Light + Darkness in the City/

A Lighting Vision for the City of London/

CITY OF LONDON

SPEIRS + MAJOR

Credits/

City of London, London, UK
Lighting Vision

The City of London Lighting Vision has been prepared by Speirs+Major for the City of London Corporation. The Lighting Vision aims to provide the vision, methodology, standards and guidance to meet the future requirements of the City of London. It seeks to deliver a creative, holistic and smart approach in which light and darkness are better balanced to meet both a functional and aesthetic need.

The Lighting Vision has been developed in conjunction with the City of London Corporation's supervising officers and various other members of the stakeholder group.

Cover and page 13: photograph by Jason Hawkes Photography

Content/

0.0/Executive Summary

The re-lighting of the City of London is a 'once in a generation' opportunity afforded by the upgrading of the street lighting and the improvement of specific architectural and landscape lighting as well as lighting of other features owned and operated by the City of London. The ongoing development of the area, including major initiatives such as Culture Mile, Illuminated River and Crossrail, will act as a further catalyst for change. This Lighting Strategy provides analysis and guidance to help facilitate the delivery of the new lighting and includes a number of important recommendations for the future.

The following provides a brief summary of the key observations and recommendations:

Vision

"This Lighting Strategy aims to deliver a creative, holistic and smart approach in which light and darkness are better balanced to meet both a functional and aesthetic need."

It aims to provide the vision, methodology, standards and guidance to meet the future requirements of the City of London. It also suggests how light may be employed to help reinforce the City's existing identity as a world-class business centre, whilst respecting and complementing both its heritage and character. It specifically looks to encourage walking and cycling by creating an enjoyable, safe and secure experience of the public realm after dark, but in a sensitive and environmentally responsible manner. In recognising the City of London's Smarter City programme initiatives it introduces an innovative approach to both technology and technique to help create much greater flexibility for the future.

Approach

The quality of light and darkness, key design issues and opportunities for change were identified as follows:

1. Reducing the amount of light used and improving both colour appearance and colour rendering.
2. Providing a more human scale lighting after dark and improving legibility through the lighting of vertical surfaces.
3. Controlling the balance of light and shade including retaining natural darkness to some areas.
4. Highlighting changes of level and conflict areas and supporting the prevention of crime through surveillance.
5. Improving the uniformity of light and reducing glare to help provide a more legible and accessible environment.
6. Enhancing character to assist with place-making to create an exciting and pleasing experience after dark.
7. Highlighting key landmarks and providing the conditions to support night-time events.
8. Balancing the social and economic benefits of light with the environmental consequences.

Key Opportunities

A number of key opportunities were identified:

- Providing improved levels of illuminance for the various routes and open spaces to enhance pedestrian use.
- Using light to accentuate the unique qualities of the overall network and each distinct area after dark
- Illuminating key buildings and bridges to help improve intuitive way-finding and orientation at night
- Reassessing the existing lighting levels and uniformity to help reduce energy use and light pollution
- Upgrading the existing light sources to newer low energy, longer life LED
- Upgrading both contemporary and heritage street lanterns, bulkheads and other fittings while retaining existing gas lighting
- Installing a City-wide smart lighting control system to improve management, provide flexibility and reduce energy
- Re-assessing mounting positions and heights of fittings including the occasional use of columns
- Illuminating important archaeological, heritage, cultural sites and public art
- Reducing light spill, intrusive lighting and light pollution, particularly adjacent to residential properties
- Providing better environmental control of the lighting will assist in reducing adverse impacts on local ecologies
- Embedding lighting within the planning system will help improve design and control aesthetic outcomes
- Taking a more holistic approach to lighting will assist with communications between key stakeholders

Corporate Plan and Objectives

The City Lighting Strategy strives to follow the vision of the City of London Corporate Plan to support a diverse and sustainable London within a globally-successful UK.

This document contributes towards the achievement of the three aims and their outcomes as follows:

Contribute to a flourishing society

- People are safe and feel safe through the careful design of lighting the public realm
- People enjoy good health and wellbeing as a result of limiting obtrusive light spill into windows, light pollution and using warm white light in residential areas
- People have equal opportunities to enrich their lives and reach their full potential in the City's public spaces made accessible at night through appropriate lighting
- Communities are cohesive and have the facilities they need in the City's welcoming spaces where people can meet and socialise during the day as well as after dark

Support a thriving economy

- Businesses are trusted and socially and environmentally responsible by taking a more sustainable approach to lighting
- We are a global hub for innovation in finance and professional services, commerce, and culture: our night time economy is supported by better lighting to encourage commercial activities in the public realm after dark

Shape outstanding environments

- We are digitally and physically well connected and responsive through an interactive and efficient Control Management System (CMS)
- We inspire enterprise, excellence, creativity and collaboration with stakeholders including engineers, designers, planners and developers among others
- We have clear air, land and water and a thriving sustainable natural environment by reducing light pollution and energy consumption
- Our spaces are secure through the recommended lighting design principles, resilient and well maintained, with a reduction of maintenance costs through the use of LED lighting

Strategy

The following is a summary of the key recommendations of this report for the City of London:

Safety

Lighting plays a key role in enhancing safety after dark. The following measures are recommended within the City of London:

- Prioritise improvements in lighting in relation to pedestrians and cyclists
- Contribute to road danger reduction through the positive highlighting of conflict areas
- Employ fuller spectrum white light sources such as LED to help improve vision
- Provide better optical control to light fittings to help reduce disability glare for motorists
- Use integrated lighting to changes of level such as staircases or ramps
- Illuminate vertical surfaces to improve legibility
- Avoid high light levels where possible to discourage unsafe driving practices such as increased driving speeds.

Security

Lighting can support the prevention of crime and anti-social behaviour and improve the perception of personal security. The following are recommended:

- Employ fuller spectrum white light sources such as LED to help improve recognition
- Design for the minimum requirements of CCTV cameras
- Consider improved lighting local to hotels and residential areas
- Allow the control of individual groups of luminaires in response to incidents
- Provide sufficient flexibility to allow a managed response to police requirements

Accessibility

The public realm in the City of London must remain accessible for all after dark. Measures should include:

- Enhanced lighting on key routes for people with reduced mobility
- Avoid glare and excessive contrast for those with visual impairments
- Positively illuminate steps, ramps and other changes of level
- Ensure that uplighting is well shielded and properly directed to avoid glare
- Ensure dimming of light sources during off-peak hours will not compromise accessibility needs.
- Consider the needs of people with mental health disability or have sensory/ neurological processing difficulties and how lighting could improve their journeys

Sustainability

A balance should be achieved between the social and economic benefits that good lighting brings with the environmental consequences of its use. The following should be considered:

- Improve the quality of light in residential areas
- Provide an appropriate ambience in night time economic areas
- Reduce light spill and light trespass local to hotels and residences
- Consider a 'dark night' to help save energy
- Consider the impact of artificial light on people's well-being
- Provide good practice guidelines to building owners and users including contractors
- Employ high quality luminaires with good optical control
- Ensure that any upward light is directed at vertical surfaces rather than into the sky to minimise light pollution
- Consider retaining natural darkness as is appropriate in environmental sensitive areas
- Employ best practice guidance with respect to limiting impacts on bio-diversity and reducing light pollution
- Remove unrequired luminaires where deemed appropriate

Culture

Lighting can play a key role in cultural development, interpretation, education and tourism in the City of London. The following are recommended:

- Develop a simple policy for the highlighting of key building, bridges and other landmarks, beginning with a pilot proposal in Culture Mile area
- Avoid over-lighting, floodlighting and the inappropriate use of colour
- Manage timings of lighting schemes through the City-wide smart lighting control system
- Co-ordinate the feature lighting of buildings, bridges and artwork with a programme of local, national and international events including flexibility in lighting control

Planning

Lighting is part of urban design and can contribute to place-making. The following should be considered:

- Promote best practice on lighting around design and environmental considerations
- Require lighting strategies to be provided as part of the pre-application process where appropriate
- Improve communication between key stakeholders regarding function and aesthetic outcomes
- Publish detailed planning guidance as to the use of lighting within the City of London to support and enhance the implementation of policy

Management

The lighting of the City of London requires careful ongoing management and investment. The following recommendations will help:

- Improve communication and follow up with key stakeholders
- Develop a clear policy of the long term procurement, upgrading and repair of new systems
- Employ smart lighting controls to provide a more responsive and flexible approach
- Consider the appointment of a dedicated City of London Lighting Board
- Update the City Public Realm Technical Manual to include the introduction of new luminaires and light fittings to inform external stakeholders

Technology

State of the art technology can be employed to assist in improving the lighting to the City of London as follows:

- Upgrade all public lighting within the area to high quality LED with the exception of historic gas lighting which should be preserved to enhance character
- Employ simple lanterns and bracketry that are architecturally neutral
- Consider the use of custom housings where fitted to key listed structures
- Upgrade the lighting control to a smart system allowing the individual addressing, feedback and monitoring
- Provide more flexible management of the lighting systems adopting different lighting levels at different times
- Save energy by using technology to allow the lighting to respond more dynamically to background lighting levels

Delivery

The Lighting Strategy for the City of London will only be effective if feasible delivery mechanisms for its recommendations are identified. Whilst this will take both time and funding the realisation of the vision can be achieved in the short to medium term through:

- Fully replace and upgrade all of the existing street and amenity lighting to LED whilst retaining and enhancing the historic gas lighting and heritage lanterns. The installation of smart lighting controls to monitor and manage the system, offers a unique opportunity to put a large amount of the recommendations of this Lighting Strategy into practice
- Improve the illumination of the public realm and key landmarks through a series of ongoing publically and privately funded initiatives including Culture Mile, Illuminated River, the upgrading of the architectural lighting of St. Paul's Cathedral, the realisation of the way-finding strategy and various public realm projects. The use of section 106 incentives for best practice could also help improve lighting of public spaces throughout the City
- Implement planning policy and guidance in respect of lighting to see the early introduction of more detailed requirements for development with respect to the aesthetic, environmental and residential amenity impact of lighting including adherence to the recommendations made in this report. The requirement for all new development not only to properly consider issues such as character after dark but also to provide a greater level of detail as to the implementation of the lighting.
- Improve communication between key stakeholders and with the wider public
- Creation of a Strategic Lighting Board and a growing understanding of the importance of lighting within the City

Conclusion

Further detail can be found on all aspects of this study in Sections 1.0 – 4.0 of this document and in the Appendix.

For any queries, feedback or further copies of this report please contact:

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1.0/Introduction

1.1/Background to Study

The City of London is home to one of the world's most important international finance districts. It also possesses a unique collection of heritage sites. Moreover, it has a burgeoning twenty-four-hour-a-day economy that is rapidly growing on the back of increased development. The City's relatively small residential population is also beginning to expand. The next few years will see the realisation of exciting new initiatives such as Crossrail, Culture Mile and the Illuminated River. As a result of these developments the streets, open public spaces and riverside will become increasingly busy with pedestrians, bicycles and vehicles, not only by day but also after dark.

Various layers of light combine to produce the character and identity of the City of London. These include spill light from buildings, street and amenity lighting, the floodlighting of both public and private buildings, landscape lighting and illuminated media and signs. These coalesce not only to meet visual needs but also to create ambience and atmosphere. Of these layers, only two are fully owned and controlled by the City: the street and amenity lighting and the highlighting of a number of historic buildings, bridges and monuments. Both of these lighting systems are in need of upgrading or replacement. Whilst the rest of the lighting within the City is largely owned by third parties – often private commercial interests - there is little coherence in terms of the quality or amount of light provided through such schemes. They therefore demand increasing scrutiny through the planning system.

The need for a comprehensive Lighting Strategy at this moment in time arises from the need to replace the majority of the public lighting systems, which are now coming to the end of their life. This in turn provides a 'once in a generation' opportunity to provide a more innovative, imaginative, holistic and consistent approach to lighting within the City of London. Careful planning and design will not only allow the proper consideration of key issues such as movement, safety, security and accessibility, but also the reduction of energy use and light pollution. It will also help improve the character of the City and the way that people experience it after dark.

This Lighting Strategy represents a new vision for the City of London after dark. In so doing, it aims to set a new benchmark for urban lighting, not only in London – but nationally and internationally.

Corporate Plan and Objectives

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1.2/ Briefing Process and Consultation

This Lighting Strategy has been developed to be integral to a number of overall strategic changes taking place within the public realm in the City of London. It has been informed by the individual area strategies and related studies such as the Way-Finding Strategy, Cultural and Visitor Strategies and Local Plan. It has also been subject to a carefully guided process, including briefing, consultation and a series of 'night-walks'.

1.2.1 Briefing

Briefing took place through a series of workshops and meetings and the provision of a series of notes created through Stakeholder Workshops held prior to the commissioning of this study (see Appendix C.2).

1.2.2 Working Group Consultation

Consultation has played a key role; workshops, meetings and presentations have helped a wide variety of stakeholders to share their experience and better understand the issues. Such groups have included:

- City of London Public Realm Team
- City of London Highways and Street Lighting Team
- City of London Transportation Team
- City of London Planning Team
- City of London Open Spaces Division
- City of London Environmental Health Team
- City of London Police
- City of London Cultural and Visitor Development Team
- Culture Mile team
- City of London Access Team
- Transport for London

1.2.3 Nightwalks

A number of guided 'night-walks' took place both to facilitate a better understanding of urban lighting, provide a critical appraisal of the existing conditions and to improve the common experience of the City of London after dark. These tours not only included observations and discussion but also spot meter readings were taken. These helped the various stakeholders better understand the variance in both the quality and quantity of light.

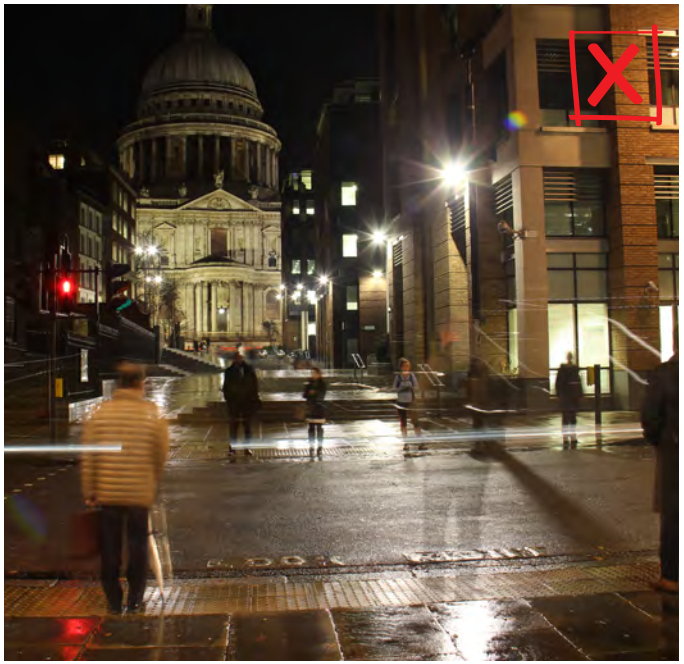
1.2.4 Conclusion

The briefing, consultation and night-walks resulted in a general agreement that the key drivers for the Lighting Strategy would be as follows:

Standards: A set of standards currently regulates the lighting within the City of London which are based on recognised British and European guidance. These help to determine the levels of light and the degree of uniformity for the various routes and open spaces. It was agreed that this Lighting Strategy should provide a new set of standards with the view to reducing light levels but without compromise to safety and security.

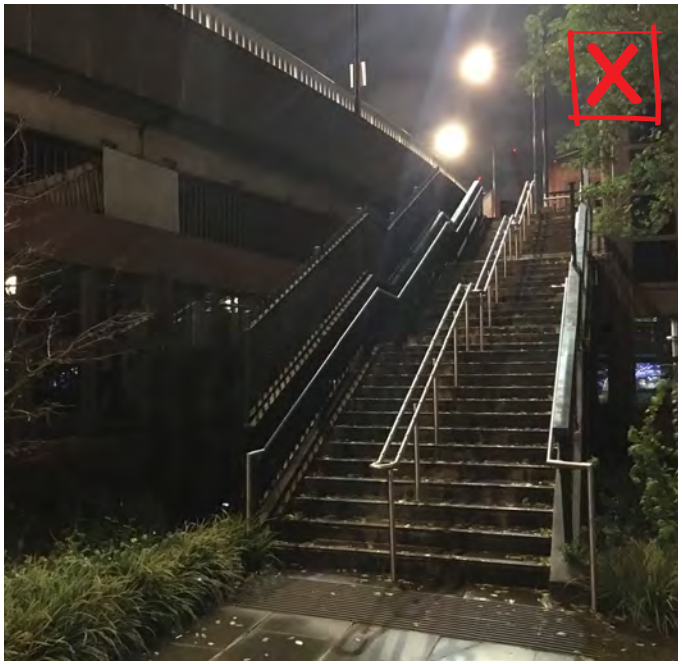
Design: The City of London is directly responsible for the design of the public realm. Whilst lighting is one of the many design considerations, a lack of overall guidance risks an unsatisfactory approach. It was agreed that this Lighting Strategy would provide the context for the early inclusion of lighting into public realm lighting projects and inform the detailed design and delivery.

Planning: Lighting is considered an important and integral part of the planning process, and whilst it is enshrined within both national guidance and local policy, there is a lack of clear and unambiguous good practice guidance to assist both applicants and officers. It was agreed that this Lighting Strategy would provide the context for more detailed planning guidance to be carried out as an independent study with the aspiration to make lighting into an important part of the discussion on planning proposals. This would take place in conjunction with the ongoing review of the Local Plan.



Blanket lighting reduces legibility of space

Overlap of lighting creates unbalanced lighting



Controlled illumination required at key changes in level

Private lighting contributes to illumination of public realm

Historic light sources disappear among high light levels

Lighting integrated into overall design

1.3/ Public Consultation

The Strategy document was published and available to download on the City of London website. The consultation was carried out through a series of drop-in sessions open to public, user surveys and night walking tours, which engaged with local businesses, residents, workers and visitors. The City Lighting Strategy gained widespread attention through social media, receiving over 4,000 shares on LinkedIn; media outlets, with over 10 featured articles; and the public, with a total of 79 formal responses from residents, workers, professionals and visitors.

All surveys and postcards consistently posed the following 4 questions:

- What do you think of the City of London lighting?
- What changes would you like to see in the City of London lighting? If possible, can you please provide location examples.
- What elements of lighting are important to you?
- Please provide any further comments or suggestions you might have.

An evening event was also organised following the consultation to present the draft strategy document to the public. The evening featured a presentation of the strategy followed by a night walk around the Square Mile, which included the demonstration of the lighting Control Management System that allows street lights to be dimmed remotely. The event was very well attended and received positive comments from a varied audience.

All feedback received was collected and documented, and the key points by questions have been summarised. All feedback was also then analysed by themes to gather specific understanding of the issues, concerns and questions that the public had. The themes that emerged included:

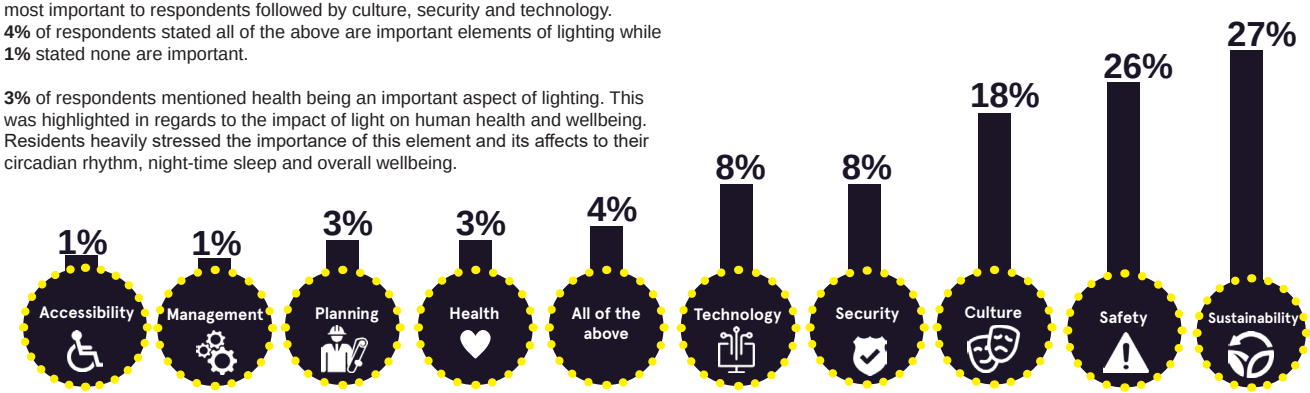
- Safety and Security
- Inconsistency
- Planning
- Character Areas
- Technology and Innovations
- Light Pollution
- Environment/Sustainability
- Culture
- Communication and Stakeholder Engagement
- Management

Drop-in sessions

Q3: What elements of lighting are important to you? (e.g. safety, security, accessibility, culture, sustainability, planning, technology, etc.)

Respondents were asked to list elements of lighting that is most important to them. The aim of this question was to identify and align the priorities within the strategy to the priorities of the public. Both **sustainability** and **safety** were the most important to respondents followed by culture, security and technology.
4% of respondents stated all of the above are important elements of lighting while **1%** stated none are important.

3% of respondents mentioned health being an important aspect of lighting. This was highlighted in regards to the impact of light on human health and wellbeing. Residents heavily stressed the importance of this element and its affects to their circadian rhythm, night-time sleep and overall wellbeing.



Public response summary

Drop-in sessions

Night walking tour

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Night walking tour

2.0/Analysis

2.1/Site Critique

A visual survey of the existing lighting was conducted as part of this study (see Appendix C.3 for detailed analysis and appraisal). The key issues identified were:

- Over-lighting: many areas have higher levels of illumination than required
- Glare: certain types of light fittings being employed create excessive glare
- Scale: the mounting height of some fixtures create an inappropriate scale for pedestrians
- Variety: there is considerable inconsistency and variety born out of piecemeal upgrading

Additional issues raised through stakeholder meetings and briefing materials include:

- Architecture: whilst some unimportant buildings are overlit many landmarks remain dark
- Media: many signs, media screens and advertising sites are too bright
- Colour: coloured lighting is sometimes used in inappropriate places
- Hierarchy: street lighting does not always respect hierarchy, particularly in conservation areas
- Character: the lighting does not always appropriately reflect the character of an area
- Energy use: many commercial buildings have their lighting left on even when empty
- Retail: retail frontages are often over lit and spill too much light into the environment
- Flexibility: current lighting does not suit the needs of the evolving public realm design and use

A full list of concerns, suggestions and observations is listed in Appendix C.3.

Glare is sometimes a problem

Lack of consistency in colour appearance and colour rendering

Highly glazed buildings increase ambient light levels

Luminaire mounting height does not relate to street scale

Overilluminatiion of passageways results in areas of high contrast

Lighting does not celebrate historical character or materiality

Unlit landscape along routes reduces perceived brightness of space

Lack of dedicated event and holiday lighting infrastructure

2.2/Qualities of Light

The quantity, colour, scale and distribution should be reconsidered as part of any upgrade to the street and amenity lighting as follows:

2.2.1 Intensity

Many of the main thoroughfares within the City of London are brightly lit. In some cases lighting levels may be double that of equivalent routes in other areas of London. Whilst this is in response to the need for safety and security, overall levels of illumination should be re-appraised. This will help reduce both energy use and light pollution. Reductions can be achieved without compromise to functionality both through the introduction of fuller spectrum white light sources and by improving uniformity. Both measures allow people to see better in lower lighting conditions. The requirement for lighting may change over the course of an evening; some areas may need to be brighter during busier periods but can be dimmer later at night when there is less footfall. The provision of a new network of dimmable LED street and amenity lighting controlled by a 'smart' public lighting control system will allow the intensity of the light to be raised, lowered and balanced with spill light from buildings. Recommendations for revised levels of illumination for the varying conditions are set out in 4.0 Strategy.

2.2.2 Colour

Both the colour temperature and colour rendering of the public lighting systems should aim for a more consistent approach. Whilst the colour rendering capabilities of modern light sources such as LED have greatly improved over more traditional lamps distinctions might still be made between certain character areas, and in particular conservation areas, by having differing colour rendering performance. Recommendations for colour temperature and colour rendering are set out in 4.0 Strategy.

2.2.3 Scale

The scale of the lighting is a key issue. The preference for mounting street lighting on buildings helps reduce clutter on the footways. At the same time mounting at high level, particularly within narrow streets alters scale and character. Consideration should be given to mounting fittings at a more human scale, when possible, as part of any move to upgrade the public lighting systems to LED. The introduction of column mounted lanterns of an appropriate style and height might be considered in places where the width of footways permit, or where such forms make a positive contribution to the streetscape. The physical size and identity of light fittings must also be considered, particularly in historic areas and residential neighbourhoods. Recommendations for mounting heights are set out in 4.0 Strategy.

2.2.4 Glare

Whilst the procurement, design and delivery of new public lighting systems offer an opportunity to address glare in some cases pilot schemes have led to an increase in this problem. This is due to the optical design of new LED street lights. Greater consideration of this factor will allow a reduction in street and amenity lighting levels but without compromise to safety and security.

Example of overlit public realm affecting light levels in adjacent spaces

Example of colour temperature having a direct impact on the appearance and character of an area

Example of human scale lighting and luminaire style enhancing character of street

Example of high glare luminaires reducing eye adaptation to lower light levels

2.3/Layers of Light

The lighting of the public realm is composed of a series of 'layers of light' that are designed, delivered and controlled by a wide variety of stakeholders. Each makes its own contribution to the image and identity of the City after dark. Whilst the City of London only directly controls two of these layers; the street and amenity lighting and the occasional architectural illumination of key buildings, and bridges, consideration must be given to the contribution made both to the visual scene and also the amount of available light that each of the layers provides. In some cases it may be possible to exercise discrete control over the design, delivery and maintenance of certain layers, by example illuminated signs and media. Good practice guidelines provided to both retailers and commercial developers and landlords responsible for the provision of office lighting may contribute to a reduction of unnecessary light spill into the public realm.

The lighting of the City of London can be improved by considering how each layer is designed, delivered and controlled to meet both present and future needs as follows:

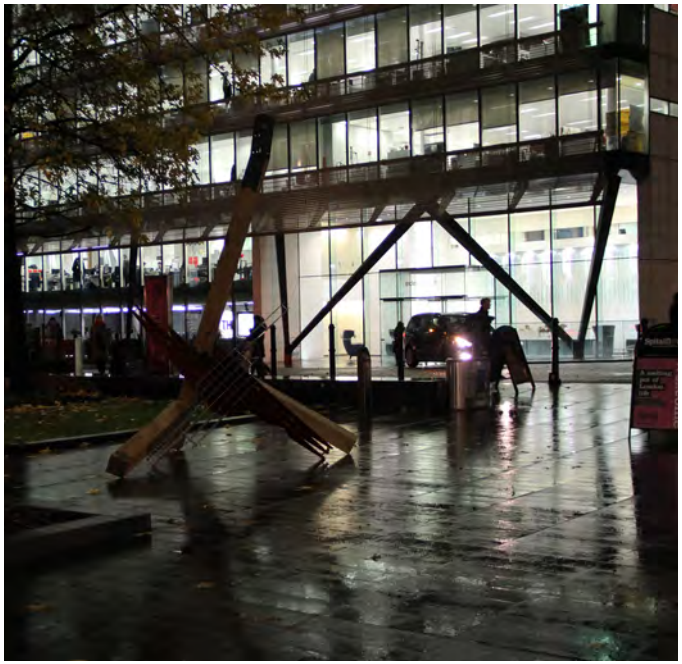
- Occupancy: spill light from glazed buildings is an issue that may be positively addressed both through good practice and by balancing the street and amenity lighting to account for the contribution it makes.
- Signs and Signals: better control should be exercised over the brightness of illuminated signs and media screens. This can be achieved both through guidelines and improved communication with stakeholders at early stages.
- Street and Amenity Lighting: This is to be upgraded throughout the area as part of a major procurement of new LED lanterns and smart lighting controls.
- Architectural Lighting: lighting to existing landmarks should be upgraded alongside an initiative to identify historic and contemporary buildings, bridges and other structures worthy of illumination.
- Landscape Lighting: greater provision of landscape lighting should be considered as part of improvements to the public realm. Consideration should also be given to landscaped areas where darkness should be retained such as parks and churchyards.
- Art: it is recommended that greater consideration is given to the illumination of public art to allow it to make a contribution to the streetscape and for it to be enjoyed after dark.
- Event: Consideration should be given to upgrading and improving the electrical and mechanical infrastructure to support events as part of the upgrade of the street and amenity lighting systems including a more integrated approach to control.

A more detailed analysis of the definitions and contribution made by the various layers of light within the City of London can be found in Appendix B.

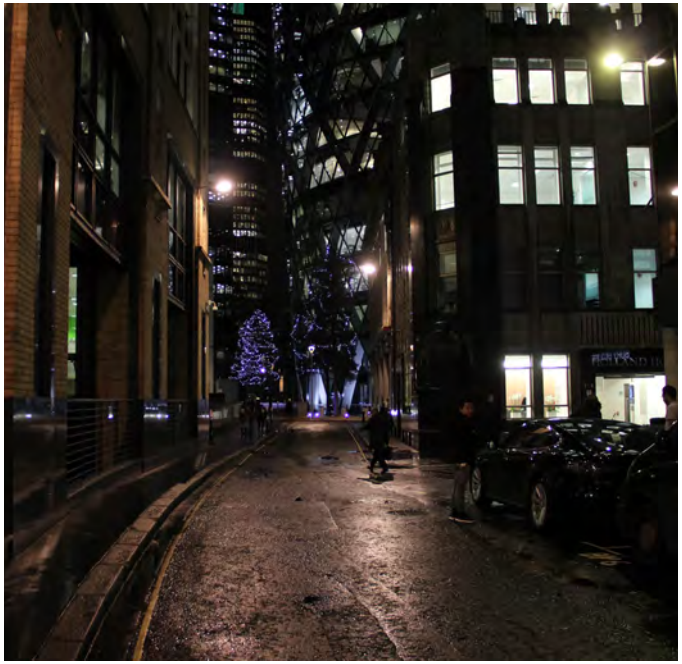
Illuminated signs and media screens detract from night-time character

lighting to existing landmarks should be upgraded

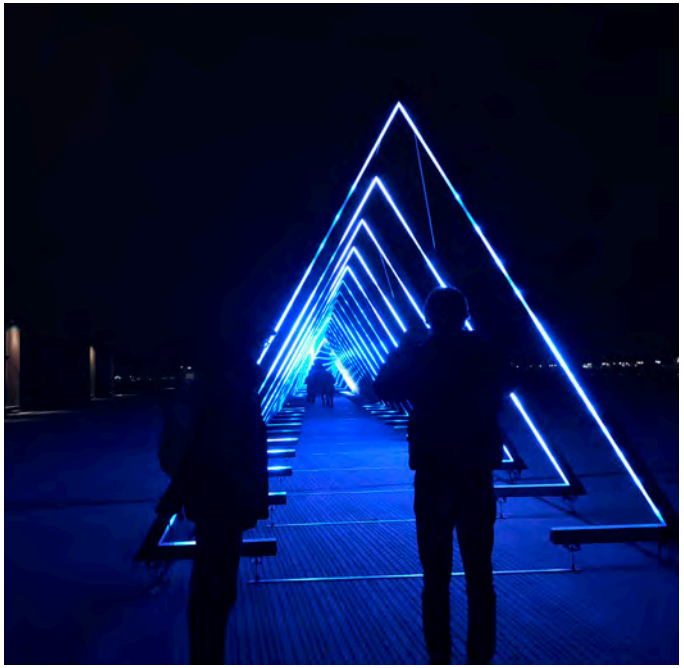
Spill light and intrusive light from glazed buildings should be avoided



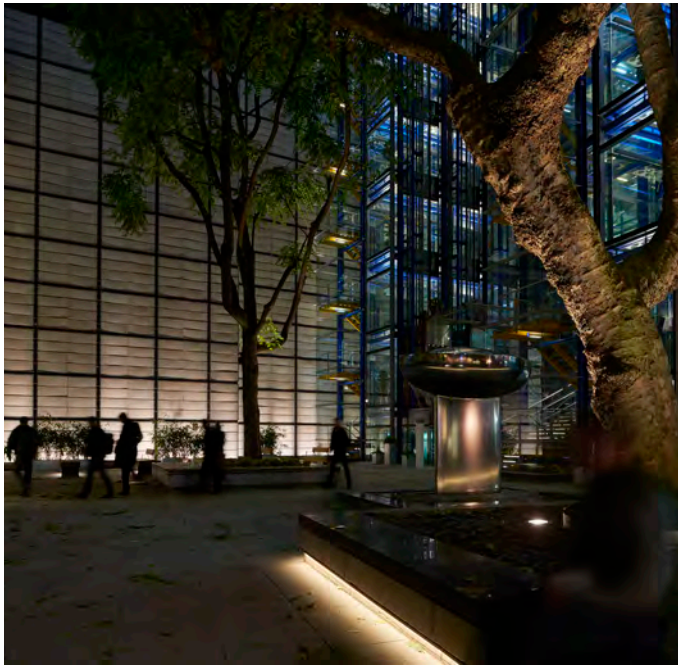
Considerate lighting of lobbies can reduce impact on public realm



Private and public lighting require a cohesive approach



Upgrading lighting infrastructure can facilitate greater range of events



Landscape lighting enhances public spaces

Public art illuminated after dark accentuates local landmarks

2.4/Character Areas

Lighting plays a key role in place-making after dark. As such it is therefore an essential extension of urban design. One of the key recommendations of this strategy is to employ light and darkness to enhance the character the series of distinct character areas that make up the City of London. These may be distinguished after dark by subtle changes to intensity and colour appearance. Creating specific lighting treatments to open spaces, buildings, landscaped areas and public art will also help highlight the unique heritage, scale and detail that helps to define their individual character. Such character areas include:

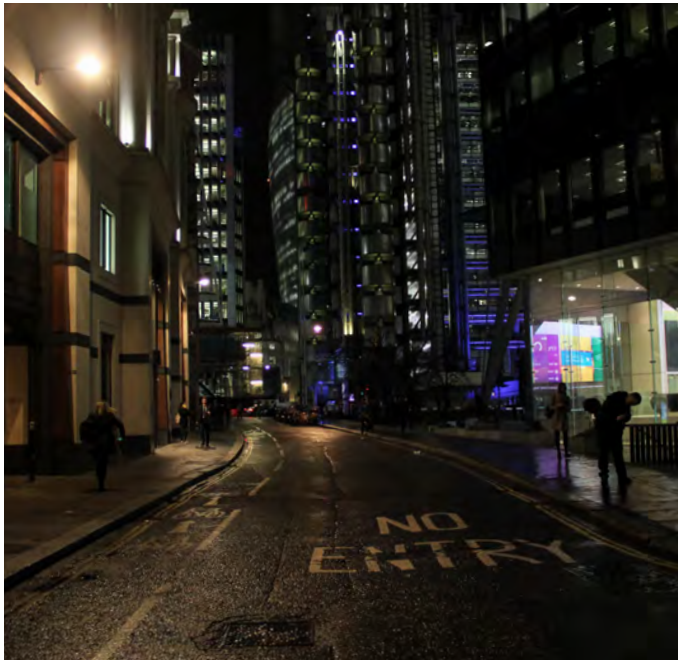
- Chancery Lane
- Temples
- Fleet Street
- St. Paul's and Carter Lane
- Culture Mile
- Cheapside and Guildhall
- Bank
- Liverpool Street
- Middlesex Street
- Eastern City Cluster
- Aldgate
- Riverside Walk

A detailed description to the approach to the illumination of each character area is summarised in 4.0 Strategy.

Existing lighting at Bank Junction within Bank area

Existing lighting at Millennium bridge underpass within Riverside Walk area

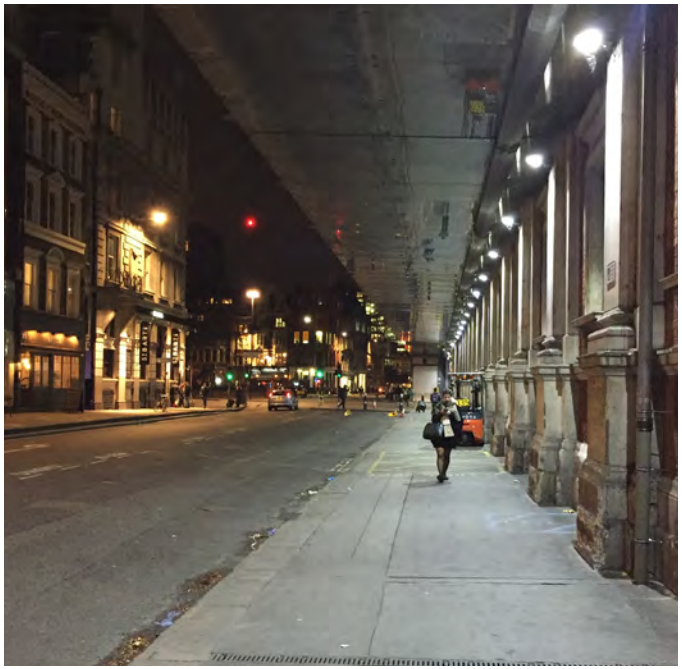
Existing lighting at Widegate Street within Middlesex Street area



Existing lighting at St. Mary Axe within Eastern City Cluster area

Existing lighting at Lower Thames Street within Riverside Walk

Existing lighting at Bow Churchyard within Cheapside area



Existing lighting at Long Lane within Culture Mile area

Existing lighting at Finsbury Circus within Liverpool Street area

2.5/Night-Time Legibility

A more legible city after dark is a safer city for all. It is widely recognised that using light to reveal the hierarchy of streets, buildings and open spaces and their dimensions, materiality and detail, can greatly benefit people's movement and use of the public realm. This is through assisting intuitive way-finding and orientation. Improving the legibility of the City after dark however is not to make it appear as it does by day: Rather it is to provide its own specific 'night-time character'.

One methodology is to focus on the illumination of a series 'urban elements' with the view to forming a list of opportunities for projects that will not only help improve legibility but also help reinforce character and identity. Such elements include:

- Gateways: the positive illumination of thresholds into and out of different areas can contribute to way-finding.
- Routes: hierarchical illumination of principle, secondary and tertiary routes can assist with promoting pedestrian movement.
- Open Spaces: careful consideration of the illumination of all types of open public spaces can inform both movement and dwell time and assist with orientation.
- Landmarks: the highlighting of landmarks such as buildings, bridges and monuments, and in particular those that close vistas or appear on the skyline, can greatly aid orientation
- Vistas: the highlighting of buildings on corners or those that stop views can help reinforce existing vistas and promote pedestrian movement.
- Boundaries: the positive illumination of routes over, under or around topographical and man-made boundaries can help promote pedestrian movement after dark

A more detailed analysis and study of how to promote greater legibility after dark can be found in Appendix A.

Example of Gateway

Example of Landmark

Example of Route

Example of Open Space

Example of Vista

Example of Edge

3.0/Vision

3.1/Design Principles

"This Lighting Strategy aims to deliver a creative, holistic and smart approach in which light and darkness are better balanced to meet both a functional and aesthetic need."

It aims to provide the vision, methodology, standards and guidance to meet the future requirements of the City of London. It also suggests how light may be employed to help reinforce the City's existing identity as a world-class business centre, whilst respecting and complementing both its heritage and character. It specifically looks to encourage walking and cycling by creating an enjoyable, safe and secure experience of the public realm after dark, but in a sensitive and environmentally responsible manner. In recognising the City of London's Smarter City programme initiatives it introduces an innovative approach to both technology and technique to help create much greater flexibility for the future.

Good lighting not only keeps us safe by helping to prevent accidents, but also contributes to security through assisting with the prevention and detection of crime. It can also help us find our way, whether through intuitive means or illuminated signage, thereby preventing us from becoming lost and disorientated.

Lighting also helps underpin the night-time economy creating the ambience against which shopping, dining, entertainment and events can all take place. Alongside economic activity, it can also support communities by extending the use of public space after dark - thereby promoting interaction and providing people with confidence to use the streets and spaces.

There are however consequences to using artificial light: reducing the amount of light we use can help conserve fossil fuels and reduce carbon emissions. Light pollution, a by-product of illuminating the City, not only blocks our view of the stars but can cause a nuisance for residents and damage local ecologies. Over-illumination not only wastes energy but also creates visual pollution that can be detrimental to character.

This Lighting Strategy considers all of the above. It also seeks to address and balance a wide number of, often conflicting, requirements from a range of stakeholders who use lighting as part of their lives. This includes not only the workers, shoppers and visitors but also residents.

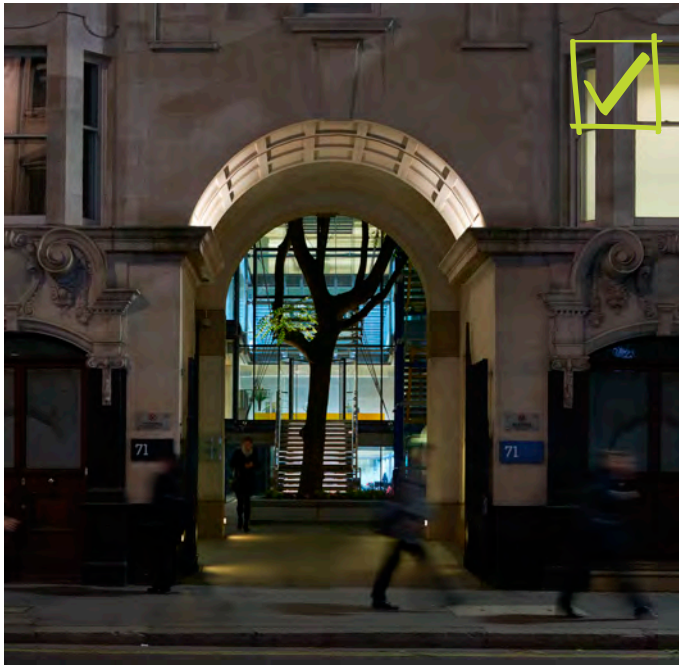
Feature lighting to landscape elements enhances public realm

Balance of public and private lighting creates cohesive streetscape

Low level lighting reinforces sense of privacy

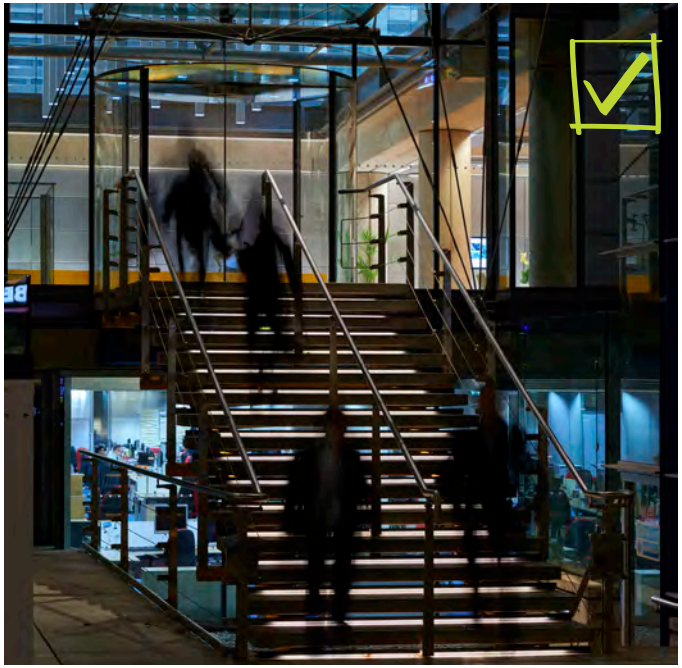
Low level lighting promotes views out to the City

Well illuminated areas support night time economy



Positively illuminated thresholds and end views support legibility

Well illuminated routes reinforce pedestrian movements



Integrated lighting to changes in level supports pedestrian safety

3.2/Key Objectives

The Lighting Strategy aims to meet a range of objectives. These include:

- Improving the quality and balance of light and darkness.
- Addressing a series of design criteria.
- Examining opportunities for improving the public lighting in a coordinated manner throughout the City

This section of the study aims to define these in general terms prior to specifically addressing them in 4.0 Strategy.

3.2.1 Balance of Light + Darkness

The night has distinct qualities creating an experience of the public realm that is different to that by day.

It is vitally important to improve the quality of light within the City of London as part of any initiative to re-light the whole area. This should done through considering properties such as intensity, colour temperature, colour rendering, glare and scale (see Appendix C.1 for definitions).

Both the quality and quantity of light can be determined through the careful selection of light sources. Glare and scale can be controlled both through the optical design of the lighting equipment, how the light is directed and the height at which it is mounted. The overall impact and effect of the lighting can be further managed through the use of lighting control.

The provision of light however must be carefully balanced against the need to retain natural darkness in some areas of the City of London such as churchyards, parks and gardens - and along the Thames corridor. Consideration should also be given to the amount of light that is to be used local to residential properties with the view to avoiding light spill through windows. Whilst darkness can sometimes heighten the fear of crime and increase the risk of accidents, it can also provide visual quietness and a sense of silence, privacy and intimacy. It also greatly helps bio-diversity with many creatures such as insects, birds and bats and other flora and fauna benefiting from the proper observation of the natural diurnal cycle.

Appropriate light sources for routes promotes views to landmarks

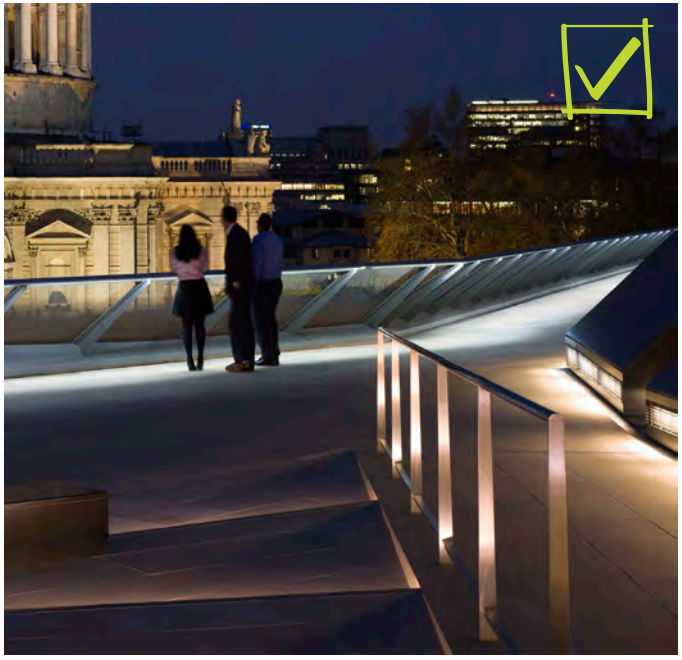
Darkness can provide sense of quietness and silence

Obtrusive light spill into windows must be avoided

Balanced intensity of light reduces visual discomfort

Balance of light and darkness creates visual interest

Sense of privacy supported through subtle lighting



Varied colours of white light differentiate spaces

Scale of lighting responds to street character

3.2.2 Design Criteria

Any reappraisal of the existing public lighting, or the future provision of new street, amenity, architectural and landscape lighting, must address a number of issues. In some cases these are complementary - but in others quite contradictory. The delivery of any part of this Lighting Strategy should aim to balance these criteria, not only based on the brief and agreed priorities but also experience and judgment. They broadly divide into three specific categories: Functional, Cultural and Sustainable:

Functional

Safety

One of the primary reasons public lighting is used is to help prevent accidents. This is through addressing the potential conflict between people, bicycles and vehicles, identifying key hazards such as changes of level or by simply enabling people to see where they are going and what others are doing. Improving the quality of light and the balance of vertical and horizontal illumination together with the positive identification of hazards such as flights of steps and ramps will contribute to greater safety. High light levels should be avoided where possible to discourage unsafe driving practices such as increased driving speeds.

Security

Lighting plays a key role in the prevention of crime through support for surveillance, both natural and via CCTV. It also helps the police carry out their duties effectively after dark. A reduction of contrast and glare, improvements in uniformity and colour rendering and the provision of better lighting control can help reduce people's fear of crime. This in turn enables the authorities to improve their response to incidents, safeguard against anti-social behaviour, street crime and terrorism and support ongoing measures to reduce suicides.

Accessibility

People with disabilities, especially those with visual impairments and the ageing population, and those with sensory/ neurological processing difficulties can struggle to use the City after dark. Better consideration of the quantity, quality and uniformity of street and amenity lighting and the reduction of excessive contrast and glare will help improve accessibility. Measures to use lighting to provide greater legibility after dark, such as improved lighting to signage, will also assist with orientation and movement.

Legibility

We use a combination of intuition and recognition to help navigate space and orientate ourselves by day. This helps with movement and supports our understanding of place. Many of the visual clues we use such as landmarks and signs are not always visible after dark. The manner in which streets and space are illuminated can often make the City confusing and disorientating creating a sense of alienation and fear. Illuminating key features can create a more visually intelligible nightscape and help make public space more accessible.

Cultural

Experience

Good lighting should create a positive experience after dark. It must not only meet the basic functional requirements for illumination but also clearly reveal the various public spaces and buildings that make up the fabric of the City. Balancing light and darkness and prioritising the illumination of vertical surfaces will help improve legibility and character.

Character

The City of London is composed of a number of distinct character areas. Visible layers of history, architecture and the scale of the streets and public spaces all combine to create character. A homogenous approach to street and amenity lighting, and a lack of clarity in respect of the hierarchy of architectural lighting, can result in a loss of distinction. Place-making at night can be informed by good lighting through tailoring the intensity, contrast, colour and scale of the light.

Heritage

Lighting can play a key role in revealing the heritage of the City helping to enhance its reputation as a tourist destination. It should be employed not only to ensure that historic street patterns and buildings, monuments and art remain as distinguishable by night as they are by day, but also provide an appropriate interpretation and thereby make a contribution to tourism and education.

Flexibility

The celebration of local, national and international events including winter festivals such as Christmas, Diwali and Chanukah provide opportunities to celebrate the life of the City and its culture and bring communities together. Illuminating events to both create drama and celebration can be complex and expensive. The provision of a supporting electrical and mechanical infrastructure including control can improve co-ordination and provide a more cost-effective solution for the rigging of events.

Sustainable

Social

Lighting can help bring communities together and encourage greater use of public space and local amenities after dark, particularly during the winter months. Safely illuminated streets and open spaces provide the opportunity for greater interaction between all those that use the public realm after dark.

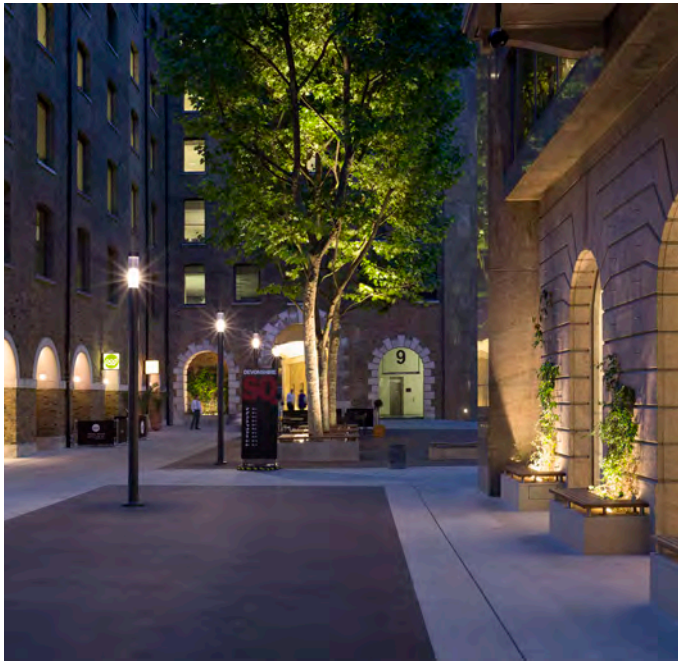
Economic

Lighting can help support the development of the night-time economy not only through enhancing safety and security but by also providing an appropriate ambience against which retail, entertainment and other commercial activities can take place. The provision of retail lighting guidelines can assist.

Environmental

Proper consideration must be given to the reduction of energy use. Light pollution, light spill and trespass and over-illumination should also be better controlled. A reduction on adverse impacts on local ecologies must also form an integral part of any strategy. Greater access to natural darkness can help create visually quiet areas of respite. Further guidelines can be found in Appendix C.4.

Safety



Experience

Economic

Legibility

Heritage

Environmental

3.2.3 Opportunities

This Lighting Strategy seeks to identify opportunities for improving the lighting within the City of London across a wide range of considerations.

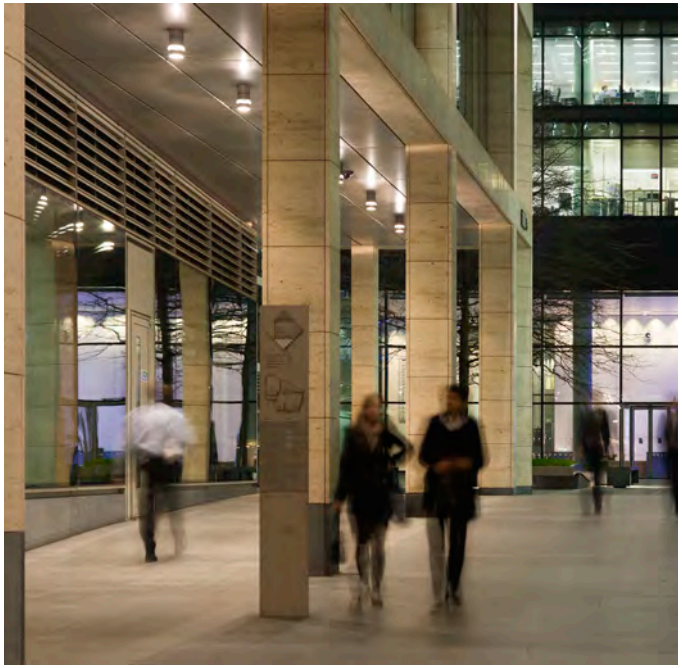
Opportunities include:

- Movement: providing improved levels of illuminance for the various routes and open spaces with a particular focus on pedestrian and bicycle movement.
- Character: using light to accentuate the unique qualities of the overall network and each distinct area after dark
- Legibility: illuminating key 'urban elements', and in particular key buildings and bridges to help improve intuitive way-finding and orientation at night
- Standards: reassessing the existing lighting levels and uniformity to help reduce energy use and light pollution but without compromise to safety and security
- Sources: upgrading the existing light sources to newer low energy, longer life LED with improved colour appearance and colour rendering to help improve safety and security whilst reducing energy costs and maintenance
- Luminaires: upgrading both contemporary and heritage discharge lamp street lanterns, bulkheads and other fitting types together with supporting electrical and mechanical infrastructure to help improve performance including the reduction of glare
- Control: installing a City-wide smart lighting control system to allow dimmability in response to diurnal change and light spill from buildings to help improve overall management, provide greater flexibility and reduce energy and maintenance costs
- Mounting: re-assessing mounting positions and heights of fittings as part of any upgrade to the lighting infrastructure including the occasional use of columns to help improve scale and enhance character
- Visitor attraction: illuminating important archaeological, heritage and cultural sites and public art assists with tourism and education
- Well-Being: reducing light spill and light pollution, particularly adjacent to residential properties, will help improve well-being
- Bio-Diversity: better environmental control of the lighting will assist in reducing adverse impacts on local ecologies
- Planning: Embedding lighting within the planning system will help improve design and control aesthetic outcomes
- Management: a more holistic approach to lighting will assist with communications between key stakeholders resulting in greater efficiency, less waste, lower costs and improved maintenance

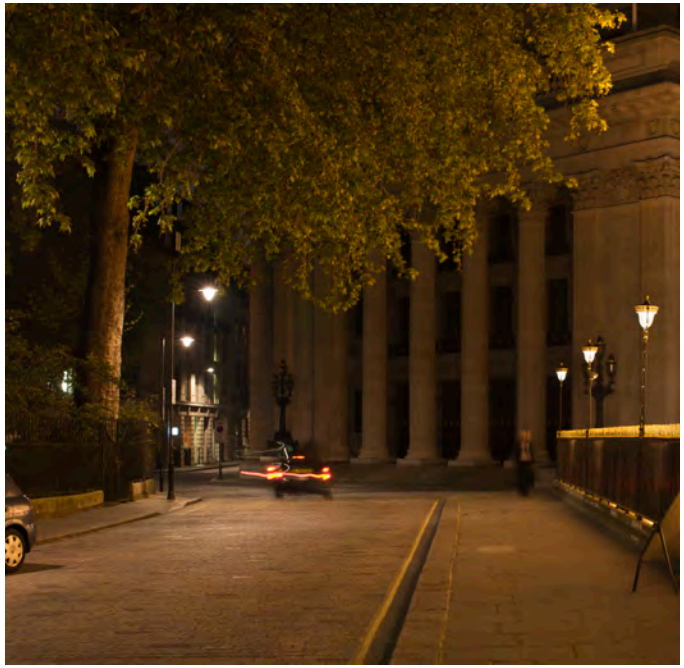
All of the above opportunities and more are further explored in 4.0 Strategy.

Movement

Character

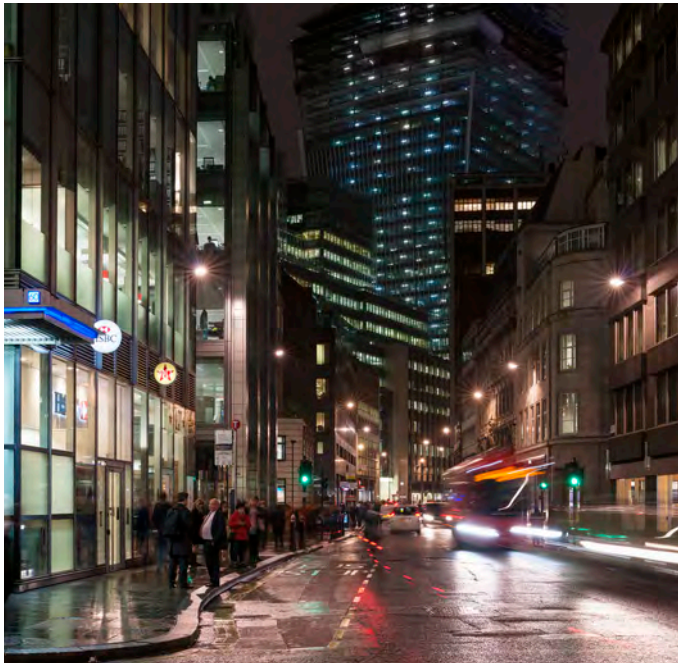


Luminaires



Mounting

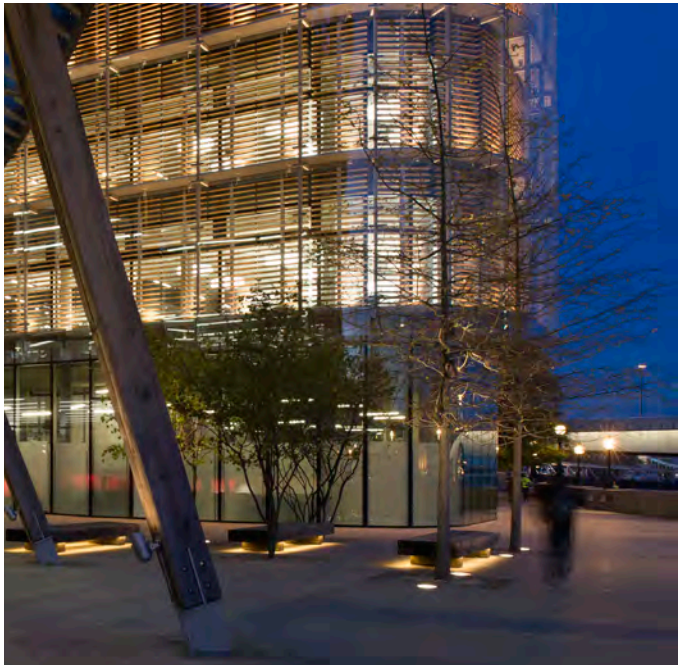
Legibility



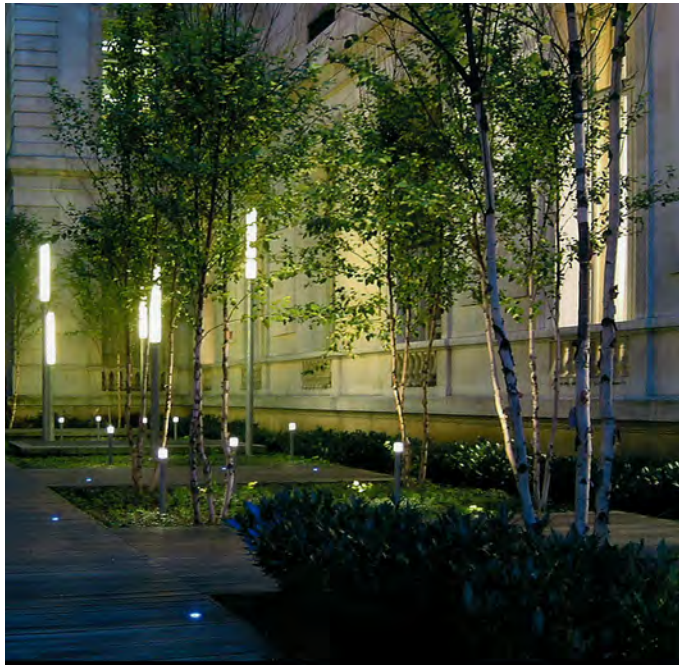
Standards

Sources

Visitor Attraction



Well-Being



Bio-Diversity

4.0/Strategy

4.1/Key Recommendations

This Lighting Strategy seeks to provide a number of recommendations for improving the lighting within the City of London. It does so not only through examining the quality and quantity of light itself but also through the identification of ideas and measures that might be practically implemented over time.

Whilst the introduction of new dimmable LED lighting systems and a smart lighting control system, along with a review of standards, will provide a better quality of light and balance of illumination, people's experience of the City of London after dark can be enhanced through many other initiatives. However, the key to gaining the most from the implementation of the various recommendations is to focus on how lighting can be best orientated and prioritised towards pedestrians and cyclists rather than vehicles.

Most of the prevailing standards, techniques and methodologies that have dominated the design of public lighting in the post war period are based on 'lighting the highway'. This has often led to over-scaled solutions that have focused light onto the kerb and roadway from fittings located at high level on building or columns leaving pedestrian footways largely illuminated by secondary spill. Whilst providing light that aims to prevent accidents is critical, priorities may now shift in response to the reduction of traffic speed and increased pedestrianisation. Changing attitudes towards the relationship between light and crime also inform new ways of thinking whilst concern to provide even greater accessibility creates new requirements. Above all the need to create a more sustainable approach means that reductions in energy use, light pollution and ecological impacts are imperative.

All this points towards a new approach in which the ability to reduce the background levels of illumination whilst enhancing the enjoyment of architecture, landscape and art through bold and imaginative lighting schemes.

This section of the Lighting Strategy addresses key areas of design and management that are recognised as the main priorities for the design, implementation and maintenance of the public lighting: safety, security, accessibility, sustainability, culture, planning, management and delivery. These have been the subject of more detailed consultation with key stakeholders and have been revised following the comments received through the public consultation. It also examines the possibilities offered by new source, luminaire and control technologies, a topic that has been widely discussed with the Street Lighting Division.

4.1.1 Safety

One of the key roles of artificial lighting is to keep people safe and prevent accidents, whether through the avoidance of conflicts or the clear identification of potential hazards such as changes of level. Road danger reduction, the improvement of lighting for pedestrians and cyclists and the highlighting of conflict areas are all priorities.

Improvements in lighting technology have seen the introduction of fuller spectrum white light, initially through metal halide and more recently through light emitting diodes (LEDs). These new sources improve our ability to see, including our peripheral vision. Their small size and potential for better optical control allows greater uniformity without recourse to glare. It is therefore possible to improve the lighting of conflict zones despite reducing levels of illumination. This has the advantage of mitigating other factors that can impair vision such as glare and excessive contrast whilst at the same time reducing energy use and light pollution.

The clear identification of hazards against a lower background illumination also makes for a safer environment. By example highlighting junctions makes crossing points clearer or providing integrated lighting to staircases not only signals changes of level but also put sources below eye level allowing a clearer field of view. Improving vertical illumination can make for better recognition, an important factor in the future where increased use of bicycles and electric vehicles raises the risk of accidents due to their silent running. Whilst recent research questions the direct correlation between the incidence of traffic collisions and the reduction of street lighting the reduction of lighting levels should only be considered when balanced by other positive measures such as an increase in the lighting of vertical surfaces.

Recommendations:

- Prioritise improvements in lighting in relation to pedestrians and cyclists.
- Contribute to road danger reduction through the positive highlighting of conflict areas .
- Employ fuller spectrum white light sources such as LED to help improve visual function.
- Provide better optical control to luminaires to deliver uniformity without recourse to disability glare for motorists.
- Use integrated lighting to changes of level such as staircases or ramps.
- Illuminate vertical surfaces to improve legibility and heighten the sense of security.

4.1.2 Security

Lighting plays a key role in the prevention of crime, largely through surveillance. Whilst new research demonstrates that there may be little direct correlation between the incidence of crime and the reduction of street lighting, and that turning down lighting can have a positive impact on behaviour, good lighting nonetheless governs people's perception and provides them with the confidence to use the public realm after dark.

Improvements in light quality through the provision of fuller spectrum white lighting providing good colour rendering aids facial recognition and helps support CCTV, not only helping to deter and prevent crime and anti-social behaviour but also assist with suicide watch. The use of higher quality lighting with its more accurate rendering of colours combined with improved camera technology can result in accurate CCTV footage despite lower levels of light.

It is also important to recognise the need to improve the lighting as the residential population of the City of London increases. This relates as much to areas with hotels that serve tourists as it does for the more permanent residents. There is also the requirement to respond to peak lighting demand in different areas by various authorities, and in particular City of London Police; by example to be able to raise or lower lighting levels when clubs and pubs close down or in response to the threat of terrorism.

The ability to control public lighting, and in particular street and amenity lighting, on an area by area or even fitting by fitting basis provides the potential for a more dynamic response when incidents occur after dark. Opportunities include ideas such as officers attending an accident or crime scene being able to turn up the street lighting local to the incident to assist them with their work. This in turn means that general reductions in street lighting may not compromise policing.

Recommendations:

- Improve communication and coordination between different stakeholders.
- Employ fuller spectrum white light sources such as LED to help improve recognition.
- Design for the minimum requirements of CCTV cameras
- Consider improved lighting local to hotels and residential .areas
- Allow the control of individual groups of luminaires in response to incidents.
- Provide sufficient flexibility to allow a managed response to police requirements.
- Ensure consultation is carried out with CoL Police to obtain recommendations for colour temperature, light levels and timing management of streetlighitng in vulnerable areas.

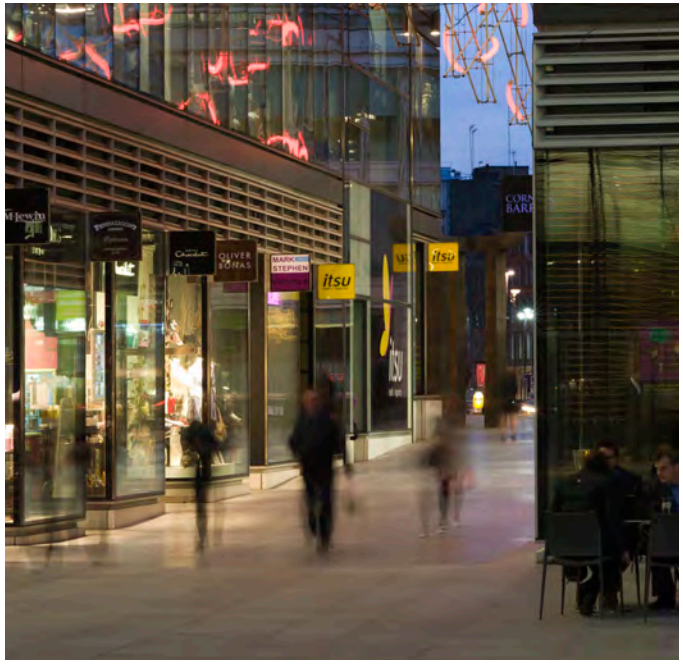
4.1.3 Accessibility

The City of London should be accessible to all, regardless of ability and age. Future measures should carefully consider how lighting may be better employed to assist people with disabilities, especially those with visual impairments and address the needs of an ageing population including the increased use of mobility scooters, wheelchairs and walking aids. Whilst the working population has a reasonably young demographic there are residential communities within the City that include large numbers of elderly people. The needs of tourists, young children and other visitors must also be considered. Improvements in the quantity, quality and uniformity of street and amenity lighting and the reduction of glare will help improve accessibility. Measures to use lighting to provide greater legibility after dark will further assist with orientation and movement.

Recommendations:

- Consider the needs of people with reduced mobility, particularly on key routes
- Avoid glare and excessive contrast for those with visual impairments
- Positively illuminate steps, ramps and other changes of level
- Ensure that uplighting is well shielded and properly directed to avoid glare
- Ensure dimming of light sources during off-peak hours will not compromise accessibility needs.
- Consider the needs of people people who have sensory and / or neurological processing difficulties and how lighting could improve their journeys

Prioritise improvements in lighting to pedestrians and cyclists



Design for minimum requirements of CCTV

4.1.4 Sustainability

Sustainable lighting development seeks to balance the social and economic benefits that good lighting can bring to the City of London after dark with the environmental consequences that arise from using artificial light. These include energy use, light pollution and potential ecological impacts. Re-lighting the City of London over time provides a unique opportunity to observe best practice.

Social: In terms of social benefit good lighting can improve communication and interaction within communities after dark. A reduction in light spill and light trespass that can impact sleeping patterns amongst the residential population can aid well-being through observation of the impact of light on circadian cycles. This not only includes commercial properties, advertising sites and the floodlighting of buildings but also temporary measures such as security lighting on construction sites.

Economic: Benefits should include providing more focus to retail areas at night, and in particular those streets and open spaces where food and beverage offers might thrive. This might include a warmer quality of ambient lighting and the more frequent highlighting of architecture, public art and landscape features. The provision of a network of hanging points and electrical outlets that are closely integrated to the smart lighting control system will help improve the City's ability to create more imaginative, colourful, and spectacular events after dark which in turn will help boost the economy.

Environmental: Whilst new LED lighting technologies can provide greater efficiency, lowering light levels or encouraging private building owners to switch off unnecessary lighting after hours, will greatly help reduce the City's overall carbon footprint. Such reductions can not only be achieved through better use of lighting control but also through better design. Light pollution can be mitigated through the use of light fittings with improved distribution and which limit light spill into the sky and removing unrequired luminaires where appropriate. Glare can be better controlled through selecting luminaires with high quality optical design. Ensuring that fittings are properly angled such that they are directly lighting surfaces will help reduce unwanted light spill. A reduction in background levels of illumination will make it easier to highlight buildings, monuments and art without recourse to creating lighting solutions that are brighter than necessary due to competition from street lighting. Observing good practice with respect to limiting obtrusive light will help minimise light trespass and nuisance. Retaining and protecting natural darkness in landscaped areas such as parks, gardens, churchyards and by the river will also help protect local ecologies. Adverse impacts on bio-diversity can also be avoided through specific measures such as limiting the amount of uplighting to trees, particularly where there are nesting birds, observing the presence of bat corridors and following recognised guidance such as DEFRA's Statutory Nuisance from Insects and Artificial Light. A 'dark night' might be considered where lighting to key landmarks is turned off.

Recommendations

- Improve the quality of light in residential areas.
- Provide an appropriate ambience in night time economic areas
- Reduce light spill and light trespass local to hotels and residence
- Reduce over-lighting through consideration of the lit context.
- Consider a 'dark night' turning off non-essential lighting to help save energy
- Consider the impact of artificial light on well-being.
- Reduce levels of illumination either through design or the use of smart lighting controls
- Provide good practice guidelines to building owners and users including contractors
- Employ high quality luminaires with good optical control.
- Ensure that any upward light is directed at vertical surfaces rather than into the sky
- Consider retaining natural darkness as is appropriate in environmental sensitive areas
- Employ best practice guidance with respect to limiting impacts on bio-diversity and reducing light pollution
- Remove unrequired luminaires where appropriate

4.1.5 Culture

Lighting can play a key role in the cultural development of the City of London at night. This will be particularly important with respect to key programmes and projects such as Culture Mile and the Illuminated River. It is therefore recommended that key archaeological, historic and culturally significant buildings, bridges and artworks are highlighted to assist with interpretation, educational outreach and cultural tourism. Whilst details of typical subjects are included in the Legibility Study in Appendix A a separate analysis should be carried out to identify priorities, hierarchy and funding. For this to be successful and sustainable a clear and simple policy is required that provides guidance as to the lighting of such features, particularly where listed. An overall reduction in lighting levels will help ensure that building and bridges do not become over-lit by having to compete with the background conditions. Floodlighting should be avoided in favour of 'close offset' techniques where the lighting is either directly attached to the subject or located very locally. Integration of architectural and landscape lighting with the smart lighting control system will assist with the management of timings.

Recommendations

- Develop a simple policy for the highlighting of key building, bridges and other landmarks, beginning with a pilot proposal in Culture Mile area
- Avoid over-lighting, floodlighting and the inappropriate use of colour
- Manage timings of lighting schemes through the City-wide smart lighting control system
- Co-ordinate the feature lighting of buildings, bridges and artwork with a programme of local, national and international events

4.1.6 Planning

Lighting is required to be properly and fully embedded within the planning system and both national guidance and local policies seek to secure this. This can be further achieved through measures such as more detailed planning guidance. The successful illumination of new developments could be better secured through earlier engagement with applicants and the requirement to include a lighting strategy as part of any pre-application submission. Better resources and an improved knowledge base are required to assist with the discharging of conditions including the provision of best practice guidelines for commercial, retail and residential buildings. Improved communication between the planning department and key stakeholders as to the aesthetic and wider environmental outcomes of lighting decisions will greatly aid a more holistic approach. The new planning guidance would be required to cover both design and environmental considerations as well as the potential impact on residential amenity e.g. obtrusive light, light spill, light pollution etc.

Recommendations

- Promote best practice on lighting around design and environmental considerations
- Require lighting strategies to be provided as part of the pre-application process where appropriate
- Good communication between key stakeholders regarding function and aesthetic outcomes
- Publish detailed planning guidance as to the use of lighting within the City of London to support and enhance the implementation of policy

4.1.7 Management

However successful the design and delivery of the various recommendations of this Lighting Strategy, its continued success will be reliant on the ongoing management and maintenance of both the lighting policies and systems. Improved communication between key stakeholders, and in particular residential groups, will greatly assist in continuing the dialogue, knowledge base and response. Careful observation of policy and the coordinated procurement of both lighting equipment and control, including spare parts, will avoid a repetition of the piecemeal development of the lighting systems over time and will help maintenance and reduce running costs. Use of smart lighting controls to help control the lighting in response to background levels of light, footfall and the need to respond to incidents will make for a more successfully managed scheme. Lighting is now sufficiently important to the social, economic and sustainable development of the City of London that it may require a dedicated strategic group to champion it and direct its management on a night-by-night basis.

Recommendations

- Improve communication and follow up with key stakeholders.
- Develop a clear policy of the long term procurement, upgrading and repair of new systems
- Employ smart lighting controls to provide a more responsive and flexible approach
- Consider the appointment of a dedicated Strategic Lighting Board
- Update the City Public Realm Technical Manual to include the introduction of new luminaires and light fittings to inform external stakeholders

4.1.8 Technology

The City of London has decided to upgrade its street and amenity lighting systems. These will use new types of lanterns employing light emitting diodes (LED) as sources, which in turn will be controlled by a new state-of-the-art 'smart' lighting control system. Upgrading to new light sources will not only provide improvements in the quality of the light but also allow much slimmer and lighter-weight lanterns to be used. This in turn will help reduce the visual clutter on facades. At the same time consideration must be given to the visual design of new lanterns and their sympathy for the architecture onto which they are fitted. This is particularly important in the case of listed buildings. The use of special and customised luminaire variants should be considered for luminaires mounted on listed buildings or installed withing historic areas. In some cases it may be considered appropriate to provide custom design housings and/or bracketry. This in turn will help reduce the visual clutter on facades. Whilst current solutions do not provide good glare control it is anticipated that this will improve with new generations of lanterns that follow.

A new 'smart' lighting control system will not only allow the street and amenity lighting to be switched on and off on a fitting by fittings basis as required but also dimmed such that it can account for spill light coming from buildings as well as responding to time, footfall and incidents. It will not only provide greater flexibility but also allow monitoring and feedback which will assist with the management of the lighting systems and help reduce maintenance costs. It will also allow light and darkness to be better balanced.

Recommendations

- Upgrade all public lighting within the area to high quality LED
- Employ simple lanterns and bracketry that are architecturally neutral
- Consider the use of custom housings where fitted to key listed structures
- Upgrade the lighting control to a smart system allowing the individual addressing of luminaires and feedback and monitoring
- Provide more flexible management of the lighting systems adopting different lighting levels at different times and the ability to respond to incidents
- Save energy by using luminaire and control technology to allow the lighting to respond more dynamically to background lighting levels
- Consider opportunities to reduce number of luminaires where practical

4.1.9 Delivery

The Lighting Strategy for the City of London will only be effective if feasible delivery mechanisms for its recommendations are identified. Whilst this will take both time and funding there are three key ways the realisation of the vision can be achieved in the short to medium term:

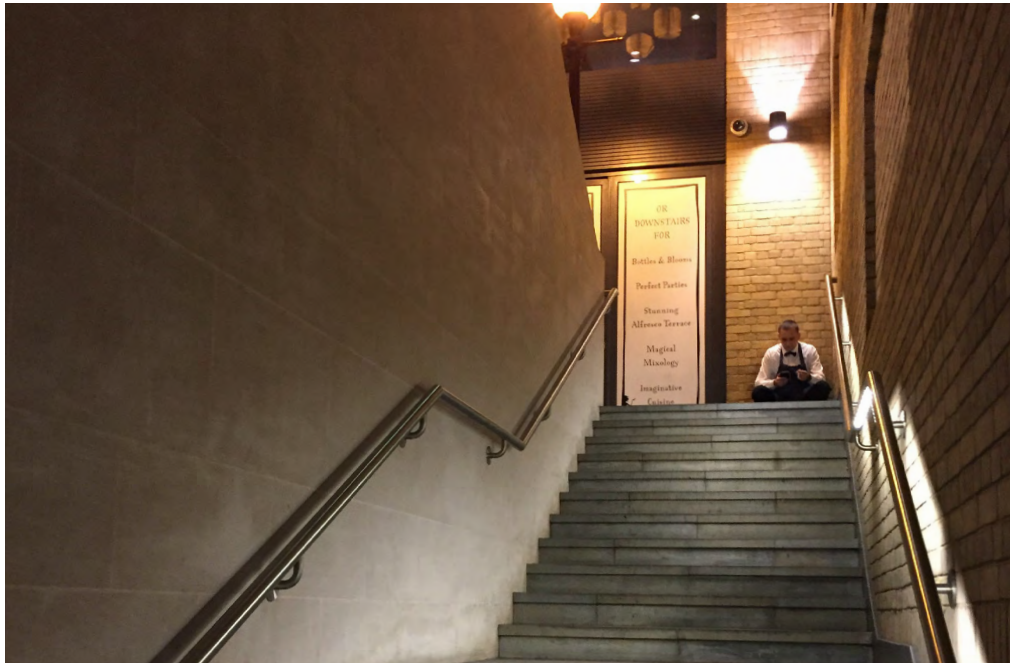
- Replacement of Street and Amenity Lighting: The current proposal seeks to fully replace and upgrade all of the existing street and amenity lighting to LED whilst retaining and enhancing historic gas lighting and heritage lanterns. The installation of smart lighting controls to monitor and manage the system offers a unique opportunity to put a large amount of the recommendations of this Lighting Strategy into practice. Not only will the upgrade allow smaller and more efficient light fixtures to be employed that will save energy and reduce environmental impact, but also the ability to dim the street lighting on an area by area or street by street basis will allow for a general reduction in brightness without compromise to safety and security. Such an upgrade will also allow for improvements to mounting heights, when feasible and agreed by building owners, and glare and promote a potential reduction in the amount of lighting equipment and its supporting infrastructure. Along specific roads and alleyways and historically sensitive areas the use of trial tests could help agree appropriate colour temperature for new lighting.
- Improvements to the illumination of the public realm and key landmarks: A series of ongoing publically and privately funded initiatives including Culture Mile, Illuminated River, the upgrading of the architectural lighting of St. Paul's Cathedral, the realisation of the way-finding strategy and various public realm projects all provide the opportunity to deliver a series of finished lighting projects. This will greatly help improve the overall experience and perception of the City of London after dark. It is also hoped that a wider series of initiatives will be considered for the illumination of key elements that assist with creating a more legible environment at night including the illumination of various historic buildings such as churches and livery halls, public art and key public spaces. The use of section 106 incentives for best practice could also help improve lighting of public spaces throughout the City.
- Implementation of improved planning guidance: Improvements to planning policy and guidance in respect of lighting as suggested by this Lighting Strategy will see the early introduction of more detailed requirements for development with respect to the aesthetic, environmental and residential amenity impact of lighting including adherence to the recommendations made in this report. The requirement for all new development not only to properly consider issues such as character after dark but also to provide a greater level of detail as to how the implementation of the lighting will encourage a response that is more sensitive to the broad requirements of each character area. It is recommended that this framework is provided through planning guidance. Such guidance will provide clarity of advice on potential lighting impacts arising from development and how they need to be considered as part of the planning process.

Other measures as recommended in this report including improved communication between key stakeholders and with the wider public, the creation of a Strategic Lighting Board and a growing understanding of the importance of lighting within the City of London will greatly help with incremental improvements over time that will further support the initiatives outlined above.

Lighting integrated into public realm design

Vertical illumination can help create continuity between spaces

Improve lighting local to hotels and residential areas



Upgrade to LED sources can help improve facial recognition

Balance public and private light

Illumination of key landmarks improves legibility and wayfinding

4.2/Lighting Standards

4.2.1 Lighting Levels

The City of London currently maintains over 14,000 lighting points the majority of which deliver the street and amenity lighting throughout the City to help keep people and property safe and secure. It also illuminates street signs and bollards and a number of key buildings, bridges and monuments.

Public lighting for the streets and open spaces is currently designed to a set of standards that are based on British Standard BS5489/EN13201-1:2013. This nationally recognised standard provides guidance for the design of lighting of roads and public amenity areas. Other lighting standards which inform current policy includes codes and design and engineering guidance from the Institute of Lighting Professionals, Chartered Institute of Building Services Engineers, Secured by Design and other organisations with an interest in public lighting.

It is recommended that the current lighting standards are amended to align with the adoption of an updated transport strategy and account for the following:

- Improvements in the quality of light delivered by new source technologies.
- Improvements in the flexibility of lighting delivered by new control technologies.
- The needs of character and ambience
- Requirements of the City of London Public Realm team
- Requirements of the City of London Police
- Requirements of the City of London Accessibility Group
- Changes in best practice

The definition of routes used in the following diagrams has been created following the Local Plan, Transport Strategy and the highways route classifications (Appendix C.2) which is based on the purpose and the users of the roads. 'Main Roads' are both London and City access, which are strategic roads and London, local and borough distributor roads (as per the Town&Country Planning Act definition). 'Side Roads' and 'Footways and Alleyways' are local access roads and function as local access roads for vehicles and cycles with pedestrian priority, and streets which are closed to vehicles.

A table outlining the recommended lighting standards to be employed in the City of London is included below. This includes for three levels of light which are influenced by time of day and levels of daylight:

- Peak: the general lighting level to be employed during busy times from twilight and dawn until an agreed curfew which may vary from area to area
- Off-Peak: a lower level of lighting to be employed during quieter times from an agreed time which may vary from area to area until dawn
- Incident: a maximum level of light which may only be employed in emergencies or in direct response to incidents or public order issues
- Night: a lower level of lighting which can be employed after an agreed curfew time in residential areas or areas of lower traffic among others.

Although the timings and management of these different states can be determined on a street by street basis once the new street and amenity lighting is installed and commissioned, it is proposed the new control system is based on levels of daylight in conjunction with time of day. Since the peak/off-peak times do not greatly vary seasonally, the difference in dusk and dawn times is accounted for by sensing daylight and using that condition as the main on/off trigger. This will allow peak, off-peak and night-time levels to be pre-programmed and respond to the dramatic shift in daylight hours between the summer and winter months. The tables below provide suggested lighting levels and lighting levels criteria which may be adjusted after a trial period in response to feedback.

Lighting levels may be increased at key junctions where there is a proven or perceived heightened risk of accidents occurring. However, high light levels should be avoided where possible to discourage unsafe driving practices such as increased driving speeds. A series of unique scenes may also be used to suit areas of increased night time economy, residential areas, temporary events, and proximity to transport hubs by example. The following diagram provides a summary of the recommendations with respect to lighting levels:

Lighting Levels Timings Criteria*

Peak Time	5:00 - 21:00
Off-Peak Time	21:00 - 0:00
Night Time	0:00 - 5:00

*Lights to turn on only if light levels fall below designated levels

Streets

	Uniformity (U_o)	Peak (E_{av})	Off-peak (E_{av})	Incident (E_{av})	Night (E_{av})
Main Roads	0.4	20lx	10lx	50lx	10lx
Side Roads	0.4	15lx	7.5lx	30lx	7.5lx-5lx
Footway/Alleyway	0.2-0.4	10lx	7.5lx	20lx	7.5lx-5lx
Riverbank	0.2-0.4	7.5lx	5lx	15lx	--

**Appropriate 'Night' light levels to be assessed depending on location and foot traffic
**Uniformity (Uo) dependent on routes through space as defined by use

Open Spaces

	Peak (E_{av})	Off-peak (E_{av})	Incident (E_{av})
Adjacent to Main Roads	15lx	10lx	30lx
Adjacent to Side Roads	10lx	7.5lx	20lx
Adjacent to Footway/Alleyway	7.5lx	5lx	15lx
Adjacent to Riverbank	7.5lx	5lx	15lx

**Lighting levels indicated define values for routes around or through open spaces. Values noted should not be applied to entire space.
**Uniformity (Uo) dependent on routes through space as defined by use

4.2.2 Colour

The hue of white light (colour temperature) of the public lighting systems should be more consistent. It is recommended that the main street and amenity lighting systems range from warm white light (2700K) to cool white light (4000K) depending on the typology of the route or open space with consideration given to the intended character of the wider area and the particular route. As the classification of routes changes over time as a result of traffic experiments and implementation of reduced traffic zones supporting more pedestrian oriented use it is important to reevaluate colour temperature and ensure it supports the changing character and primary user accordingly.

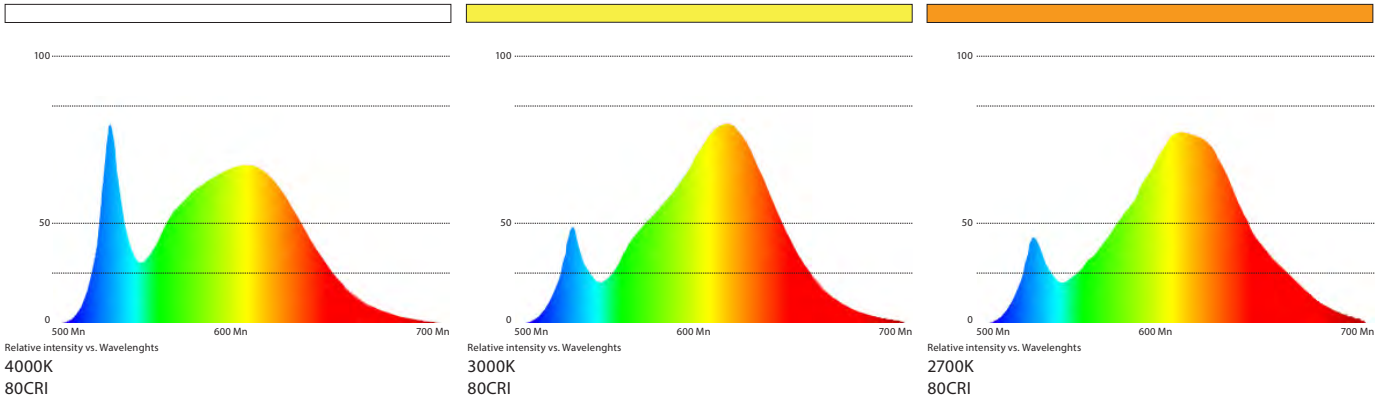
Distinctions between certain character areas may be made through the use of colour temperature, by example Fleet Street's warmly lit narrow streets and passageways will help enhance the historic character or within the Eastern City Cluster where the highly glazed towers marry well with warmer colour temperatures of the public realm and open spaces. In the near future tuneable white luminaires will offer a flexible alternative allowing a luminaire to shift between a range of colour temperatures as explained in Appendix C.5.

Where there is doubt over the appropriate colour temperature required for a route, the decision should be informed by the wider character of the area as well as the following criteria themes:

- Conservation area
- Pedestrian dominated
- Residential area
- Proximity to wildlife and greenery
- Open space
- Vulnerable area
- Night time operation use

LED's generally provide high quality colour rendering Ra 90 or above. This means colours will look natural or accurate. In some cases such high quality might work against the character of an area, by example in historic districts where a lower quality may seem more authentic and appropriate. In such areas the use of lower colour rendering such as Ra 80 or lower may be employed.

The use of saturated coloured light should be limited to temporary lighting schemes only such as is employed for festivals and events. The permanent lighting of public art or light art itself may be an exception. This is in recognition of the unique setting of the City of London as a historic and cultural centre. Care should be taken to regulate coloured spill light onto building facades and into the public realm from illuminated advertising and media screens. Please note estate lighting should follow residents' consultation and advice regarding listed building consent. The following diagram provides a summary of the recommendations with respect to colour temperature:



4000K
80CRI

3000K
80CRI

2700K
80CRI

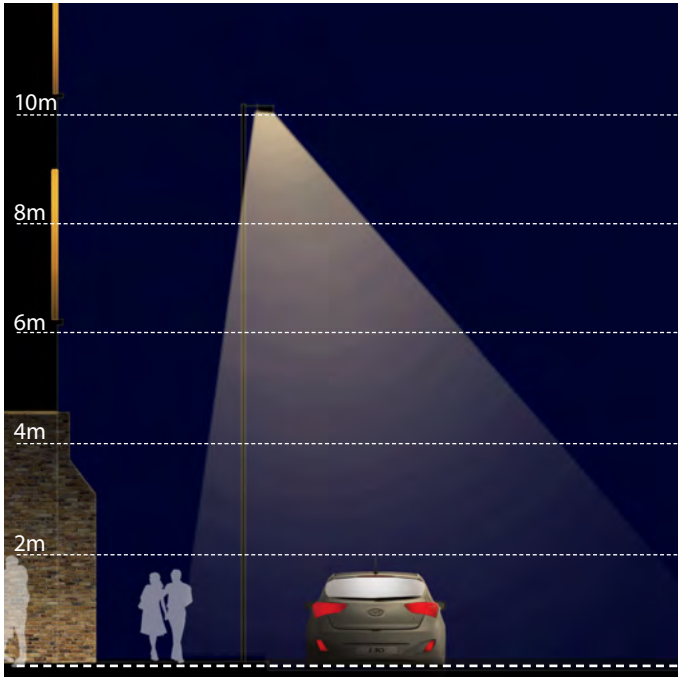
*Colour temperature of routes will be determined in response to the criteria themes listed in text opposite such as conservation area, proximity to wildlife and pedestrian dominated among others. Colour temperature will be reevaluated in future in response to changes of route typology

4.2.3 Mounting

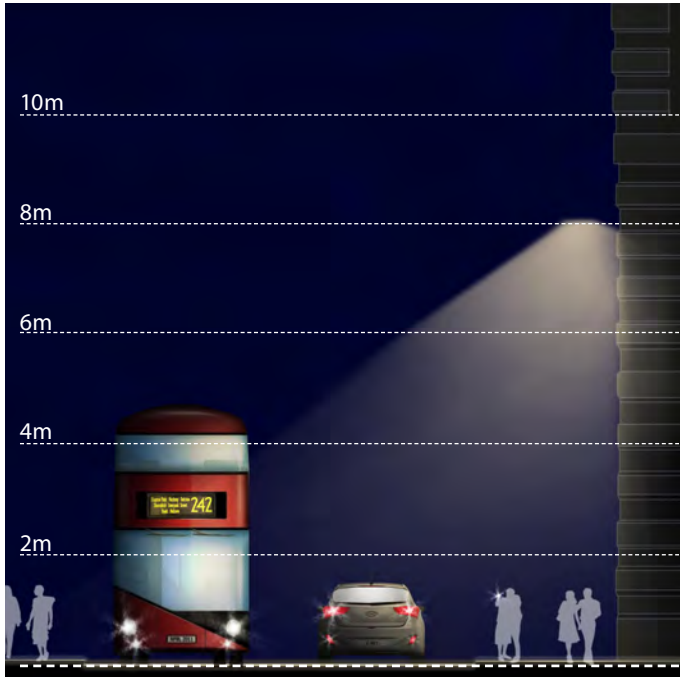
Lanterns should generally be mounted on building facades wherever possible in accordance with current policy and in the interests of reducing clutter on the footway. The occasional use of column mounted lanterns may be permitted where it can be clearly demonstrated that such an arrangement makes a positive contribution to the design of the public realm or no alternative strategy is possible or practical.

Lanterns should be mounted on building facades such they respect the design and visual hierarchy of the building with custom fixtures and/or brackets being considered in the case of important listed buildings or bridges. Whilst spilling light onto the facades of buildings is often unavoidable lanterns should be specified so as to limit visually inappropriate scalloping or shadows.

The mounting height of lighting equipment should generally be sympathetic to the height and width of a street or open area such that it either responds to the architecture or human scale. The following diagram provides a summary of the recommendations with respect to mounting heights. Estate lighting should follow residents' consultation and advice regarding listed building consent as to how existing luminaires are upgraded.

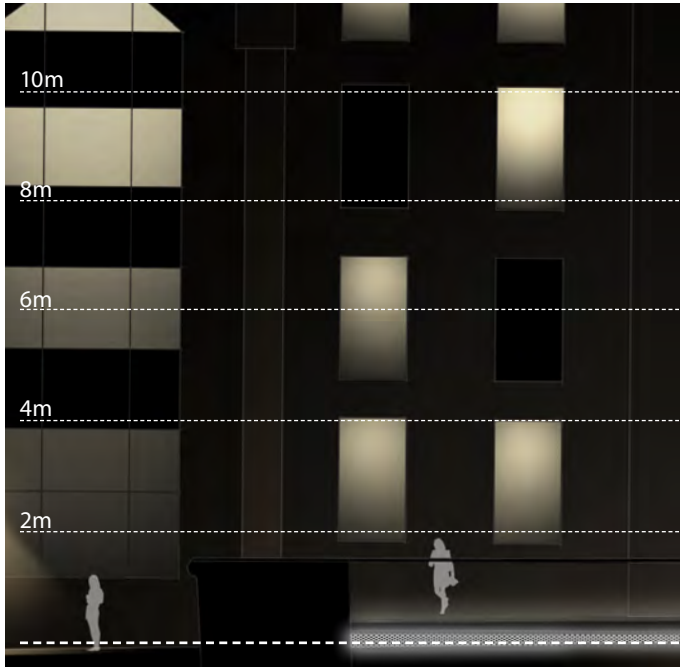


Illustrative diagram: 10m mounting height



Illustrative diagram: 8m mounting height

Illustrative diagram: 4m mounting height



Illustrative diagram: under 4m mounting height

4.3/Character Areas

The City of London is made up of a series of character areas, each with distinct attributes. The distinction between these areas in terms of the hierarchy and scale of the streets, the design and materiality of the buildings and the provision of open space is clear by day. Appreciation of the character of each area directly contributes to the experience of being in the City.

Lighting can play a key role in place-making after dark through creating the right balance of light and darkness, revealing the texture and colours of materials, providing new interpretations for architecture and landscape and promoting the use of light for public events. In so doing lighting becomes a key urban design tool.

This Lighting Strategy aims to accentuate the unique qualities of each area through a layered lighting approach such that the various character areas maintain some distinction after dark. This will help avoid homogeneity and enhance people's experience of the public realm at night.

The following summaries build on the general recommendations of this strategy to provide a guide as to measures that might be adopted in addition or as variations to suggested lighting standards, colour temperature, scale, mounting heights, etc. Such guidance is not intended to be prescriptive, rather it provides the context against which individual lighting schemes might be developed in different areas over time.

4.3.1 Network

There are a series of site-wide conditions that require specific lighting considerations irrespective of the character area within which they exist. These 'network elements' include routes, changes of level, transport entrances and exits, bus stops and shelters and taxi ranks.. A consistent approach to the illumination of such network elements will help create cohesion.

The most prominent elements within this wider network are the various East/West and North/South routes used by pedestrians, cyclists and vehicles on a daily basis. Whilst the intensity of light will distinguish each type of route it is proposed to unite all primary routes with secondary and tertiary routes in line with each character area through employing a consistent colour temperature. This differentiation of routes is proposed with the intent to encourage pedestrians onto alternate routes alleviating overcrowding.

In addition to the functional lighting of routes accent lighting is proposed to assist wayfinding along primary and secondary routes and to help provide a more human scale. This includes the positive lighting to bus stop totems and shelters, illuminated bollards adjacent to cycle hire stations and taxi ranks. This will help to highlight their presence after dark.

Transport hubs such as underground stations and bus terminals are currently illuminated to much higher levels than those proposed within the wider public realm leading to areas of high contrast in which the eye struggles to adapt. It is therefore proposed that light levels gradually step up around transport entrances and exits to create a gradual transition into and out of the public realm.

The implementation of a dedicated site-wide control system supported by sensors and monitoring devices will provide the potential for light levels to be automatically adjusted in response to surrounding light levels or conversely respond to a drop or increase in light levels around station entrances.

Recommendations:

- Employ a consistent colour temperature to primary routes. Highlight changes of level including steps and ramps when appropriate.
- Highlight entrances to rail and underground stations, bus stops, cycle stations and taxi ranks.

Chancery Lane

Temples

Fleet Street

St.Paul's and Carter Lane

Culture Mile

Cheapside and Guildhall

Bank

Liverpool Street

Middlesex Street

Eastern City Cluster

Aldgate

Riverside Walk

4.3.2/Chancery Lane

Providing a unique mix of historic and modern, Chancery Lane houses modern amenities at its Northern and Southern extremes with a wide variety of historic buildings located in between. Historic lanterns should be employed to illuminate streets and passageways in a warm white light enhancing the character of the area while concurrently supporting pedestrian safety and security. The introduction of a consistent human scale of mounting height and retail signage lighting will help reinforce vistas along routes and allow shops, cafes and restaurants in the area to become focal points after dark. Listed buildings such as The Public Record Office should be carefully illuminated in rich warm light delivered from customised lanterns.

Recommendations:

- Use historic lanterns to enhance the character after dark.
- Introduce consistent luminaire mounting heights.
- Introduce a retail lighting strategy along main routes to help reinforce night-time economy.
- Highlight major junctions to assist with legibility and improve safety.
- Use customised lanterns to deliver subtle lighting to historic facades.
- Employ warm white lighting to enhance historic character.

Consistent mounting heights reinforce vistas

Warm white colour temperature enhances historic character

Retail lighting strategy gives cohesive appearance to street

Illustrative Section

Chancery Lane Sketch Visual

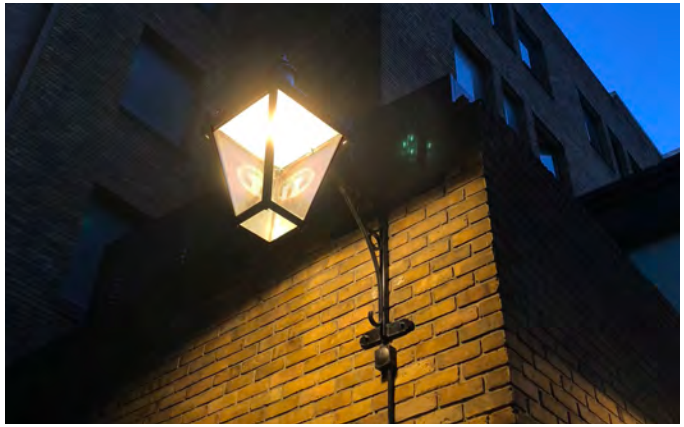
4.3.3/Temples

Situated in the western periphery of the City, Temples is an area full of rich architectural history illuminated by modern and historic light sources. Middle and Inner Temple, both privately maintained areas, are illuminated by gas light providing a softly lit and unique atmosphere after dark with very low yet uniform light levels. In order to reinforce the historic character, period appropriate lanterns shall be mounted at a human scale of between 4-6m throughout the area including on streets such as Temple Avenue, Carmelite Street and, most notably, Tudor Street which provides a direct link to the Inner Temple. Entrances into Temples along Fleet Street as well as Victoria Embankment will be illuminated in a subtle manner conveying a welcoming atmosphere after dark. A warm white colour temperature will be implemented throughout the area to assist in stitching the historic and more modern urban fabric together while carefully balancing light and darkness avoiding high levels of contrast. Careful consideration should be taken in the selection of LED light sources to compliment and enhance the existing gas lighting of the area. Many LED sources such as LED panels cause notable reflections in historic style lanterns resulting in an unwanted appearance after dark which does not marry well with the historic lantern. Given that footfall throughout the area will vary at peak and off peak hours, the lighting control will adjust light levels during these times of the early morning and evening to assist with wayfinding creating a safe and secure environment.

Recommendations:

- Retain historic lighting and ensure addition of modern luminaires and light sources complements and enhances the existing lanterns of the area.
- Maintain low uniform light levels to enhance historic atmosphere, deliver balanced light levels, and reduce contrast. Introduce historically appropriate lighting to Temple gateways including retrofit LED sources, such as LED gas mantle replacement modules, to maintain historic appearance by day and night.
- Use colour temperature to blend newer areas with historic:
  -Historic gas: 2000-3000K
  -Modern LED: 2700K
- Keep mounting heights low to create positive pedestrian experience and reduce visual contrast between historic area and surroundings.
- Ensure luminaire distribution provides gentle illumination to vertical surfaces

Historic lantern with original gas mantles



Discharge lamp period style lantern fitted with appropriate LED module

Illustrative Section

Tudor Street Sketch Visual

4.3.4/Fleet Street

Directly north of Temple and bordering Culture Mile, the character area of Fleet Street is home to a series of narrow lanes and courtyards, some which are still illuminated by gas, such as Gough Square. These narrow routes are pedestrian spaces accessed via covered passageways. Soft illumination to these routes combined with positively illuminated terminations will help encourage pedestrian movement through the area.

It is proposed that the network of medieval streets and lanes will be softly illuminated by historic lanterns mounted at human scale with controlled light spill onto walls. Careful consideration must be given to limiting obtrusive light spill through the windows of residential properties.

Key landmarks within the area, such as St. Brides Church, should be illuminated to serve as local landmarks after dark and aid legibility and orientation.

North of the network of courts and lanes the area has given way to larger commercial developments composed of glazed buildings and large public spaces. As a result mounting heights in these areas need to increase to respond to the architecture with a cooler colour temperature introduced to aid the transition between the historic and modern. Low level lighting to seating areas, landscape and artworks will help provide a more human scale supporting social activity after dark.

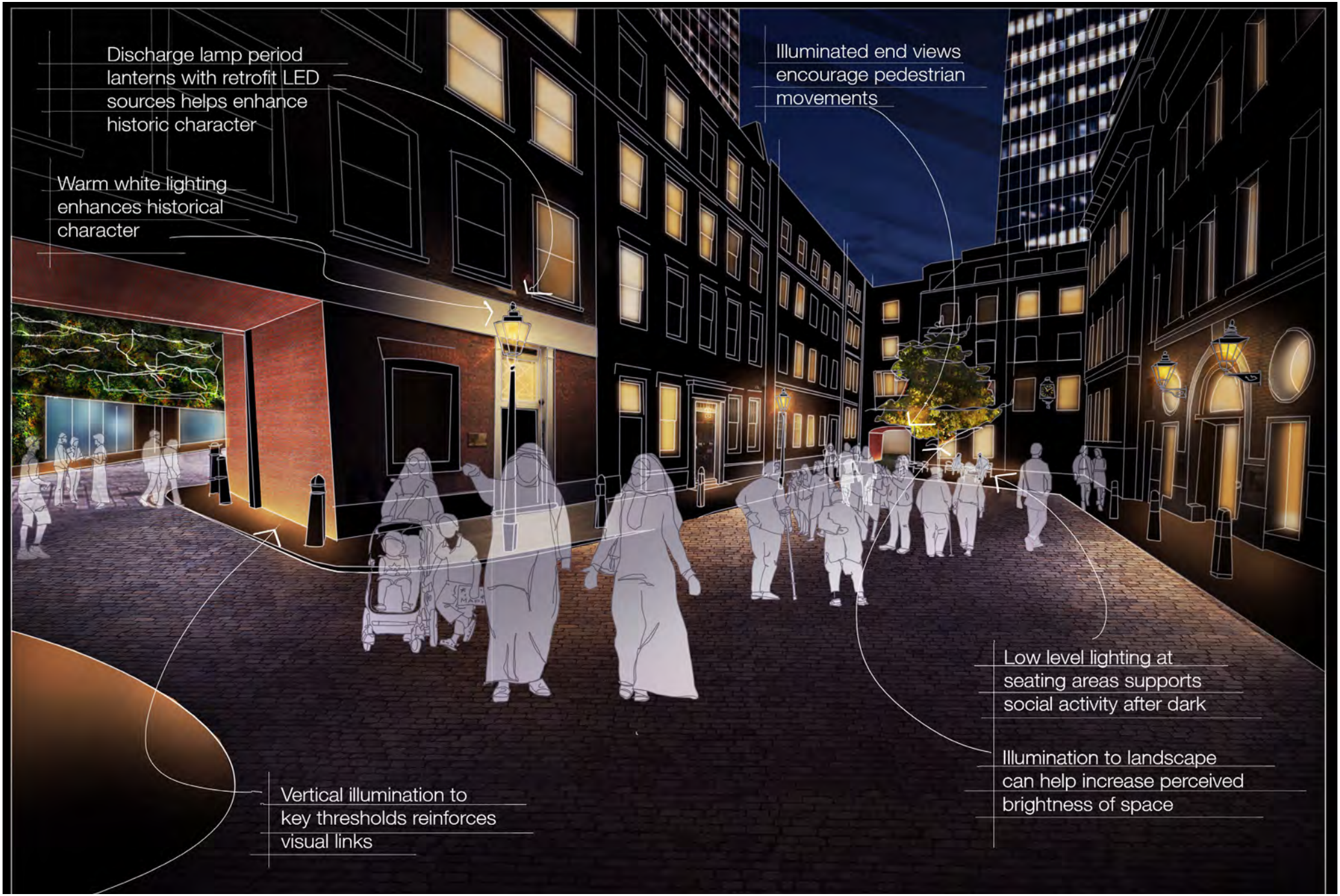
Recommendations:

- Provide vertical illumination to key thresholds reinforcing visual links between streets and smaller courtyards and lanes.
- Illuminate key elements forming end views beyond covered passageways to encourage pedestrian movement.
- Introduce low level lighting within seating areas to support social activity after dark.
- Provide lighting to significant landmarks, such as St. Brides, to support wayfinding and enhance legibility.
- Smooth transitions between routes must be established to reduce areas of high contrast and support accessibility.

Illuminated thresholds and end views encourage pedestrian movement

Human scale mounting height emphasises pedestrian routes

Illustrative Section



Gough Square Sketch View

4.3.5/St. Paul's and Carter Lane

Bounded by Cannon Street and the Riverside Walk, St. Paul's and Carter Lane area is made up of a series of narrow lanes and passages largely dominated by pedestrian movement and cyclists. Hosting a wide variety of public realm design styles the lighting should aim to respond to the immediate context with modern luminaires adopted along routes such as Peter's Hill with period luminaires introduced on narrower roads such as Carter Lane and Burgon Street.

Low level lighting should be introduced where possible to promote views to landmarks such as St. Paul's Cathedral and the Tate Modern. Additional landmarks including St. Benets Metropolitan Welsh Church and the national Firefighters Memorial will be carefully illuminated to serve as local landmarks within the area assisting wayfinding and legibility.

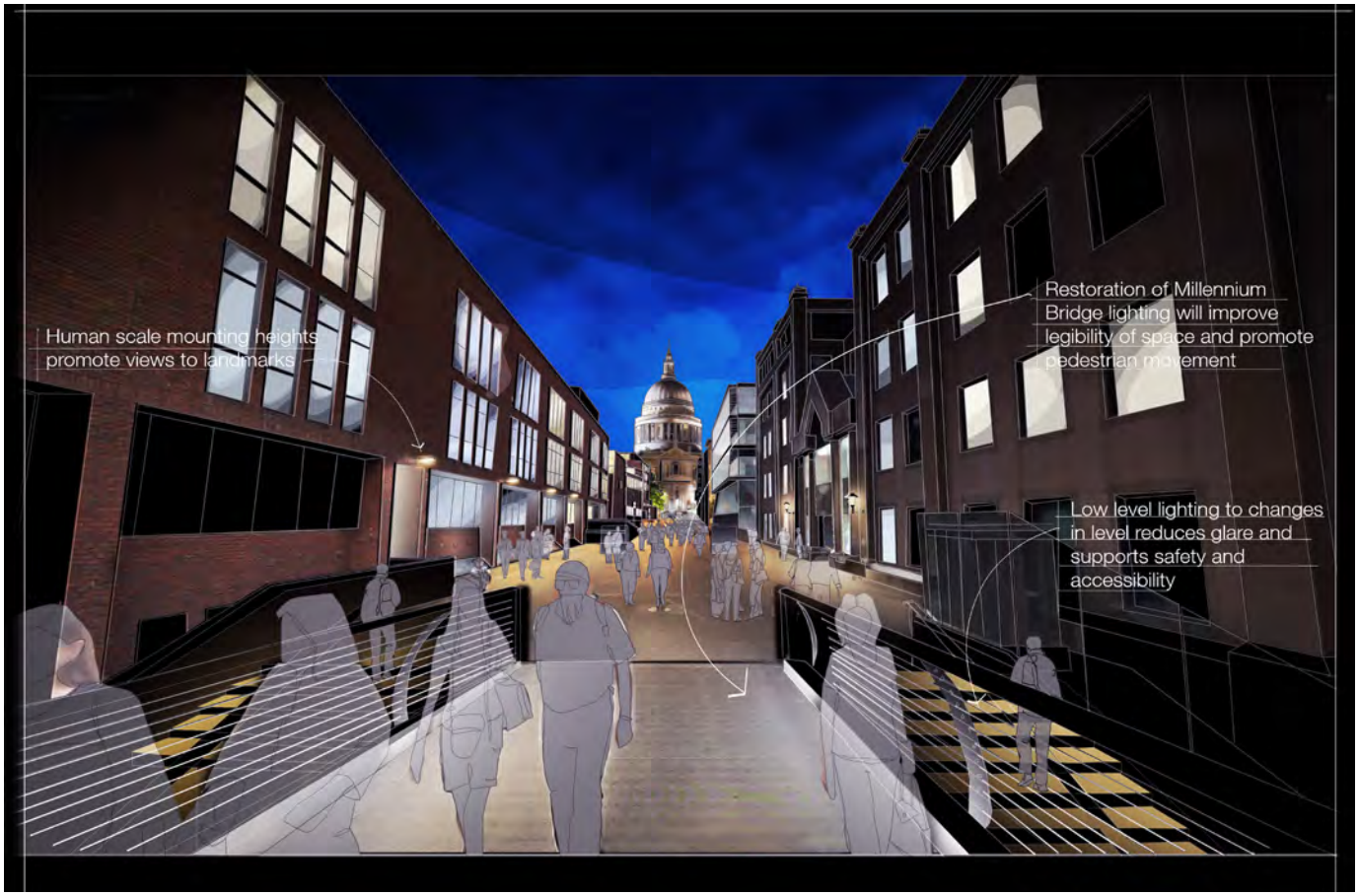
Restoration of the lighting to Millennium Bridge and the upgrade of external lighting to St. Paul's Cathedral will introduce positively illuminated end views towards and from the river encouraging pedestrian movement. Bifurcated by Lower and Upper Thames Street the illumination of key pedestrian crossing point will help reinforce connections to the riverfront and create a more safe and secure area.

Recommendations:

- Introduce low mounting heights to promote views to landmarks and destinations such as the Tate Modern and St. Paul's Cathedral.
- Luminaire style and integration method should respond to public realm design creating a cohesive design approach.
- Feature lighting to historic buildings and landmarks such as the National Firefighters Memorial and St. Benets Metropolitan Welsh Church will enhance character after dark.
- Restoration of lighting to Millennium Bridge and St. Paul's Cathedral to support connections to and from the River Thames and Riverside Walk.
- Low level lighting to key pedestrian crossing point along Upper and Lower Thames street will reinforce connections to the riverside walk.

Controlled spill light to greenery creates welcoming space

Low level illumination celebrates vistas



Sketch View from Millennium Bridge

Peter's Hill Sketch View

4.3.6/Culture Mile

Poised to become a major arts and culture destination in the future Culture Mile will transform the area attracting vast amounts of visitors throughout the year. The opening of the new Crossrail station in the area will see footfall increase dramatically and careful consideration must be taken to ensure light levels around the new station and existing stations is adequate and blends into the wider context in a sympathetic manner to avoid areas of high contrast.

In keeping with the aspirations of the public realm design and methodology, the lighting should aim to complement the public realm design whilst simultaneously introducing a unique identity to the area to distinguish it from the adjacent surroundings which includes Golden Lane Estate and the City's largest residential community within the Barbican Estate. Consideration must be taken to prevent any negative impact to residents and respecting the needs of residential areas.

Glowing light objects could be peppered throughout the public realm to introduce lighting with which the public can interact. These objects should provide a soft diffuse light and serve multiple functions such as seating, wayfinding and play features becoming local landmarks and supporting wayfinding.

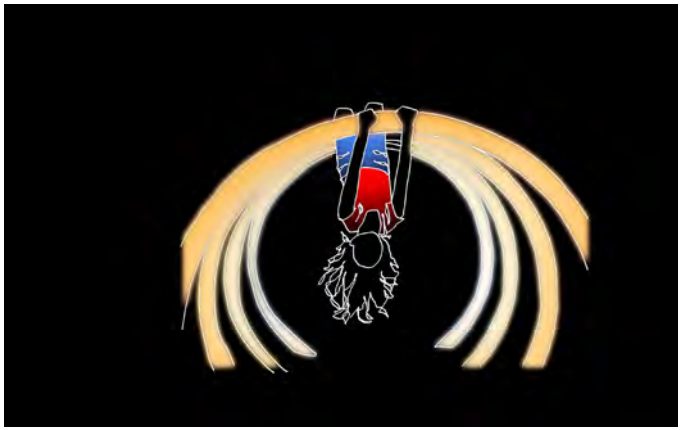
Key landmarks and memorials such as Smithfield Market and the William Wallace Memorial should be lit in a sympathetic manner to enhance their presence after dark.

Recommendations:

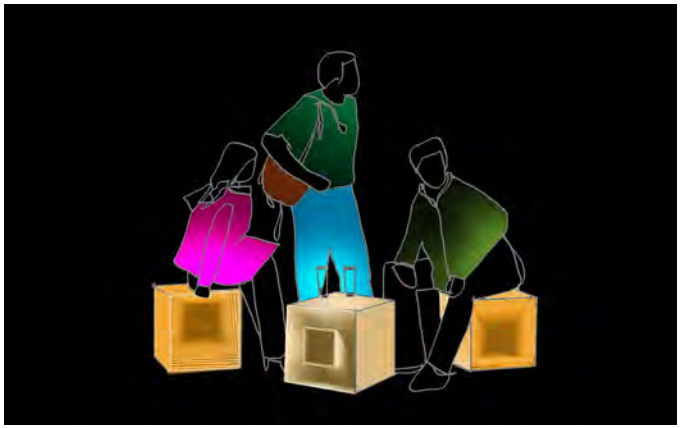
- Introduce a playful lighting approach which assists in connecting the various cultural institutions in the area, most notably, the Barbican.
- Celebrate the rich historic and iconic architecture of the area by introducing lighting which is sensitive to the original design intent.
- New developments such as the Museum of London provide opportunities to become beacons after dark.
- The base level of functional light for large open spaces is to be delivered from high level low glare luminaires to allow maximum flexibility for events.
- 'Light objects' to be introduced throughout the area to create unique identity and allow for moments of interaction.
- Low level lighting to seating areas after dark to create intimate ambience and encourage activity after dark.
- Ensure lighting does not negatively impact residents or residential areas.

Light objects blend into the surroundings by day.

Playful lighting assists with wayfinding and legibility after dark.



Illuminated objects allow moments for interaction and play



Integration of public art into urban fabric increases their prominence

Considerate illumination of historic landmarks

Long Lane Sketch View - Typical Evening

4.3.6/Event lighting within Culture Mile

With various cultural institutions already within the vicinity and various others to be introduced in time, Culture Mile is poised to become an ideal location for events in the future.

The introduction of temporary event lighting, such as projections and colour changing elements, will allow the area to transform at specific times throughout the year becoming a destination known to visitors and locals alike. Invited artists could create temporary site specific installations which will bring the area to life after dark.

A flexible infrastructure to facilitate event lighting and temporary installations should be introduced. This will aid in reducing costs and providing easy installation and removal of temporary lighting for a variety of events.

The installation of permanent coloured or theatrical lighting should be avoided. The use of theatrical light including coloured and textured illumination to be subject to an assessment on the impact of such lighting on those with visual impairments which also considers and respects the residential areas in the area.

Recommendations:

- Avoid permanent use of coloured lighting
- Consider how temporary lighting can enhance art installations, events or exhibition launches.
- Identify areas where temporary installations or theatrical lighting features could be installed and provide required infrastructure to allow easy and cost effective installation.
- Event lighting should consider and respect residential areas and ensure there is no negative impact on residents.

Janet Echelman's temporary installation illuminated after dark.

Temporary installation within Beech Street Tunnel

Long Lane Sketch View - Temporary Event Mode

Beech Street Tunnel Sketch View - Typical Evening

Beech Street Sketch View - Temporary Event Mode

Beech Street Sketch View - Temporary Event Mode

Beech Street Sketch View - Temporary Event Mode

4.3.7/Cheapside + Guildhall

Deemed as the new retail destination within the City, Cheapside has recently been upgraded to provide wider pavements and improved lighting running from Bank to St. Paul's Cathedral. Human scale lighting should be introduced to help support North/South pedestrian movement.

An emphasis should be placed on lighting to corner buildings in order to encourage pedestrians away from main thoroughfares onto alternate routes. Low level lighting should be employed to enhance the greenery of local pocket parks whilst warm white light will create intimate areas of pause around seating areas creating a welcoming experience after dark encouraging extended footfall throughout the evening. Uplighting to trees should be dimmed after a designated curfew time to reduce negative impact on ecology and reduce light pollution.

Feature lighting to key landmarks such as the Guildhall and St. Lawrence Jewry will help celebrate the historic character of the area and encourage pedestrian movement through the area after dark.

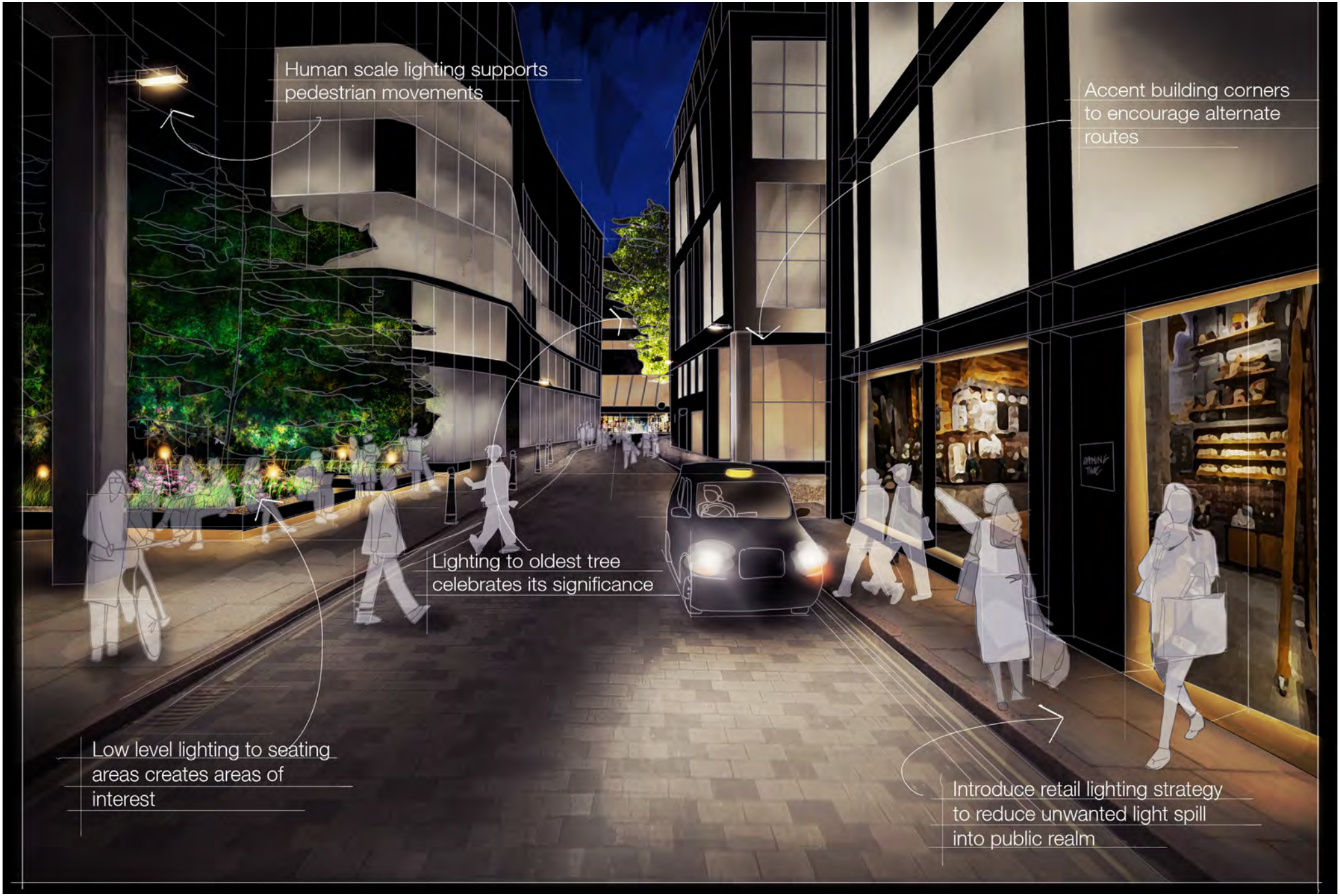
Recommendations:

- Human scale lighting and lighting to building corners will support pedestrian flow onto alternative routes and alleviate overcrowding of pavements.
- Lanterns along pedestrian routes to provide vertical illumination to create vistas.
- Cool white (4000K) lighting will be introduced to landscape to accentuate greenery while warm low level lighting to seating areas will create welcoming after dark environment for pedestrians.
- Tree uplights will be dimmed or switched off after an agreed curfew time.
- Introduce a consistent lighting approach to shopfronts and associated signage to reinforce character after dark and avoid obtrusive lighting.
- Architectural feature lighting to key landmarks such as Guildhall and St. Lawrence Jewry will celebrate historic character of area and improve their presence within the public realm after dark.

Consistent retail lighting approach enhances legibility

Highlighting building corners encourages pedestrian movement

Illustrative section



Sketch View

4.3.8/Bank

An area defined by the movement of people and vehicles, Bank functions as the daily route for many throughout the City. However, unbeknownst to most, it is also the largest and oldest conservation area within the City. Architectural illumination to key monuments including Mansion House and 1 Princes Street would help celebrate these landmarks after dark while also increasing vertical illumination at Bank junction aiding in wayfinding.

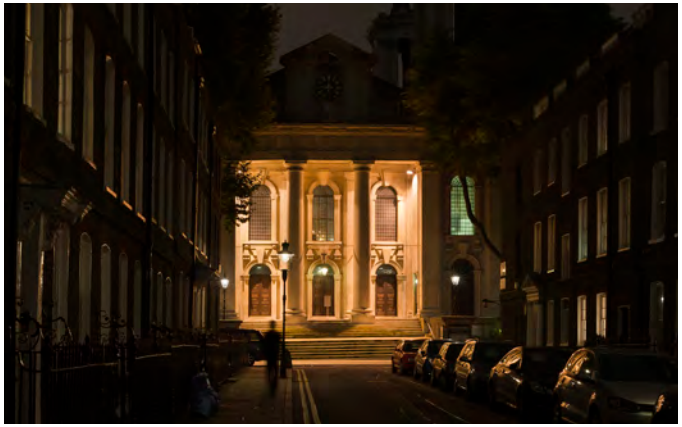
Where streetlights are mounted onto historic buildings adjustment to luminaires should be applied to soften the backspill onto the building facades reducing harsh scallops.

The subtle illumination of building corners and smaller streets and passageways of pedestrian scale in a warm white light will promote alternate routes for pedestrians aiding congestion and overcrowding along pavements supporting a positive pedestrian experience.

As a result of the current traffic experiments and the potential for future implementation of reduced traffic zones and route reclassification geared towards more pedestrian orientated use, the lighting levels and colour temperature will require reassessment in accordance to the intended users.

Recommendations:

- Introduce architectural lighting to the landmark buildings at Bank Junction to improve legibility of junction and elevate buildings' historic importance.
- Provide lighting control to luminaires to capitalise use of public space after dark during peak and off peak hours.
- Illuminate junctions to improve safety and legibility and connect into the larger network of routes.
- Highlight street corners and secondary routes to encourage pedestrian use of alternative routes.
- Introduce feature lighting to destinations supporting night time economy and pedestrian movement.
- Provide a hierarchy of routes using luminaire mounting height and colour temperature to differentiate primary and secondary/tertiary routes.
- Consider future traffic changes to the area and ensure lighting levels and colour temperature adapt in accordance to any new route classifications



Architectural lighting enhances historic character

Vertical illumination enhances landmarks

Illustrative section- Primary Route

Illustrative section- Secondary Route

Bank Junction Sketch View

4.3.9/Liverpool Street

Already one of London's busiest transport hubs, Liverpool Street will see a dramatic increase in pedestrian activity with the opening of Crossrail. The lighting local to this area must therefore be designed to create a welcoming and secure environment with pedestrian comfort, wayfinding and security as a priority.

Human scale mounting heights should be introduced along pedestrian routes such as Liverpool Street to support the burgeoning night-time economy while also enticing pedestrians onto alternate routes, alleviating overcrowding of pavements throughout the area.

Light levels should be increased during peak hours, returning to a low, uniform level throughout off-peak hours to encourage cafe, restaurant and bar spill out into the public realm to help create a vibrant and colorful atmosphere.

Care must be taken to avoid harsh transitions between private and public lighting, most notably transport hubs, in order to reduce unwanted contrast and provide an accessible environment after dark. Along with an increase in vehicular and pedestrian traffic, cyclists are plentiful throughout the area and will likely increase in number with completion of developments within the Eastern Cluster and Moorgate. With Sun Street serving as a major connection into the Cycle Superhighway network, passive reflective materials embedded into the pavement would create interest by day and increase safety after dark without the need to increase light levels dramatically.

The illumination of artworks and key buildings and artworks would improve perceived brightness supporting wayfinding and providing meeting points away from busy station entrances alleviating congestion.

Recommendations:

- Introduce dynamic lighting control, including light sensors, to adapt light levels throughout public realm in response to commercial office spill therefore reducing energy.
- Lighting control will respond to pedestrian volume and activity:
  - Morning > Commuters > High light level
  - Evening > Commuters/Shoppers >High light levels
  - Night > Visitors/Social > Medium light levels
- Introduce vertical illumination at transport hubs to reduce contrast an support wayfinding.
- Utilise passive light sources to improve wayfinding and maintain low light levels.

Reducing contrast around transport hubs improves legibility of space

Passive reflective sources can assist in identifying hazards

Illustrative section

Liverpool Street Sketch View

4.3.10/Finsbury Circus

Nestled within the larger Liverpool Street area, Finsbury Circus serves as a retreat for pedestrians traversing the busy area from Moorgate and London Wall directly adjacent. The historic square is surrounded by a multitude of listed buildings which gives the area a distinct character.

Lighting levels should be kept to a minimum throughout the area to allow soft feature lighting to key entrance thresholds to become the main focus. Warm white lighting to the public realm will help support the historic character.

Historically appropriate lanterns should be introduced in keeping with each building's style to celebrate the distinct character of each building with staggered post top globe lanterns introduced at street level to provide illumination to pavement and street.

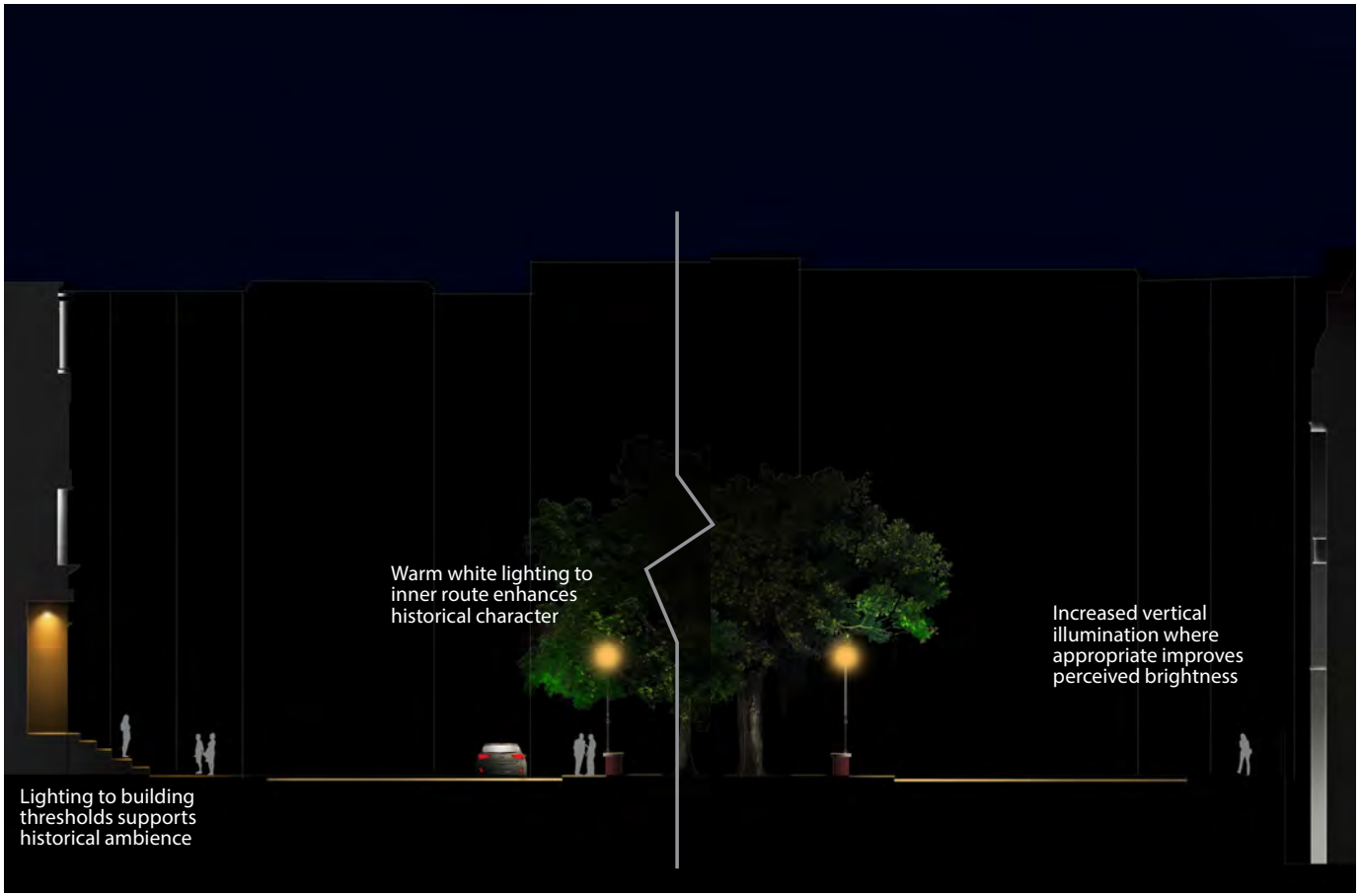
Efforts to reduce visibility of office lighting within buildings must be employed to limit unwanted spill light and views of office lighting after dark.

Recommendations:

- Introduce feature lighting highlighting architectural details to create a unique identity after dark.
- Introduce human scale lighting columns at street level to provide functional lighting reinforcing the historic character of the area.
- Provide sensitive landscape lighting scheme to the main garden at the heart of the space.

Historic lanterns enhance character

Human scale lighting reinforces pedestrian movement



Illustrative section

Sketch View

4.3.11/Middlesex Street

Forming the north-east corner of the City, Middlesex Street is a lively area throughout the day and night. A short walk from Old Spitalfields Market and Brick Lane, the area is characterised by a wide mix of retail, restaurants and bars along narrow passageways. The area is also home to Petticoat Lane Market located at the boundary between City of London and Tower Hamlet which will undergo changes and improvements as a result of an enhancement project currently being developed. This will allow opportunity to review the current lighting and ensure lighting introduces will help support the night time economy of the area.

Wall hung lanterns should be employed throughout these narrow pedestrian routes such as Artillery Lane and Widegate Street in order to introduce lighting at a human scale.

The lighting along key pedestrian routes should be varied and evolve throughout the year attracting visitors and improving the appearance of these unique streets after dark increasing footfall and supporting the night time economy.

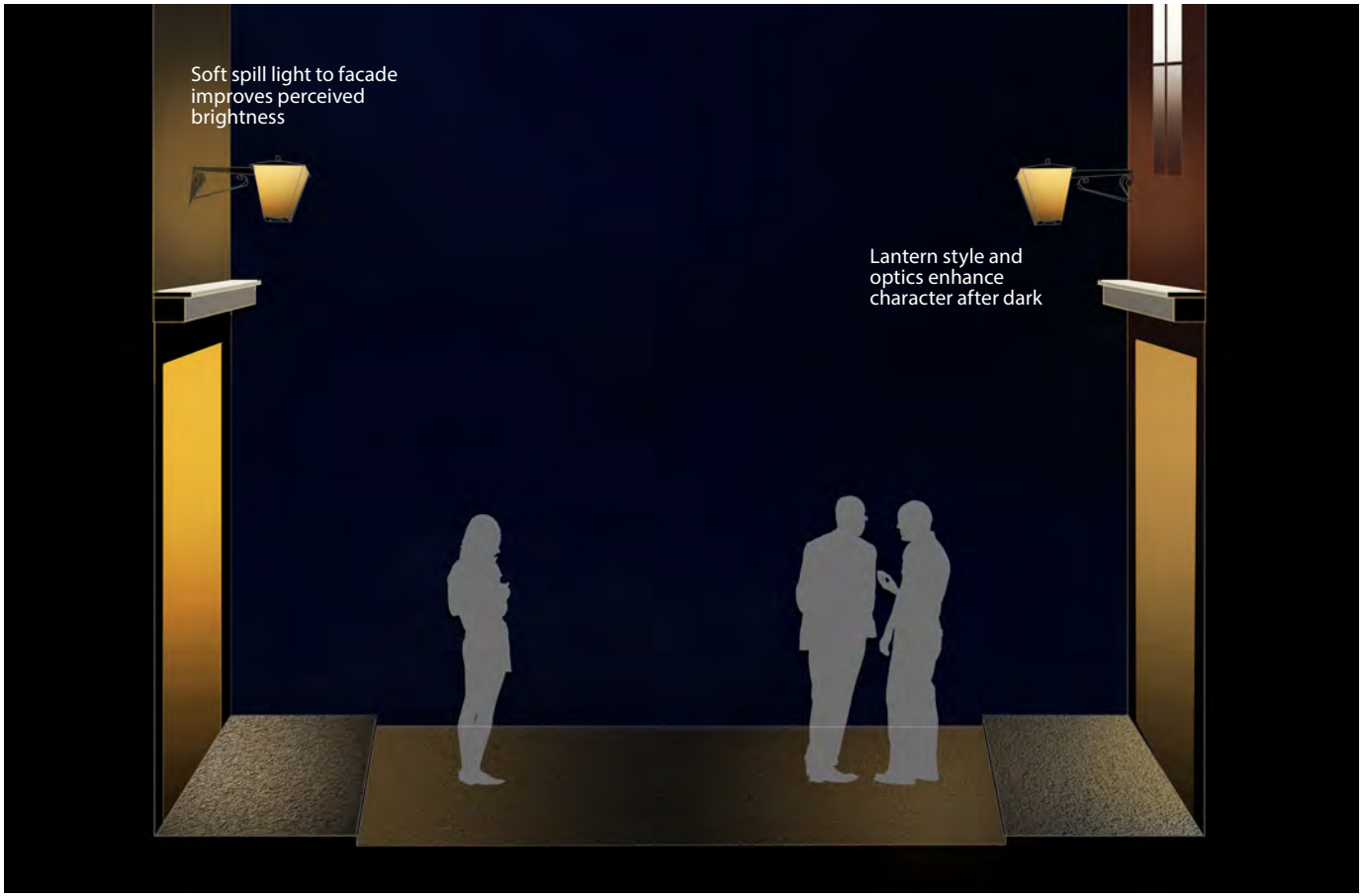
Guidelines to storefront lighting should be introduced to limit obtrusive light and high levels of contrast reinforcing feelings of safety and security throughout the area.

Recommendations:

- Lighting should assist in seamlessly blending the public realm into the adjacent context in order to improve the night time economy and attract pedestrian footfall.
- Opportunity to introduce wall mounted lanterns along selected routes to attract pedestrians from visually busy Bishopsgate corridor and create intimate atmosphere for pedestrians.
- Opportunity to review existing lighting where street and area enhancement projects are undertaken to support night time economy.
- Introduce omnidirectional sources along pedestrian routes to highlight vertical surfaces.
- An overall approach to storefront lighting should be established maintain a high level of perceived brightness throughout the evening reinforcing feelings of safety and security.

Warm white human scale lighting enhances character

Infrastructure allows flexibility for event and festive lighting



Illustrative section

Widegate Street Sketch View

4.3.12/Eastern City Cluster

Home to London's most recognised skyline, the Eastern City Cluster provides the backdrop for many key monuments throughout the City as well as the wider London context.

Local landmarks such as historic churches or prominent squares should be illuminated with warm white light accentuating their materiality and emphasising their presence after dark. Lighting to smaller local landmarks such as squares and artworks would help reinforce a sense of scale creating a network of reference points within the area supporting way finding and navigation after dark.

Given the fluctuation in footfall during peak and off peak hours, dynamic lighting control should be introduced to increase safety after dark while avoiding over illumination during off peak hours such as weekends and holidays when pedestrian movement is considerably reduced.

A unique opportunity exists to integrate lighting within transport links such as bus shelters and totems introducing human scale lighting throughout major transit areas otherwise lacking human scale markers or landmarks. Integration of light into the totem and location identifier would create a visual marker creating an opportunity to introduce colour and playfulness after dark.

The Easter City Cluster is also home to a successful urban sculpture park 'Sculpture in the City', which showcases a selection of contemporary public artworks installed in the space between buildings of this insurance district of the Square Mile. Considerate and appropriate lighting could enhance this world class set of sculptures after dark, encouraging local workers and visitors to discover the artistic trail. In addition special consideration in areas used for the 'Sculpture in the City' should be taken to ensure artworks are enhanced after dark.

Recommendations:

- Introduce lighting to foreground elements such as landmarks, artworks and wayfinding aids distinguishing them from the background illumination of the high rise towers.
- Illuminate local landmarks in warm white light highlighting buildings and objects of interest at street level reinforcing wayfinding and celebrating heritage.
- Introduce dynamic control to adjust light levels in relation to varying pedestrian movement and varying levels of spill light from private developments reducing contrast.
- Integrate lighting to wayfinding signage throughout major transit areas reinforcing human scale and supporting wayfinding and legibility.
- Improve lighting in areas used for 'Sculpture in the City' to enhance artworks.

Cool white light distinguishes primary routes through the area

Warm white light creates contrast against neutral white light

Illustrative section

Leadenhall Street Sketch View

4.3.13/Aldgate

Undergoing a series of improvement projects, Aldgate is quickly becoming a sought after destination given its close proximity to Liverpool street and various other transport links.

The introduction of a number of new pocket parks, and planted areas, alongside an emphasis on art and play offers an opportunity to integrate feature lighting to green spaces and public squares accentuating their presence after dark transforming them into destinations for visitors, commuters and local residents supporting the character of the area and improving accessibility. One such space is Aldgate Square which is poised to become a local meeting point and space for social interaction and events.

Key monuments such as the Church of St. Botolph should become landmarks after dark through being bathed in warm light highlighting the ornate windows after dark; exterior lighting introduced in a restrained manner will maintain its historical integrity.

Tertiary routes should be lit to lower lighting levels with mounting heights reduced to 4-6m to avoid unwanted spill light into windows supporting the wellbeing of local residents.

The introduction of a lighting control system will allow light levels to primary and secondary routes to vary during peak and off-peak hours supporting the safety and wellbeing of pedestrians while concurrently supporting an emerging night time economy composed of restaurants, bars and cafes.

Recommendations:

- Light key greenery to celebrate the green character of the area and provide vistas for pedestrians after dark to help improve wayfinding.
- Introduce feature lighting to historical landmarks and artworks to improve legibility of the public realm after dark.
- Human scale mounting heights, controlled light distribution and smart control will reduce light trespass into windows and help improve health and well being of residents after dark.
- Use lighting as a tool to differentiate thoroughfares from local and residential routes and passages improving legibility after dark.
- Introduce flexible lighting around public squares which also serve as event spaces to support activity.

Lighting to greenery creates vibrant backdrop for events

Illuminating pocket parks transforms their appearance after dark

Illustrative section

Sketch View

4.3.14/Riverside Walk

A prominent destination for runners, tourists and Londoners looking to escape the busy roads, the riverbank provides an opportunity to create a unique pedestrian destination.

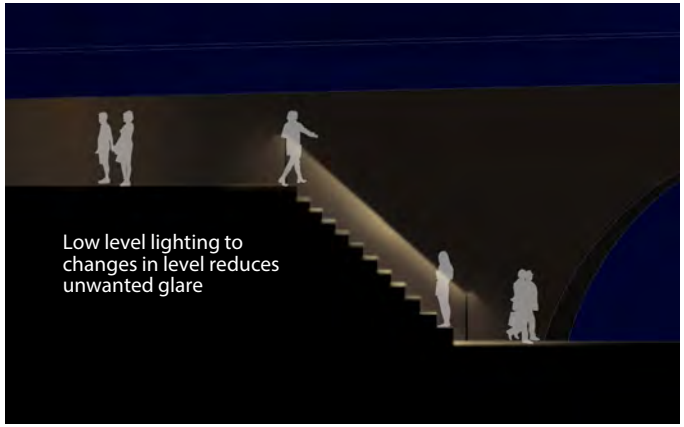
Light levels along the riverbank should remain low yet uniform and be delivered from low level lighting to promote views out across the Thames and reduce impact on the local ecology. Such measures will also help support the local ecology. It is proposed that the iconic 'Sturgeon Lights' be restored and refurbished in order to reduce glare and provide a greater amount of functional light to the path supporting accessibility and promoting feelings of safety and security.

A series of underpasses and overhangs are dotted along the path. The perception of these should be improved by the introduction of lighting to the walls as well as bridge soffits to help create positive thresholds for pedestrians after dark.

The introduction of human scale illumination at key changes in level such as Millennium Bridge would help encourage more activity onto the Riverside Walk. In order to support the running community which regularly use the riverbank for sport the introduction of pavegen or similar smart flooring technology which can harness footsteps to create energy could introduce an analog level of lighting interaction creating ripples of light along riverside festoons triggered by the amount of activity.

The use of existing infrastructure to mount temporary lighting for events such as night walks and runs for charity or to showcase temporary installations or artworks will provide greater flexibility along the Riverside Walk allowing for adaptation and flexibility in the future.

Low level lighting delivers controlled lighting to potential hazards



Illustrative section

Illustrative section

Sketch View

The lighting of the riverbank will be greatly influenced by the 'Illuminated River' project, the outcome of which must be considered as part of any re-lighting of the area. Human scale, warm white lighting and reduced glare will help promote views of the illuminated bridges and celebrate the panoramic views along the river Thames ensuring the bridges become an integral element of the area's character and image after dark. Consideration must be given to areas where decorative lighting to the bridges and functional light will overlap, such as at changes of level, to ensure the lighting is balanced and the overall effect of the bridges is showcased.

Places of pause such as seating areas and planted pocket parks will be softly illuminated to suit the activities of each space in order to create a welcoming environment after dark which allows flexibility of use and helps showcase notable historic buildings. At selected key junctions along the pathway theatrical lighting to gathering areas will be bold and memorable supporting a diverse and ever changing series of events throughout the year.

Recommendations

- Introduce uniform low light levels along extent of riverside walk improving accessibility and creating continuity along extent of pathway.
- Provide feature lighting to landscape and seating areas creating a welcoming pedestrian environment after dark.
- Integrate lighting at low level along key changes in level reducing glare and improving the legibility of the space without negatively impacting existing ecology.
- Retrofit existing historic lanterns along waterfront improving light distribution and reducing glare.
- Positively illuminate underpasses to promote pedestrian movements and support safety and security.
- Consider the benefits provided by the Illuminated River project.
- Introduce playful interactive lighting which creates a direct link between pedestrians and activity.
- Promote views of the Illuminated River bridges and views across the river Thames.

Low level lighting promotes views

Illuminated River proposal

Variation in lighting supports a wide range of activities

Human scale lighting enhances public space and supports safety

Sketch View

A.0/Appendix A - Legibility

A.1/Introduction

The following 'Legibility Study' was carried out as part of the City of London Lighting Strategy:

A more legible city after dark is a safer city for all. It is widely recognised that using light to reveal the hierarchy of streets, buildings and open spaces and their dimensions, materiality and detail, can greatly benefit people's movement and use of the public realm. This is through assisting intuitive way-finding and orientation. Creating an appropriate ambience not only helps to reduce the fear of crime but also aids a better understanding of the culture and heritage of an area. Improving the legibility of the City after dark however is not to make it appear as it does by day: Rather it is to provide its own specific 'night-time character'.

One methodology is to focus on the illumination of a series 'urban elements' with the view to form a list of opportunities for projects that will not only help improve legibility but also help reinforce character and identity. Such elements include:

Example of Gateway

Example of Landmark

Example of Route

Open Space

Example of Vista

Edge

A.2 Gateways

The City of London is composed of a series of thresholds both into and out of the City and between its character areas. In many cases, such as railway and underground stations, these 'gateways' are the first experience and lasting memory of the City. Special lighting treatments will assist with their identification and thereby enhance the overall experience. The City of London also possesses a unique pattern of historical gateways that once formed the key entry points within the city wall such as Moorgate, Aldgate, Ludgate, etc. A unique opportunity exists to use light to help reveal and reinterpret this former system. The illumination of gateways spaces can be unified via a public lighting control system. Key gateways that are to be specially illuminated might include:

Recommendations:

- Introduce brighter lighting to gateways to support the pedestrian experience and improve legibility and connectivity.
- Clearly demarcate gateways of differentiating scales by illuminating key landmarks or creating physical manifestations such as illuminated totems/information points.

Historic Gateways
(for example)
- Fleet Street
- Moorgate
- Ludgate
- Aldgate
- Temple Bar

Rail Stations (for example)
- Liverpool Street
- Cannon Street
- Fenchurch Street
- Blackfriars
- Moorgate

Underground Stations
(for example)
- Chancery Lane
- St. Paul's
- Bank
- Blackfriars
- Temple
- Aldgate
- Barbican

Bus Stations (for example)
- Liverpool Street

Bus Stops
- Various

Bridges
- Blackfriars Bridge
- Millennium Bridge
- Southwark Bridge
- London Bridge

A.3 Routes

The movement of pedestrians and vehicles takes place via a well-established and extremely busy network of routes ranging from major streets to narrow, meandering paths. These connect both major and minor open spaces. The provision of lighting for all routes within the City of London links to the type of user, speed of movement and the potential for conflict between people and traffic. Deciding the appropriate standards for the illumination of routes will determine the design and character of the street and amenity lighting. To that end recognising and respecting the type of movement, hierarchy and scale of each part of this network is critical. The illumination of all routes must be controlled by a public lighting control system.

The definition of routes used in the following diagram has been created following the Local Plan, Transport Strategy and the highways route classifications (Appendix C.2) which is based on the purpose and the users of the roads. 'Main Roads' are both London and City access, which are strategic roads and London, local and borough distributor roads (as per the Town&Country Planning Act definition). 'Side Roads' and 'Footways and Alleyways' are local access roads and function as local access roads for vehicles and cycles with pedestrian priority, and streets which are closed to vehicles.

The hierarchy of routes is as follows:

Recommendations:

- Differentiate routes through colour temperature, intensity and mounting height.
- Differentiate routes at different times through the use of lighting control.

Primary/Main Road (for example):
- Leadenhall
- King William Street
- Cannon Street
- Bishopsgate
- London Wall

Secondary/Side Road (for example):
- Gresham Street
- Eastcheap
- Wallbrook
- Wood Street
- Old Bailey
- Tudor Street

Tertiary/Footway/Alleyway (for example):
- Watling Street
- Garlick Hill
- Abchurch Lane
- Ironmonger Lane
- Red Lion Court

Pedestrian (for example):
- Riverside Walk

A.4 Open Spaces

The various routes connect a series of open spaces ranging from major traffic junctions and circuses to small public squares and gardens. The City of London possesses a wealth of such places. Such spaces act as decision making points and meeting places, often leading people and vehicles to pause or stop. These should be highly legible places with an increase in the lighting of vertical surfaces including the illumination of buildings, landscape features and monuments to help improve their identity. As the confluence of several routes the larger and busier junctions may also be seen as areas where there is a higher risk of accidents. Such spaces should be lit to a slightly higher level than the routes that interconnect them. Like routes the illumination of open spaces should be controlled by a public lighting control system as part of the wider network. Care should be taken that lighting to open spaces does not negatively impact existing biodiversity with limited landscape lighting introduced in wildlife habitats. The hierarchy of open spaces might typically include:

Recommendations:

- Make open spaces slightly brighter than their immediate context where appropriate to do so.
- Prioritise vertical illumination to increase legibility.
- Introduce landscape lighting to help anchor open spaces within their context
- Introduce a legible perimeter to open spaces by lighting sculpture, landscape and facades
- Introduce human scale lighting to through routes crossing open spaces.
- Leave inaccessible spaces unilluminated where appropriate.
- Limit lighting of landscape elements in wildlife habitats to reduce negative impact of local biodiversity.

Primary (for example)

- Bank/ Mansion House Street/ Princes Street/ Cornhill
- Bishopsgate/London Wall
- Fenchurch Street/ Leadenhall Street/ Aldgate High Street
- Ludgate Circus
- Finsbury Square
- Paternoster Square

Secondary (for example)

- Cheapside/ New Change
- Monument
- Fenchurch Street/ Gracechurch Street
- Old Broad Street/ Threadneedle Street
- Aldgate High Street/ Minories

Tertiary (for example)

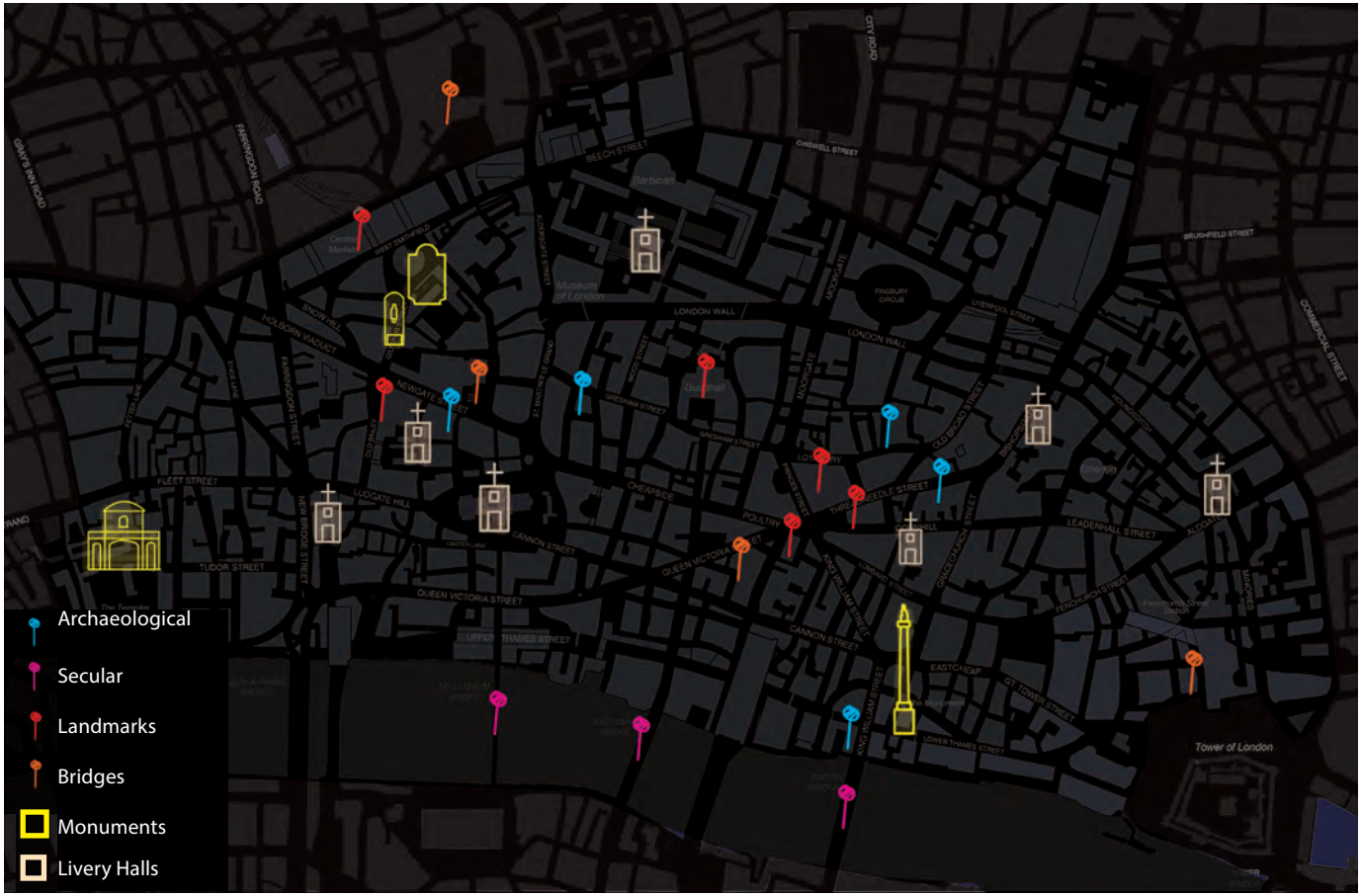
- Christchurch Greyfriars Church Garden
- New Street Square
- St. Mary Aldermanbury's Garden
- Coleman Street Garden
- Church of St. Botolph without Bishopsgate Garden

A.5 Landmarks

There are a large number of landmarks of different scales and types within the City of London including major historic buildings, public monuments and artworks, bridges and archaeological remains. The illumination of key landmarks will greatly assist with orientation by allowing them to become as recognisable after dark as they are by day. At the same time given the rich history and culture of the area, it is necessary to safeguard against over-illumination. Also, whilst it is recognised that major commercial towers form important landmarks the architectural illumination of such buildings should be limited to the sensitive highlighting of their crowns to help inform the skyline, but only where appropriate. A list of landmarks to be illuminated should be agreed through consultation with the view to such lighting schemes being implemented over time. Wherever practical to do so, the collection of lit landmarks should be unified via the public lighting control system such that intensity and timings can be informed. Examples of landmarks might include:

Recommendations:

- Only illuminate landmarks which contribute to improvement of overall public realm at a local and sitewide level, such as supporting vistas, enhancing the after dark experience.
- Consider a series of lighting projects which will help interpret history after dark and promote night-time tourism, by example lighting of specific groups of churches, archaeological features, livery halls, bridges, etc.



Secular Buildings (for example)
- Old Bailey
- Bank of England
- Guildhall
- Mansion House
- Smithfield Market
- Royal Exchange
- Central Criminal Court

Religious Buildings (for example)
- St. Paul's Cathedral
- St. Mary-Le-Bow Church
- St. Bride's Church
- St. Botolph's Church
- St. Giles, Cripplegate Church
- St. Ethelburga Church
- St. Michael Cornhill Church

Bridges
- Tower Bridge
- Southwark Bridge
- London Bridge
- Millennium Bridge
- Blackfriars Bridge

Monuments (for example)
- The Monument to the Great Fire of London
- William Wallace Memorial
- Golden Boy of Pye Corner
- Temple Bar
- Queen Victoria
- Wills Fountain

Livery Halls (for example)
- Drapers Hall
- Cutlers Hall
- Fishmonger's Hall
- Goldsmith's Hall
- Merchant Taylors

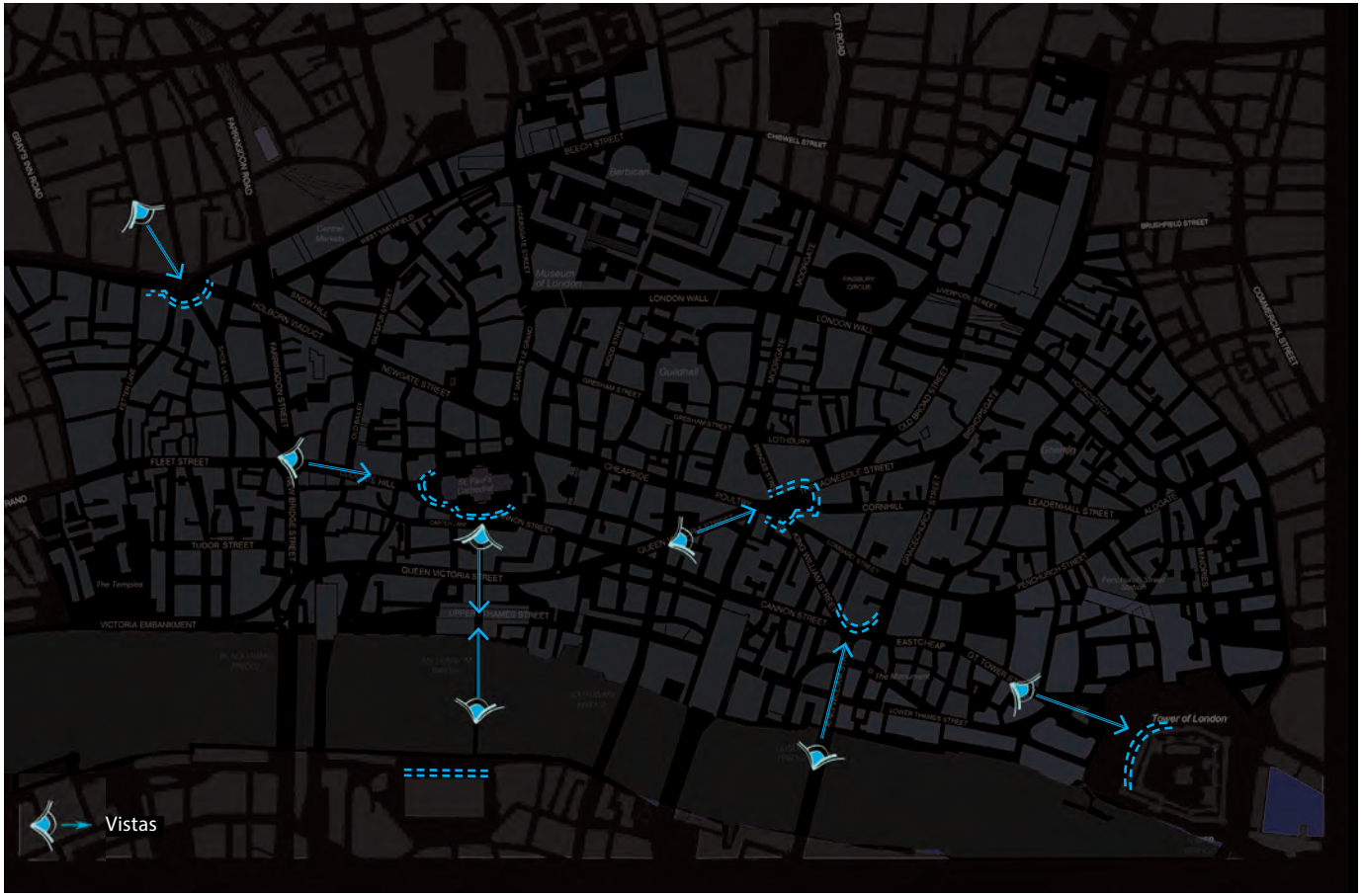
Archaeological (for example)
- London Wall
- London Charterhouse
- London Mithraeum
- Christchurch Greyfriars

A.6 Vistas

The lighting of key vistas can greatly assist with way-finding. Illuminating buildings or other features that terminate the views at the end of a major thoroughfare can change the perception of the City after dark. The reinforcement of long views across the City can also assist with the identification of landmarks. The City of London is full of important views. It is therefore recommended that only key vistas that assist with east-west or north-south orientation are reinforced. The principle vistas after dark may be as follows:

Recommendations include:

- Enhance views at key decision making points by introducing feature lighting to buildings, local landmarks and landscape elements to inform pedestrian movement and improve legibility.



Vistas (for example)

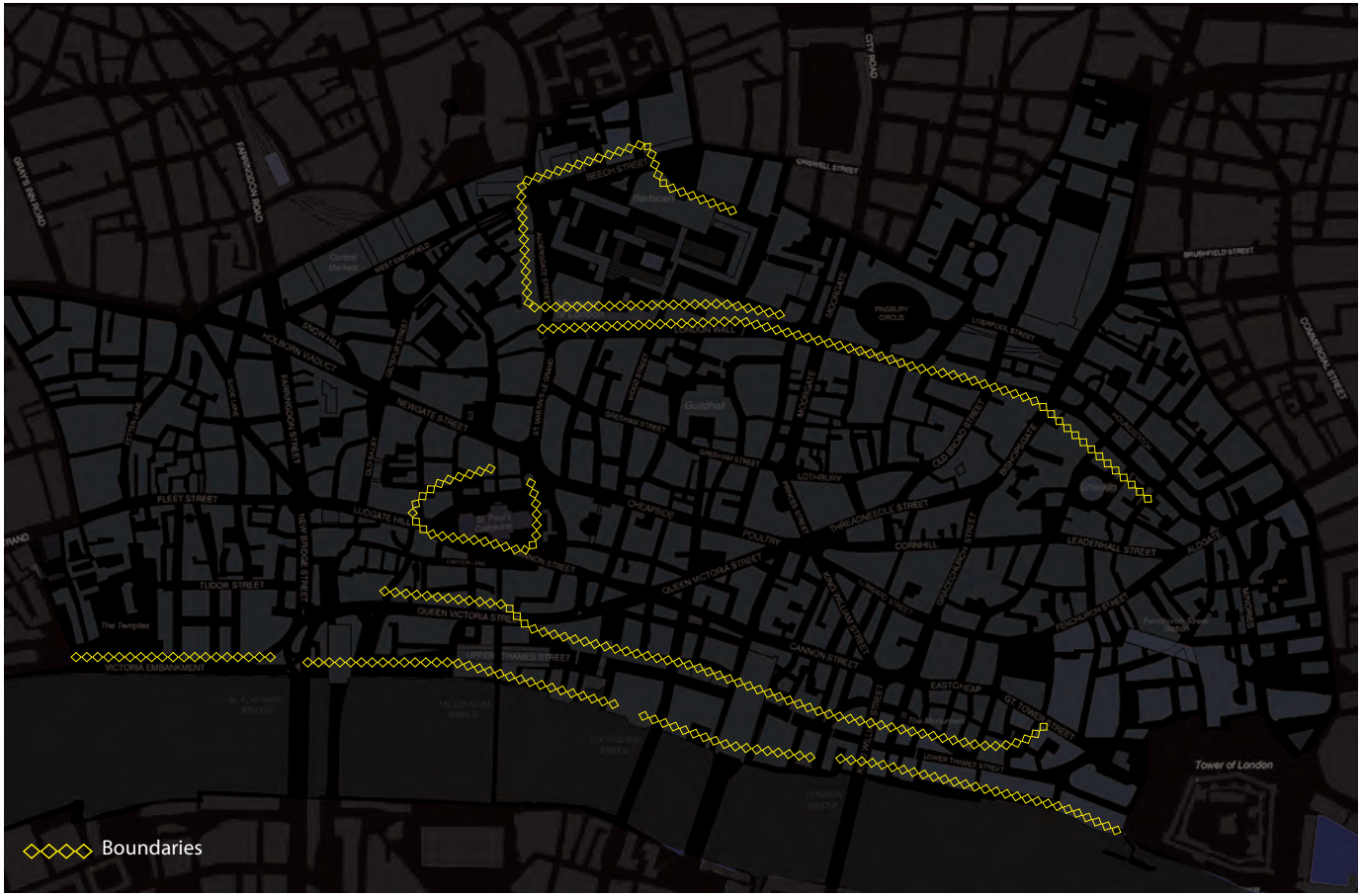
- Ludgate Hill
- London Wall
- London Bridge
- Fleet Street
- Queen Victoria Street
- Millennium Bridge

A.7 Boundaries

The key topographical and man-made boundaries within the City such as the river's edge and major arterial roads may be perceived as barriers to public movement. The lighting of such 'edges' should encourage greater permeability. By example the positive illumination of the pedestrian routes over the main bridges that cross the river should be linked to an improved lighting scheme for the riverside walk. Boundaries, such as the river, may be places deliberately left darker, other than the positive lighting of those routes that cross them. The lighting of footbridges and underpasses and associated staircases and ramps are particularly important. These are to be controlled as part of the wider network. Key boundaries include:

Recommendations include:

- Illuminate openings in edge conditions, including changes in level, to encourage alternate pedestrian routes throughout the City.
- Natural boundaries such as the riverfront to be left unlit where practical to support ecology.



Boundaries
- River Thames
- Upper Thames Street/ Lower Thames Street
- St. Paul's Churchyard
- Barbican
- London Wall

Appendix B - Layers of Light

The following study into the various 'Layers of Light' was carried out:

B.1 Introduction

The lighting of the public realm is composed of a series of 'layers of light' that are designed, delivered and controlled by a wide variety of stakeholders. These include the occupancy of the buildings, signs and signals, street and amenity lighting, architectural lighting, landscape lighting and the illumination of public art and events. Each makes its own contribution to the image and identity of the City after dark.

Whilst the City of London only directly controls two of these layers; the street and amenity lighting and the occasional architectural illumination of key buildings, and bridges, consideration must be given to the contribution made both to the visual scene and also the amount of available light that each of the layers provides. In some cases it may be possible to exercise discrete control over the design, delivery and maintenance of certain layers, by example illuminated signs and media. Good practice guidelines provided to both retailers and commercial developers and landlords responsible for the provision of office lighting may contribute to a reduction of unnecessary light spill into the public realm and unwelcome visual disturbance to residents and tenants alike.

B.2 Occupancy

The internal lighting of buildings makes a considerable contribution to the lit environment. This random and uncontrolled source of illumination not only provides the visual background but also spills light into public space. It can make a positive contribution to the nightscape as well as presenting an environmental challenge. Light from brightly illuminated interiors, often using cooler whiter light, not only makes the internal spaces highly visible but also often creates spill into the surrounding area. The dimmer warmly lit doorways and windows of residential and historic buildings of more solid construction make a positive contribution to the visual scene. Whilst very little control can be exercised over the impact of internal lighting best practice guidelines would help improve the understanding of developers and building owners as to the potential impact that lit interiors can make after dark.

B.3 Signs and Signals

Created from the combination of lit signage and other illuminated media this layer adds colour and interest to the nightscape. It also has the potential to create unwanted visual pollution. Lit signage should be better controlled. This is often related to advertising and branding ranging from the sensitive highlighting of painted signs above shopfronts to bright and garish media screens. Whilst subject to advertising consent the design of such signs and media, including their visual brightness, colour and scale needs careful consideration, particularly in sensitive heritage environments and conservation and residential areas. Where employed internally within highly glazed shopfronts and lobbies signs and media can sometimes be detrimental to character. Where too bright they create light spill and nuisance. It is recommended that better planning guidelines are adopted and existing regulatory measures enforced to allow greater aesthetic control. Illuminated road signs, traffic lights and other statutory signals provide a dynamic and colourful layer of light at the scale of the street that directly contributes to character. Whilst regulated, some signs are internally illuminated whilst others have light applied. A more consistent approach would be preferable as this would improve legibility after dark.

B.4 Street and Amenity Lighting

This layer of illumination is publically owned and controlled, or where privately owned and controlled is often adopted. It provides the means by which to meet the general requirements for legibility, safety and security. The street and amenity lighting is largely owned, designed, delivered and maintained by the City of London, or in the case of key trunk roads by Transport for London. In some cases what appears to be publically owned is within private control. Street and amenity lighting is predominantly mounted to building facades to help reduce clutter on the footways. Pole mounted lanterns exist in some public areas where building mounting is not practical or appropriate. The light produced by the street lighting systems is determined by standards and guidelines agreed internally within the authority which in turn is based on best practice. Recent years has seen gradual modification to provide greater flexibility and different degrees of interpretation allowing local government authorities to adapt and modify their street lighting to better respect the character of the public realm whilst still meeting the needs of both safety and security. The planned upgrading of the public lighting systems from traditional discharge and fluorescent sources and limited photocell and time-based control to a new LED system controlled by 'smart' digital systems provides a unique 'once in a generation' opportunity to modify the approach. This upgrade allows the street lighting to be re-designed not only to better serve the functional requirements but also provide more flexible solutions sympathetic to local character.

B.5 Architectural Lighting

The lighting of both historic and contemporary buildings provides visual richness and assists with legibility and interpretation. Care must be taken to consider which buildings are lit in terms of hierarchy. A wide variety of buildings within the City of London are currently illuminated with varying degrees of success. In an area that enjoys a rich architectural heritage there are many opportunities to light buildings, monuments and bridges with a number of techniques ranging from general floodlighting to close-offset applications. In many cases the lighting providing expression to more contemporary buildings often competes with either unlit or poorly illuminated heritage sites. It is recommended that a hierarchical list of opportunities for architectural illumination is considered in each character area ranging from key landmarks and monuments to the highlighting of details and features. All architectural lighting schemes that in any way reinterpret or alter the character of a building, monument or structure should seek planning consent irrespective of whether they are listed or within a conservation area. Finally, all illuminated buildings, irrespective of ownership should be linked to a centralised control system such that their operation can be controlled by the City of London. In the case of privately owned lighting schemes this will need to be by agreement.

B.6 Landscape Lighting

The occasional lighting of hard and soft landscape such as trees, benches, walls and low level planting can provide both colour and texture to the visual scene. Care must be taken to minimise ecological impacts. The potential for providing illumination to gardens and churchyards offers the opportunity to highlight trees and planting alongside benches, pergolas, water features and key vertical surfaces such as walls. Whilst caution should be taken not to over-illuminate such areas lighting should be considered as an integral part of public realm design in the future.

B.7 Art

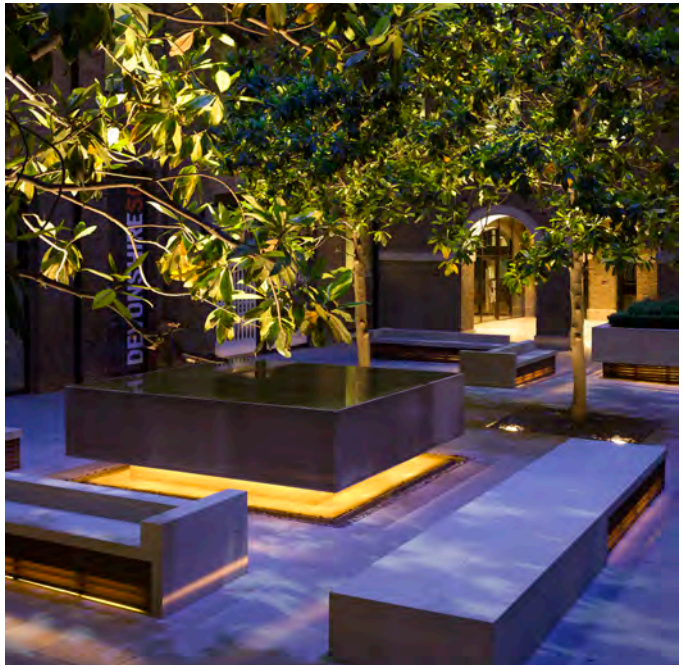
The lighting of public art, including monuments and statues, adds richness and diversity and assists with education and interpretation. It not only includes the illumination of specific works but also details such as carvings and plaques sited on buildings. Which artworks and details to light and which to leave dark must be carefully considered. The City of London possesses many statues and monuments of varying importance. Whilst many would benefit from illumination by no means should all artworks be lit. As important as publically owned pieces are those works of public art commissioned by developers and other private interests. Like the illumination of architecture and landscape the highlighting of art, both permanent and temporary, can make a significant contribution to the enjoyment of the public realm after dark as well as supporting heritage and educational aims.

B.8 Event

The lighting of events is important to the cultural life of the City and can make a significant contribution to the development of the night-time economy. This transient layer of light can add richness and diversity to the visual scene irrespective of whether the event is a limited one-off community based festival or a major annual contribution to the night-time economy such as Christmas lighting. Flexibility in lighting control will allow selected luminaires to dim down or turn off to allow event lighting to be more prominent. Determining the requirements for the supporting infrastructure such as rigging points and power and data outlets can help make rigging temporary lighting quicker and more cost effective. Whilst this layer does not form part of the permanently installed and maintained lighting infrastructure, planning for the installation of temporary lighting may be seen as an important part of the overall strategic approach.

Occupancy

Street and Amenity Lighting



Landscape

Art

Appendix C - Technical

C.1/Glossary

The following is a glossary of terms employed with the Lighting Strategy:

Intensity

'Illuminance' refers to the amount of light falling on a surface and measured in lumens per sq. m - or lux. The healthy human eye can adapt across a wide range of illuminances: By example, we can see reasonably clearly in moonlight, which is less than 1 lux. Conversely we can also see well in bright sunlight which can be 100,000 lux or higher. The amount of light we employ is therefore relative – what is important is the time that it takes our eyes to adapt between one level of light and another. 'Luminance' refers to the visual brightness of a surface and the measured in candelas per sq. m. It is often more important to our vision than illuminance as it directly relates to the colour and reflectance of a surface and the amount of light that travels back towards our eyes. Both the amount light falling on a surface and its visual brightness directly influence our vision and perception. The way that we adapt between different intensities of light dictates how well we see. That is why walking from a brightly lit area to one that is left dim is often to be avoided.

Colour

As important as the quantity of light is its quality. We generally consider this in terms of the spectrum of the light that determines both its appearance or 'colour temperature', measured in Kelvin (K) and also the way in which it allows us to appreciate colour or 'colour rendering' which is traditionally measured through an index (Ra about to be superseded by Rg). In the immediate post-war period street and amenity lighting was delivered through sources such as low and high-pressure sodium which whilst warm (2,500K or lower) had very poor colour rendering (Ra 65 or lower). Whilst sources were improved in the last decade with the introduction of metal halide lamps with their improved colour temperature (2800K) and fuller spectrum delivering better colour rendering (Ra 80+) LED offers a further step change again where a pleasant warm light can be delivered (2700K-3000K) but with an improved attention to colour (Ra90 or higher).

Glare

Glare is caused by excessive levels of contrast and the direct visibility of unshielded light sources. This can result in visual discomfort and temporary visual disability. Glare can be reduced by balancing luminance levels, selecting appropriate mounting locations for equipment and through the proper optical control of light fixtures. The use of improved optical control can mitigate disability glare for motorists improving visibility after dark and increasing visibility of pedestrians at junctions.

Scale

Lighting has scale, and also provides scale. A streetlight mounted on a high column or on a building at high level can make the scale of a street or open public space feel overbearing and inhuman. People often refer to the mounting of floodlights on the tops of buildings at high level as feeling like a prison yard i.e. scale-less and foreboding. Lighting mounted on lower columns or lower down buildings such as in canopies or colonnades, or even low-level landscape lighting can provide a more appropriate scale for pedestrian movement and enjoyment of the public realm. At the same time it is recognised that the architecture of any street has its own specific scale and that any lighting must be sympathetic to that.

Verticality

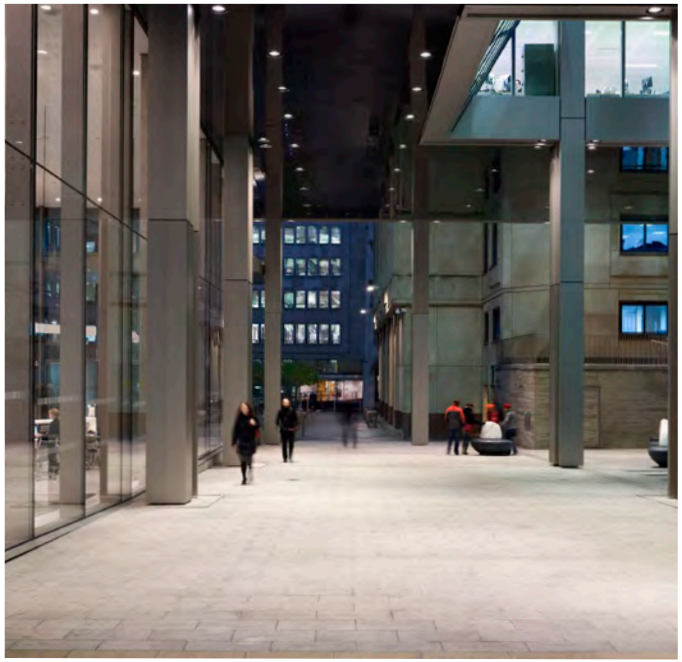
The illumination of vertical surfaces is the key to making the built environment more legible. The deliberate highlighting of walls, trees, buildings, monuments, statues and all manner of other urban features not only helps to define the dimension and scale of space but also provides texture and colour. Such lighting can be integrated into the public realm from high level or low level positions. It often has the additional advantage of reflecting light back into the environment thereby increasing the local level of illuminance.

Balance

The natural condition of the night is darkness. We add light to meet our requirement for vision to reveal the environment around us. The balance of light and darkness not only creates the right ambience and character but also defines the shape and scale of the public realm. At a fine grain it also helps to reveal texture. A uniformly lit environment can be dull and shapeless whilst an area with excessive contrast can cause problems, particularly for those with visual impairments. Careful design and control of the lighting can achieve an appropriate balance of light and darkness.

Darkness

The retention of natural darkness, or areas of low light is critical to night-time character and the reduction of environmental impact. Natural darkness should be retained in areas such as the river, parks, gardens and churchyards where birds, bats and other fauna and flora benefit from the observation of the circadian cycle. Darkness also provides visual relief, silence and privacy for people. Seeking to retain darkness in agreed areas not only has environmental benefits but also helps retain the qualities of the night.



Balanced intensity of light reduces visual discomfort

Balance of light and darkness creates visual interest

Varied colours of white light differentiate spaces

Scale of lighting responds to street character

C.2/Briefing Materials

Throughout the course of developing this lighting vision, various meetings, workshops, conversations and presentations were undertaken in order to obtain feedback and comments from a wide range of stakeholders within the City. A summary of key outcomes from these meeting and workshops can be found below along with relevant documents, digital tools and maps which were shared with Speirs+Major for reference.

Light Levels and Technical

- Provide lower light levels and warmer colour temperature.
- Illuminated landmarks are not visible after dark due to overillumination.
- More subtle lighting needed in historic areas.
- There is a conflict between functional light and accent lighting to buildings or monuments.
- Excessive contrast and glare should be avoided.
- Where columns are implemented multi purpose approach for Wi-fi and CCTV could be introduced.
- The implementation of a control system could facilitate the implementation of appropriate light levels in different areas.
- Can colour temperature be tuneable to change in response to the character of the area or throughout the night to vary the night-time appearance?
- Many areas are gradually becoming pedestrianised - the lighting should be adaptable for future changes in use.

Architecture

- There is currently too much light in the background which does not allow accents or landmarks to be visible after dark.
- Some buildings are overlit while others which are historically significant are left dark.
- Floodlighting to buildings should be avoided.
- Roof terraces are over-lit.
- Simple policy to guide lighting of buildings and facades is required.

Movement

- Lighting strategy should take into consideration wayfinding strategy among others to ensure they support one another.
- Lighting should support walking and cycling
- Dwell time in areas should be encouraged to improved economy after dark.

Planning

- Lighting needs to be embedded into the planning policy.
- There is a need for supplementary information to better evaluate lighting proposals during pre-planning
- Earlier engagement with applicants regarding lighting could lead to a better, more coordinated outcome.

Environmental

- There are a variety of wildlife which reside within the currently unlit parks and churchyards - this should be taken into account with regards to lighting these spaces.
- Thames corridor and churchyards should be left predominantly dark places.
- Uplighting trees impacts bio-diversity.

Health and Well Being

- The City is home to various permanent and temporary residents, light spill into windows should be avoided.
- Lighting to residential areas should be looked at as separate to the overall City.
- Circadian rhythms are negatively impacted by light.
- Distant views across the can be negatively impacted by overlit office interiors or floodlit building exteriors.
- Suicides during both winter and summer months should be taken into consideration especially along high risk areas such as bridges.

Management

- There is a lack of a plan or strategy to light iconic locations
- Management process needs to be improved.
- There needs to be a system in place to dictate who has access to smart control of lighting.

Crime

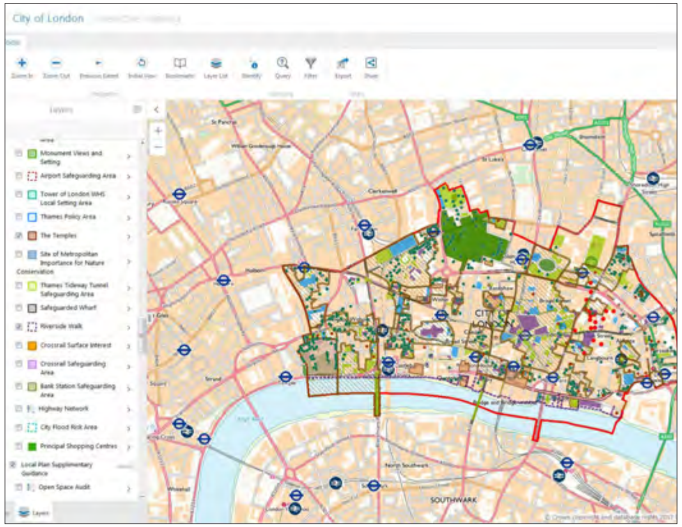
- Turning down lighting levels can have a positive impact on behaviour.
- The implementation of a centralised control system would allow greater flexibility to raise light levels in specific areas during an incident or other situation.
- The lighting should support CCTV.

Safety

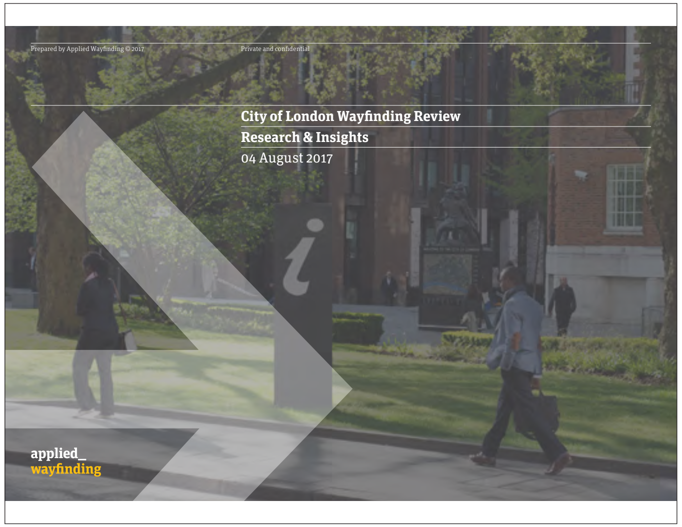
- Reduction in road danger should be addressed
- Conflict areas should be highlighted
- Improved lighting for cyclists should be introduced
- Well lit spaces are perceived to be safer.

Events and Retail

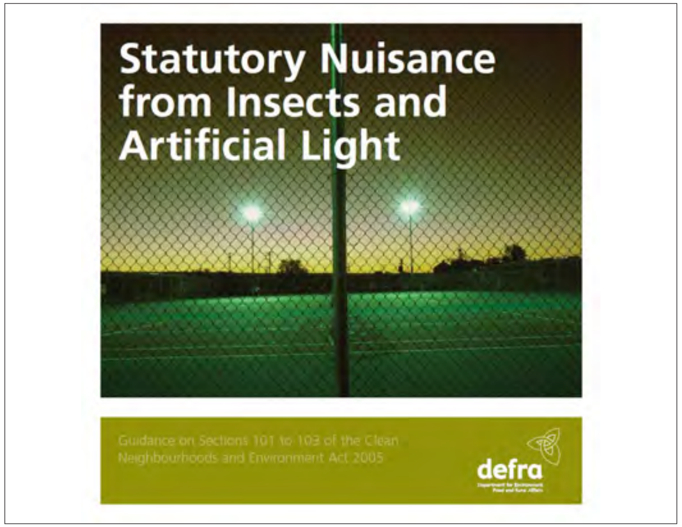
- Lighting events should be coordinated on national and international level.
- The City should be made a special place after dark for visitors.
- A City-wide control system could facilitate various after dark activities.
- Lighting should be used to support a night-time economy most notably in the winter months when it becomes dark very early.
- More events can also help support night-time economy and footfall.



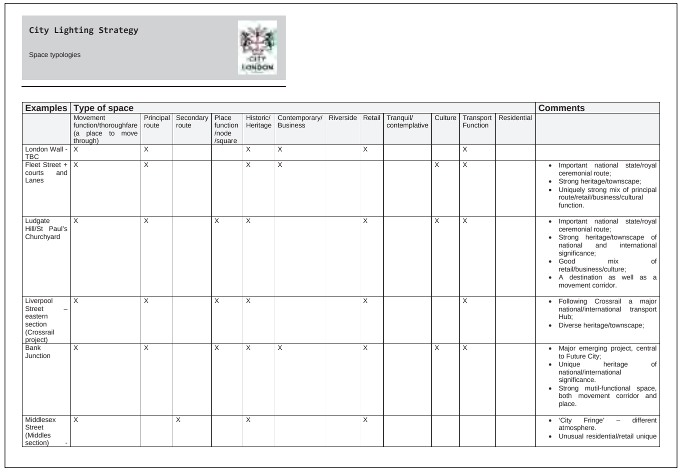
City of London interactive online map



City of London Wayfinding Strategy

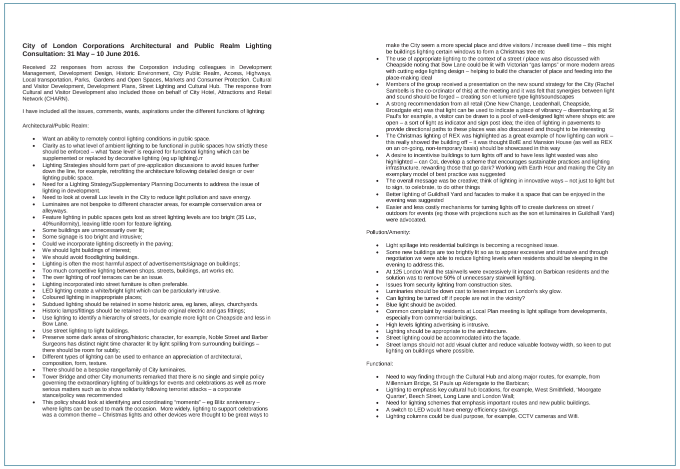


Guide to nuisance lighting

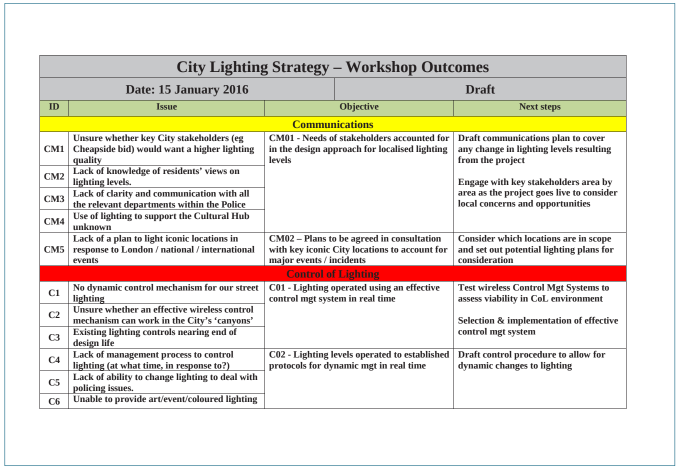

City Lighting Strategy

Space typologies

City of London space typologies

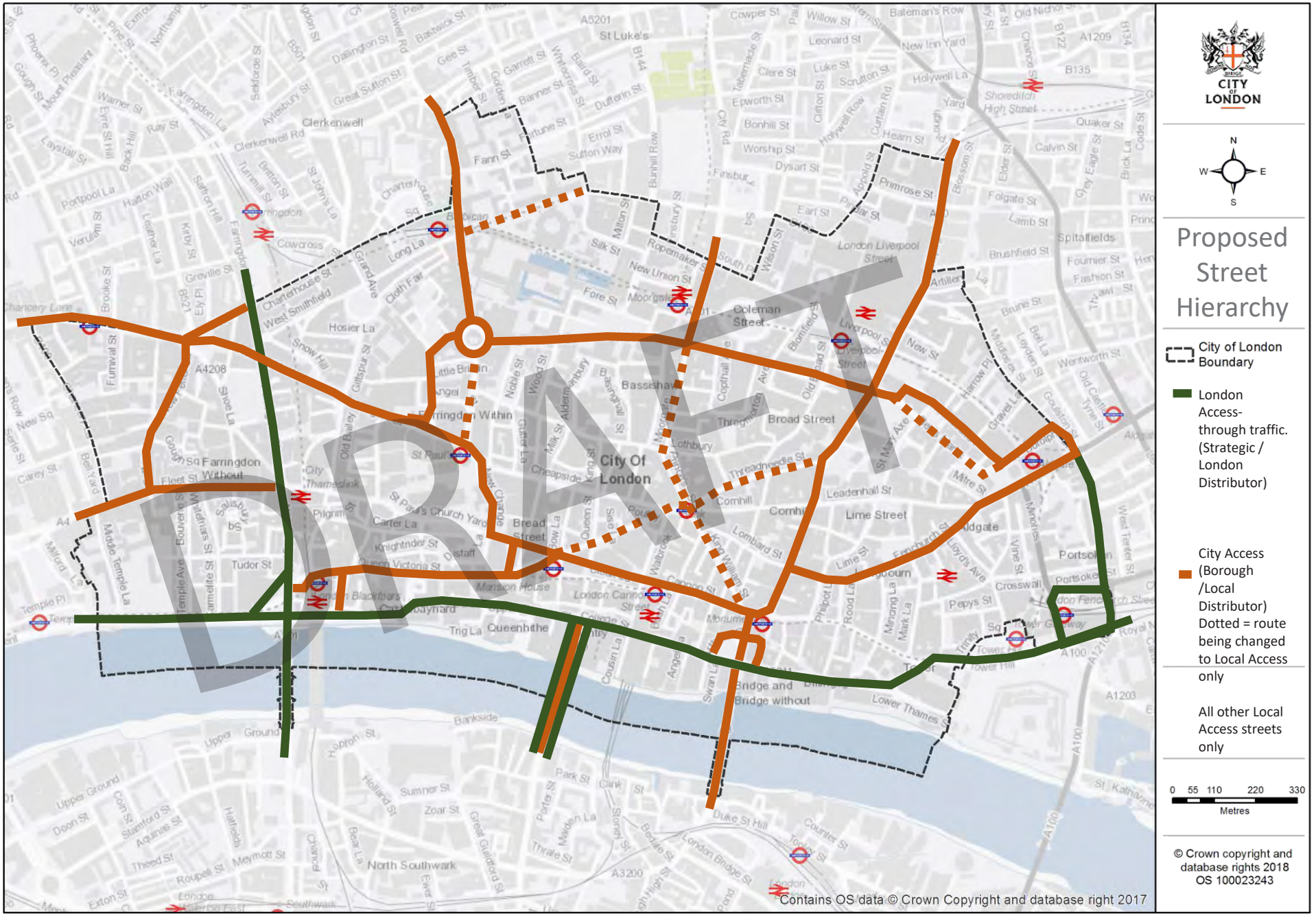

City of London Corporations Architectural and Public Realm Lighting Consultation: 31 May – 10 June 2016.

City of London lighting consultation comments

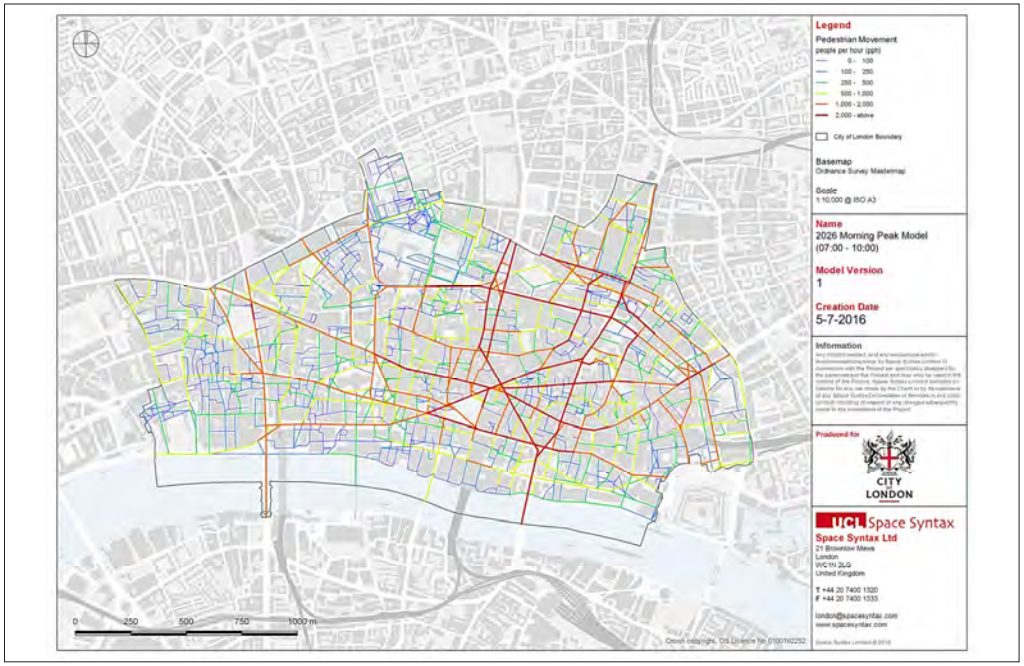


City Lighting Strategy – Workshop Outcomes			
Date: 15 January 2016		Draft	
ID	Issue	Objective	Next steps
Communications			
CM1	Unsure whether key City stakeholders (eg Cheapside bid) would want a higher lighting quality	CM01 - Needs of stakeholders accounted for in the design approach for localised lighting levels	Draft communications plan to cover any change in lighting levels resulting from the project Engage with key stakeholders area by area as the project goes live to consider local concerns and opportunities
CM2	Lack of knowledge of residents' views on lighting levels.		
CM3	Lack of clarity and communication with all the relevant departments within the Police		
CM4	Use of lighting to support the Cultural Hub unknown		
CM5	Lack of a plan to light iconic locations in response to London / national / international events	CM02 – Plans to be agreed in consultation with key iconic City locations to account for major events / incidents	Consider which locations are in scope and set out potential lighting plans for consideration
Control of Lighting			
C1	No dynamic control mechanism for our street lighting	C01 - Lighting operated using an effective control mgt system in real time	Test wireless Control Mgt Systems to assess viability in CoL environment Selection & implementation of effective control mgt system
C2	Unsure whether an effective wireless control mechanism can work in the City's 'canyons'		
C3	Existing lighting controls nearing end of design life		
C4	Lack of management process to control lighting (at what time, in response to?)	C02 - Lighting levels operated to established protocols for dynamic mgt in real time	Draft control procedure to allow for dynamic changes to lighting
C5	Lack of ability to change lighting to deal with policing issues.		
C6	Unable to provide art/event/coloured lighting		

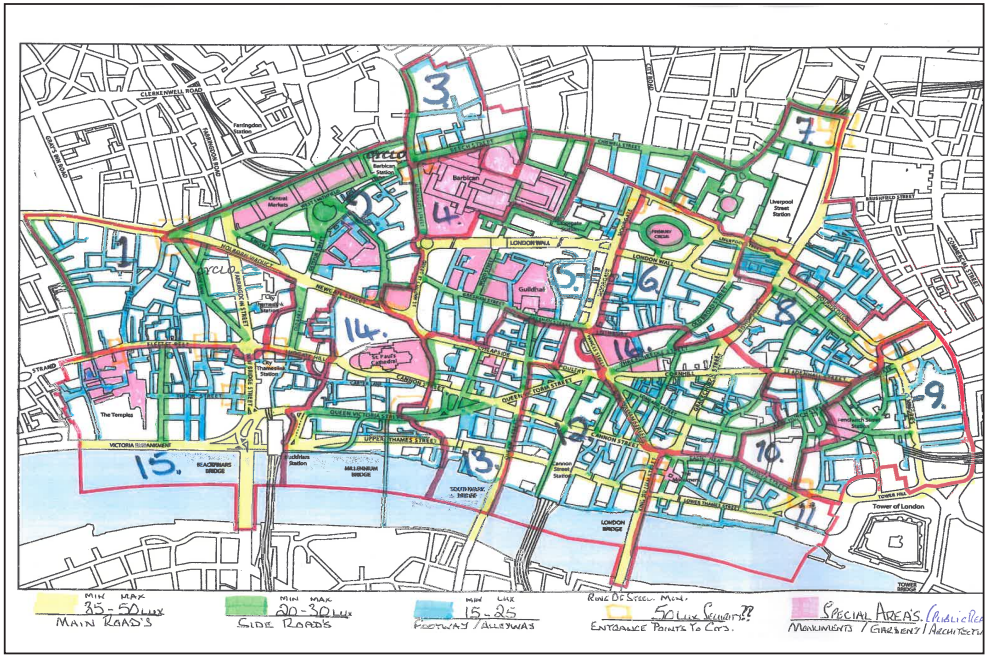
City of London workshop outcomes



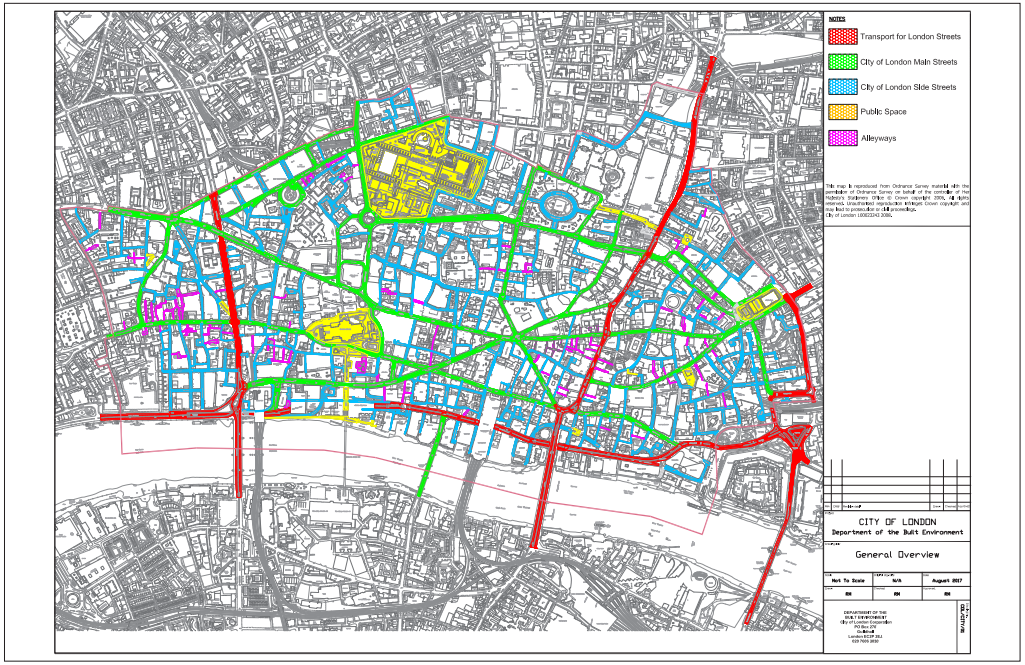
Draft Transport Strategy Map - Pending Approval



Pedestrian movement research



Sketch diagram of route classification diagram and guideline illuminance levels used during briefing



Route classification diagram

C.3/Visual Survey

A visual survey of the existing lighting was conducted as part of this study. The key issues that were identified were:

- There is a trend towards highly glazed buildings, particularly office buildings, that results in an increase in spill light into the public realm. Highly glazed residential buildings are less of an issue due to the lower levels of internal lighting.

- The presence of internally illuminated signage and media screens used for direct and indirect advertising represent an increasing threat to the night-time character.

- With respect to the street lighting, many areas have high levels of illumination, often far in excess of general guidance. There is also a lack of consistency in colour appearance and colour rendering caused by the provisions of different lamp technologies over time. Whilst the distribution of light to principle routes is uniform, secondary and tertiary routes that favour pedestrian movement are subject to greater contrast. There is sometimes excessive glare, including from some of the new LED street lamps. It was also noted that many building mounted lanterns are at a height that belie the scale of the architecture.

- The amenity lighting is similar: alleyways, passages and underpasses i.e. areas where there is a higher perceived risk of crime, are frequently lit to very high levels. This creates excessive contrast with adjacencies, particularly at their thresholds. Scale is a concern in the narrower medieval streets where high mounting positions produces substantial amounts of spill light onto building facades working against the character of the architecture.

- In terms of architectural lighting the City of London does not boast a high number of exemplar schemes despite its rich heritage. In some cases existing public lighting schemes for key landmarks have come to end of their life and are being considered for renewal. Lighting schemes to private buildings have been carried out with varying degrees of success. Some contemporary buildings have lighting solutions that make them visually more important after dark than might be desired.

- Landscape lighting is limited. Many landscaped areas, including the riverside walk and the network of churchyards remain extremely dark, which whilst environmentally beneficial, deters the use of such routes by pedestrians. Landscape lighting might be employed as part of any move to help reduce the fear of crime and combat anti-social behaviour.

- The City of London boasts a substantive amount of public art though many statues and monuments either remain unlit or deserve improved treatments.

- There is limited public infrastructure such as fixing points and power provision to allow for the easy staging of events after dark including the lighting of key religious festivals and commercially important occasions that take place in the winter months such as Christmas and the New Year.

In conclusion, whilst the existing illumination of the City of London follows a pattern commonly seen within urban areas throughout London and the UK, there is considerable room for improvement. Recognition of this has led to the need for this comprehensive Lighting Strategy that aims to provide guidance as to future planning policy and aesthetic control, greater integration of lighting into public realm and improvements to lighting standards.

Highly glazed buildings increase ambient light levels

Luminaire mounting height does not relate to street scale

Overilluminatiion of passageways results in areas of high contrast

Lighting does not celebrate historical character or materiality

Unlit landscape along routes reduces perceived brightness of space

Lack of dedicated event and holiday lighting infrastructure

C.4/Guidelines

C.4.1 Retail Lighting Guidelines

The illumination of shop floors and F&B premises heavily influences the street level experience of the City after dark.

High quality retail lighting will play a critical role in supporting the image and experience of the City's streets and open spaces. The visibility of lit shop interiors also contributes to vertical illumination and helps boost perceptions of security and passive surveillance.

Individual retailers are encouraged to implement high quality lighting for their interiors and to consult professional lighting designers to work with their teams to achieve this. Well-lit interiors will not only make a valuable contribution to the experience of the public realm but will also promote the retailer's brand after dark and encourage passers-by to go inside.

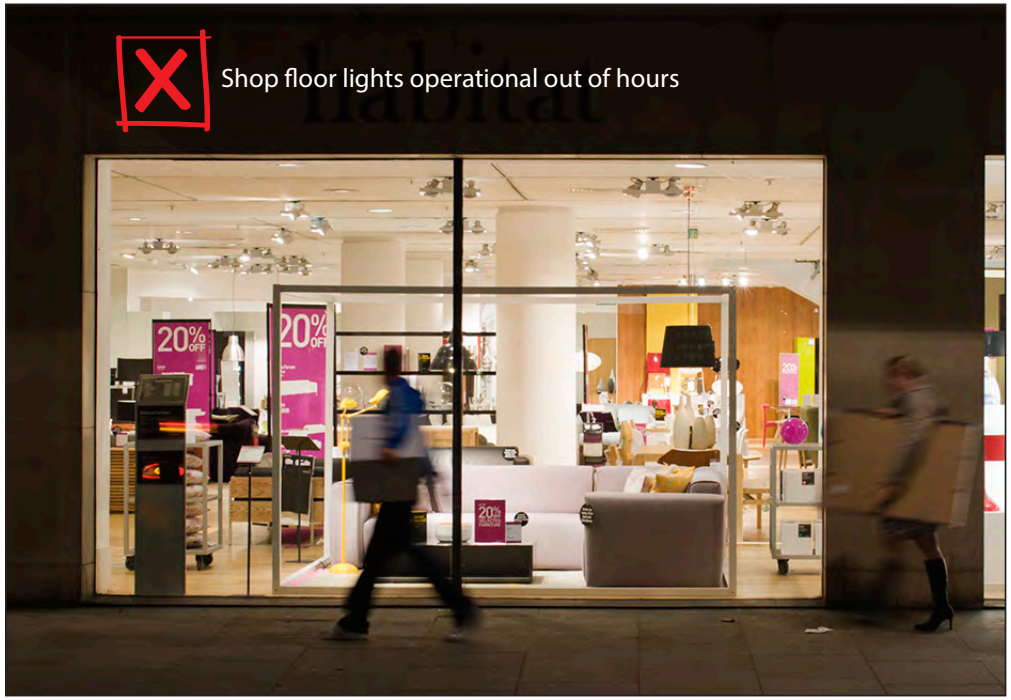
A series of technical parameters are set out below to help ensure that no one interior space dominates or compromises the lit character of the City:

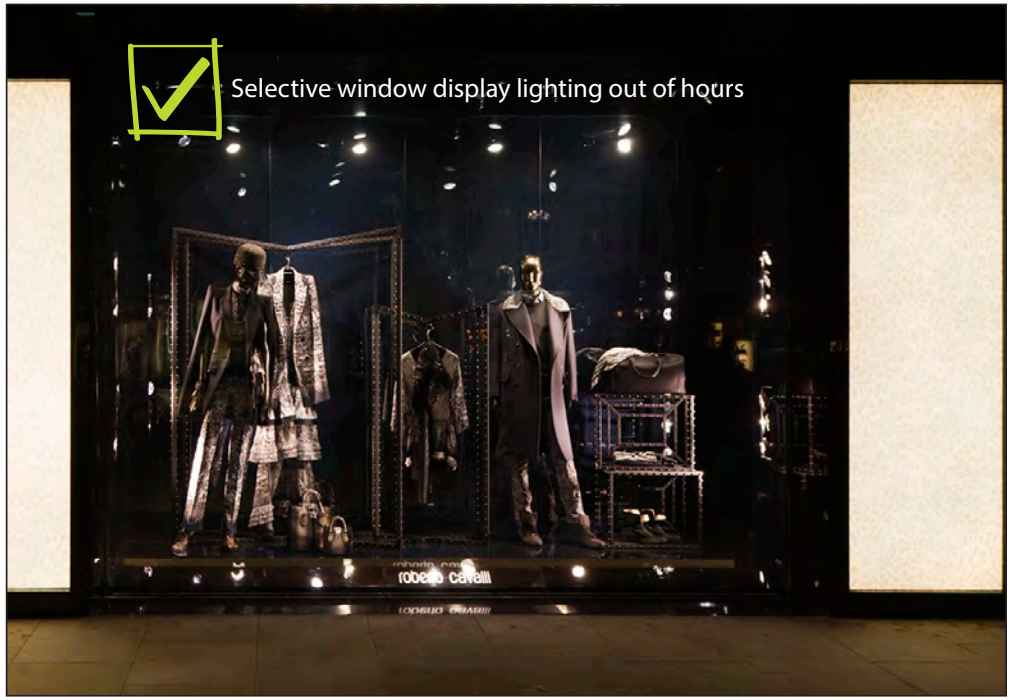
- Glare from artificial light, either direct or indirect, is not acceptable when viewing the retail/F&B unit in elevation or obliquely from the street.
- The lighting to interior retail spaces must be switched off outside of agreed operating hours. The only exception to this would be if selected interior lighting is left on to stand in for shop window display lighting, which is encouraged to be left on until at least the curfew time as agreed by mutual consent with the required personnel within the City.

Given the proximity to the street, the illumination of retail window displays require careful design and management to ensure that the character of the City is protected after dark. Sensitively-lit shop windows will help to enliven the experience of the streets as well as promote the goods on display. In so doing, it is hoped that the retailers will help enrich the visual scene at street level.

Whilst diversity and creativity is encouraged in the design of shop window display lighting, the following guidelines should be adhered to in order to ensure a balanced after dark appearance is maintained:

- Glare from artificial light, either direct or indirect, is not acceptable when viewing the retail/F&B window display in elevation or obliquely from the street.
- Luminaires should be concealed from view, with the emphasis placed on creating a lit display that is not cluttered with luminaires. An exception to this would be if luminaires form part of the decorative display or part of the merchandise of a particular unit.
- Coloured and animated lighting effects are discouraged unless the effects form part of a designed narrative of the shopfront as agreed with required personnel within the City.
- The amount of after-hours lighting found in each window display is the tenant's responsibility. However, tenants are encouraged to keep window display lighting on, even at a low/reduced level, until a curfew time agreed with the required personnel within the City to help maintain a consistent sense of light on the street.
- Spill-light onto the pavement should be limited and not extend beyond 2m of the shopfront.
- During opening hours, spill-light onto the pavement within 2m of the shopfront glazing must not exceed 30lux (maximum point illuminance).
- Outside trading hours, spill-light onto the pavement within 2m of the shopfront glazing must not exceed 15lux (maximum point illuminance).
- Lighting to window displays should remain operational until the agreed curfew time.





C.4.2 Signage Guidelines

Lit signage will help to animate the streets and improve legibility at night but must be carefully controlled to ensure that it does not cause glare or become a visual nuisance. The following lighting guidelines should be adhered to for retail signage lighting:

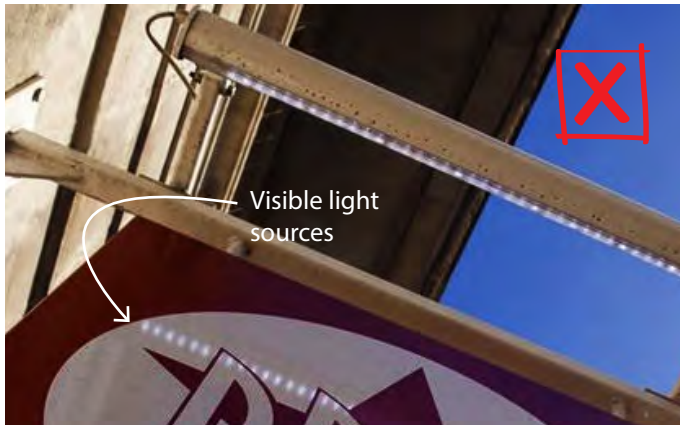
- Lighting must be used to define each individual letter as opposed to the full signage band - internally illuminated light box signs are to be avoided unless approved by required personnel within the City.
- Lighting must be designed as an integral part of the signage to ensure a sympathetic appearance is achieved both by day and by night.
- Lighting to signage must be easily accessible for maintenance.
- Glare from the lighting, either direct or indirect, is not acceptable when viewing the signage in elevation or obliquely.
- Both direct and reflected views of light sources must be avoided. An exception to this could be if the signage is deliberately designed with directly-viewed light sources, in which case it should be submitted to the required personnel within the City approval.
- The luminance of backlit surfaces must be even and free from bright or dark spots. Images of the light sources backlighting the surface should not be visible.
- White light only should be employed and preferably with colour temperatures of 3000K and warmer. Where colder or coloured light is proposed, the designs should be submitted to the required personnel within the City for approval.
- Variation in colour/colour temperature of light sources mused must be avoided, unless expressly intended as part of the design.
- The maximum luminance of backlit display or signage will vary per character area but must be limited to a maximum of 600cd/m2 (up to 10m^2 in area) and 300cd m^2 (over 10m^2 in area) during the hours of darkness, in accordance with the ILP's Professional Lighting Guide 05 (2014) for an environmental zone E3/E4. Appropriate luminance levels for each character area must be approved by required personnel within the City.
- Coloured and animated lighting effects (including colour changing) are discouraged unless they form part of the narrative of the store front. In this case the design should be presented to the required personnel within the City for agreement.
- Signage lighting should remain operational until at the agreed curfew.
- All lit signage must comply with statutory requirements for advertising consent and with any tenancy agreements.

Lit projecting hanging signs are encouraged to help promote movement along the streets. The following lighting guidelines should be adhered to for hanging retail signage lighting:

- Lighting must be designed as an integral part of the hanging signage to ensure a sympathetic appearance is achieved by day and by night.
- Lighting must be accessible for maintenance.
- Glare from signage lighting, either direct or indirect, is not acceptable when viewing the signage from any angle.
- Light sources must be concealed from view when the sign is viewed in elevation, obliquely or from any angle outside of an area 1m diameter directly below the hanging sign.
- Light sources must be deep recessed, shielded and/ or angled towards the sign to minimise direct views to them.
- The reflected image of the light source/s must not be visible in the hanging sign - this requires careful detailing of the lighting and the selection of matt or satin sign finishes.
- Variation in colour/colour temperature along the length of the sign lighting used must be avoided.
- The sign must be evenly illuminated and free from graphic bright spots, shadows or striations.
- High CRI white light must be used, with colour temperatures between 2700K and 4000K selected as a result of the location within the City and the relevant character area unless otherwise agreed with the required personnel within the City.
- Direct spill-light to the ground plane from the signage lighting must not exceed 2 lux.
- The maximum luminance on the face of the hanging sign must not exceed 300cd/m2.
- Coloured and animated lighting effects (including colour-changing) should not be employed.
- Signage lighting should remain operational until at the agreed curfew.
- All lit signage must comply with statutory requirements for advertising consent and with any tenancy agreements.

Illuminated box signs to be avoided

Back-lit channel letters



Visible light sources (incl. reflected) to be avoided

C.4.3 Office Lighting Guidelines

After dark, buildings become lantern-like, with interior lit spaces visible from the surrounding streets. Tenants for commercial office spaces are required to help ensure that the lit image of the building is carefully managed so that it does not appear excessively bright or otherwise create light pollution, light trespass or a visual nuisance to residents. The cooler colour temperatures typically found in office spaces pose a particular threat to the character of the City if not carefully controlled.

Tenants should adhere to the following requirements:

- Internal luminaires employed within office spaces must employ louvres and/or other glare control devices to minimise direct views of light sources.
- The first 1.5m depth behind the façade glazing should be free from lighting where practical and where present must be very low glare (e.g. utilising 'darklight' reflectors). Such lighting should not provide upward light to the soffit.
- All ambient lighting luminaires must be dimmable.
- Window blinds - full blackout and/or scrim type - are encouraged to further minimise building luminance and light-spill after dark.
- All internal lighting must be switched off when the room is unoccupied.

C.4.4 Planning Guidance

A planning guidance will be developed to accompany this document and aim to provide further guidance on the following topics:

Residential Amenity/Light Pollution

Establish a criteria for assessing acceptable levels of light spill into residential windows.

Visual Amenity/Public Realm

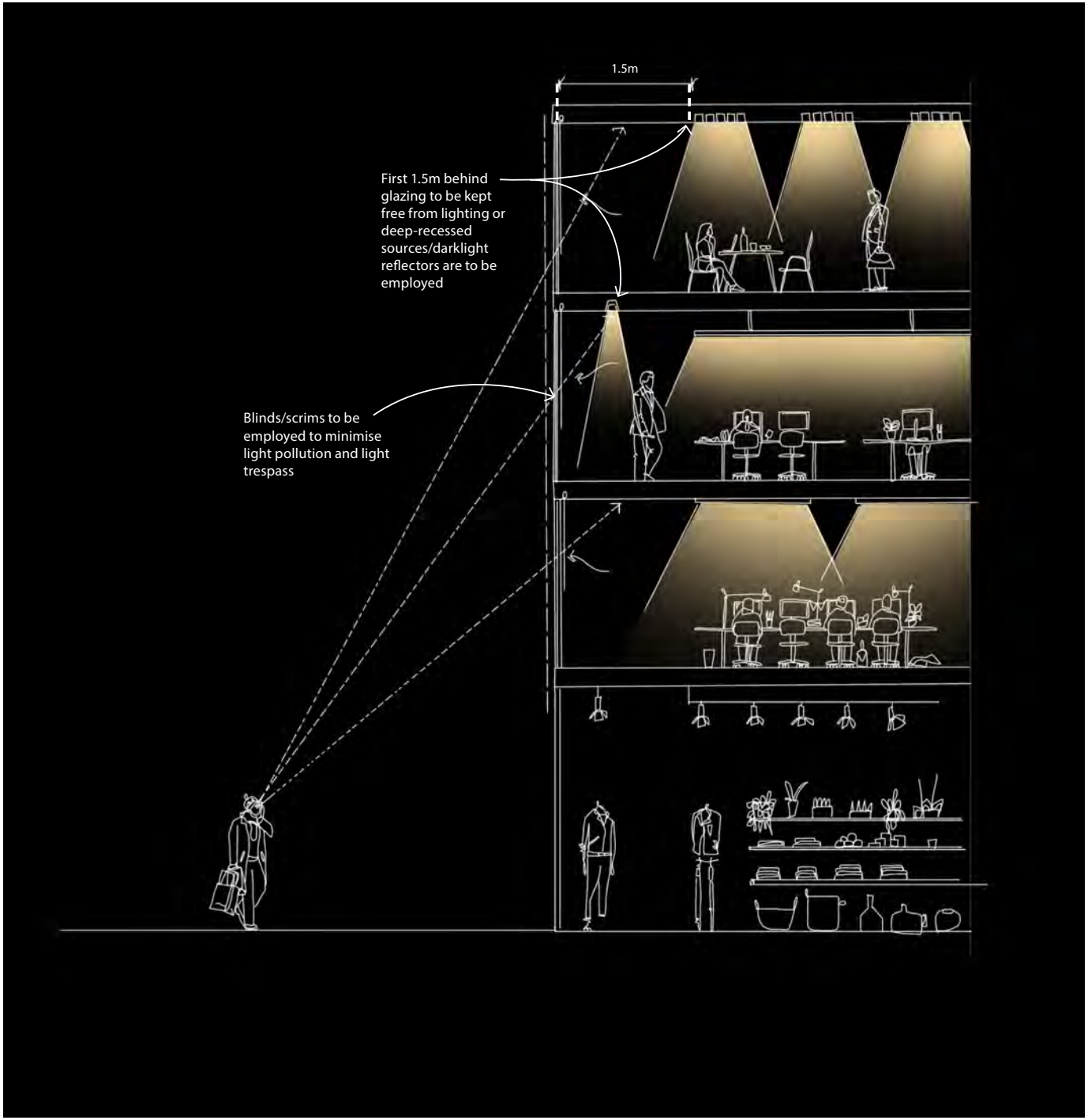
Provide guidance, methods and criteria for assessing acceptable levels of light spill and light trespass into the public realm from developments as part of the planning process.

Architectural Design

Guidance on designing with light on facades, including retrofitting existing lighting installations on both modern and heritage buildings, designing integral lighting applications such as lighting of an entrance canopy, shopfront or other feature among other applications.

Advertisements

Guidance on illuminated signage, including criteria for visual brightness, colour, and style appropriate within each of the different character areas identified in the Lighting Strategy.



C.5/Innovation

This Lighting Strategy aims to be both creative and visionary as well as pragmatic and deliverable. It seeks to find innovative ways to introduce change using a combination of technologies and techniques. The primary areas of investigation should be as follows:

C.5.1 Sources

Recent advances in LED technology have resulted in the development of 'tuneable white' LEDs which allow the delivery of white light of varying colour temperatures (warm to cool). Cities including Eindhoven in the Netherlands and White Bear Lake, Minnesota in the United States are currently trialling this technology. Unlike traditional luminaires which are made to deliver a fixed colour temperature typically 3000K (warm white), 4000K (neutral white) Tunable white LED technology allows a single luminaire to deliver a range of colour temperatures anywhere from 2200K to 4000K thus introducing opportunities for tailored white light to be implemented throughout commercial, residential and historic areas. The technology, which likely to be readily available in the UK in the coming years, also provides greater flexibility to the lighting of routes seasonally as well as responding to future scenarios.

Recommendations:

- Opportunity to introduce tailored colour temperature and colour rendering to all areas.
- Introduce greater flexibility in colour temperature during various seasons as well as over time.

C.5.2 Lighting

The optical design of LED light fixtures has evolved to deliver a wide variety of light distributions to serve various situations. This allows the delivery of beams of light that may be 'shaped' whilst also controlling glare such technology.
This particularly useful in heritage areas: Designed largely for modern luminaires the use of LED optics in historic lanterns often results in unappealing reflections that detract from the historical character and appearance of both the fitting and its environment both during the day and after dark.

Recently, however, manufacturers of historic style lanterns have developed a range of LED optics which address these issues without hindering the output or optical variations. These systems may be retrofitted into existing period lanterns throughout the City which are currently fitted with metal halide sources or LED boards. In some cases such optical arrangement can have the character of gas but with the advantages offered by LEDs in terms of energy efficiency and long lamp life.

Recommendations:

- Employ high quality optical design to luminaires to improve distribution and reduce glare.
- Improve appearance of period lanterns by retrofitting with LED optics designed for the desired lantern style.

C.5.3 Control

The City of London has already determined that it should invest in a 'smart' lighting control system that will allow for the timed dimming of the street lighting. This will have a number of advantages not only in terms of saving energy but also in respect of feedback and diagnostics, management and flexibility. Conceived as a combination of hard wired and wireless technology such controls will allow instructions to be provided to groups of light fittings, or even individual lanterns if required via a variety of intuitive interfaces including smart phones, tablets, etc. The system will also allow interfaces to other related systems such as CCTV and WiFi extending its connection to the 'internet of things'.

It is inevitable that the technology for such systems are constantly improving both in terms of hardware and software. Future investment must therefore address the continual improvement of the system over time to maximise the benefits.

Recommendations:

- Control the street and amenity lighting through the use of a city-wide smart lighting control system
- Consider the long term management and upgrading of the smart system as part of the internet of things.

C.5.4 Materials

Introducing passive and reflective materials in ecologically sensitive areas where reduced light levels are required such as the Riverside Walk or within churchyards will allow the spaces to become more legible under low light conditions. Such materials work particularly well where signage and other way-finding devices are employed.

The colour and texture of paving can also play a role in increasing legibility of spaces under reduced lighting conditions. Lighter toned materials will always appear brighter under artificial light than darker tones due to their luminance. As a result the material palette of a space or route can have a large impact on the after dark appearance. The texture of materials and level of gloss among other characteristics affects how lighting is perceived in a space after dark.

Recommendations:

- Introduce passive and reflective materials where reduced light levels are employed, particularly in relation to signage and way-finding devices
- Take into consideration the effect colour, texture and finish of materials within the public realm have after dark.

C.5.5 Management

With the implementation of a centralised control system, lighting throughout the City will become much more responsive to the needs of specific areas and events. The introduction of a Strategic Lighting Board would not only provide a decision making group that can collectively scrutinise and endorse City-Wide lighting proposals, but would also allow for improved consultation and communications with the various stakeholders to take place over time. Their mission would also be to help further develop and deliver this strategy.

Recommendations:

- Use the flexibility introduced by a centralised area-wide lighting control system to cater for different timings and lighting levels to be provided to each area as required.
- Appointment of a Strategic Lighting Board to champion the public realm after dark and to improve consultation and communication with respect to the implementation of the recommendations of this strategy.

C.5.6 Environmental

With the City constantly changing and evolving, care should be taken to appreciate the role of darkness. Light pollution is a growing problem, particularly in respect of residential areas. Reduced light levels should be considered in order to retain character.
Ideas which improve the response to energy saving, tackles over-illumination and light pollution and reduces impacts on bio-diversity should also be considered.

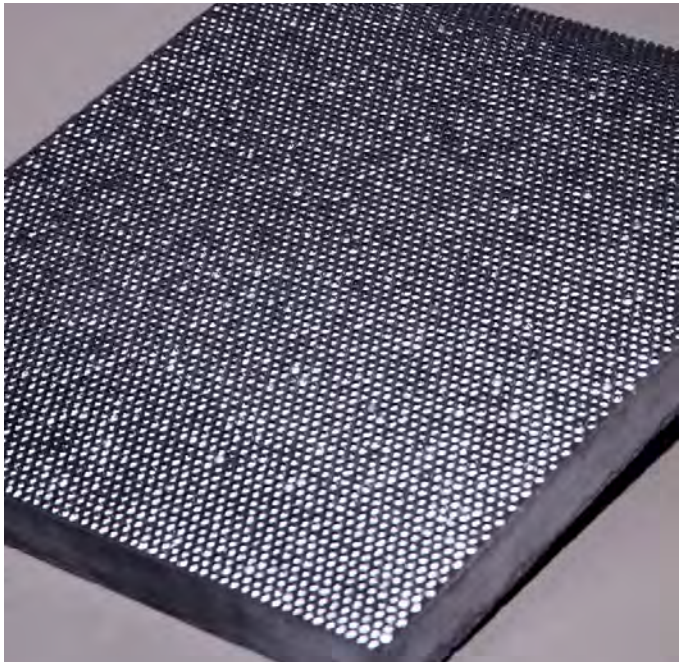
Recommendations:

- Consider areas where reduction in light levels could be achieved to reduce negative impact on residents and biodiversity.
- Introduce publicly available 'best practice' guidelines for building owners, developers, residents and visitors encouraging them to value light, save energy and reduce waste and environmental impact via a website and/or app.
- Have one evening a week where the floodlighting of major landmarks, media screens and other non-essential lighting is switched off.

Tunable white LED technology

Unsympathetic LED retrofit of historical style lantern

Sympathetic LED retrofit of historical style discharge lamp lanterns



Development of passive materials for outdoor installation

Integration of reflective materials into public realm design

Material choices in public realm can improve after dark appearance

City of London, London, UK
Lighting Vision