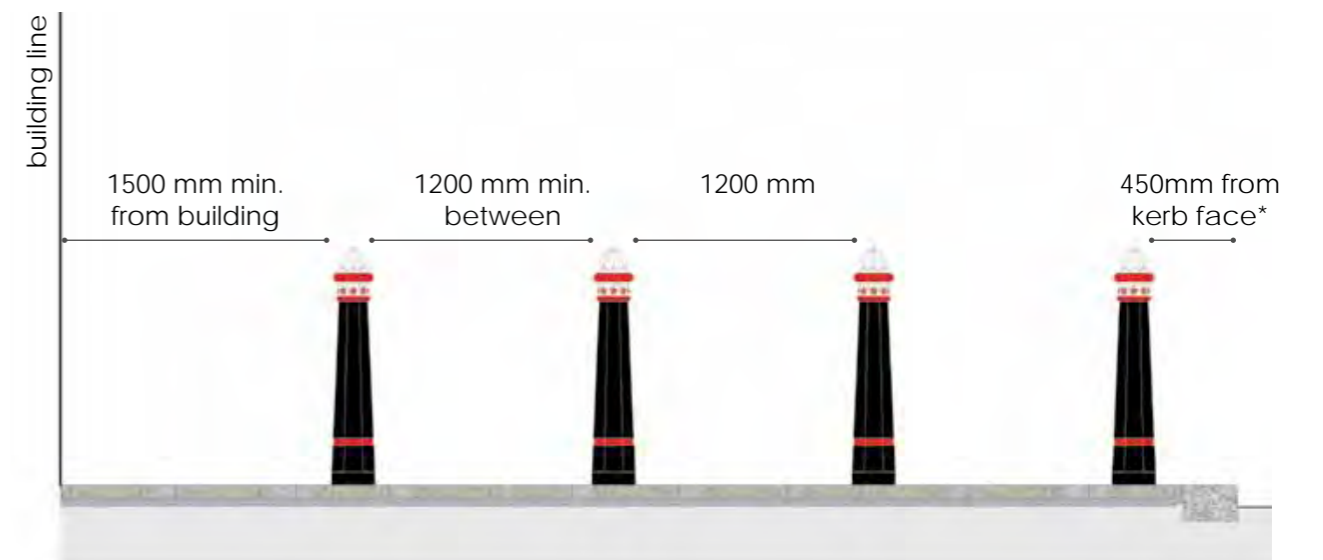
Bollards

Where required, the placement of bollards should follow the minimum spacings between bollards outlined below when placed adjacent to buildings and kerbs.



Placement Criteria

Bollard to Building	1500 mm preferred minimum
Bollard to Bollard	1200 mm clear between bollards
Bollard to Kerb	450 mm minimum from the front face of kerb *note: distance can be adjusted on a case by case basis



Footway cross-section

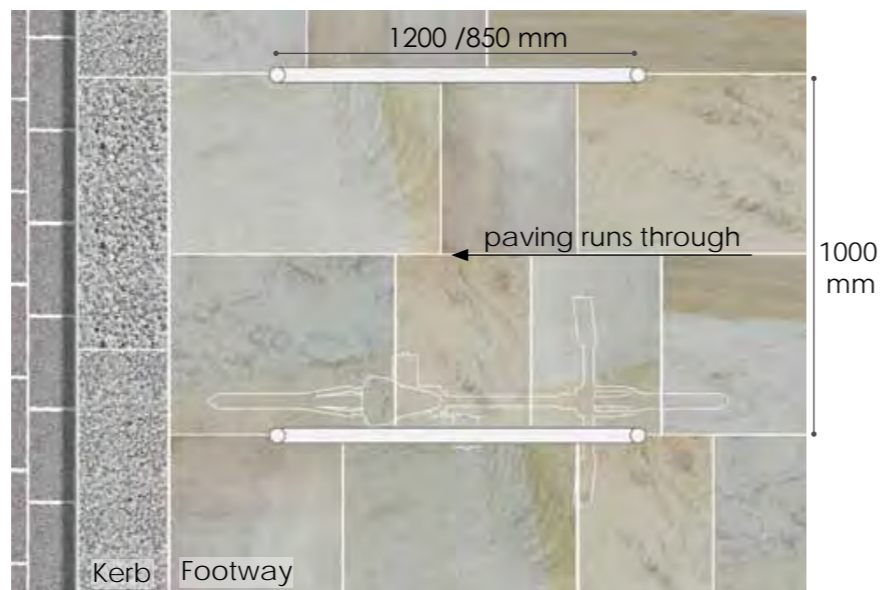
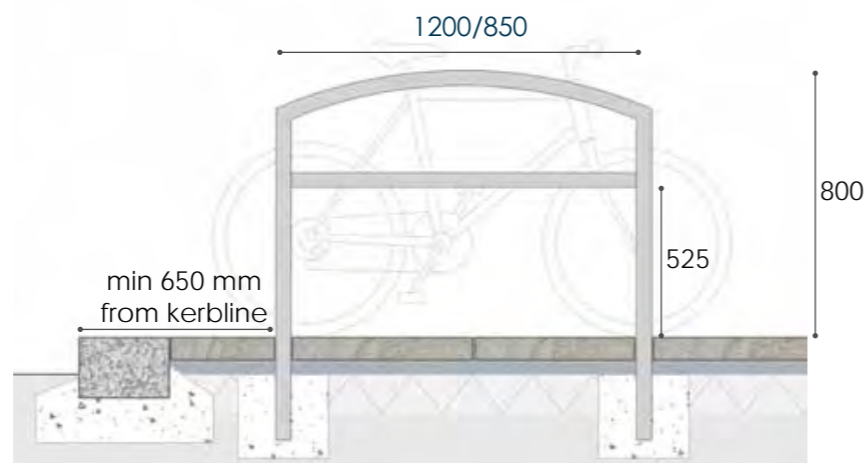
Cycle stands

Cycle stands are to be located in safe, well surveilled and convenient locations in response to an existing or anticipated need for cycle parking. 'A' frame stand groupings generally range from 3 to 12 in number, spaced to accommodate two cycles per stand with additional secure fixing provided by the crossbar. Cycle paths within pedestrian priority spaces may be marked with an inlaid natural stone marker slab.

Key Criteria	
Product	Arc Cycle stand
Supplier	Kent Stainless
Appearance	48 mm Ø brushed tubular stainless steel



Inlaid natural stone cycle lane marker slab



Litterbins and recycling bins

Litterbins should be placed where they do not obstruct pedestrian desire lines and the visibility of users, are carefully positioned to reduce clutter and visual impact and are in keeping with the surrounding built environment.

Key Criteria	
Product	Big Belly Solar Compactor bin
Supplier	570 litres
Material	Galvanised sheet metal steel interior and exterior construction
Appearance	Black painted with City of London logo



Cigarette butt bin

Cigarette butt bins may be post mounted, bollard mounted or floor-mounted on freestanding bases. The intention is to provide a convenient and accessible way to manage the challenge of cigarette butt and chewing gum collection to avoid littering the streets of the City.

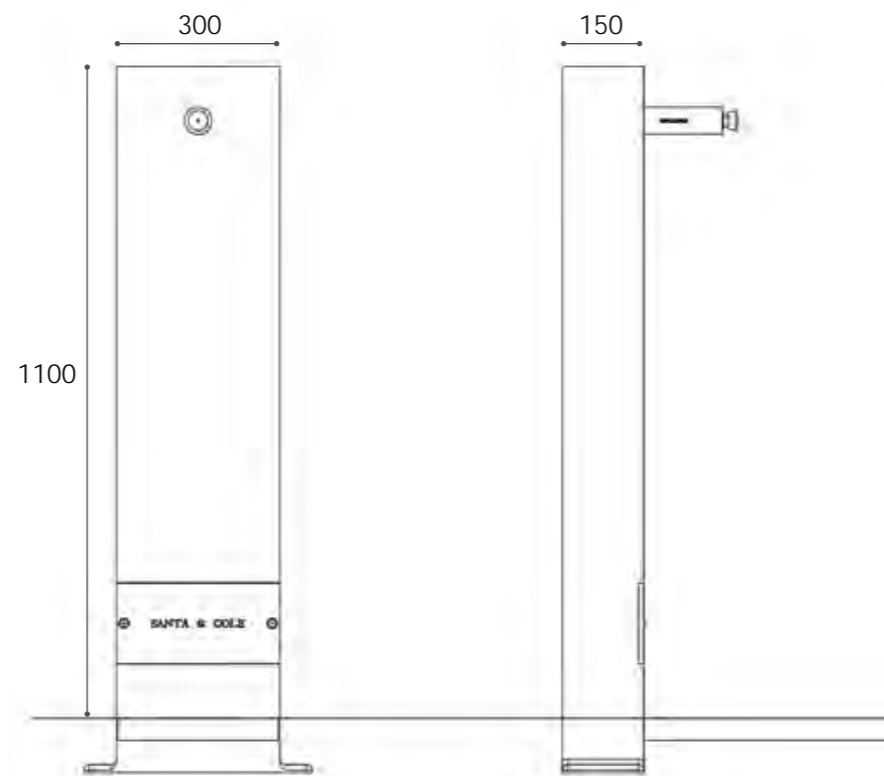
Drinking fountains



The provision and distribution of public drinking fountains is determined by need brought about by high pedestrian footfall and visitor demand. Such fountains are generally only located in larger public gathering spaces associated with visitor attractions and locations are subject to further consultation with the Environment Department.

Key Criteria

Supplier	Santa & Cole
Material	Black painted, Bronze tap
Dimensions	1200 x 300 x 150 mm



Wayfinding signs



The group of wayfinding signs within the City includes map totems, fingerposts and wall-mounted directional signs as part of the Legible London wayfinding system. Each individual sign provides unique mapping of the surrounding area, travel information and a description of the local geography and distances.



Signage suite



Minilth Totem

Monolith Totem

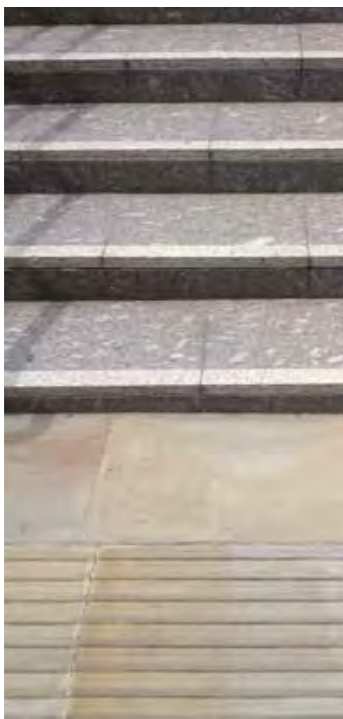
Finger post

Steps and handrails



Steps and handrails are required where immediate level changes occur along footways, within urban spaces or on approach to buildings that cannot be resolved in an inclusive manner by using surface gradients and slopes. The preferred approach to step design is to use natural stone, either York stone or granite, with the appropriate colour contrast applied to step nosing. Tactile corduroy paving to match the surrounding surface materials is required.

Handrail design must accord with relevant access guidance in terms of material choice, profile, placement and integrated protective detail to resist damage and misuse. The Corporation's Access team is to be consulted on step requirements and design.



Boundary demarcation studs

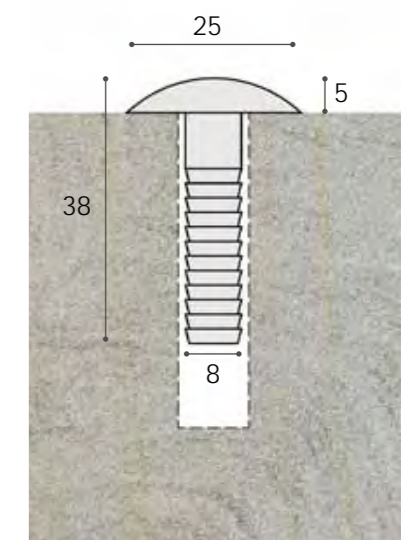
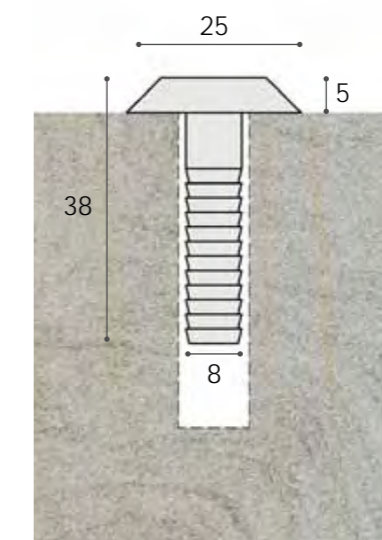


Inlaid metal boundary studs are to be provided within footway surfacing to demark ownership boundaries within the City. The delineation of ownership does not mean surface materials should be changed and continuity of material to unify the street scene will be encouraged.

The circular studs are installed with a 5 mm upstand and may be either domed or bevel edged.

Key Criteria

Material	Brass or Stainless steel (subject to location)
Supplier	Kent Stainless
Dimensions	25 mm Ø with 5 mm upstand and 38 mm deep thread
Spacing	1500 mm centres along straights and 300 mm centres when changing direction
Fixing	Core drill 10 mm Ø hole to depth 45 mm filled with epoxy resin





STREET FURNITURE

Seating



Seating is a vital component of the City's environment. A range of seating options exist to create opportunities for pause, in either individual groups or on larger capacity benches. Traditional backed benches should preferably be constructed in timber with metal legs, and fixed to the ground.



Contemporary modular benches or individual seats, informally arranged in groups can provide more flexible and sociable arrangements and often fit easier into public realm schemes to provide further enjoyment of the street scene. Utilising timber slats set within a robust metal frame, these seating clusters can provide visible contemporary additions to the street scene with powder coated metalwork providing feature accent.



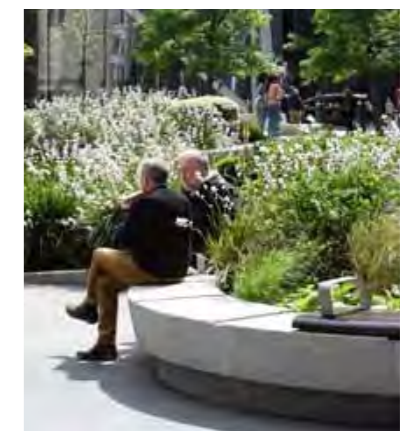
Stone seating fits well in more contemporary streetscapes, often in conjunction with planting beds, and forms attractive and robust multi-functional seating elements that should include integrated edge protection measures. Maintenance and cleansing between timber slats is a key consideration with any furniture selection.



Contemporary timber seats



Stone seating



Integrated seating & planting







STREET FURNITURE

Flexible Furniture



The introduction of modular, temporary furniture presents a unique way to enliven public spaces and test out capacity for changes within the streets. Positioning of such furniture may utilise kerbside space or occupy road closures and invite the public to establish a new relationship with the street and public spaces. Multi-functional furniture such as contemporary parklet designs provide vibrant and animated outdoor areas and a range of seating options that respond to the increasing demand for flexible, multi-use public space within the City. Urban greening is also promoted with the provision of either integrated planting or planters to provide attractive and distinctive spaces.



Moveable furniture, such as folding chairs and tables, have been also introduced within urban spaces. They provide occasional seating opportunities and introduce further flexibility to outdoor seating provision. Opportunities for such temporary furniture should be discussed with the Environment Department.





STREET FURNITURE

Integrated security measures



There is a requirement to provide safe public spaces for all users. Whilst buildings themselves should have their own inbuilt security measures, there is nonetheless a need to provide attractive and integrated security features to protect crowded places within the public realm. Opportunities exist to integrate such measures within the street scene via multi-functional, integrated street furniture comprising seating, planters and bollards. Opportunities for innovative, modular furniture can provide informal obstacle and activation of spaces.



Lighting



Lighting within the public realm plays an important role in creating safe, welcoming and inviting spaces into the evening and nighttime. Whilst the City has unique powers to affix lighting onto buildings for general street lighting which greatly reduces clutter in the streetscape, there are instances where illumination of public realm and streetscape elements can provide a distinctive and artistic response to scale and place, aiding in wayfinding and reinforcing character.

Integrated lighting opportunities may consider illuminated handrails, steps, planters or seating edges as well as localised pole or bollard lighting within specific public spaces. Lighting as artwork within public spaces can greatly assist in animation and exploration of place. Uplighting of trees or lighting within trees is to be avoided and reduction in lighting levels nearer to wildlife areas is a requirement.

Further guidance on lighting is provided in the City of London Lighting Strategy (2021).



Lighting



Integrated power and technology

The integration of power and technologies within the public realm must respond to the requirements of the space and future needs. The provision of technology and utilities such as water supply, electrical power and data connection is an increasing requirement. It is the expectation that key public spaces are therefore primed with such facilities to support public events, arts performance and streetside activities. Subtle integration of power units within the groundplane, should be carefully integrated with street furniture items such as benches and bollards.

Play and recreation



Opportunities exist within the public realm of the City, including its riverside walkway, to provide spaces and routes for play and exercise. These can include formal play areas, features that facilitate incidental play, outdoor exercise equipment and multi-purpose street furniture or exercise areas. For dedicated play and exercise areas, rubber crumb surfacing should be considered. All play and exercise opportunities are to be discussed with the Environment Department.



Historic markers



The streets and spaces that make up the City's public realm have provided both a constancy and setting in observing the rich history of change experienced over many centuries. Opportunities exist to celebrate such spaces, mark key events and interpret our social, collective histories.

Interpretation signs may be installed within the public realm to reinforce sense of place and may contain information about the history of an area or refer to historic facts and events.

Examples include the engraving of historic features, interpretative maps or commemorative text within natural stone or bronze inlaid plaques in the form of in ground markers or panels often set within the ground plane.



Heritage features

Areas of historic paving and street furniture make a significant contribution to the public realm and their ongoing contribution to the street scene as part of any enhancement proposals should be considered carefully. When evaluating existing heritage features, the following criteria should be considered;

Key Criteria	
Condition	<p>The material asset is still structurally sound and provides a lasting contribution to the street or space</p> <p>The material asset is safe and does not provide access challenges in terms of safety, slip resistance, visual contrast as well as not being an obstacle to required movement</p>
Contribution	Where assets reinforce a historic composition, alignment or make an aesthetically valuable contribution to the streetscene such that the retention and/or replication of the asset will extend the uniqueness of place
Historic value	This requires an assessment to determine heritage value based on the age, condition, contribution and any relevant heritage listings. This will allow for discussion of retention, potential reuse, replication or removal.



Listed Telephone Kiosk

In the case of removal of an asset, enhancement schemes should seek opportunities to re-interpret the history of a place with a modern intervention, extending the historic character in terms of proportions, detailing and composition of new material elements. Enhancements schemes within Conservation Areas or adjacent to listed buildings should be designed to take account of the specific characteristics of the area and features of these buildings.

Heritage features

A range of heritage assets may be found within the surface ground plane, as unique objects of street furniture or fixed to buildings as follows:

Historic paving materials

Surface materials such as Purbeck stone, Caithness and granite setts found throughout the City add local charm and distinctiveness to an area. Retention where possible is to be encouraged to maintain their imbued history, characterful patina, individual scale and contribution to the distinctiveness of place.



Historic Purbeck stone



Granite cobbles



Historic Purbeck and granite

Historic street furniture elements

Significant heritage furniture assets may include:

- Coal hole/manhole covers
- Bollards
- Edge bollards (protection from stagecoaches)
- Foot/boot scrapers
- Historic benches, kiosks and post boxes
- Traditional lamp stands
- Parish markers, plaques, milestones, boundary markers (affixed to buildings)
- Drinking fountains
- Listed Telephone kiosks



Drinking fountain



Ward boundary markers



Coal hole covers

3

TREES & PLANTING

- Consideration for tree and plant selection
- Principles for planting
- Trees
- Tree grilles and surrounds
- Tree pits
- Planting and planter beds
- Inground planting beds
- SUDs and rain gardens
- Raised fixed planters
- Protective measures
- Mobile planters
- Contemporary freestanding planters
- Trellising
- Watering & Irrigation

The public realm provides a number of opportunities to introduce trees, planting and other natural elements. The City of London supports schemes that seek to increase natural biodiversity, improve environmental conditions such as air quality and safeguard the contribution of the natural environment over the coming decades as climatic factors continue to change.

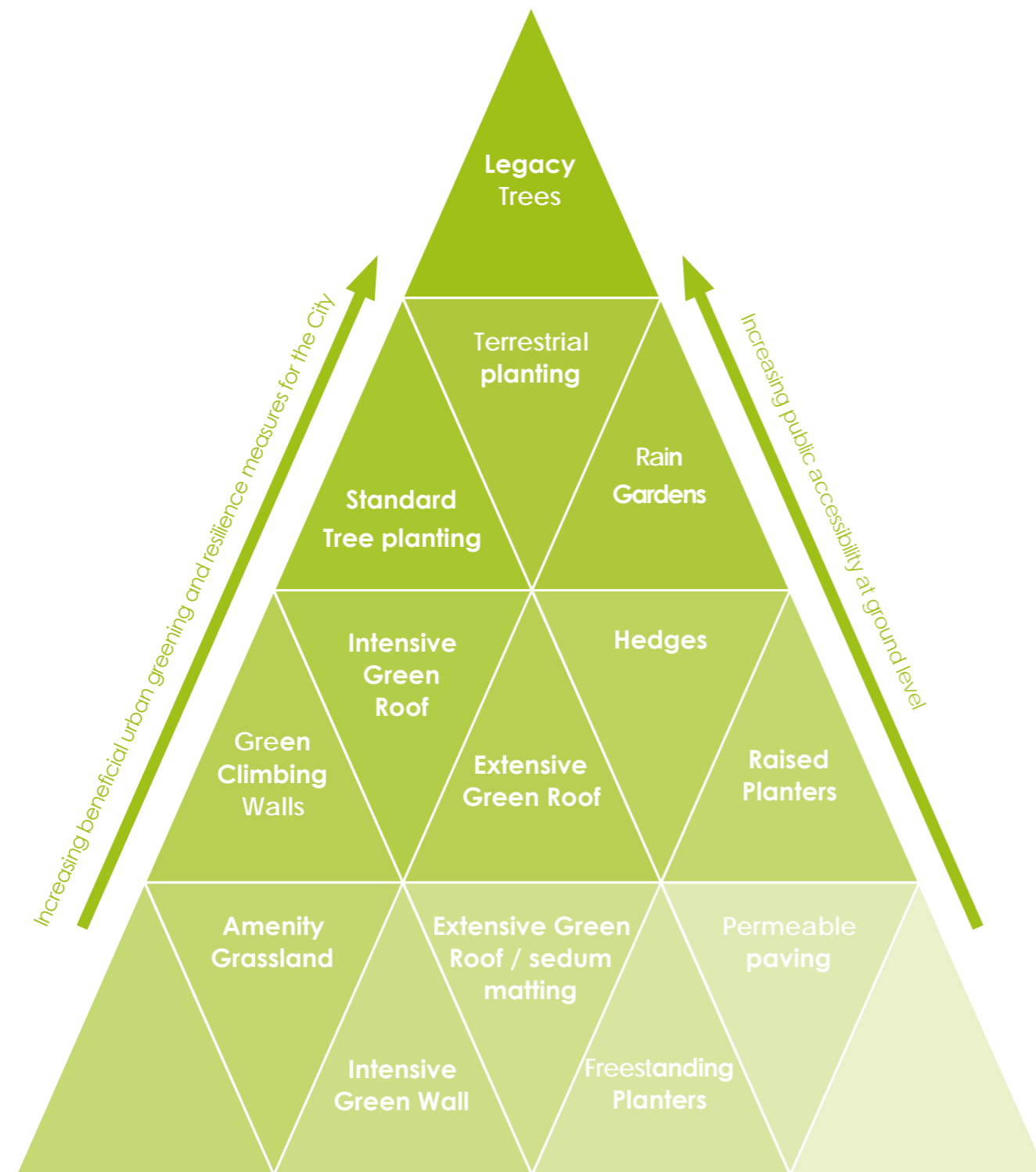
Whilst much emphasis is rightly placed on the significant contribution of green infrastructure to the character of the public realm within the City, successful planting that will contribute in the long term is not without its challenges. Below ground conditions, often rich in archaeology and an array of service utilities, present a considerable challenge to attaining appropriate root volumes for planting, particularly for trees. Careful tree species selection focussing on growth habit, vigour and irrigation demand is critical in achieving long term success.

This section identifies the technical requirements and considerations for successful plant selection and implementation.



Festival Gardens

Urban Greening Hierarchy



TREES & PLANTING

CONSIDERATIONS FOR TREE & PLANT SELECTION

An hierarchy has been developed to consider greening interventions that will offer greatest lasting impact for the City. It establishes a layered approach to urban greening and identifies beneficial greening measures to be targeted as part of the City of London Local Plan and Climate Action Strategy. Key target interventions, to be made increasingly publicly accessible at ground level and ideally within natural ground, include legacy tree planting, climate-resilient terrestrial planting, rain gardens, sustainable urban drainage systems and the promotion of sustainable and lasting green walls and green roofs (both intensive and extensive). The following considerations are outlined below to inform tree and plant species selection for our changing climate and contribution to the City's urban greening hierarchy:

CLIMATE RESILIENCE & BIODIVERSITY	The establishment of a species-diverse and mixed native/non-native plant palette will ensure that bioversity is supported within the City. Such a varied palette will ensure planting has the capacity to absorb any diseases and provide a natural resilience.
REDUCED IRRIGATION & WATER DEMAND	Plant species will be increasingly required to become more drought tolerant and require less irrigation in the face of hotter and drier summer conditions in the City.
ABSORPTIVE	The vast amount of hardstanding and developed land within the City amplifies the impact of sudden stormflow events, predicted to become increasingly more frequent and intense over the coming yeras. As part of a combined SUD's approach within the City, certain species of trees and plants that can cope with temporary inundation will help to reduce demands on the sewer system.
MICROCLIMATIC IMPROVEMENTS	Tree and shrub species can offer adaptations in their plant structure and growth habit which can aid in the capture and filtration of airborne pollutants and air flow in general to offer microclimatic improvements to air quality, pollution mitigation, acoustic and wind mitigation and localised temperature moderation.
MAINTENANCE REQUIREMENTS	Species selection to consider vigour and growth habits to plants that require less maintenance. Small lawns in particular are to be discouraged.

TREES & PLANTING



PRINCIPLES FOR PLANTING

Planting opportunities within the City are to be informed by the following key principles as illustrated:

- 1 Appropriate space for root and canopy growth to be ensured around existing heritage trees retained or newly planted feature trees.
- 2 Street tree planting at 8 m centres between avenue trees to also consider below ground archeological and utility constraints, proximity to buildings and carriageway movement.
- 3 Clear stem to street trees to be minimum 2.5-2.75m.
- 4 Planting beds within natural ground are preferred to allow for successful planting and less intensive maintenance.
- 5 Introduction of above ground planters (fixed or moveable) where protection is desired or below ground constraints determine.
- 6 Explore opportunities for Sustainable Urban Drainage measures, in the form of rain gardens, buildouts, permeable paving and SUDs tree pits.
- 7 Green climbing walls should stem from inground planting beds with appropriate wire trained trellising system
- 8 Rooftops should exploit the potential for extensive biodiverse green roofs and intensive, accessible roof terraces and gardens to extend urban greening and connectivity.



Millennium Bridge / Riverside Walk
public realm project.



Postman's Park



Trees



Trees provide many benefits in the urban environment. Their mass can not only create a balance with the density of buildings and establish an enhanced sense of place but also offer a proven contribution to the climate challenge. Over the coming decades establishing and ensuring a mature canopy cover of climate resilience tree species tolerant of a demanding and hot urban City environment will be crucial if the environmental benefits of shade provision, air cooling, improved air quality, biodiversity and general well being are to be achieved. Many of the City streets are greatly enhanced by tree planting and all major public realm enhancement schemes should address the question of whether it is possible to include trees.

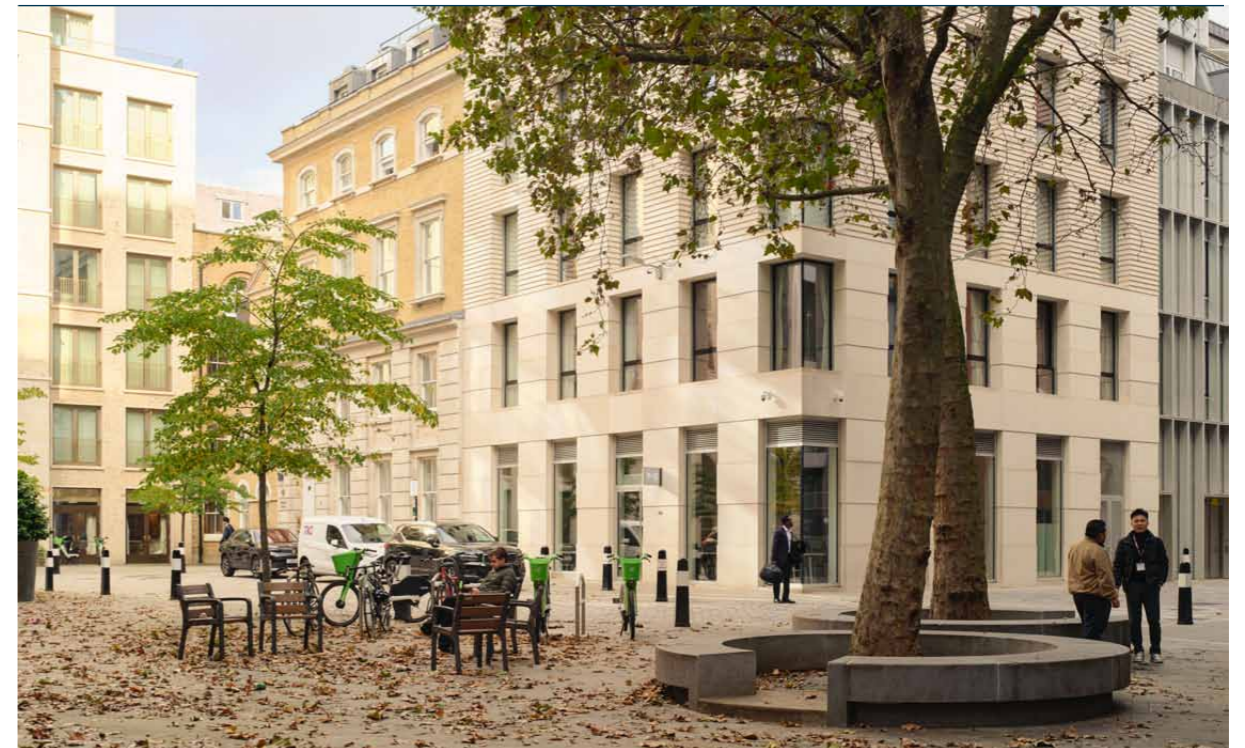
Key challenges include the presence of basements, tunnels, building overhangs and the proliferation of underground utility ducts and pipes in the footway often making it difficult to locate suitable sites for the sustainable long term growth of trees. Suitable locations for trees must also take account protected views, vehicle and building sight lines, space for the crown of the tree to develop without conflicting with buildings or high vehicles and to allow sufficient distance between the trees themselves. Species selection should also consider all maintenance implications associated with location, vigour and form.



As well as the limitations to the use of trees, consideration should be given to the positive use of the size, shape, form, texture, colour and seasonal interest that trees can provide, such as flowering trees and those offering striking autumnal colour.

Water demand is crucial beyond establishment. Whilst automated irrigation to tree pits remains an option, opportunities for SUDs tree pits, whereby surface water is directed into structural tree pits that offer appropriate soil volume to achieve mature canopy growth and to allow for infiltration and self-irrigation, should be encouraged whilst at the same time delaying stormflow to the sewer. The use of 'treegators' during the initial establishment of trees should be considered.

Treegators, as manual tree pit watering provision during establishment



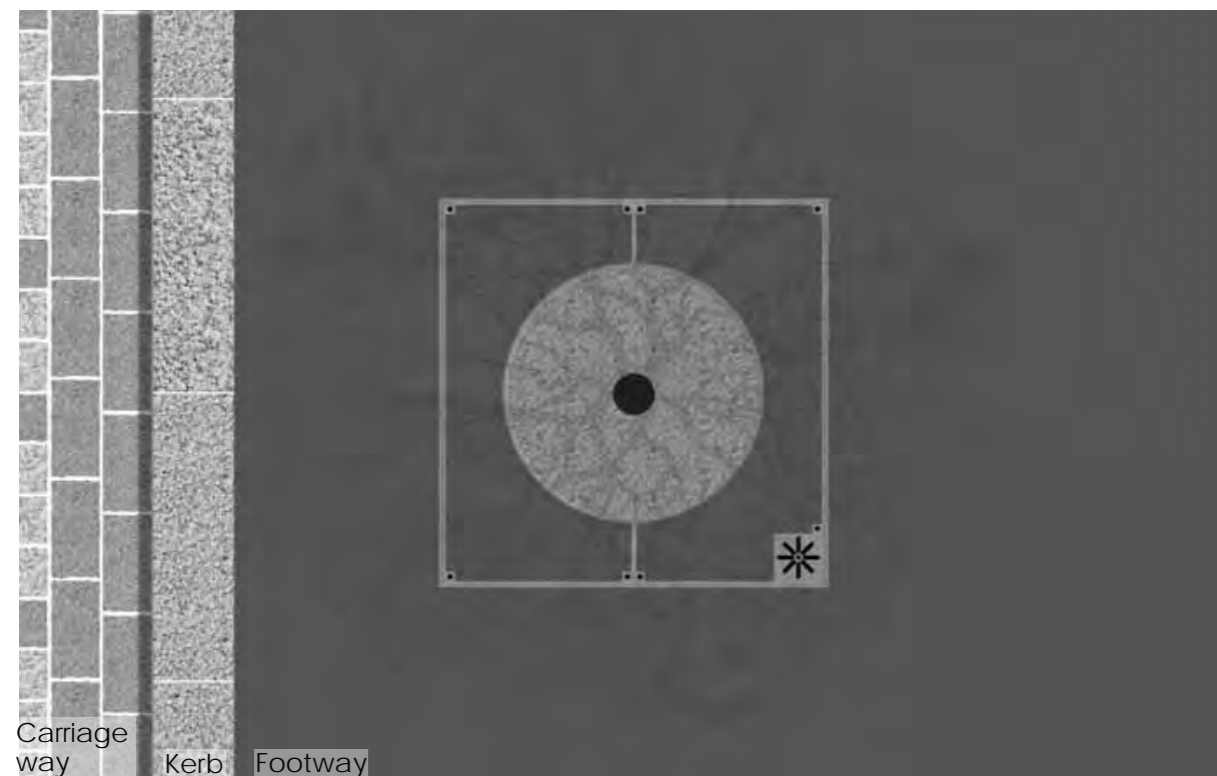
Standard tree grille



The standard tree grille for new street tree planting is a 1206 x 1206 mm recessed steel frame. This grille is to be infilled with the two footway surfacing options of either York stone or asphalt. With the use of York stone infill, paving joints should align and continue the paving joint pattern.

The circular opening at the centre of the grille is to be infilled with a porous flexi-pave material, composed of 50% recycled rubber and 50% silver grey stone aggregate. Laid flush, this infill will enable pedestrian overrun whilst allowing a flexible finish for tree trunk expansion and growth. The standard tree grille offers two removable trays for tree pit access and an integrated hinged watering point. Bespoke tree grilles may be used in exceptional circumstances to fit with the particular paving pattern of a specific location or to accommodate large existing trees.

Illustrative plan with asphalt surrounds

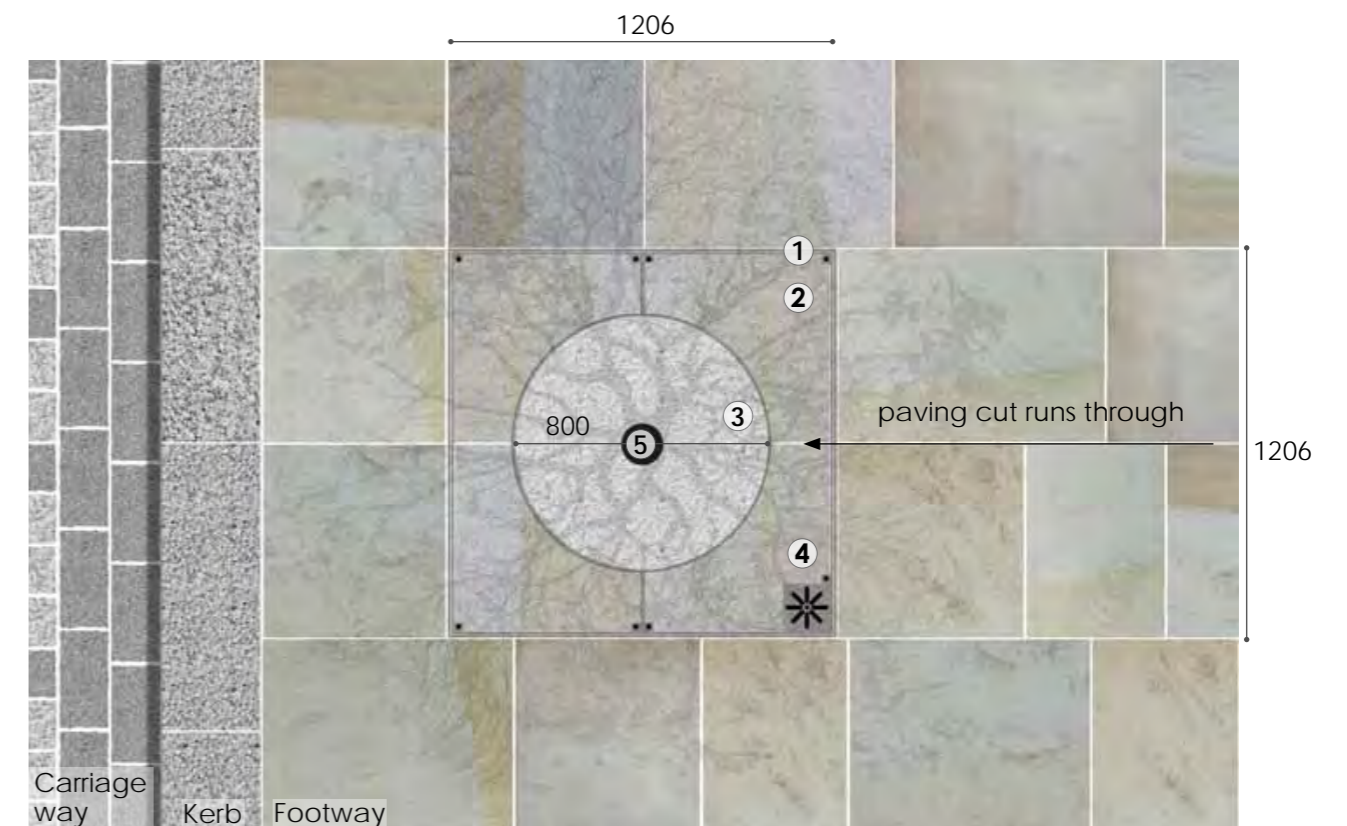


Standard tree grille

Key Criteria	Recessed cover with York stone infill
Product	Urban Forest Tree Surround (twin tray)
Supplier	SFH Maintenance Ltd
Dimensions	1206 x 1206 mm with 800 mm Ø circular opening
Finish	Hot dipped galvanised
Circular opening infill	KBI Flexi-pave colour 'London Grey'

Illustrative plan and section

- ① Recessed steel frame
- ② York stone infill paving
- ③ Flexi-pave porous infill
- ④ Watering point with hinged self closing cover
- ⑤ Tree trunk



Tree surround for existing trees



A flexible surfacing of recycled rubber granules and stone aggregate is to be used as porous infill to recessed tree grilles and around the base of existing street trees. Poured flush with adjacent surfaces, this infill not only provides a continuity of footway surfacing but also assists in sustainable urban drainage infiltration. The Flexi-pave material has been developed to compliment the granite and York stone materials palette.

Key Criteria

Product	KBI Flexi-pave 3-6 mm granule
Supplier	KBI UK Ltd
Colour	London Grey
Thickness	50 mm thick laid on 50mm porous stone base to make up levels



- ① Flexi-pave
- ② York stone paving
- ③ Granite kerb

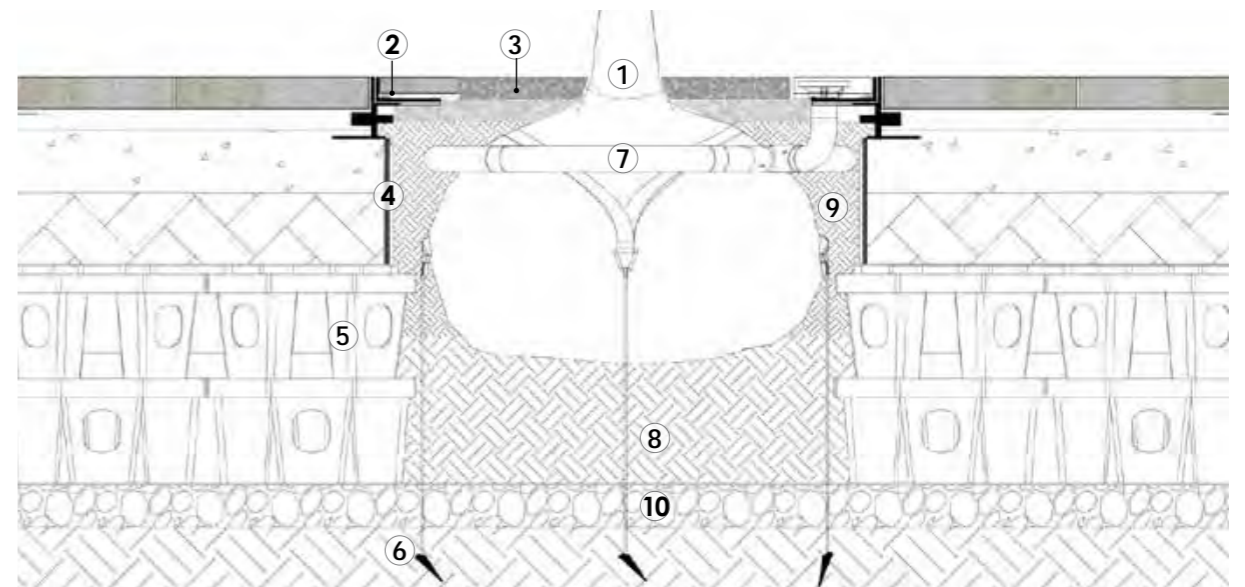


Standard tree pit construction

The standard detail for newly planted trees should utilise the following components, composition of which may be varied in proportion to suit the specific requirements of tree planting location. Tree pit depth should be a minimum of 800mm, ideally to provide 1 cubic metre of substrate.

Key Components

Tree planting	1 Newly planted tree to be planted level with nursery line
Tree surround	2 Tree surround with inlaid paving material
Infill material	3 Flexi-pave porous infill on porous stone base to make up levels
Root barrier	4 Root barrier where necessary in consultation with Open Spaces
Structural soil cells	5 Stratacell, or similar approved in consultation with the Open Spaces Department, to maximise width and depth of supported root zone infilled with topsoil (BS 3882 sandy loam)
Stabilisation	6 Subsurface guying to deadmen or ground anchors
Irrigation and aeration	7 60 mm Ø irrigation and aeration pipe immediately around the rootball linked to grille inset hinged watering point cover
Structural soil substrate	8 Rootball supported on structural tree soil
Soil substrate	9 Imported topsoil to BS 3882 (sandy loam)
Drainage layer	10 100 mm drainage layer of clean gravel beneath geonett membrane





Planting and planter beds



Careful choice of plants and planting elements can greatly enliven and soften the built environment. They can bring seasonal colour and biodiverse natural interest as well as providing green structure within the public realm.



One of the distinguishing characteristics of the City's external spaces is the green appeal particularly evident in the array of gardens and churchyards dotted throughout its historic fabric. Seasonal bedding displays and high maintenance lawned areas are to be discouraged, as more sustainable urban greening measures are increasingly required to improve the natural appeal and resilience of the City's public realm as part of the response to the climate challenge.



Sustainable urban drainage measures installed on rooftop, and streetscape environs are to be encouraged and all have the ability to contribute to a greener City. Such measures act as natural sponges to moderate local environmental effects associated with urban heat island effect through cleansing, cooling, and critically absorbing surface runoff to help mitigate stormflow into the River Thames.



Plant species are to be carefully selected to respond to each unique locality, climatic and seasonal fluctuations balanced with strong visual aesthetics, biodiverse considerations and reduced maintenance demands. There is an increasing expectation for plants to provide multiple benefits to all users, natural and human and choice of plants should be developed in consultation with the City Gardens. Water demand in particular, for planting maintenance, is an increasing pressure and a key consideration over the coming years. The availability of an adjacent water source is vital for all planted areas in the initial years to aid successful establishment but thereafter there is an expectation for planting schemes to be of a drought tolerant, self-irrigating nature. Consideration should be given at an early stage as to how this is to be achieved.

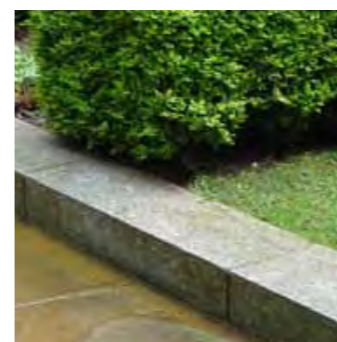
TREES & PLANTING



In ground planting beds



Narrow granite edging



Wide granite edging

The preferred approach to implementing long lasting planting schemes is to establish at grade planting in the form of low retained planting beds. Such beds support the ability for plant roots to extend into natural ground conditions, to establish good drainage conditions and allow ease of access for maintenance to the benefit and vitality of the planting.

Planting beds are to be retained by a low raised natural stone kerb of either granite or York stone to reduce litter collection demands and protect planting from pedestrian overrun. Lower metal edging provides a contemporary and more flexible edging solution where space is tight or more sinuous planting beds are required.

Minimum topsoil depths and soil composition for planting within ground level beds are subject to the specification or approval of the City Gardens Section.

Key Criteria	Minimum topsoil depths required
Lawn	300 mm
General planting	450 mm
Large shrubs	up to 600 mm
Small trees	up to 800 mm



Low metal edging



York stone edging as upstand to planter bed

SUDs and rain gardens

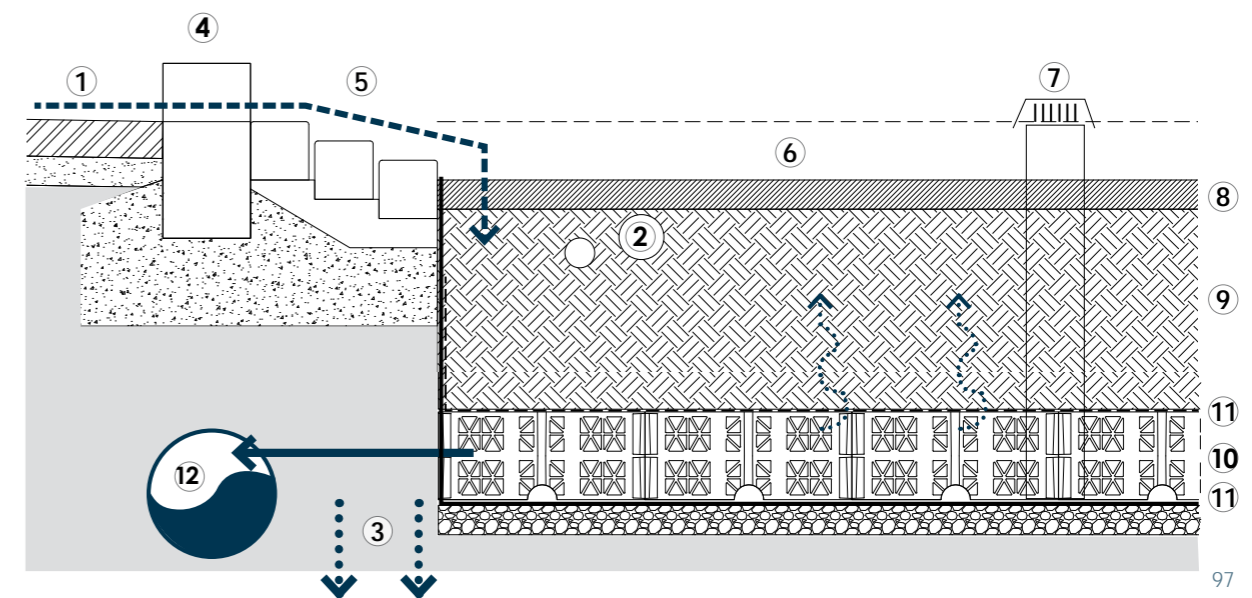


The incorporation of planting beds as an integral part of the sustainable urban drainage system is to be encouraged where ground conditions permit. Rain gardens will increasingly form an important feature in the City as a key component of the urban greening measures, designed as formalised planted beds that can receive roof and surface water runoff close to source. These features act as vegetated filters within the drainage chain, offering functional drainage improvements water flow and quality whilst also providing both visual amenity and biodiversity enhancements.



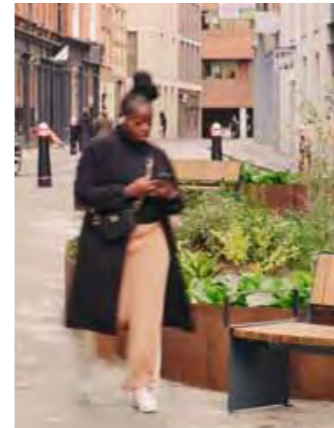
Successful rain garden implementation must consider the following factors:

- ① Surface water catchment affecting volume storage capacity
- ② Below ground constraints such as utilities
- ③ Establish natural ground infiltration capacity
- ④ Install raised kerb edges (with hit & miss gaps where appropriate)
- ⑤ Provide appropriate drainage inlets and velocity trap
- ⑥ Create a freeboard of minimum 100mm for surface flood waters
- ⑦ Install overflow pipe (for inundation events)
- ⑧ Introduce a mulch layer
- ⑨ Introduce a suitable bioretention substrate with good permeability
- ⑩ Install a water retention and storage layer such as a permavoid with options for geotextile wicking membrane to allow for ongoing vertical uptake and absorption of water in to the growing medium to self-irrigate the planting
- ⑪ Geotextile membrane for impermeable or permeable infiltration ground conditions
- ⑫ Provide onward drainage connection to piped system via orifice outlet or through natural ground infiltration





Raised fixed planters



Raised beds provide a means of getting trees and vegetation into areas where there is not a significant soil depth available. These fixed structures can provide high quality architectural and sculptural elements and often can incorporate seating elements. Raised planters may be constructed as either clad or solid stone structures or from modular metal, as either straight or sinuous sections. A number of finishes may be applied depending to material and appropriate to their setting and maintenance demand. Raised planters should have adequate drainage with consideration given to the sub-base and its drainage capability. Raised beds are to be filled to the specification or approval of the City Gardens. Automatic irrigation should be included in permanent planters to reduce maintenance costs.



The volume of soil provided within fixed planters will determine the most suitable plant species to be grown for long term impact, vigour and reduced maintenance demands.





Contemporary freestanding planters

Opportunities exist to install multi-functional contemporary arrangements of freestanding planters which can be useful in providing impact, animation, seating and temporary greening either as part of trial streetscape works and also where below ground constraints will not allow inground planters.



Mobile planters

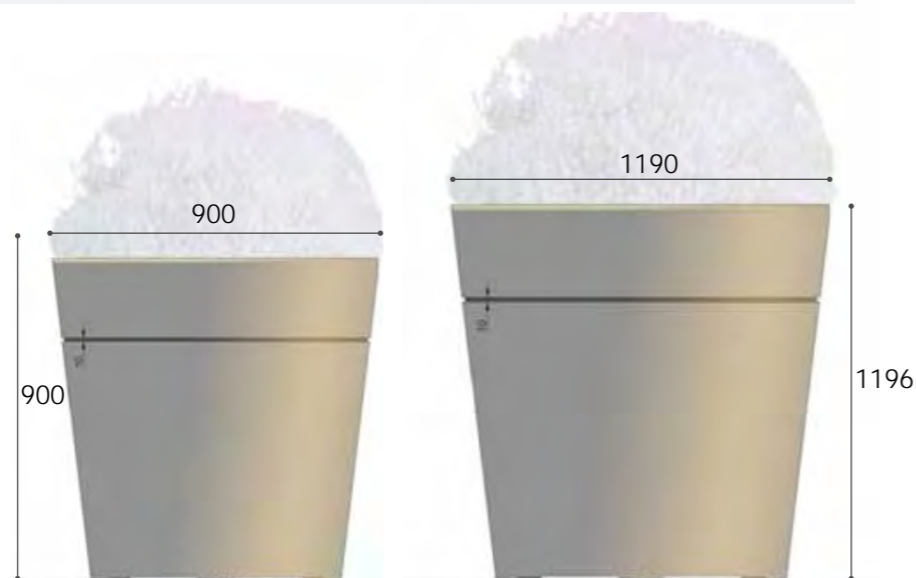


Mobile planters are used to demarcate entrances and thresholds to key buildings and spaces, extending the history of using lead cisterns in similar locations around the City. They may also be used to introduce temporary greenery where the proximity of underground services or access requirements restrict the creation of permanent planting beds.

As a minimum within each planter, a drainage layer of Lightweight Expanded Aggregate (LECA 4-10mm round) over the drainage holes and a filter membrane material such as Terram 1000 or equivalent should be installed to prevent fine soil particles from washing out on to the paving. The appropriate soil mix, planting species and irrigation demand is to developed in consultation with City Gardens.

A simple, cone shaped, bronze design is the preferred planter within the City, offering two different planter capacities.

Key Criteria	Small solid bronze planter	Large bronze clad planter
Style	Cone shaped planter	Cone shaped planter
Supplier	refer to City Public Realm	IOTA
Dimensions	900mm high	1196mm high
Diameter	Top 900mm	Top 1190mm / Bottom 990mm
Construction/Finish	Solid bronze	3mm thick Zintec Steel, clad with 1.2mm Bronze



Protective measures



Stone upstands and armrests

Street furniture elements are exposed to general wear and tear and activities such as skateboarding often resulting in damage. Furniture elements that may be affected are planters, walls, steps and benches, and in particular long exposed lengths of seating and walling.

It is important to consider potential measures to restrict damage at an early stage in the design process. Considerations over the positioning of street furniture elements, their height and material choice may all influence the exposure and risk of damage. Protective measures should be 'designed-in' to all street enhancement schemes where vulnerable features or exposed edges are included.



Groove cut into stone

In the case of stone furniture and edges, the insertion of grooves cut into stone elements add a 'break' to a continuous edge. Similarly the surface treatment of the stone finish, such as cropping or rustic finish, may also provide deterrent.



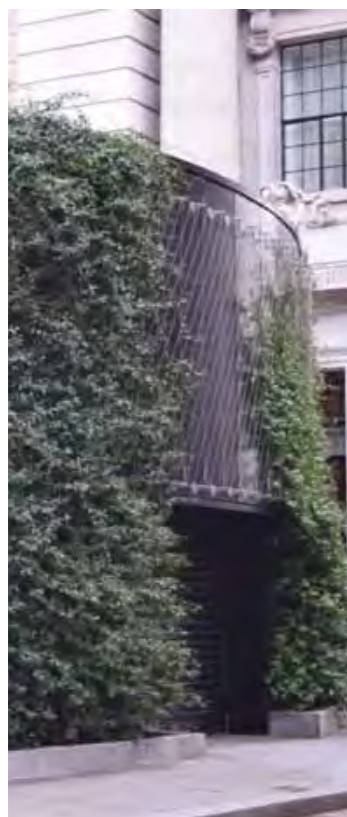
Trellising



A trellis can provide an attractive vertical display of plants where trees would not be appropriate. A stainless steel wire system, installed vertically, provides a low maintenance strong support for a range of twining climbers. This should be appropriately specified according to the height of trellis, location, plant loading and risk of vandalism or abuse.

For ease of maintenance and access, trellises should generally not exceed 2.5m in height otherwise mechanical lifting equipment will be needed to maintain. Consideration must be given to width of planting bed at the foot of the trellising also affecting means of access for maintenance and inspection.

Key Criteria	
Supplier	Jakob® INOX LINE or equivalent.
Material	Stainless steel wire
Wire dimensions	4 mm



Watering and irrigation



Standpipes

On certain projects, standpipes for hose connection may be installed, particularly to aid in early plant establishment. The requirement for standpipes are determined by site location, spatial demands, access and other constraints in consultation with City Gardens. These standpipes are to be located sensitively within the planting scheme, with consideration given to ease of access and extent of hosepipe connection to avoid crossing of pedestrian routes. In exceptional circumstances, irrigation tanks may be considered.

Key Criteria	
Product	Tower standpipe with 3/4" bib tap
Supplier	Edwards Standpipes
Material	Stainless Steel Grade 304 – 1.5mm thick
Dimensions	106 x 106 x 1470mm (720mm above ground, 750mm below ground)
Fixing	Stabilising base plate 255 x 255mm



Treegators, as manual tree pit watering provision during establishment

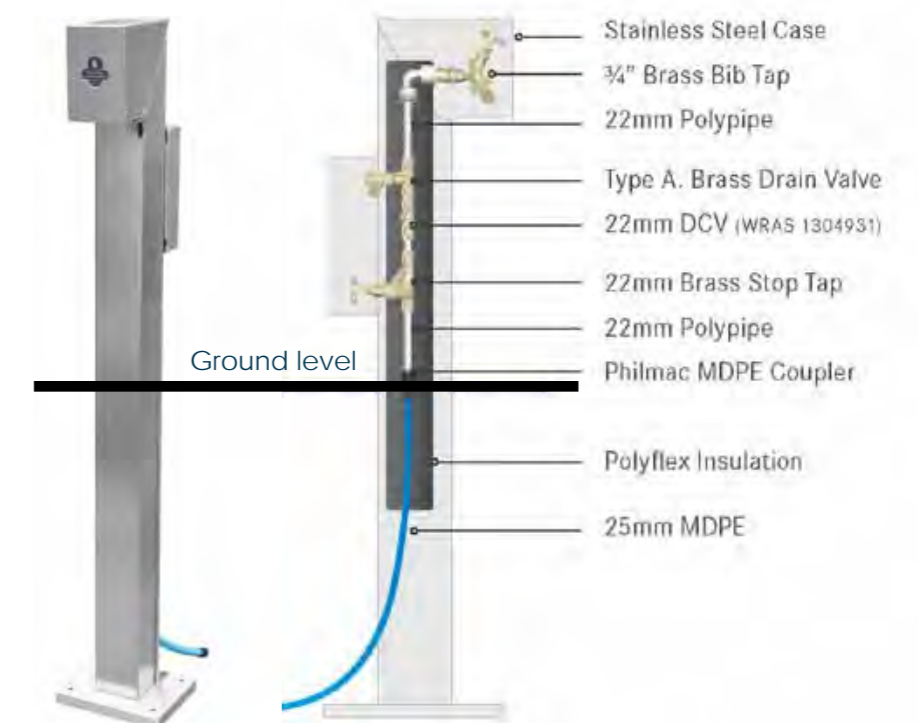


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