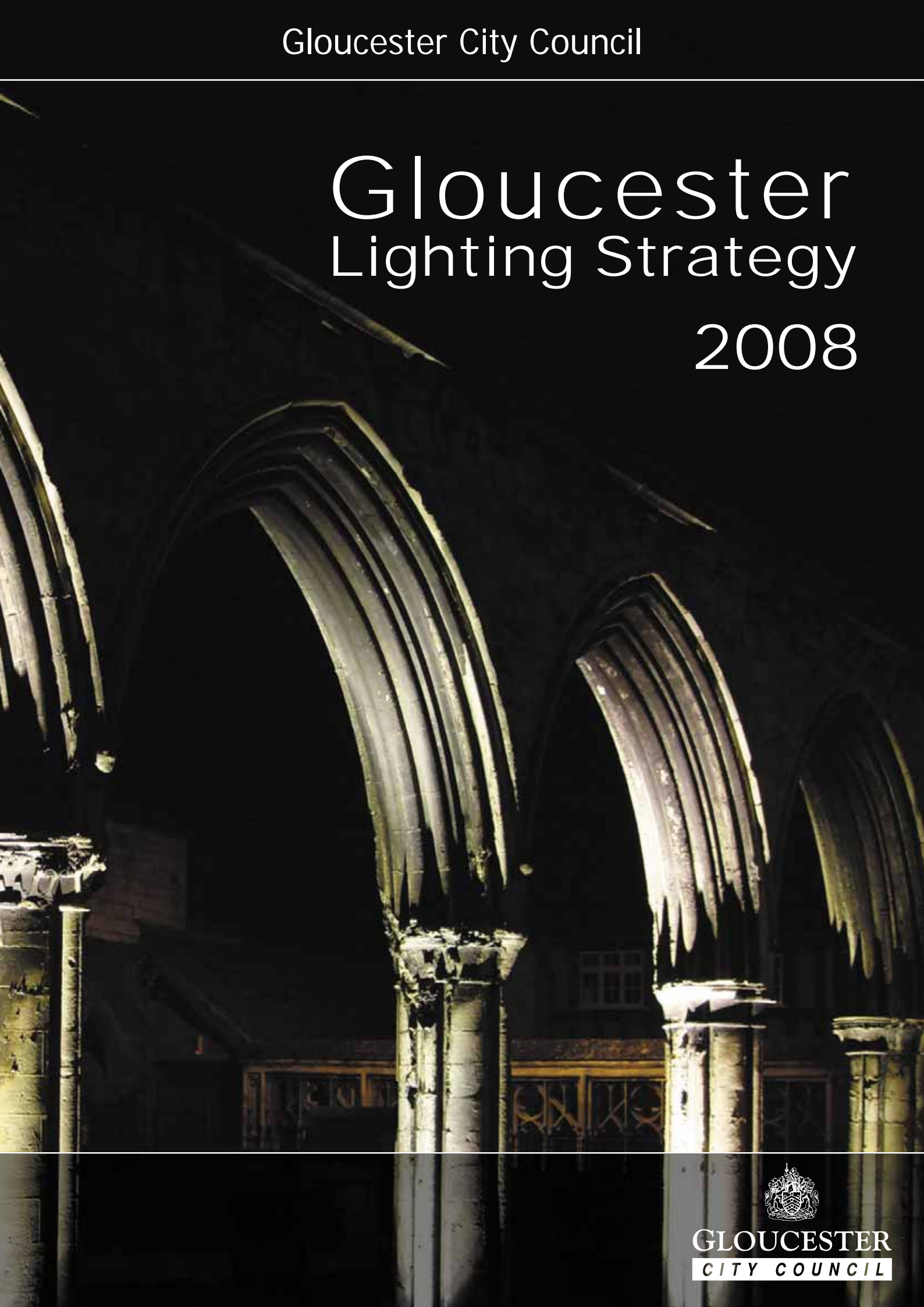


Gloucester City Council

Gloucester Lighting Strategy 2008



GLOUCESTER
CITY COUNCIL



Councillor Paul James



Councillor Steve Morgan

Foreword

It is with great pleasure that we introduce this Lighting Strategy on behalf of Gloucester City Council. The City has a unique heritage with over 700 Listed Buildings dating from the Medieval to the present day, which are largely concentrated within the city centre. The initial preparation of a draft lighting strategy by Gloucester City Council underlined the importance of using improved lighting in the city centre as a way of enhancing our night-time economy.

This was borne out when the results of our annual "People's Budget" vote strongly found in favour of using that budget for the lighting of a number of historic buildings within the central area. Among the first buildings to benefit from this will be The Guildhall, the Cathedral Tower, St Oswald's Priory and Bishop Hooper's Monument. Together they will serve to show what can be achieved by imaginative but complementary architectural lighting schemes in transforming a building and its surroundings.

This document sets out the results of close working between the City Council and its lighting consultants, Balfour Beatty Infrastructure Services Ltd, as well as the Gloucester Heritage Urban Regeneration Company and Gloucestershire County Council.

We are confident that the proposals emerging from this document will lead to a transformation in how the city looks at night and the perception of a safe and friendly environment. It will also lead to a change in how the city is used at night with lighting areas becoming visitor attractions in their own right, and assisting in the further development of the City's evening economy.

Gloucester Lighting Strategy 2008
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Executive Summary

The Gloucester Lighting Strategy was commissioned in January 2007 – and was intended to build on and extend the earlier Lighting Plan undertaken from within the Council in 2006. The photos are taken from the site trials in April 2007.

- Section 1.2 to 1.10 proceeds to an analysis of the main structural, historical, architectural and social features of the study zone within the Gloucester ring road. This includes a substantial section on the inadequacies of the existing lighting and the aspects that need to be addressed.

Framework & Analysis

- The opening section (1.1) of the document locates itself and its main aims firmly within the framework of the Gloucester Development Strategy drawn up by GHURC some 12 months ago. It sets out in very broad terms how a successful strategy could underline and reinforce some of the GHURC report's main objectives and aspirations – including boosting the evening economy and the tourist trade, improving pedestrian linkage, reducing crime and social exclusion, enhancing the city's cultural and historical assets, improving the quality of life and creating a higher quality public realm.

The Main Strategy Proposals

- Flowing from the Framework and Analysis (Section 1), Section 2 comprises the core of the document and looks at the major lighting projects that should be undertaken within the next five years or so. These are broken down into three time categories, starting with Short-term (2007-8) projects, for which some existing funding is available. Most of these projects, with the exception of the Guildhall, are grouped in the Cathedral area and could go to make up a new night-time attraction for Gloucester; the 'Cathedral Lighting Walk' (2.1.1).



Infirmaries Arches

➤ The Medium-term (2008-11) projects include concept lighting proposals for a number of key buildings and structures, including the new road bridge over the Canal (2.2.1). Equally importantly, 2.2.2 looks in detail at improvements to the circulation and ambient lighting on the main key pedestrian route in the City, starting at the Railway Station and ending up at the Docks.

➤ This important section analyses in some detail the re-lighting requirements of key areas such as the Gate Streets, the Cathedral Precincts and the entrances and circulation areas within the Docks – in order to create more night-time pedestrian use. A number of computer-generated images are included to show how Westgate and the Dock Gates, in particular, could look if the lighting was extensively improved.

➤ 2.2.2 also contains some innovative lighting concepts, with sketch illustrations, for improving the night-time identity and legibility of the Via Sacra and the old City 'Gateways'.

Lighting and Regeneration

➤ Section 2.2.3 contains another core set of lighting proposals for the first GHURC regeneration phases to come on stream – Gloucester Quays and the Canal Corridor – based on the latest known layout, character and uses of these zones. It is hoped that the lighting concepts and recommendations in this entire section, including lighting design guidelines, specific lighting equipment proposals and a set of minimum technical standards for the most popular lighting technologies, can be embodied in the future planning framework for these regeneration zones – and by extension future redevelopment areas.

➤ The Lighting Strategy in Gloucester can only be fully realised if it attracts considerable private sector involvement and funding. So Section 2.2.4 examines ways that this might be done, in the first instance focussing on three of the major bank buildings in the City and the Debenhams department store.



Guildhall detail

➤ Moving beyond 2011, Section 2.3 outlines some of the longer-term lighting proposals that might be associated with the remaining GHURC regeneration zones. Although, by necessity, such proposals can only be very general at this stage, the report focuses on particular key features or buildings within each area that will need particular lighting attention. It also discusses Gloucester's key vistas and views of the Cathedral from within and around the City and urges the protecting of these views from lighting incursions, by their adoption as 'scheduled views'.

Lighting up History, Art and Culture

➤ Lighting could play a powerful role in Gloucester in helping to present and interpret the City's many hidden and not-so-hidden historical treasures. Section 2.4 presents a number of techniques and devices, using lighting that could help make this happen.

➤ Similarly, lighting could play an important artistic and cultural role within the City, so Section 2.5 puts forward a number of 'value added' events and activities, involving lighting to a greater or lesser extent, which Gloucester could develop over the next few years. These include a *son et lumiere* (possibly out at Llanthony Priory), a local lighting design awards scheme, the use of lighting for such events as the Three Choirs and Rhythm & Blues festivals – and ways of seeding the growth of a full-blown annual Lighting Festival.

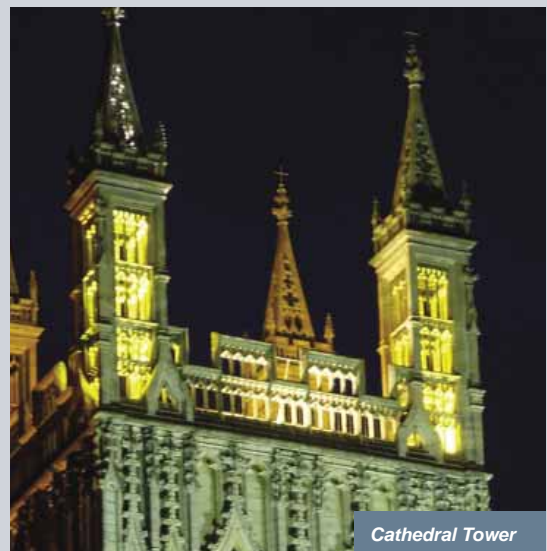
➤ Most importantly, 2.5 discusses the role that lighting could play in supporting, directly and indirectly, the City's nascent Public Arts Strategy – and lays down forms of collaboration with lighting professionals that could help the City prolong the life and durability of public light installations that use lighting in one form or another.

Lighting Management and Implementation

➤ Far too many city lighting strategies remain largely still-born, not due to a lack of lighting ideas, but for the want of a coherent, rigorous implementation and management strategy on the part of the authority. Therefore Section 3 outlines a number of key management and control issues which must underpin the Strategy's advancement in Gloucester.

➤ Section 3.1, for example, puts forward a number of measures that the City could adopt to reduce the energy and environmental impact of its lighting schemes – and in the long run save valuable funds that could be ploughed back into better lighting.

➤ Fortunately, the Planners at Gloucester have already expressed their willingness to write a number of lighting standards and recommendations into the future planning framework of the City. Section 3.2 examines the existing limited planning legislation covering lighting – and puts forward some of the ways that SPDs and SPGs could be used to enshrine the report's main strategic lighting proposals in the planning and development culture of the City over the next few years.



Cathedral Tower

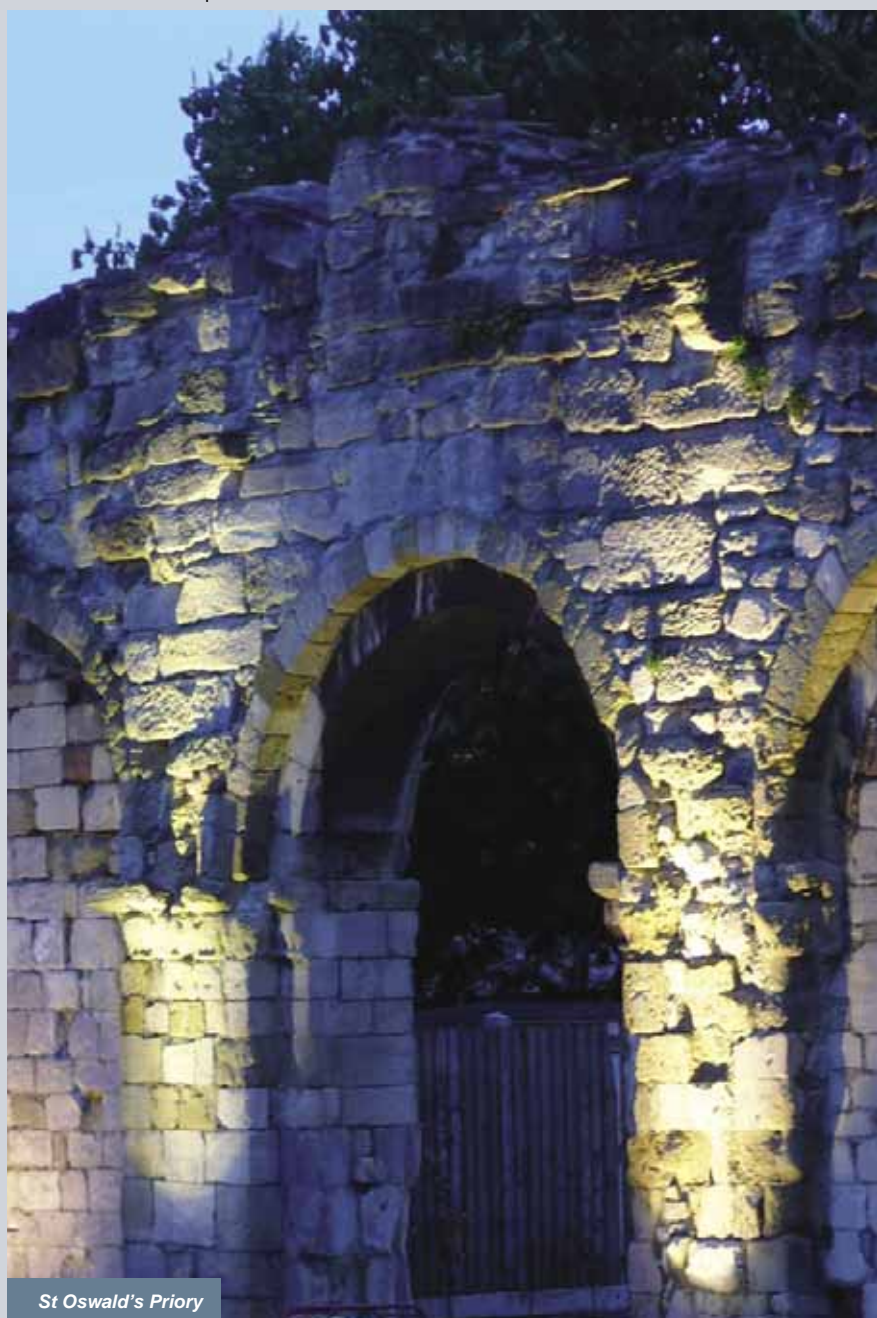
The Role of the City Lighting Manager

➤ Section 3.3 covers such issues as lighting scheme design and approval, while 3.4 argues for what the report sees as a critical appointment – that of a City Lighting Manager (CLM), possibly on a part-time or consultancy basis, to oversee the implementation of the strategy in the longer term. The CLM's role and responsibilities are outlined in considerable detail and include: overseeing the design and installation of short, medium and long-term lighting proposals, liaising with the County lighting department, advising building owners, supporting the Planning Department on lighting-related issues, collaborating with those responsible for GHURC regeneration schemes, and working with Arts officers, the police and the tourism department.

➤ Hopefully, through the popularisation of the lighting strategy and the work of the CLM, many more building owners in the City will want to illuminate their buildings. Therefore Section 3.5 offers a 'stand-alone' advisory document, 'Lighting Guidelines for Building Owners', which could be published in printed or digital form – and issued to all private building owners in the City. This 'how to do it' (and not do it) guide to lighting techniques and technologies, could help ensure that new lighting schemes avoid the worst mistakes – and measure up to the recommendations embodied in this document.

➤ Finally Section 3.6 offers a guide to various funding mechanisms that could be employed to help organisations, companies and private citizens light their properties in line with the Strategy. These 'incentives' include Grant Aid, Commuted Sums and centrally organised maintenance plans.

➤ The report also contains a number of useful Appendices, including a brief pictorial guide to lighting strategy successes in the UK and Europe, a summary of current standards for public lighting, regulations on illuminated signage, guidelines to avoid 'light pollution' and a Glossary of the major lighting terms used in this report. A list of useful publications and contact addresses concludes the report.



St Oswald's Priory





1.1 Gloucester City Council's Regeneration Plans and the Role of Lighting

The majority of lighting strategies for UK towns and cities are in the position of starting largely, or entirely, with a 'blank canvas' – i.e. with a minimum of planning or strategic objectives laid down prior to the commencement of the Analysis stage. This open brief can certainly have some advantages, in terms of offering a degree of creative freedom to the lighting design team. However, the main disadvantage is that the strategy proposals, while being valid in lighting design terms, may end up simply as a lighting design 'wish list'. As such, they may be either impractical to implement with the resources available or they may fail to 'fit' the long-term objectives of the authority concerned.

In the case of Gloucester, the City already has an excellent, highly detailed and well-conceived strategic plan for its long-term development. Its broad findings are commonly understood and widely accepted within the authority – the Regeneration Framework, produced by the Gloucester Heritage Urban Regeneration Company Ltd. (GHURC). Therefore, to maximise its effectiveness and relevance to the City's needs, the principles within both the original Draft Lighting Strategy and the Framework document, must lie at the core of the revised Lighting Strategy. In fact, to ensure its long-term success, it is vital that the Lighting Strategy substantially underpins and reinforces the medium-to-long term aims of the GHURC Framework.

This section looks in the broadest terms at the ways that this might be done – and the main areas in which lighting can make a contribution, through an examination of the explicit objectives and aspirations laid down within the Framework document.

'Critical Issues for Success'

Meeting the GHURC output targets is clearly the most fundamental indicator of success. However, in order to meet these targets and the wider objectives of the GHURC the following are considered to be the ten most critical issues for success:

1. **Strengthening the commercial and historic role of The Cross and Gate Streets.**
2. **Enhancing pedestrian links, and increasing pedestrian flow, between the docks and the historic core.**
3. Addressing the visual and commercial impact of insensitive development.
4. **Protecting and enhancing views of the Cathedral.**
5. Bringing active uses into Blackfriars Priory.
6. **Delivering a high quality public space at Kings Square.**
7. **Enhancing use of the water and waterfront.**
8. **Increasing walking, cycling and the use of public transport.**
9. Increasing the range and quality of employment opportunities available to local people.
10. **Improving 'quality of life' for residents.'**

It is immediately evident that in the case of seven of these ten medium to-long-term 'critical issues for success' **[marked in bold italic]** creative lighting solutions could play a central role. Later in this report we will explain in more detail how this might be achieved.

Marketing the Gloucester Brand

Similarly in Section 2.18 of the Regeneration framework report on 'Leisure & Tourism', we find the following words:

'The recent marketing strategy... considered the brand for Gloucester and how it might be developed and promoted. Aspirations include:

- **Improving the gateways to the city road, rail and bus;**
- **Improving public transport, particularly relating to the evening economy**
- A new quality hotel
- **More heritage and arts based tourism**
- Building on the city's growing reputation as a live music and dance venue
- **Ensuring the right conditions exist for tourism-related businesses**
- **Promoting the city's historic waterfront**

Once again, the strategy will detail various ways that lighting can play a central role in realising five of these central aspirations **[marked in bold italic]** – in fact these issues will lie at the heart of the main lighting proposals for the City.

Reducing Crime

In Section 2.36 of the Regeneration Framework report on 'Crime' we find the following words:

The proposed developments include a broader cultural offer in Gloucester. As this is developed it is anticipated that the evening economy will have a wider base with less emphasis on alcohol-fuelled activities. This is likely to address some of the crime and disorder issues although it is

anticipated that to facilitate the initial growth of the wider evening it will be necessary to project a safe city centre environment.

Improved lighting has long been associated with crime reduction – Section 1.2.1 spells out some of the recent research findings on the issue and the economic 'cost-benefit' statistics which flow from such reduction.

Enhancing Gloucester's Heritage

Section 3.2 of the GHURC Regeneration Framework on 'Heritage' makes the following observations:

The characterisation analysis has identified the need to:

- **Strengthen the role of The Cross as the central point of pedestrian movement and activity in the city**
- **Maintain and enhance the role of the Cathedral as a focus for the city**
- **Emphasise the special character of the historic city centre**
- **Use key historic buildings as the focus for their areas**
- Reverse the flaws of the Jellicoe Comprehensive Development Programme, allowing the city to develop organically.

The Lighting Strategy proposals will be seen to broadly underline and reinforce four out of five of these main requirements **[marked in bold italic]**.

Other Issues

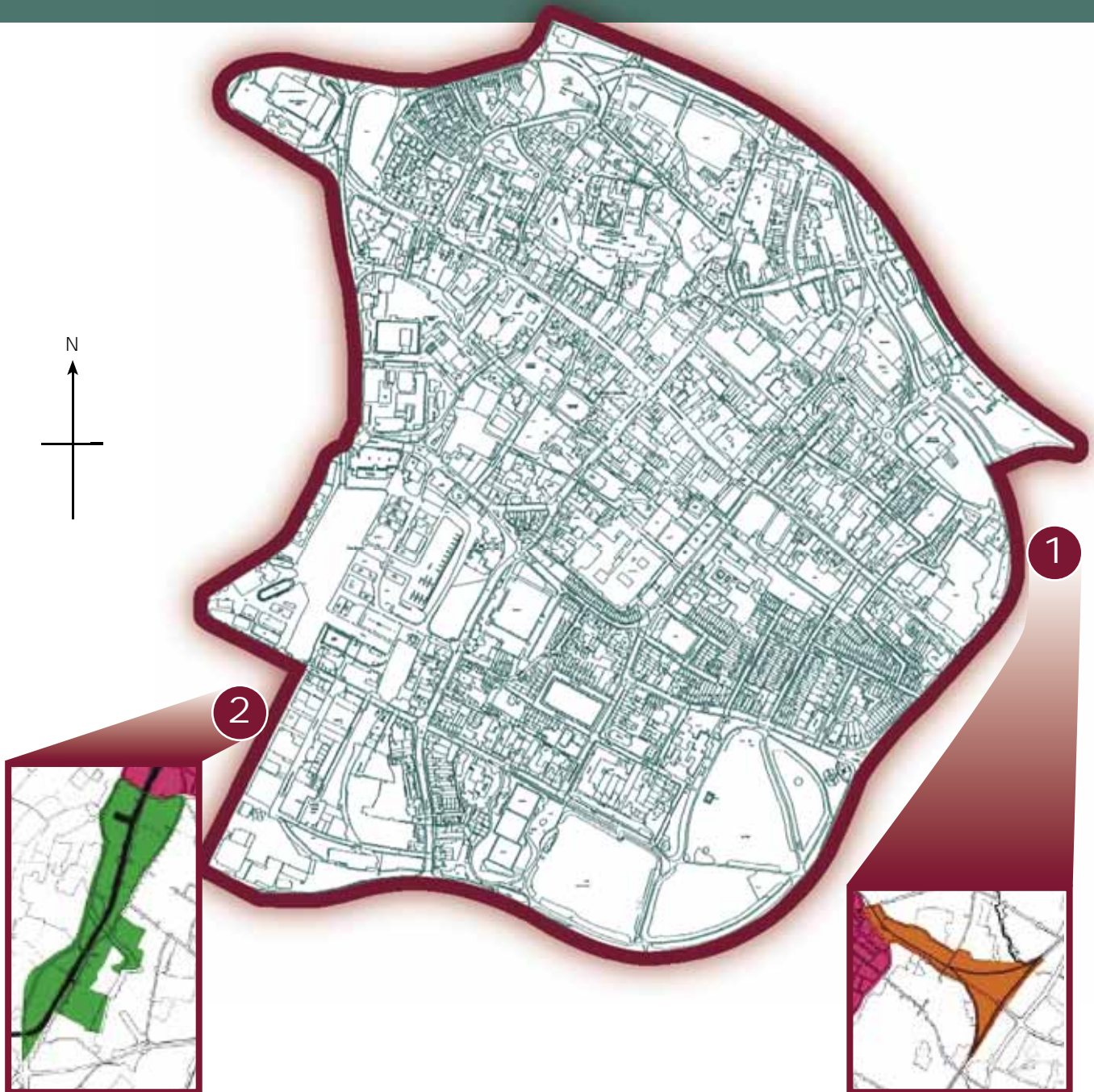
There are a number of other aims and objectives outlined in the GHURC Framework report where lighting can make a substantial, if not a principal, contribution, for example:



- Section 3.8.5 mentions two key requirements relating to the Cathedral: the need 'to ensure that new buildings do not compete with the Cathedral in key long-distance views' and a desire 'to increase the level of activity in the Cathedral quarter'. Careful control of lighting in the first case, and enhanced amenity lighting in the second, can play a powerful role here.
- Sections 4.46-4.48 of the GHURC document summarise the Framework report's analysis of the overall mediocre-to-poor quality of Gloucester's current Public Realm – and spells out a number of key areas and axes of circulation where this needs to be improved. By night, a commensurate improvement of both amenity, security and decorative lighting will be an indispensable component of any such improvements.
- Finally, later sections of the Regeneration Framework report explain in considerable detail the planning

aims, economic objectives and design principles underlying the future reconstruction of the major designated redevelopment districts within the City; – Blackfriars, Greyfriars/GlosCAT, King's Square/King's Walk, Westgate Quay, Gloucester Docks, the Canal Corridor and the Railway Triangle. Section 2.2.3 and 2.3.1 of this report spell out a series of broad lighting design themes and recommendations that must accompany any redevelopment schemes in these areas, to create a cohesive and successful night-time ambience for these districts.

All in all, the GHURC Regeneration Framework lays out a broad set of objectives which must inform and underpin a large proportion of the Gloucester Lighting Vision report. What follows must be seen in the context of that Framework, as well as the original Draft Lighting Strategy.



1.2 The Geographical Boundaries

The boundaries of the study area, marked with a red line, approximately coincide with the City ring road, except to the south-west where the report takes in the Docks area. In addition to the East, it includes one

of the GHURC development zones, the Railway Corridor (1) – while south of the Docks, off the main map it also includes lighting proposals for another GHURC redevelopment area, the Canal Corridor (2). More detailed analysis of the character of Gloucester’s City centre-zones can be found in the next section, **1.3**





PROJECTS

1. St Oswald's Priory
2. St Mary de Lode Church
3. Bishop Hooper Statue
4. Infirmary Arches
5. The Cathedral
6. St Nicholas Church
7. The Folk Museum
8. St John's Church, Northgate
9. St Michael's Tower
10. The Guildhall
11. Robert Raikes House
12. Eastgate remains viewing chamber
13. Greyfriars Ruins
14. Greyfriars House
15. St Mary de Crypt
16. Debenhams
17. Ladybellegate House
18. The Prison
19. Llanthony Bridge
20. Eastgate Shopping Centre
21. Robert Raikes Statue
22. No. 9 Southgate
23. Bearland House
24. 26 Westgate Street/Maverdine Lane
25. The Dock Walkways
26. St Peters Catholic Church

AREAS

- I. The Blackfriars
- II. The Docks
- III. Llanthony Priory
- IV. Cathedral Precincts
- V. Quays
- VI. Kings Square

GATEWAYS

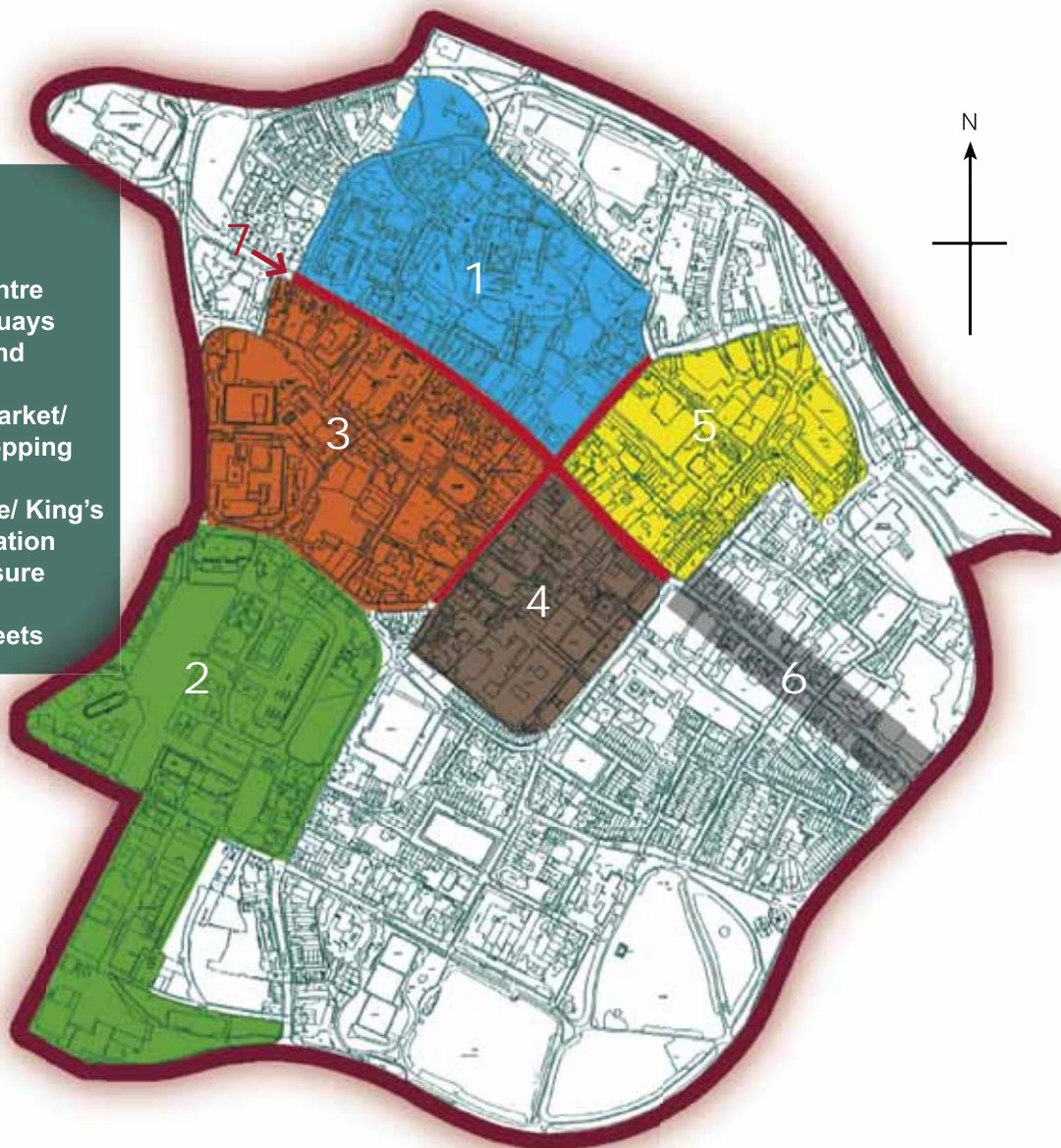
- A. Eastgate
- B. Northgate
- C. Westgate
- D. Southgate
- E. Pedestrian Crossing Points

1.3

Gloucester's Main Historic Buildings

This plan shows Gloucester's main historic structures or buildings, some of which are proposed as short-to-medium lighting subjects in later sections of this report. As can be seen, the vast majority of these fall in the north-western segment of the City, corresponding to the areas encompassed by the old Roman, and later medieval, city core, plus the ecclesiastical buildings and

- Key**
1. Historic and Religious Centre
 2. Docks and Quays
 3. Blackfriars and Prison
 4. Greyfriars/ Market/ Eastgate Shopping Centre
 5. King's Square/ King's Walk/ Bus Station
 6. Eastgate Leisure Area
 7. The Gate Streets

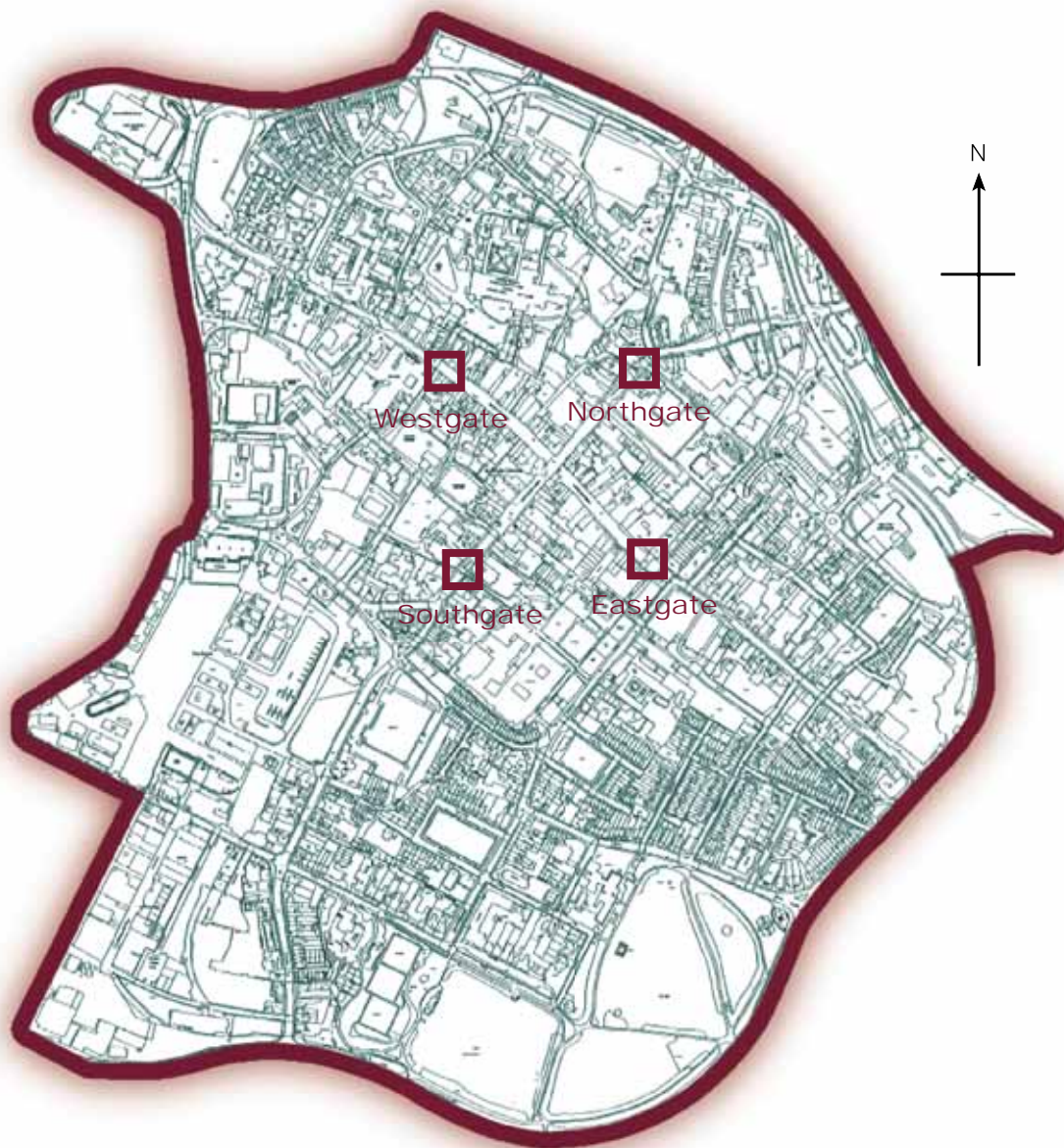


1.4 Structure of the City – its different areas, architectural characteristics and uses

For the purposes of the analysis and the main lighting proposals embodied in this report, the Strategy breaks down the city centre areas into seven broad zones. These zones have been designated according to their distinct character and/or function, which will be reflected in terms

of distinctive lighting proposals later in the report. Some of these areas correspond, in whole or in part, to specific GHURC regeneration zones – namely Gloucester Quays, Blackfriars, Greyfriars and King's Square.

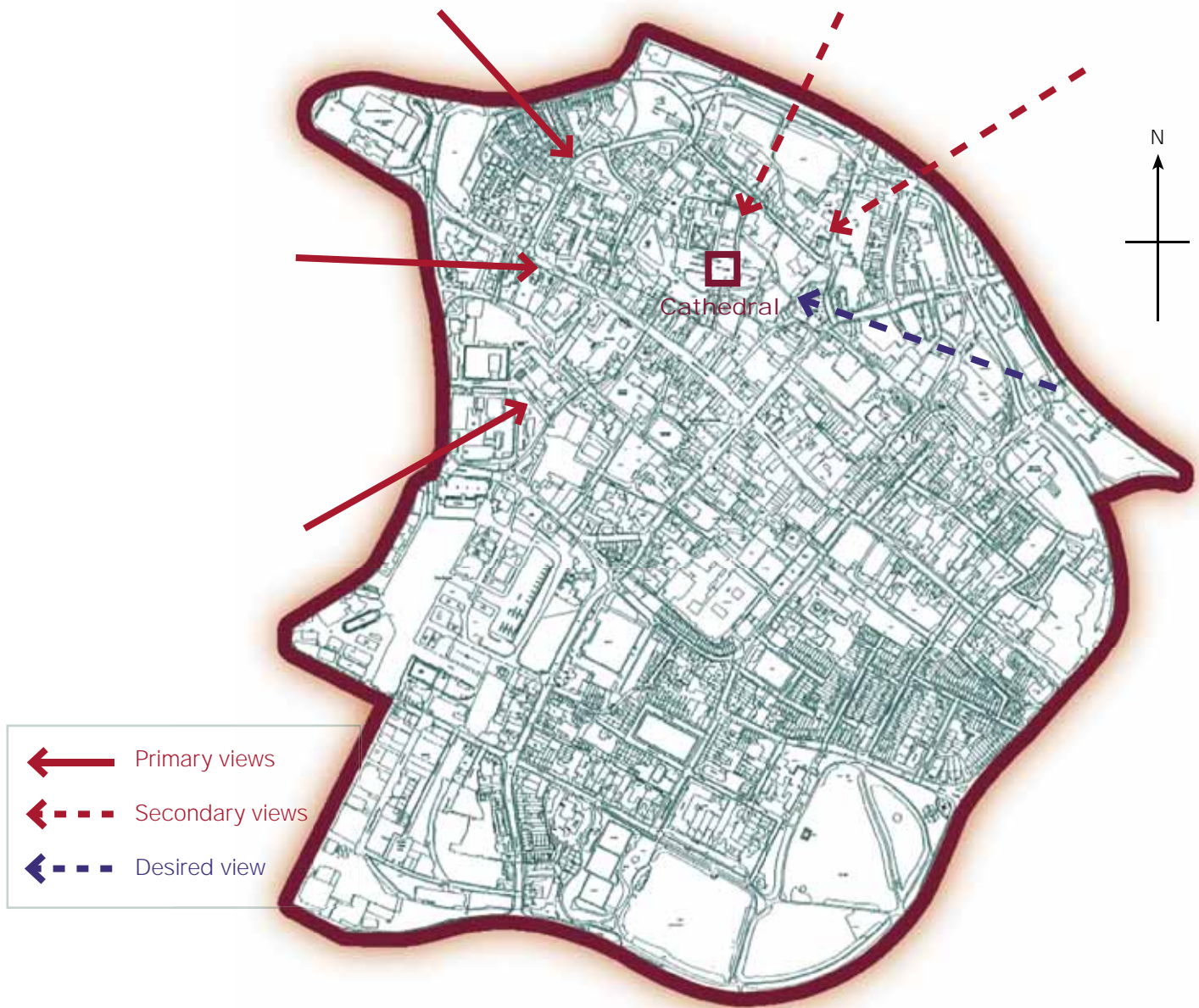
The areas outside these designated zones comprise either predominantly residential areas, parks, undeveloped commercial areas or secondary retail areas – and are not subject to lighting changes or proposals at the current time.



1.5 The City 'Gateways'

The four Gate streets, which form the central axes of the City, were clearly associated with the four former Roman, then medieval, gateways. However, with the exception of the viewing chamber showing the underground remains of the old Eastgate entrance to the city, there is little that marks out the original gateways to the City on the current street plan.

These are obviously important parts of the old city structure, and deserve some designation and demarcation, as a reminder of their location and importance. In **Section 2.2.2**, the report details some concept ideas for marking the old gateway positions, using lighting – this could possibly be combined with some new interpretative signage, explaining their historical background.



1.6 The Views and Vistas

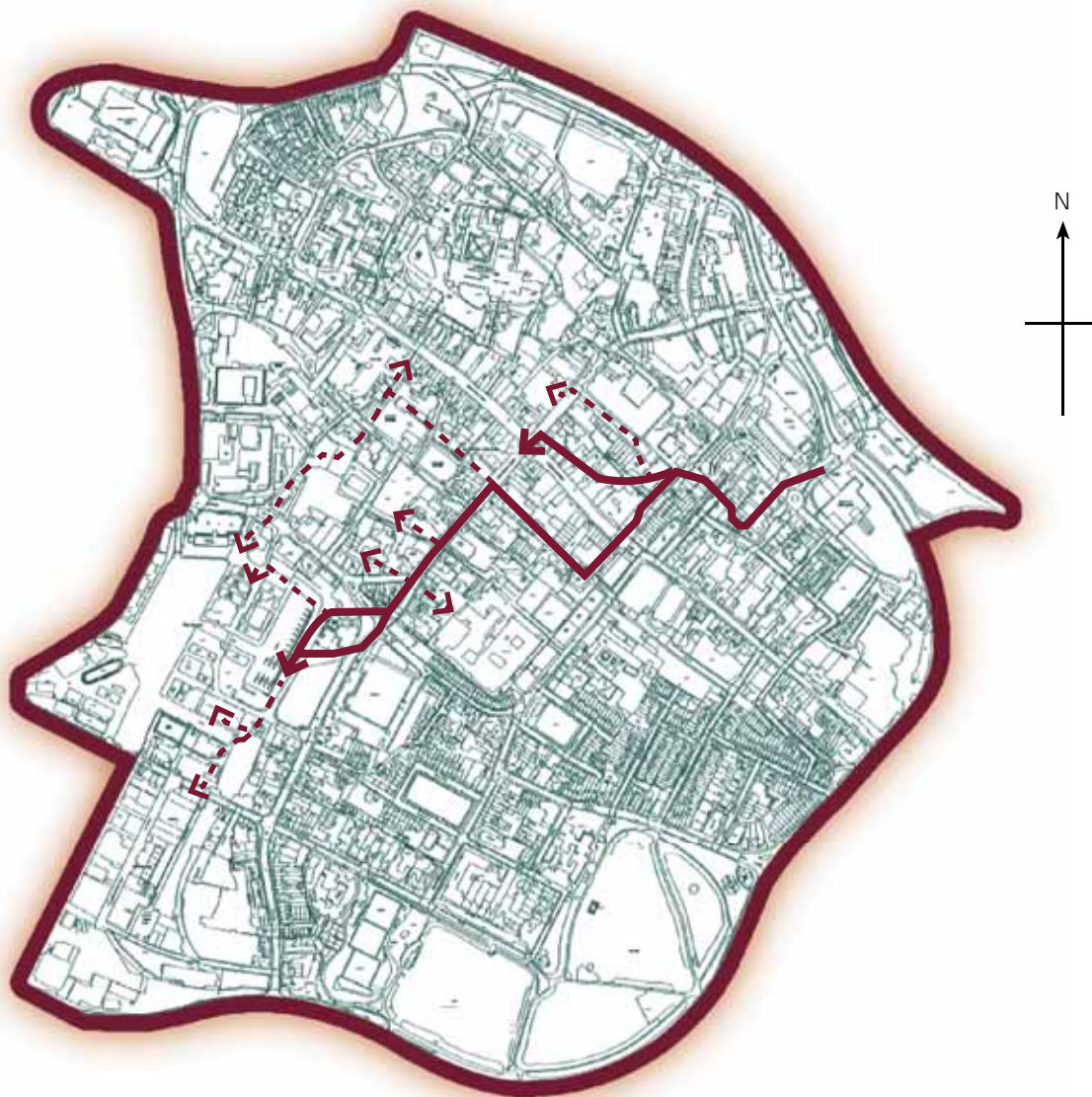
The Cathedral tower is clearly the most visible and distinctive skyline feature within the city – and one that defines the City’s image. This image will be reinforced by night with the re-lighting of the Cathedral tower as part of the first group of lighting projects in 2008.

The most prominent, picturesque views of the Tower are from the west and north-west side of the city, from along and across the river Severn. Views from the south are

limited, due to the rising ground towards the city centre – and while there are views from the east and north, they are rather cut off by the railway viaduct.

Finally, as an establishing view for rail visitors to the city, it would be desirable to have a view of the Cathedral from the railway station, but this is currently obscured by the multi-storey car-park between the bus-station and the ring road.

In Section 2.3.2 the report puts forward some proposals for protecting these key night-time views from future lighting incursions.

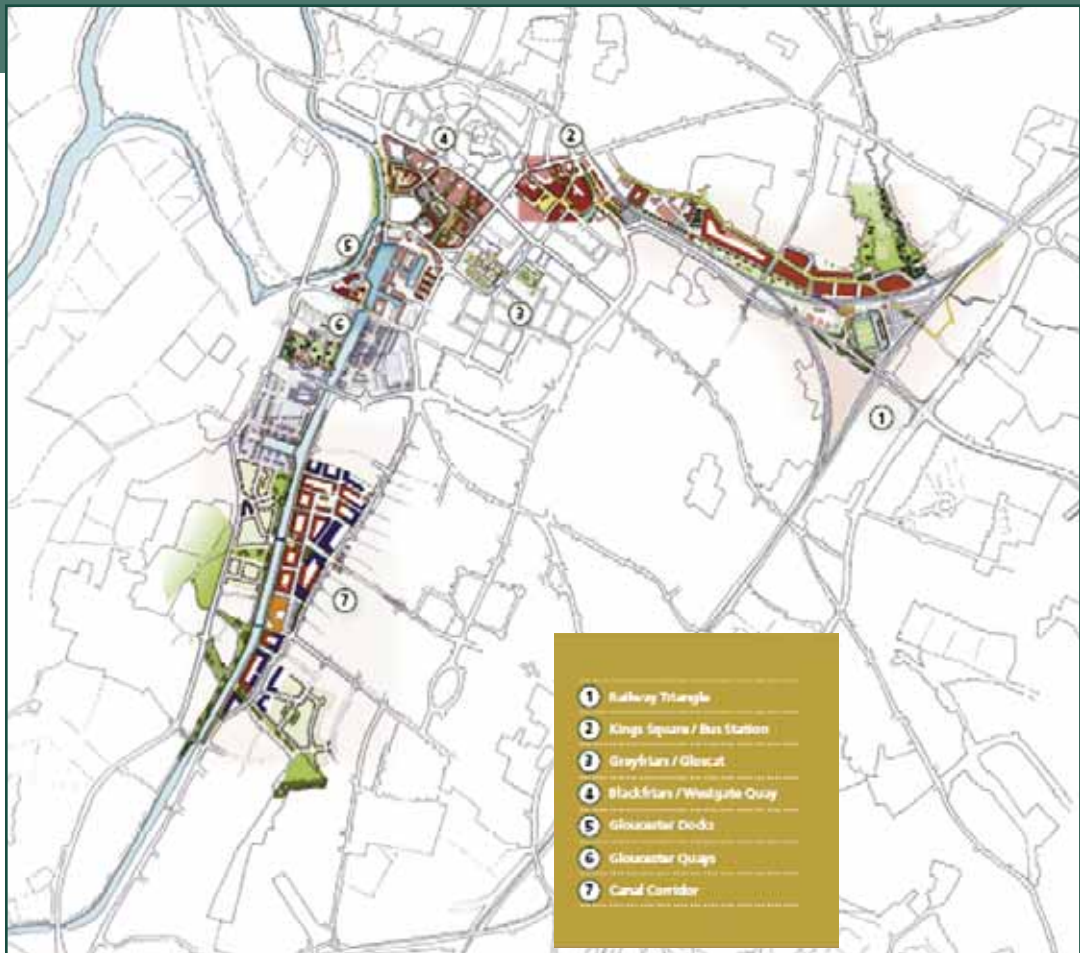


1.7 Patterns of Pedestrian Movement

The GHURC regeneration report includes detailed plans and analysis of the existing patterns of pedestrian movement, and some desired outcomes for the future, in terms of (i) changing the pedestrian environment for crossing the ring road at various points; and (ii) new pedestrian routes within the Railway Triangle and the Canal Corridor.

In the case of crossing points, lighting could certainly help to emphasise and re-prioritise the major crossing points on the ring road. In this section we look in specific detail at one particular crossing point, which could serve as the model for crossings elsewhere.

For the purposes of medium-term projects in the Strategy, there is one key cross-city pedestrian route that is central to the main thrust of this report – that is the route from the railway station, through the central shopping area (via Eastgate or King's Square/Northgate) and along Southgate to the Docks and Canal Corridor area. This route and a number of its sub-routes provides pedestrian access to virtually all the city's historic and cultural attractions. As such it should be given a lighting treatment which combines safety and visual comfort with a degree of orientation and wayfinding. Proposals for this route are discussed in **Sections 2.2.2** and **2.3**.



1.8 Future Zones of Development/Regeneration

As spelt out in Section 1.1, Gloucester City Council's regeneration strategy detailed in the GHURC regeneration framework study, focuses on seven medium-to-long term regeneration zones within the City – the so-called 'Magnificent 7' as shown on the above plan.

Clearly the role of lighting within these zones will be very important, both to define the night-time ambience, to underline the architectural character of the various new developments – and to give some visual and stylistic linkage to these disparate sites, by night and by day. However, as the future detailed design and layout proposals for most of these regenerated areas are as yet unknown, it is clearly impossible at this stage to generate specific, highly detailed lighting proposals which could play this role.

Therefore, within the scope of the Gloucester Lighting Strategy, the

consultants have concentrated on the two most advanced developments within the GHURC framework report – Gloucester Quays and the Canal Corridor. In **Section 2.2.3** a number of lighting design principles, broad specifications and technical recommendations are laid down for these two zones, which could be incorporated into binding planning recommendations for the sites, as Supplementary Planning Documents (SPDs) (see **Section 3.2**). It is hoped that these design principles will be able to be adopted and rolled out across future GHURC regeneration projects – see **Section 2.3.1**.

However, it is worth pointing out that lighting technology and legislation relating to such lighting issues as energy use and light pollution is evolving at such a rapid rate, that beyond a four-year timescale (i.e. 2011) many of these concepts and recommendations may have to be reviewed, and possibly revised, in the light of such changes.

1.9

Lighting, Security and Crime

While the main aim of the Lighting Strategy is to promote the City of Gloucester, support the process of regeneration and increase tourist visitors, particularly during the evening hours, it shouldn't be forgotten that improved lighting can also have a real benefit for the residents of the city all the year round. For a start, the improved night-time presentation of Gloucester's architectural and heritage assets should serve to increase the degree of civic pride amongst the general population. Also the improvements to the street and road lighting will certainly increase visual comfort for every one within the city centre.

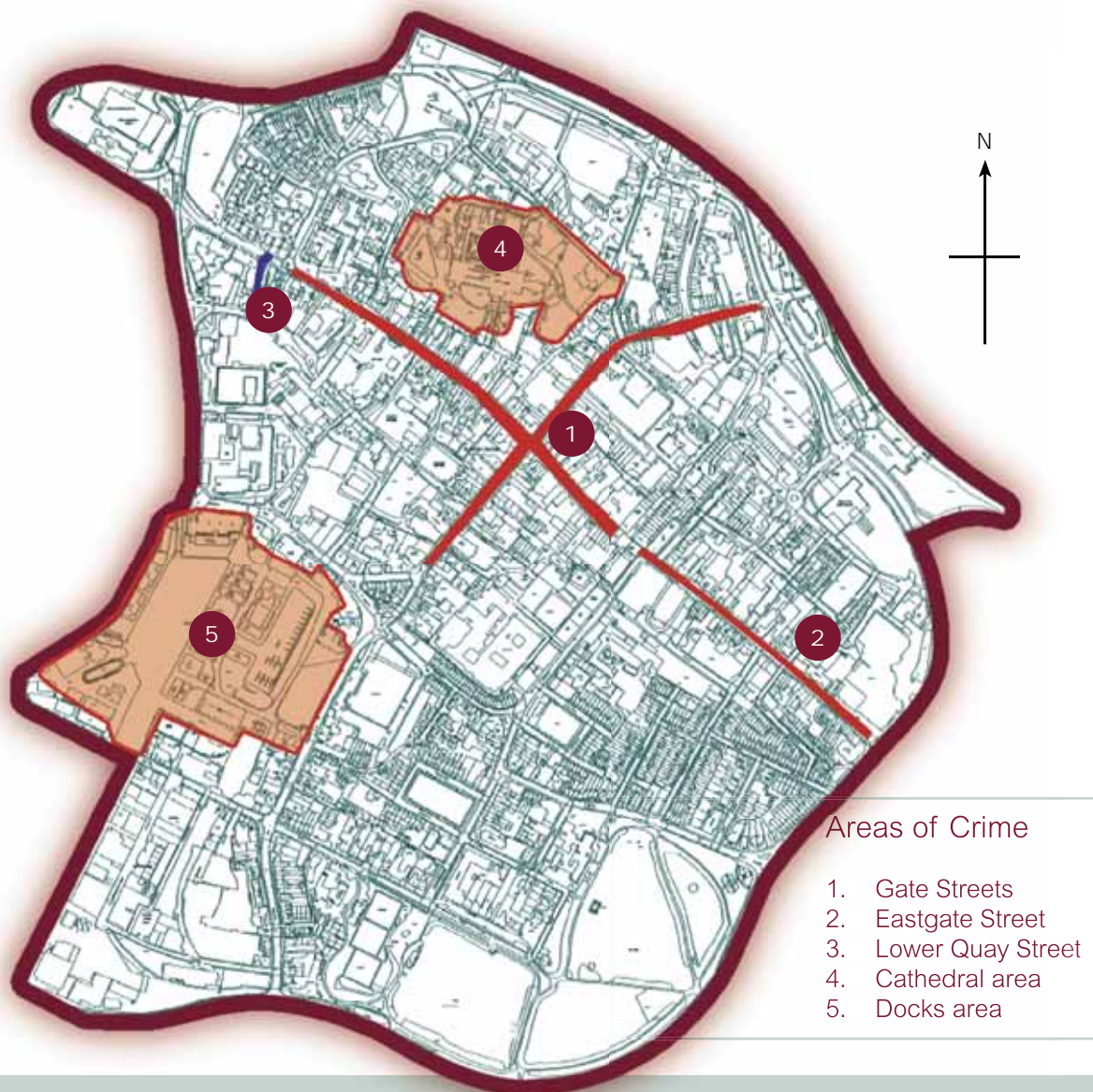
Most importantly, there is considerable evidence to suggest that improved lighting has a substantial effect in reducing levels of crime and disturbance. Equally importantly it has proved very effective in reducing the **fear of crime** (which may be disproportionate to the actual risk of crime, but is none the less a real issue) amongst more vulnerable sectors of the population, such as single women, the elderly, young people and the disabled. In promoting the Strategy and its proposals to the council-tax payers of Gloucester, the Council should stress this indirect benefit at every opportunity, to avoid being seen as overly concerned with only the interests of **visitors** to the city.

Various studies over the last 15 years have shown that improved lighting increases the number of people actually going about on foot at night. This growth in foot traffic in turn increases the degree of 'informal surveillance' by the general population (i.e. the chance of criminals and wrong-doers being seen) which acts as a strong deterrent. Research studies in Hull, Cardiff, Leeds, Manchester, Strathclyde and Birmingham in the early '90s demonstrated that improved lighting had the following results:

- The proportion of over-65s who felt that going out after dark was not safe fell from 49% to 15% (Cardiff)
- The number of people walking in the streets on their own rose by 26% (Cardiff)
- The number of women who avoided going out after dark fell from 38% to 7% (Hull)
- The number of elderly residents on the streets at night doubled (Hull)
- 44% of people felt safer in the streets around their homes (Leeds)
- Total night-time pedestrian flows increased by 9% – and between 20.00 and 22.00 by 23% (Manchester)
- Female pedestrians in groups increased by 71% (Manchester)
- Female pedestrians increased by 70% between 22.00 and midnight (Strathclyde)
- Car crime declined from 23 incidents in three months before re-lighting to just one in the following three months (Strathclyde)

Equally importantly, other studies have demonstrated the high cost-effectiveness of lighting investment. In Dudley, Stoke-on-Trent and Tameside research studies set out to demonstrate the cost-benefits of lighting, set against the total costs of crime. In Tameside the study showed that there was a 19:1 return on lighting investment, through reductions in the broader costs of crime, across the 25-year life of a lighting scheme. In Dudley the investment in lighting was demonstrated to save up to 47 times that sum in reduced crime costs over 20 years; while in Stoke every £1 spent on lighting was estimated to save £27 in reduced crime costs, over 20 years.

In August 2002, the Home Office produced a report based on 13 validated research studies on lighting and crime and



concluded that improved lighting could decrease crime by up to 30% in the UK. Equally interesting, it concluded that lighting was a much more effective anti-crime investment than CCTV systems according to recent studies, CCTV had had only a small effect on crime reduction (4%) and in some cases actually seemed to increase crime!

Crime in Gloucester

Although Gloucester's crime rate is not exceptional in national terms, the city does have the highest crime rate in the County. Based on very general information obtained from the Gloucester City police, the areas of highest crime and disturbance are:

- All the Gate Streets – 'general crime'
- Eastgate Street – 'particularly during key drinking periods of Friday/Saturday'
- Lower Quay Street – 'fear of crime and poor lighting hampering CCTV cameras'
- Cathedral and Docks area – 'general crime'
- Brunswick Road – 'residents report fear of crime'

With the exception of Brunswick Road, which lies in a residential area not addressed within the scope of this Strategy, these areas are shown on the plan above and are covered within our general strategy proposals in **Section 2**.

BS5489 1992 **Part 2- Lighting requirements for Traffic Routes**

Category	maintained average luminance L cd/m2	Overall uniformity ratio Uo	Longitudinal uniformity ratio UI	Examples
2/1	1.5	0.4	0.7	High speed roads. Dual carriageways
2/2	1.0	0.4	0.5	Important rural and urban traffic routes. Radial roads. District distributor roads
2/3	0.5	0.4	0.5	Connecting, less important roads. Local distributor roads. Residential area major access roads

1.10
The Existing Lighting

Introduction

The most important observation one can make about the existing lighting in Gloucester is that it is designed primarily for the needs of traffic, rather than pedestrians. Even the lighting of key pedestrian areas, such as the Gate streets, has been designed to traffic lighting principles – functional floodlights, mounted high on building facades, creating a monotonous, uniform lighting effect, with a considerable degree of glare, which is visually uncomfortable for pedestrians. To help support and stimulate the evening economy – and to create an attractive night-time ambience – this type of approach must be challenged and the lighting of the city-centre streets, and the streets within the new GHURC regeneration zones, must be designed in a **pedestrian-friendly manner**.

Sections 2.2.2 and **2.3.2** of this report outline in more detail the techniques and styles of lighting that could achieve these goals.

The existing street lighting within Gloucester City Centre, as with many urban locations, is varied, in both style and performance, from the predominately traffic route lighting on the Inner Ring Road through to the mixed pedestrian and traditional style lighting found within the Cathedral environment.

It is clear the street lighting has been developed on an ad-hoc basis when funding has become available – and upgrades have been carried out without an overall guidance on style, location, existing infrastructure and a vision for Gloucester.

The lighting appears to have been designed and installed in line with the relevant version of BS5489. As with any specification the guidance has improved during each update and the latest version is now in line with the European edition EN13201. However in providing an overview of the existing lighting a comparison to the previous version BS5489 :1992 will be taken as the benchmark.

Traffic Routes: BS requirements

For traffic routes it is primarily the traffic flow which dictates the levels of lighting by classification and the list below gives a brief overview of the standards and guidance:

BS5489 1992 **Part 3 - Lighting requirements for subsidiary roads and associated pedestrian areas**

Category	Maintained average illuminance lx	Maintained minimum point illuminance lx
3/1	10.0	5.0
3/2	6.0	2.5
3/3	3.5	1.0

The Inner Ring Road (IRR) is lit with 250Watt high pressure sodium lamps in modern and efficient lanterns sat upon 10 metre high columns. These units are spaced uniformly along the highway and produce an even light distribution and appear to conform to British Standards. These units perform well and appear to provide the appropriate illumination for the traffic numbers and speed of vehicles using the highway. They also work well as way finders outlining the traffic route by both day and night

Within the IRR there are a number of key roads that provide access to the centre and act as key routes into the centre and public bus routes.

These roads are lit by various types of lanterns and lamps being generally mounted between 8 m and 10 metres and either from street lighting columns or building-mounted. Both the quality and levels of lighting within these streets varies and does not contrive to produce a cohesive feel for either vehicle drivers or pedestrians; nor does it reflect the importance of the streets within a natural hierarchy.

In the centre of the City the streetlights are building mounted which has the clear benefit of allowing ease of access for all, especially emergency vehicles. Although the streets are clear of obstructions, the lighting itself tends to produce a false night time ceiling along the streets and has deterred any architectural lighting. The cold harsh white light flooding onto the Gate streets tends not to promote a welcoming feeling and enforces the hardness of the scene.

Subsidiary Roads: BS requirements

For subsidiary roads the BS requirements were simplified and were related to local crime data with high, medium and low crime categories linked to the levels of lighting. Lighting was often installed to the middle band of 3/2 which was perceived as the most cost-effective light levels (see table above).

The existing lighting on the side roads within the city centre is provided by a broad mixture of lantern/lamp types and sizes, mounting heights and mounting platforms, even within the same street.

A number of streets rely upon the illumination provided by the existing properties to light the streets which can result in walking into a dark hole once past the area of illumination. This will often raise the fear of crime and uncertainty about personal security and thus deter usage. Key routes such as the Via Sacra or routes between the Docks and the shopping centre are in places poorly illuminated and lack any coherent lighting theme as both the light source type of lamp and the style of equipment changes without any rationale.

Pedestrians Zones, Open Squares: BS requirements

The table below indicates the various levels to be specified for locations within City centres. Where pedestrian activity is pronounced then illuminance levels in lux are specified.

There are three principal pedestrian areas within Gloucester centre and in addition the Docks. these are:

BS5489 1992 **Part 9 - Lighting requirements for general traffic situations**

Category & type	L cd/m ²	U _o	U _l	E _h (av)	E _h (min)
9/1 City or town centre	1.5	0.4	0.7	n/a	n/a
9/1/1 primarily vehicular	n/a	n/a	n/a	30	15
9/1/2 mixed vehicular & pedestrian	n/a	n/a	n/a	25	10
9/1/3 wholly pedestrian					
9/2 Suburban shopping street	1.5	0.4	0.7	n/a	n/a
9/2/1 primarily vehicular	n/a	n/a	n/a	25	10
9/2/2 mixed vehicular & pedestrian	n/a	n/a	n/a	15	5
9/2/3 wholly pedestrian					

- The Gates
- Kings Square
- Cathedral Precincts

The Gates are lit from the adjacent building frontages at an average height between 8 and 10 metres and use a variety of lanterns that have been upgraded over the years. This has been done to remove the street 'clutter' and allow easier access.

The lights have recently been changed to a white light source which enhances the colours in the street, but fails to provide sufficient vertical illumination to clearly pick up the two cyclists in photo1. The intensity of the lamps to provide sufficient illumination is high so the eye is drawn towards the brightest source in the visual field, which distracts from the whole scene. In addition it produces a false ceiling above the light source as the eye cannot see beyond this bright source. The positioning of the lanterns also interferes strongly with any highlighting of architectural features within the streets.

Kings Square is an open area used by the weekly market or as a performance space for a variety of types of event. There is little direct lighting as it relies on the adjacent street lights to provide general low illumination which is supplemented by low level luminaires located around the perimeter of the square.

Lighting within the Cathedral precincts is not uniform in either its performance or

style. Areas of relative darkness within the grounds exist which may have contributed in some way to recent criminal activity. This clearly needs to be addressed in a sympathetic approach to the location. In addition, there are at least three competing styles of equipment that do not work well together. The area could easily have its own style that links to the overall Gloucester image.

The Docks are a potential jewel in the crown in Gloucester that has been largely overlooked in terms of any planned exterior lighting. The entrances from the Inner Ring Road are unlit and unwelcoming to any potential visitor.

Within the Docks there is again a mixture of styles of luminaires scattered around the area. Some buildings are lit but in an uncoordinated way that does little to provide confidence and a welcome to those visiting for the first time. The installed lighting varies dramatically in performance and appearance. The floodlighting to a number of buildings is welcomed but again emphasises the lack of co-ordination and fails to promote the Dock's identity. The off-building pedestrian lighting produces poor illumination through extreme control of the light within the lantern, so that its output is negligible and energy used is wasted.

Looking Forward:

A number of column and lantern manufacturers are in use around

Photos 1-3 show the effects of the existing lighting in the Gate streets. Photo 4 shows the inadequate lighting of the narrow side streets; Photo 5 shows a view of one of the Dock gates, which is very uninviting to visitors.



Gloucester City centre to provide the existing illumination. However this does not provide any cohesive quality nor help portray any image for the City.

As part of this Strategy the opportunity to introduce a family style into the City is imperative and listed below are the key factors in developing the choice of equipment. Details of the choice of the proposed equipments is detailed in Section 2

Technical Guidelines

The choice of lighting equipment and light source is critical to the process of lighting design. It is a primary goal to ensure the best possible lit environment is created using the lowest possible energy consumption and minimised light spill and light pollution. To achieve this, specific lighting products will be selected to perform specific functions.

Public Lighting Equipment

Lighting Columns

Lighting from the buildings can be most advantageous in minimising damage and reducing street clutter but columns will be required in some areas.

The columns should have long life with ease of maintenance – i.e. minimal paint protection cycle and provide pleasing aesthetics in the City centre.

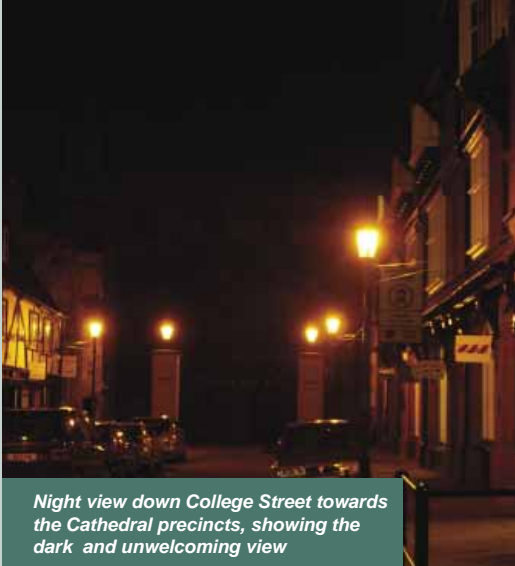
Stainless Steel and Aluminium columns offer both of the above with Aluminium providing a passively safe option regarding any vehicle impacts, are light to handle and at a similar cost to the traditional steel columns

Luminaries

Optical performance – light fittings must have superior optical control, using reflector design and internal and external accessories to ensure precise beam control and minimised light spill.

Quality – the lighting equipment will be selected to provide long maintenance free life

Ease of Maintenance – lighting equipment is often required to be mounted in difficult



Night view down College Street towards the Cathedral precincts, showing the dark and unwelcoming view

to access conditions. It is important that the fitting can be maintained without unnecessary effort.

Cost – all fittings must demonstrate value for money

Light Sources

It is proposed to utilise the following light sources in the design and delivery of this lighting strategy;

Philips Cosmopolis lamps and /or cmh lamps

High pressure Sodium lamps SON T Pia – e.g. Inner Ring Road

Light Emitting Diodes (LED) both white and colour changing depending on required effect.

All lamps will be operated on energy efficient electronic control systems, possess excellent warm white appearance – 3000K with excellent colour rendering properties (Ra>60+ for white sources), robust, long reliable life (minimum 12 000hrs - maximum 100,000hrs), and easily available for future maintenance

Operation and Maintenance

It is recommended that a co-ordinated approach to the operation and maintenance of the City centre lighting is implemented to ensure the successful day-to-day appearance and functionality of the full lighting installation.

Working in partnership with Gloucester County Council to ensure satisfactory operation through their lighting maintenance programmes and specialist contractors should be organised via a centrally organised resource, controlled by Gloucester City/County Council. This will establish the City Centre as a priority within the County and ensure the lighting remains operating as designed.

Sustainability

Alternative forms of energy such as solar power and wind power were assessed at the initial stages of this project for potential use. A number of factors have rendered them unsuitable at this moment in time, including; limitations in technology relating to large scale commercial use, physical limitations in available space required to make alternative forms of energy viable for the majority of the proposals. However it is feasible to carry out a trial of renewable energy for the canal towpath lighting.

Variable lighting levels should be introduced to manage the lighting network to its optimum performance.

Remote monitoring systems exist that can vary the lighting from 100% to 0 and will supply valuable technical and performance information back to the lighting manager. These systems are becoming more affordable and can be introduced step by step and as part of any new project before being expanded across the City/County. Alternatively electronic ballasts to control the lamps can be pre-set to dim the lighting level to say 50% between the hours of 12 midnight and 5.30am to reduce both the light in the atmosphere and the energy usage, without compromising safety

The use of highly efficient gas discharge lamps and LED's with their associated electronic control systems ensure that the lighting system will be the most electrically efficient possible with current technology.

Detailed Specification Sheets for Public Lighting use in Gloucester City are detailed as part of Appendix B



Section 2 The Lighting Strategy



Introduction

The strategic lighting proposals embodied in this document are designed to inform and guide future lighting planning and investment within the City over the space of some 5-8 years. As such they are broken down into three timescale groups:

i) Short-term Projects (2008)

This group of architectural lighting proposals for some half dozen or so buildings or structures are projects for which the city already has existing plans and/or funding (Guildhall, St Nicholas Church, St. Oswald's Priory) or which have been prioritised through other policy initiatives, prior to the start of the Strategy. However, others have been identified as relatively inexpensive lighting opportunities, in particular the Cathedral Tower lighting improvements and the lighting of the nearby Infirmary Arches.

However, through experience, the consultants have learnt that it is important, in terms of public visibility, to achieve a 'critical mass' of lighting projects in the first two years. The effect of this early impact is to raise the policy profile of the strategy and to sustain and draw in future funding. It is doubly effective if such projects have some kind of thematic or geographical connection.

Five of these short-term projects lie within, or close to, the Cathedral and could constitute the nucleus of new evening attraction within the city – the 'Cathedral Lighting Walk', which could be promoted via the city's tourism department. Further additions to this walk could include new lighting of the statues over the Cathedral door, improvements to the pedestrian lighting within the Cathedral precincts, the lighting of St. Mary's Gate and the lighting of College Street, the access route from Westgate.

The intention is that all these projects can go to detailed design in the autumn of 2007, for installation within the 2008 financial year.

ii) Medium-term Projects (2008-11)

The strategy has identified a number of medium-term lighting projects which could be started, if not completed, over the next 4-5 years. Some of these would certainly require higher levels of funding, on an ongoing basis, to reach full fruition. There are three types of project involved:

- A number of important single architectural lighting schemes, such as the two canal bridges. Three lighting projects for church spires and towers along Northgate and Southgate have been grouped together within a sub-group called 'The Gleaming Spires' project.
- The second group of projects involves important street or area lighting projects, including the Gate streets, the Via Sacra and the pedestrian route across the city from the railway station to the Docks.
- Lighting associated with two of the GHURC redevelopment zones – Gloucester Quays and the Canal Corridor – which will be well under way within this time-scale and which certainly require some coherent lighting proposals, which could be laid down within SPDs for the various developers.

The report also discusses a number of potential private sector lighting schemes for individual landmark buildings within the City and puts forward ideas for how the building owners/occupiers might be encouraged to fund them.

iii) Long-term Projects (2011 onwards)

This section spells out very general proposals for the lighting of the other major GHURC redevelopment proposals which will probably be started, or will be substantially constructed, after 2011. While the report endeavours to suggest broad prescriptions for how these areas might be lit, the unknown nature of these developments and the rapidly evolving nature of current lighting technologies will mean that these projects must be re-considered closer to the time of commencement.

2.1 Short term Lighting Projects (2008)

2.1.1

The Cathedral Lighting Walk

Introduction

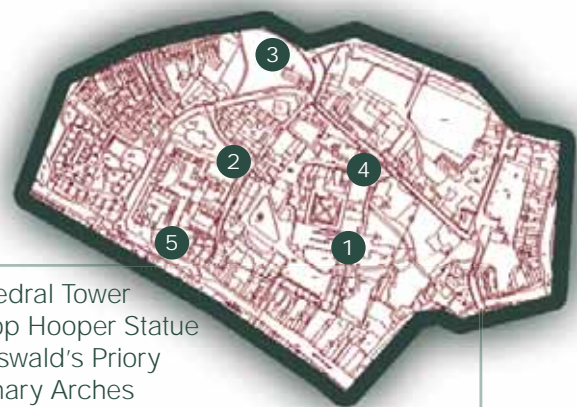
Given the centrality of Gloucester Cathedral to the city's history, identity and character, the first five short-term projects combine to form the core of a new night-time attraction for the City – the 'Cathedral Lighting Walk'. This new walk could be promoted via the city's tourism department in its literature and promotional activity – and could form the centre-piece of a new strategy to attract tourists and other visitors into the city after dark. Later additions to this walk could include new lighting of the statues over the Cathedral door, improvements to the street and pedestrian lighting within the Cathedral precincts, the lighting of St. Mary's Gate and the re-lighting of College Street, the main access route from Westgate.

Improvements to the Lighting of the Cathedral: Concept Proposals

Following the site trials on April 26, 2007 firm proposals can now be advanced for re-lighting the tower and the front entrance of the Cathedral, for approval by the Cathedral authorities – prior to the preparation of detailed designs, and subsequent installation.

- **Changing the Colour of the Existing Floodlighting**

The old high pressure sodium floodlighting scheme, with its rather unflattering yellow-orange tones, has already been modified by re-equipping the existing light fittings with modern metal halide lamps. This offers a much cooler, white light effect, which is more sympathetic to the light buff tones of the stonework and highlights the architectural detail.



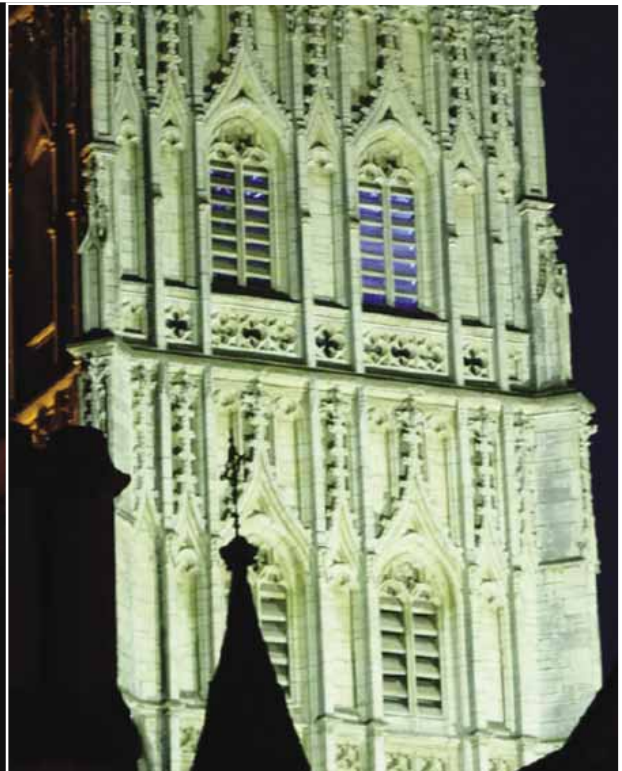
- 1 Cathedral Tower
- 2 Bishop Hooper Statue
- 3 St. Oswald's Priory
- 4 Infirmary Arches
- 5 St. Nicholas Church

- **Main Aims of the New Lighting Elements**

Having changed the main floodlighting to cool white, the intention of the new additional lighting proposals is to accentuate key details of the tower. The corner pinnacles and the balustrades will be lit with a subtle warm white light and the rear face of the pinnacles with a matching cool white. In most cases this can be achieved with relatively inexpensive lighting equipment, with minimal or no fixings to the Towers fabric



Tower lighting concept – site trial, April 26



Old lighting (left) and new lighting on the front face of the tower (right)



Spotlight location on the walkway marked in red (left) and proposed lighting effect (right)

● Lighting the Corner Pinnacles on the Roof

The tall square sections of the corner pinnacles on the roof comprise a hollow interior surrounded by open, fretted stonework (picture right).

Following the lighting concept trial on April 26, it is proposed to light the pinnacles in two ways:

1. A single 250W narrow-beam spotlight mounted vertically on the walkway below each pinnacle to flood the interior of the pinnacles with light, making them appear to glow from within. The fittings would be mounted on free-standing stone blocks, at each inside corner of the walkways – with the control gear located remotely on the roof, behind the balustrades. The proposed fitting position is marked by a red box on the photo adjacent, so as not to obstruct the walkways for visitors to the tower roof.



The Cathedral Pinnacles

The base of the south-east pinnacle is, occupied by the stone-covered exit door from the tower stairs there a special timber cradle will have to be constructed to sit on the top of the curved stone roof of the stairway, to take the light fitting.

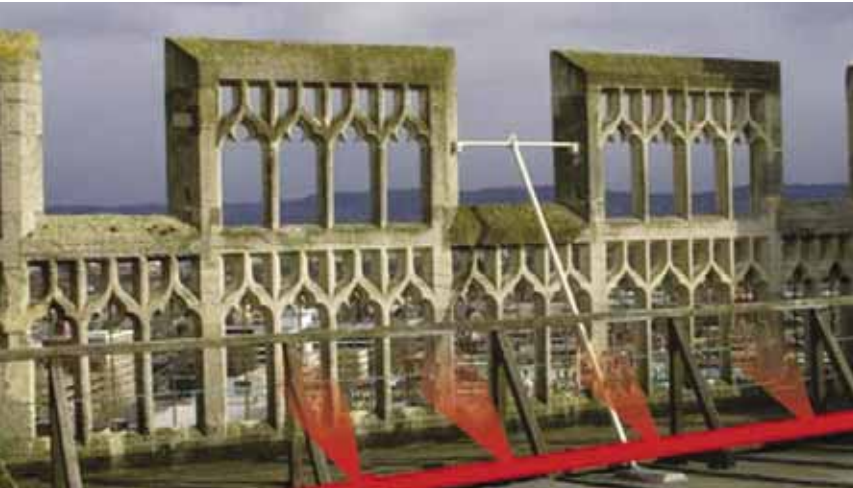
2. Unfortunately, the uppermost triangular sections of the pinnacles are inaccessible and could not be lit internally in this way. However, this could be mitigated by replacing the four rather ineffective floodlights (right) in the centre of the roof, which currently wash the two inner (roof side) faces of the pinnacles, with narrow-beam projectors to illuminate the triangular pinnacles. A photo showing the effect of a single fitting at the site trial is seen on the right – the actual lighting would not be as white as shown.



Existing floodlights (right) to be replaced by narrow-beam projectors aimed at the triangular sections of the pinnacles; and the effect of a single projector seen above

● **Lighting the Roof Balustrades**

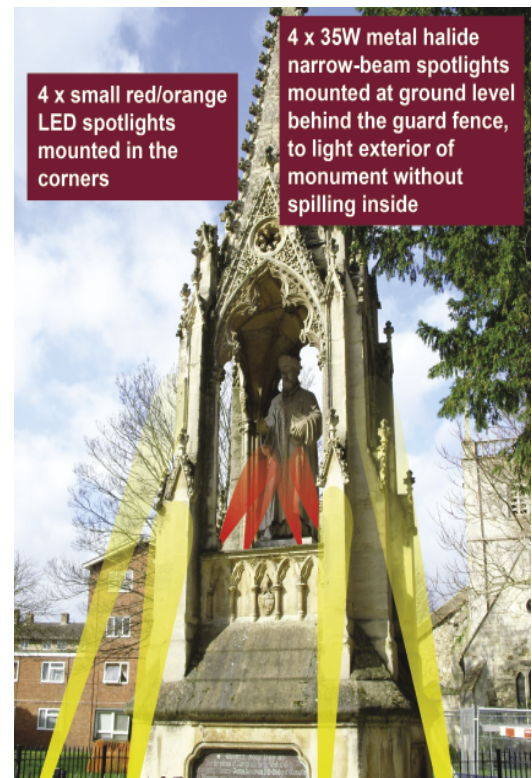
The open castellated balustrades along the roof between the pinnacles (below) are a characteristic feature of the Cathedral's design.



These could be silhouetted and outlined in a similar way to the pinnacles, in a very simple manner, using a line of inexpensive, waterproof fluorescent battens mounted in a continuous row on the roof inside the walkway balustrades – position marked in red on the upper photo above – so as not to obstruct the walkways. Angled upwards, they would light the undersides of the stone balustrades – the effect can be seen in the photo above.

Bishop Hooper Statue

This could be a simple and effective scheme, that would emphasise the story of Hooper's martyrdom by fire at the hands of Queen Mary.



- (i) The outside of the monument could be lit using 4 x 20W warm white ceramic metal halide medium-beam spotlights mounted at the four corners at ground level, inside the new guard fence. This would light the corner columns, without spilling inside the statue niche.
- (ii) 4 x small red/orange LED spotlights could then be mounted inside the canopy, located in the four corners around the statue itself, to wash Bishop Hooper and the upper canopy in red/orange light.

- (ii) If it was impossible to mount fittings inside the canopy, then a single narrow-beam red/orange spotlight might be mounted on the building opposite to light the front of the statue. It might be difficult to light the rear of the statue in a similar way.



Three lighting trial photos from April 26



St Oswald's Priory

1. A basic architectural uplighting scheme for the façade facing the main road might be possible within the current funding, using 7/8 x burial floodlights carefully positioned along its length (see concept below). The fittings should be as close offset as possible, to bring out the texture of the stonework. Given the potentially shallow mounting depth available and the sensitive historical remains beneath, it might be necessary to use LED floodlights rather than conventional fittings, as these are much shallower in profile.

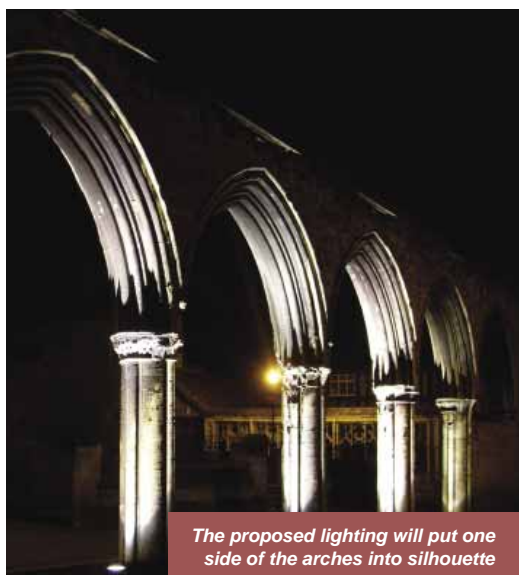
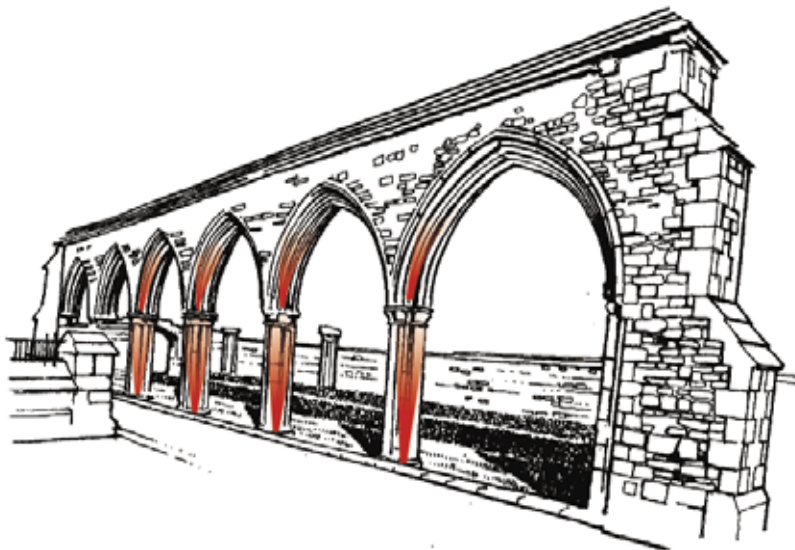


St Oswald's Priory Lighting Concept

Infirmary Arches

The Infirmery arches could be given a dramatic and yet simple lighting treatment, using 35W burial fittings mounted at the foot of west column of each arch. The light would illuminate one side of each arch, while throwing the near side of each arch into silhouette from main viewing positions.

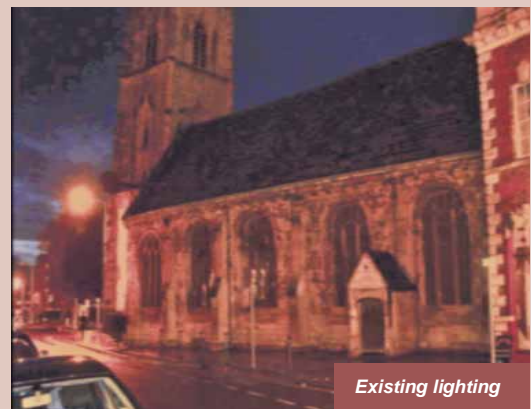
The two new column 'stumps' across the path might also be lit in a similar manner – these were not lit for the site trial.



The proposed lighting will put one side of the arches into silhouette

St Nicholas Church

St Nicholas Church forms a key visual feature at the bottom of Westgate. No lighting is currently used on the church, with the exception of the spill light from the adjacent street lighting column. As you can see from the picture below, the church becomes lost in the amber glow of the night scene, with all the architectural features being lost.



Existing lighting

2.1.2

Concept Lighting Proposals - Tower & Knave Facades

• Tower

The first step is to reposition the street light located in front of the tower, which will usually impede the principal views of newly illuminated church. The tower is divided into four sections - three 'stepped' square sections, topped by a six-sided spire. The lighting design approach would be to light each of the four sections, or stages, with a dedicated, close offset lighting treatment. If only high-wattage floodlights were used to light the lower three stages of the tower from the base, each step back on the tower would create unavoidable ugly shadows on the stonework at each level. Such a basic, 'broad brush' treatment would also fail to model the building adequately.

The three lower stages of the exterior would be lit in medium-warm white, with cool light for the spire at the top.

The two louvred windows at high level would also be backlit from inside using contrasting warm high pressure sodium floodlights.

On the two most visible faces of the tower, the lighting treatment would start at the base, using 70-watt medium beam burial fittings mounted on either side of the main windows. On the other two sides, the lighting treatment would start at the second 'stage' level.

The spire would be lit using 8 x 35W cool, narrow-beam metal halide or LED spotlights, mounted behind the parapet at the highest level. Slender strips of LEDs with a 50,000-hour life would be required to light the exterior of the two middle sections of the tower - three on each side at the second level and two on each side at the third level. These would be mounted on the stepped-back ledges, using minimal fixings into the masonry joints or removable bonding.

- **Main Entrance Doorway**

The main entrance doorway onto the street will require some lighting emphasis. This could be provided by four small burial fittings - two wide-beam versions for the outside walls of the porch and two narrow-beam versions either side of the door. A warm colour temperature would be advisable, to create a welcome ambience.

- **Flank Wall of the Nave**

The main flank wall of the nave facing the street would be lit using a series of 35-watt narrow-beam burial fittings mounted each side of the buttresses. It would be advisable to backlight the large windows in a contrasting manner, if possible - with white light to pick up the colours of the stained glass.

- **Luminaires**

The Church upper tower sections have some decorative stonework, which could be highlighted by using linear LED fittings to 'graze' energy efficient light up the

building facade, catching the undersides of any textured surface and ledges, bringing the texture of the building to the fore.

LED lighting requires very little maintenance, as they can last for up to 50,000 hours, requiring only the occasional clean. On this scheme all luminaires depicted in the visualisation are warm white and the luminaires are located between the windows. The light distribution is generally narrow and linear, but the wide beam version will spread this distribution out in a sideways direction, catching the undersides of the arch windows and undersides of ledges. Surface mounted high powered cool white LED luminaires can be mounted on the roof above the top section, to graze cool white light up the eight sides of the spire. The cool light will contrast with the warm white light of the tower luminaires.

The lower section of the tower and the knave section, use warm white recessed wide-beam 70w luminaires installed close to the building grazing up the decorative stonework. Although the luminaires are wide beam the beam is still relatively narrow and will push light up the walls adjacent the windows, but will spread sufficiently to catch the undersides of the decorative stonework of arched windows.

- **Luminaires inside building**

It is proposed to illuminate the louvred windows on the tower and the arch windows of the knave section, by placing luminaires inside the building. The louvred windows will be illuminated with a WB luminaire with 70w SON lamp (one in each window) to provide a warm glow and a feeling of someone being inside. The Knave windows will use the same luminaire but the lamp source will be 70w CDM providing a cool white light to shine through and highlight the colours of the stained glass windows (one for each window).

- **Main Door Entrance**

It is proposed to use four recessed luminaires (two on each side) to illuminate the outer and inner architrave of the arched entrance, these can be either 35w CDM or recessed LED luminaires.

Please Note: all these proposals are conditional on English Heritage approval



The picture above is a computer generated visualisation showing what the church may look like with luminaires installed.



Schematic diagram of new lighting

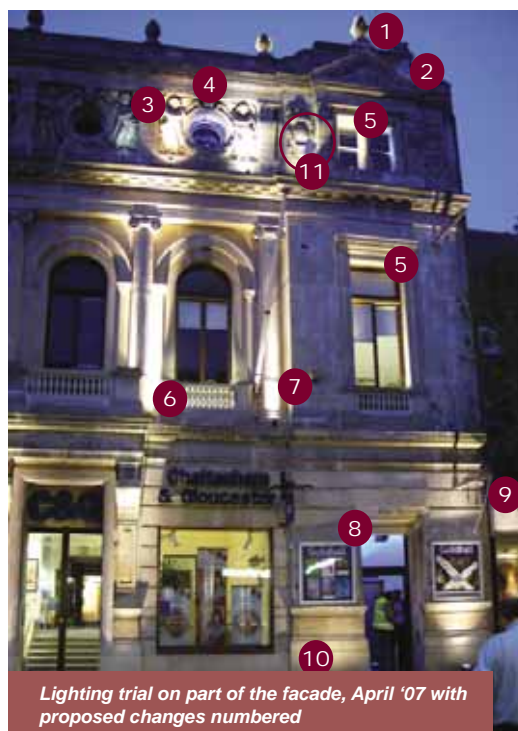
2.1.3

Other Short-term Lighting Projects

Guildhall

As a result of the April site trial on a section of the Guildhall façade, the main parameters of the proposed lighting design for the Guildhall have now been broadly established (numbers refer to Photo):

1. Lighting of the urns around the roof line, using small spotlights mounted on the upper parapet.
2. A line of light running above the upper pediment and along the uppermost ledge of the building (not shown in this photo) created by a linear LED strip.
3. A series of small (20W) metal halide spotlights mounted on the next ledge down, to pick out each of the cherubic statues in warm light.
4. A small LED uplight on the front sill to wash the inside surface of each bull's-eye window.
5. Small narrow-beam window-reveal fittings to put light into the square window reveals at first and second floor levels.
6. Linear fluorescent wash light behind the three central balustrades, to silhouette them from the rear.
7. Narrow-beam spotlighting of each of the four central Ionic columns.
8. A line of light around the frame of the door to the Guildhall Arts Centre, to emphasise its presence (not shown here).
9. Two small gobo projectors mounted on the canopy of the shop new door to throw a changing pattern of light onto the pavement in front of the door (not shown here) – again to draw attention to the Arts Centre entrance.
10. Unfortunately due to extensive services in the ground, it will **not** be possible to install burial uplights along the ground floor façade.
11. Removal of the two large, visually intrusive floodlights currently installed at frieze level on the second floor.



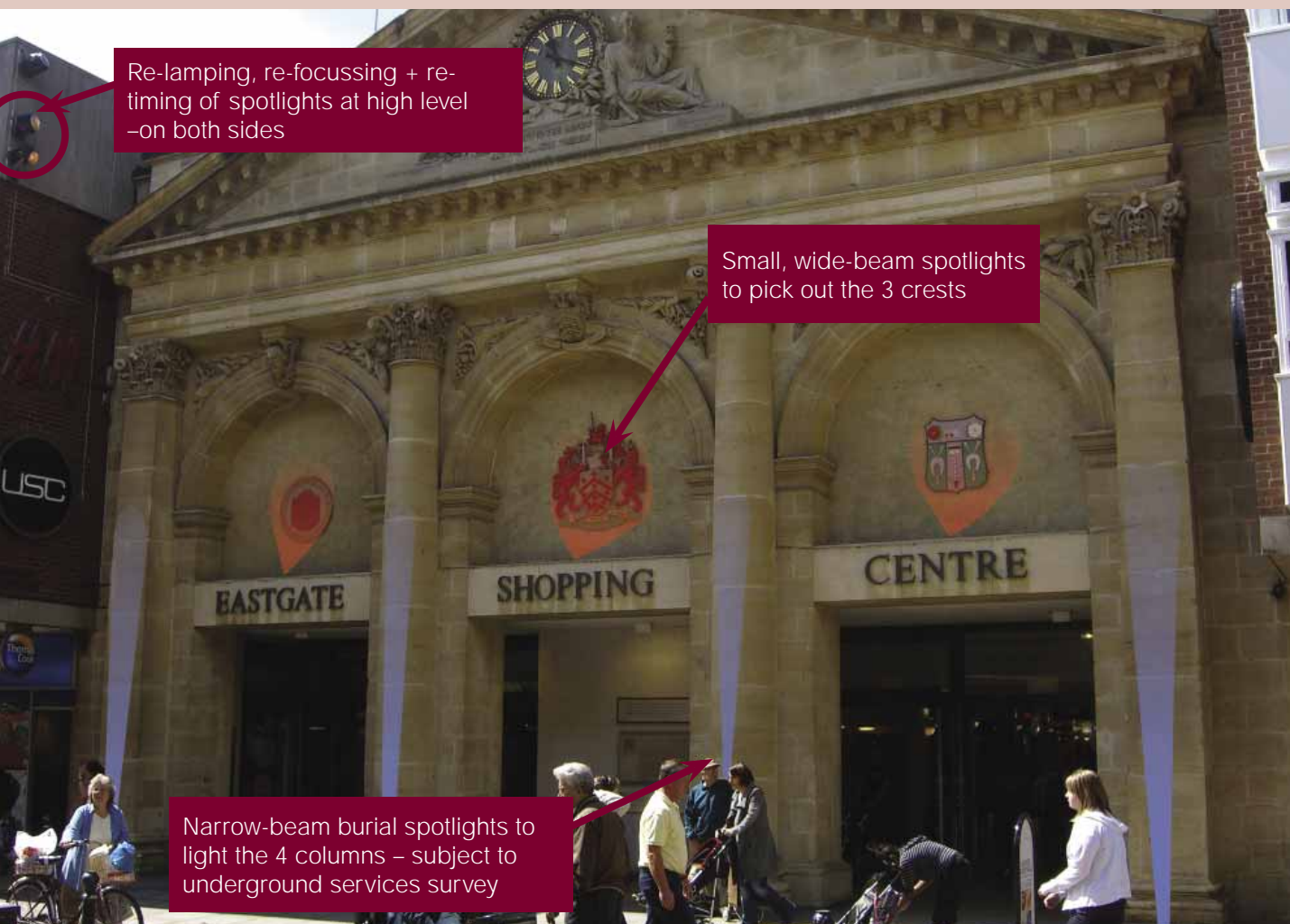
Eastgate Portico

The portico of the Eastgate shopping centre is a handsome neo-classical structure built in the Victorian era. It already has some lighting to the substantial pediment, statuary and clock at high level. This lighting needs some significant maintenance – namely, the six fittings need re-lamping and re-focussing and the time-clock controller needs adjusting, to ensure that the lighting is not switched on during daylight hours, as at present.

Additional lighting that might be considered is the addition of four ground-recessed narrow-beam uplights to the two inner columns and two outer pilasters. This would be subject to a survey of underground services in the

street, to ensure that excavation to a depth of 400-500mm is possible. Due to their accessibility in a public space, these fittings should not exceed the recommended 72°C maximum on the top glass and should have non-slip glasses and interior anti-glare louvres.

Finally, three small wide-beam spotlights (or possibly linear fluorescent uplights) could be mounted on the ledges above the doorways, to pick out the three colourful crests/ coats of arms and to put a gentle wash onto the upper curve of the arch above.



Re-lamping, re-focussing + re-timing of spotlights at high level –on both sides

Small, wide-beam spotlights to pick out the 3 crests

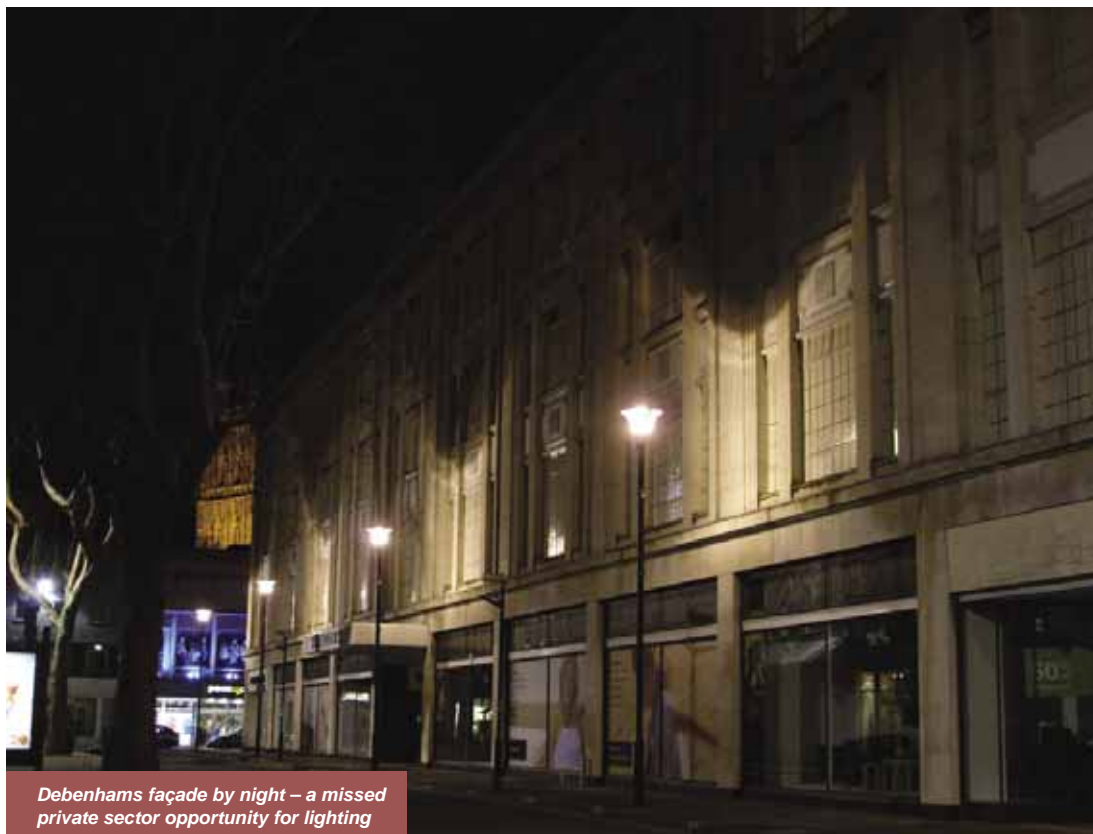
Narrow-beam burial spotlights to light the 4 columns – subject to underground services survey

2.2 Medium-term Lighting Projects (2008-11)

Introduction

The strategy has identified a number of medium-term lighting projects, which could be started, if not completed, over the period 2008-11. Some of these would certainly require higher levels of funding, on an ongoing basis, to reach full fruition. There are four types of project involved:

- A number of important single architectural lighting schemes not tackled in the first year's programme (2.2.1).
- Key street or area lighting projects, including the Gate streets, the Via Sacra and the pedestrian route across the city from the railway station to the Docks (2.2.2).
- Lighting associated with two of the GHURC redevelopment zones – Gloucester Quays and the Canal Corridor – which will be well under way within this time-scale and which certainly require some coherent lighting proposals, which could be laid down within SPDs for the various developers (2.2.3).
- A number of prominent private sector lighting projects for individual landmark buildings within the City. This section includes ideas and proposals for how the building owners/occupiers might be encouraged to fund such schemes within the medium-term (2.2.4)



2.2.1 Individual Buildings and Structures

Cathedral Entrance

The main, south doorway is key feature of the important view from West Gate, along College Street. The doorway is very generally illuminated at present by a sodium floodlight mounted on the nearby light column – this can be seen in the left-hand photo. The strategy would propose retaining the existing fitting and adding a narrower beam, white light floodlight to the same column, to accentuate the statues over the door (beam angle shown in red). The site trial photo (bottom right) gives a very approximate idea of the effect, but the fitting used has too narrow a beam – and the lighting appears green in the photo.



'Gleaming Spires' project

The Southgate Street-Northgate Street axis is one of the most important routes through the City. If one examines that route, there are three prominent historic towers and spires which lie on or just off that axis – St Mary de Crypt, St. Michael's Tower and St John's Northgate. In addition, opposite the corner of Northgate on the ring road, lying on the same axis, is the very tall spire of the Catholic church of St. Peter's.

To emphasise that central route and to provide some visual linkage across the city, it would be very effective to light all four spires or towers within the scope of the same lighting project – what this report has called the 'Gleaming Spires' project. This section includes lighting concepts for three of these, plus photos of the fourth (St. Peter's) which could be lit in a similar manner.



St Mary de Crypt

St Mary de Crypt has had some rudimentary floodlighting – a working floodlight can be seen in the photo below and two defunct floodlights to the north in the photo above right. However, what becomes apparent from the two night-time photos on the next page, most of the uncontrolled lighting of the south and west facades is overspill light from the sodium street lighting. This would have to be controlled, with rear baffles and good cut-off lanterns, before any new scheme could be successful. The new scheme should involve a cool white lighting treatment, to bring out the pale limestone finish of the stonework.

As part of a relatively inexpensive re-lighting project, the emphasis should be put back on the church tower, with some minimal wash lighting to the lower structure, particularly facing onto Southgate. This could be done using the following:

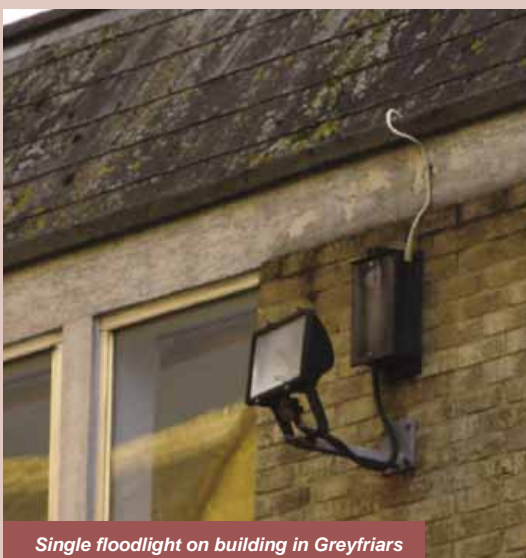
The existing floodlight on the wall of the building opposite in Greyfriars (photo below), which lights the south face of the tower could be re-equipped with one, or possibly two, 70W metal halide spotlights.



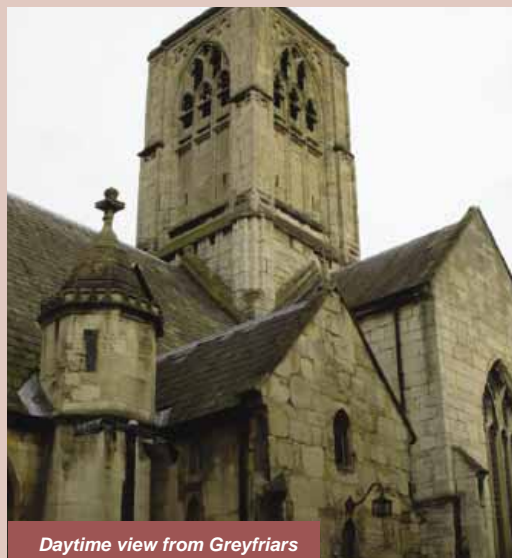
Two defunct floodlights on wall behind the Schoolroom

The two defunct floodlights above the pub and behind the Schoolroom could be replaced with 2 x 150W spotlights, to light the north face of the tower – a higher wattage would be required, due to the greater throw distance to the tower. Neither of these replacements should involve new wayleaves, due to the existing equipment.

The front facade of the tower, facing Southgate, would need some new lighting – with permissions, the tower and the end of the nave, could be lit by two fittings mounted on the parapet of the County Hotel opposite (see photo overleaf). Alternatively, and to tap into the council supply, they could possibly be mounted alongside the street light on the front façade.



Single floodlight on building in Greyfriars

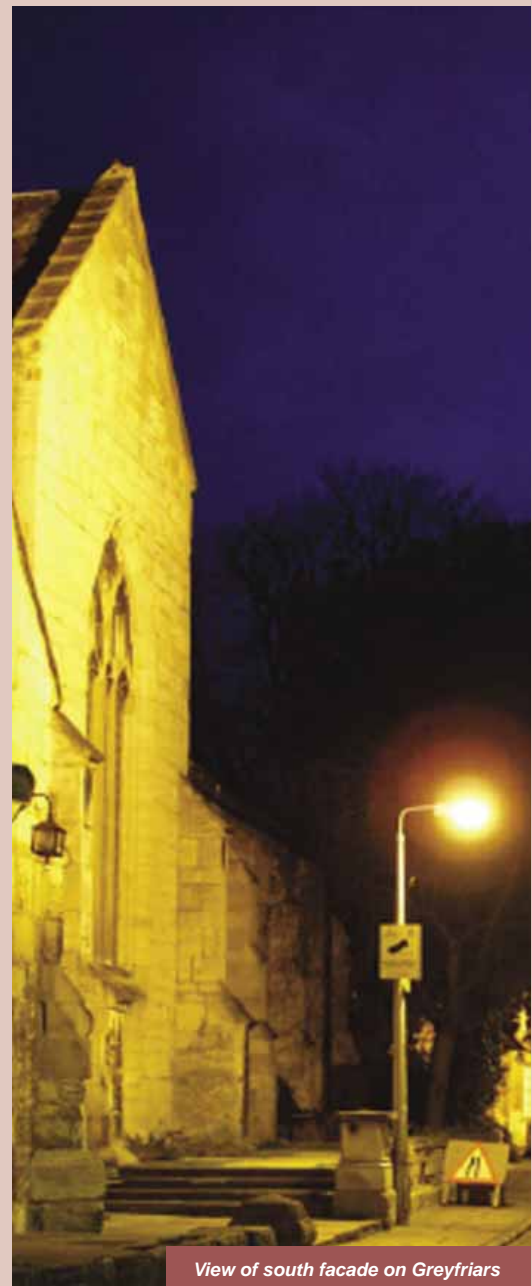


Daytime view from Greyfriars



Existing lighting – view from Southgate

It would be extremely difficult and expensive to light the rear (east) face of the tower – the church has a sloping roof and there are no buildings or structures within a reasonable distance on which to mount equipment. The only possibility would be to erect a lighting column in the churchyard, but that would probably not be permitted by the church and heritage authorities, for very good reason.



View of south facade on Greyfriars



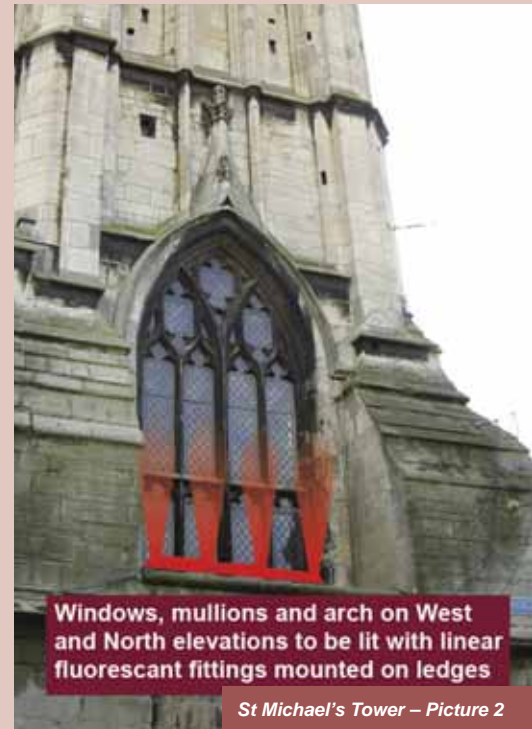
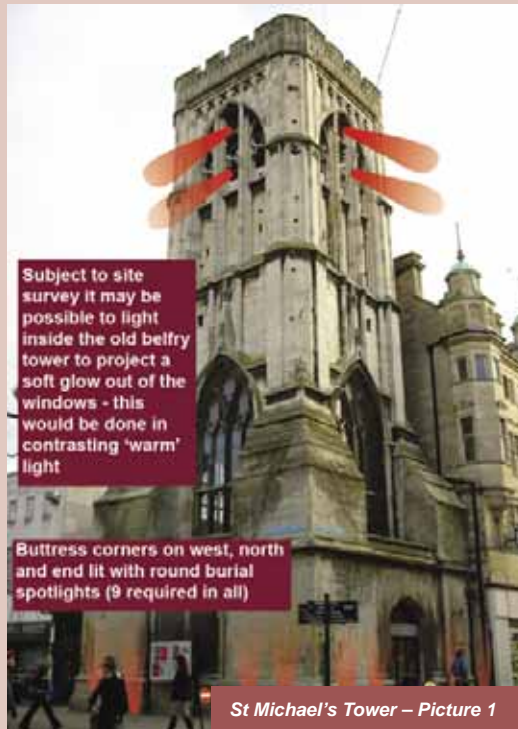
Possible lighting position for front of tower on County Hotel

St John's Northgate

The lighting of St John's Northgate tower could be achieved quite effectively through a combination of three lighting elements: cool narrow-beam uplighting of the corners of the lower section of the tower, from the roofs below; (red beams) uplighting of the spire at the highest level

from smaller narrow-beam spotlights hidden behind the balustrade; (red beams at high level) and (subject to survey and access) it might also be possible to create a glow within the belfry window louvres, using 'warmer' high pressure sodium floodlights (yellow beams).





St Michael's Tower

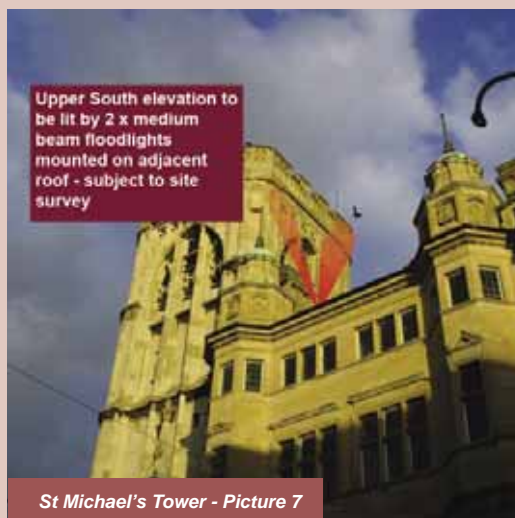
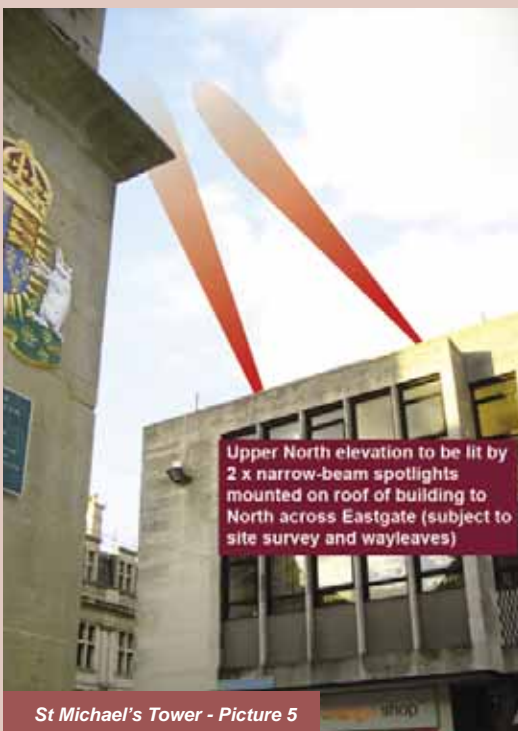
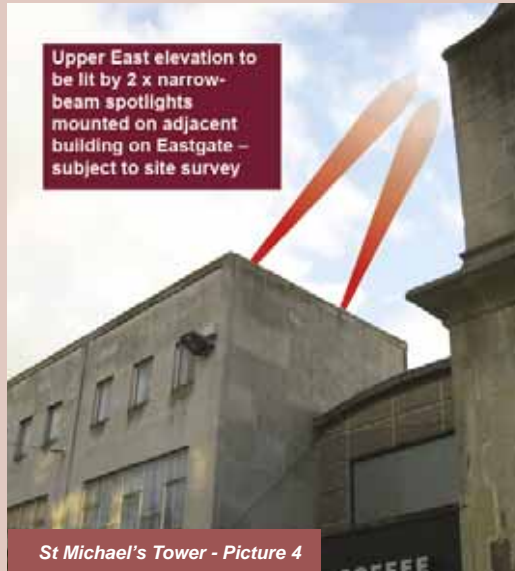
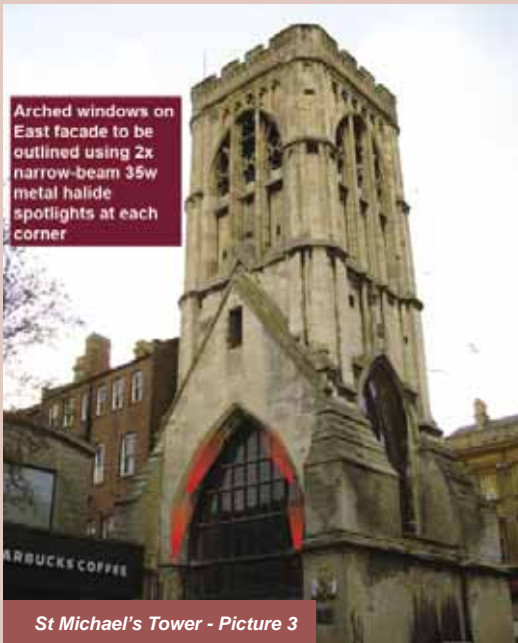
Sitting as it does at the central axis of the four 'gate' streets (the Cross) at the heart of the City, the lighting of St Michael's Tower is a crucial component of the strategy to re-animate the pedestrian streets in this area.

However, given its 'stepped' structure and lack of any immediate lighting positions around the base (apart from the street itself) the lighting would have to be done in three distinct 'stages' from three different types of location. All the exterior lighting would be in 'cool' white metal halide, to bring out the tones of the limestone masonry.

- The lower base at ground level, on three sides, could be lit by a series of close-offset, ground-recessed burial fittings (9 required in all) – but the light would cut off at the projecting first floor cornice level. The benches around the tower would have to be relocated to achieve this treatment (pic1).

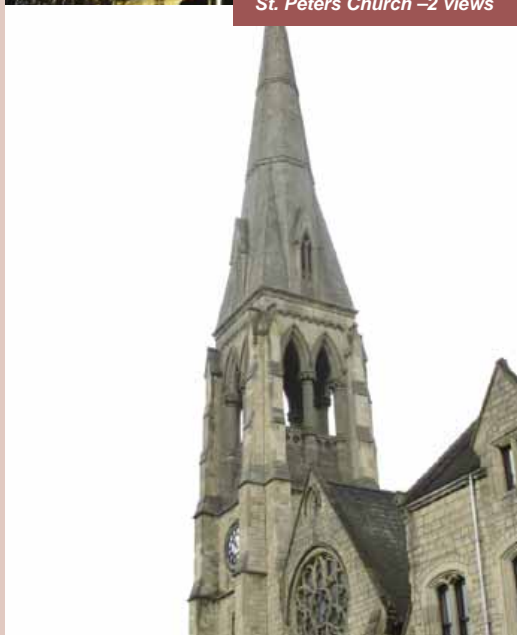
- The first floor arched windows on the west and north elevations could be outlined and accented using fluorescent linear fittings mounted on the deep ledge (pic 2) – the third window, above the main door on Eastgate, could have its arch accented by using relatively low wattage narrow-beam spotlights mounted in the corners above the entrance glazing (pic3). These locations would be subject to Heritage permission.
- The upper sections of the tower could not be lit from close to or from locations on the structure itself. All faces would need to be illuminated by medium-narrow spotlights mounted either on adjacent buildings (East and South facades – see pic 4, 5, 6, 7) – or on the roofs of buildings facing the tower across the street (West and North facades). Two spotlights would be required for each face, to pick out the upper and lower sections of the elongated towers. All mounting positions would be subject to site survey and would require wayleaves from the owners.

- A final lighting refinement might be achieved by mounting contrasting warm floodlights inside the old belfry, to project a warm glow out through the louvered windows (red beams, pic1). Again this would be subject to a site survey and Heritage permission.



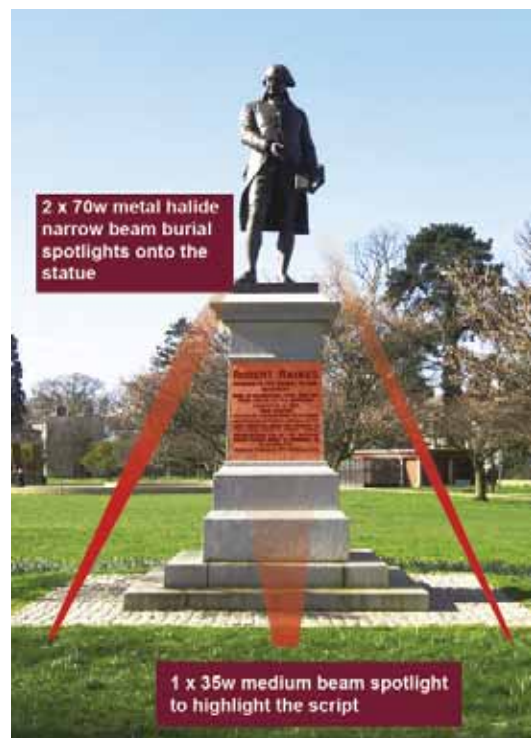
St. Peters

St Peter's Catholic Church is Victorian in origin and lies on the ring road, opposite the junction with lower Northgate Street. However, it has a very prominent spire, which if illuminated, would effectively complete the line of four 'Gleaming Spires' along that north-south axis. The lighting treatment could be very similar to that applied to St John's, Northgate.



Robert Raikes Statue

This monument in the park could be easily illuminated using 3 x burial fittings recessed into the ground in front of the statue – 2 x 35W narrow-beam metal halide fittings with louvres to light the statue from each side and a medium-beam 35W fitting mounted directly in front of the monument, to wash the script to much lower levels.



Eastgate Archaeological Remains – Viewing Chamber

The current daytime viewing conditions through the glass down into the excavated gateway remains are not ideal. The horizontal glass gets dirty quite quickly and creates a reflective screen which makes viewing quite difficult. (see photo, opposite)

There are long-term proposals to re-design the glass lantern, but in the short term even a small amount of lighting inside the chamber would make public viewing much easier. Four carefully located floodlights, mounted to avoid upwards glare, would

make most of the underground features much more visible. These could be free-standing on stone blocks, with loose cables – LED floodlights, which are more expensive, might be the best option, as they generate little heat.

While the lighting design and specification itself would be quite simple, subject to a site survey, the actual positioning and installation would be subject to extensive discussions with the conservation authorities, to ensure no damage was done to the underground remains.

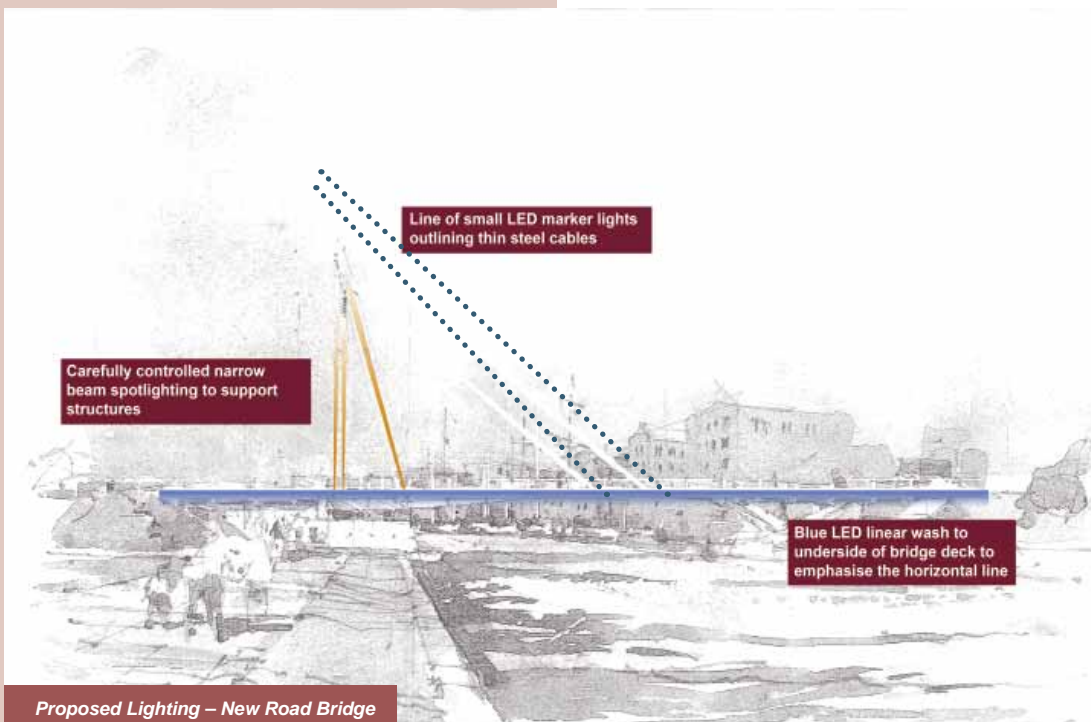


Eastgate Viewing Chamber

St. Ann Way New Road Bridge

The new road bridge (below) will form a new major cross-route from east to west and will complete the ring road around the city. It deserves an appropriately interesting and high-tech lighting solution. The concept would be to pick out the three main elements of the bridge structure in contrasting lines of light:

- The bridge deck could be underlit in blue, using a line of LEDs which would wash down the outer structure below the road.
- The vertical bridge members could be uplit, using narrow-beam spotlights, projecting a warm colour to the outer faces of the columns.
- The support cables would need a very delicate outline treatment, possibly using a string of individual LEDs, spaced along the upper edge of the cables.



Proposed Lighting – New Road Bridge



Llanthony Bridge – day-time view

Llanthony Bridge

Although the role of the rise-and-fall Llanthony Bridge over the canal will be downgraded when the new road bridge is constructed a few hundred yards away, this

bridge does form a historic visual end stop to most views from within the Docks area – and therefore could benefit from some subtle lighting treatment to bring out its industrial architectural character after dark. Unfortunately, the present structure is very rusted and dark in colour and would not take lighting very easily in its present state. To make any lighting investment worthwhile, it would have to be accompanied by a complete refurbishment and re-painting of the bridge structure, which might push it beyond the budgetary constraints of the next four years.

However, given a suitable surface to light, gentle linear wash lighting, using LED strips or fluorescent battens, could be applied to the outer metal faces of the bridge deck, perhaps in a colour, such as blue, while the vertical uprights and main tilting members of the lifting mechanism could be emphasised, using narrow-beam spotlights in a contrasting colour. The colour scheme could be made to ‘echo’ the lighting of the modern bridge downstream which is almost a stripped down, high-tech 21st century version of the same type of historic bridge form.



Linear wash lighting to outer faces of dock

Narrow-beam highlighting of moving bridge members

Uplighting of the vertical members

2.2.2 Street and Areas Introduction

Lighting for Pedestrians

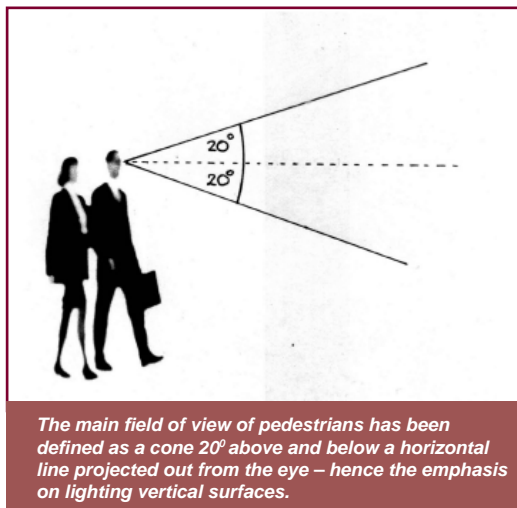
In terms of user perceptions and psychology, night-time pedestrian streets can be broadly categorised in three ways:

- (a) Streets that people definitely **won't** walk down after dark – usually because they are unlit or poorly lit, and therefore dark, threatening and apparently unsafe;
- (b) Streets that people **will** go down, if they have to, but where they will not generally choose to linger – usually because the lighting ambience is over-bright, functional, monotonous and uninteresting;
- (c) Streets that people **choose** to go down, because they look attractive, interesting, lively-looking and safe.

While Gloucester doesn't have many streets that fall into category (a) most of its pedestrian areas and streets fall into category (b) – and the key to turning those streets into category (c) streets is improved lighting, designed with pedestrian needs in mind. Well-designed lighting, in combination with good landscaping, could help to create this ultimate goal – streets that people actually **choose** to go down and linger in.

To achieve this, the lighting provided must be geared to the visual needs of pedestrians, not to traffic. Research has shown that these visual needs can be summed up as:

- Good **vertical** illuminance of walls, planting and other people – rather than the emphasis on horizontal illuminance (lighting the road surface) as in traffic lighting. The reason for this is shown in the diagram above.



- **Lower uniformity** of lighting, with varied lighting levels, creating areas of visual interest – this is in contrast to the emphasis on high uniformity in traffic lighting, which pedestrians perceive as bland and boring.
- **Human-scale mounting heights** for the lighting units – 4 to 6 metres maximum, rather than the typical 8-12 metres of traffic route lighting
- **Good colour rendering**, so that natural materials, such as stonework, plants, fabrics and human skin tones can be seen in their natural colours – this is much less necessary with traffic lighting.
- **Low levels of glare** created through the use of a number of features – indirect lighting techniques (as shown on the next page) and the use of fittings with louvres and diffusers. Traffic lighting tends to create high glare for pedestrians, which is obviated for drivers by the vehicle's roof-line. These new columns could have the names of the streets or areas cut into, or embossed or painted on the columns in some way, as can be seen in the left-hand photo on the next page – a technique we discuss in the section on the Via Sacra.



Indirect light fittings create a softer more friendly effect

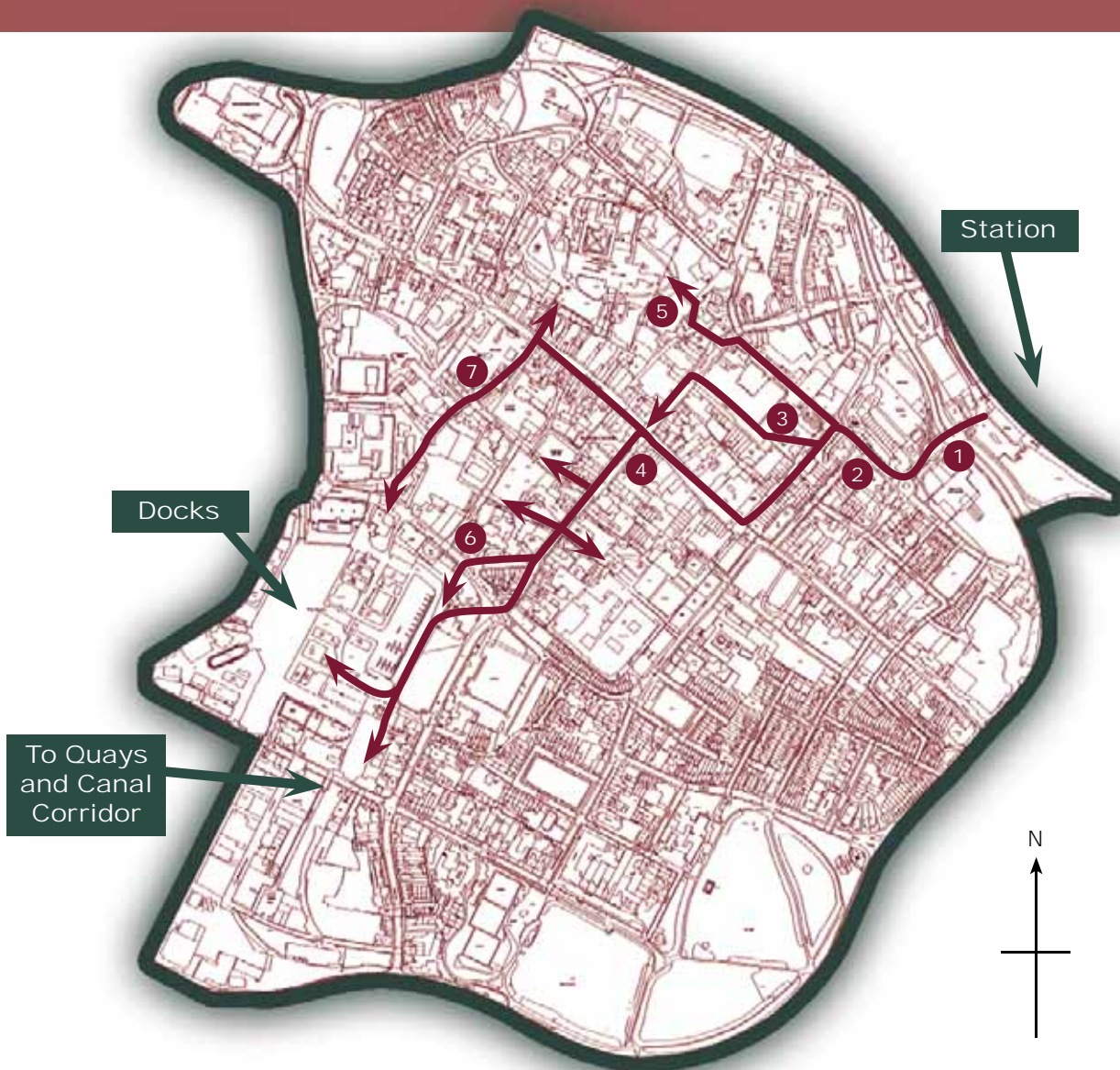
Therefore future investment in improved lighting must be designed primarily with these criteria in mind – and where there is a conflict with traffic lighting, for example where pedestrian routes cross the ring road or other traffic streets, the pedestrian route should be prioritised – and lit in a distinctive, pedestrian-friendly manner.

Of course, the above design principles apply primarily to the street or amenity lighting units, mounted on columns or bracketed off walls. In addition the street scene can be further enlivened through decorative lighting details – uplighters for trees, integrated landscape lighting features, low level bollard lighting and coloured marker lights.

Various types of decorative lighting feature that could be integrated into pedestrian streets.



Various integrated landscape lighting details



Pedestrian Link Route from the Station to the Docks

For the purposes of this study, Section 1.7 of the Analysis nominated a principal route across the city centre from the station to the Docks, which encompasses all types of pedestrian area or route that require a new and distinctive lighting treatment. The plan of that route is shown, with the seven main areas above.

1. Pedestrian Crossing over the Ring Road

The ring road around the city centre currently acts as a very powerful physical barrier to visitors arriving by train or on foot from elsewhere. It is very important to use lighting, in conjunction with landscape changes, to clearly signal the crossing

points – and to help visitors to cross the road with a minimum of effort.

One proposal might be the addition of illuminated light columns on each side of the crossing, which (a) signal the crossing point to both drivers and pedestrians; (b) create a 'gateway' feature to give the pedestrian a distinct feeling of 'arrival' in the city; and (c) add extra illumination to the pedestrians at and on the crossing.

Modern light columns (see photos overleaf) are not merely decorative. An upper reflector also helps to create a degree of ambient lighting around the base, by reflecting in downwards.

The same device could be used on several key crossing points on the ring road,



not just at the station – and also at other places, to create ‘gateway’ features – for example the crossing points over Llanthony Road from the Docks to Gloucester Quays. Three variants of the light column idea are illustrated here.

2. The Bus/Taxi Station

The pedestrian route now turns right into the bus/taxi station, a dual use space, where there is a considerable amount of mixed use (traffic of various kinds and pedestrians). Here the recommendation is to use the Urbis Sexton fitting (right) on 8-metre conical tapered columns. This unit is very versatile, allowing a range of configurations, with single and double arms and one/ two lanterns per arm – it also allows for the addition of banners and other features.

The Urbis Sexton should be introduced throughout the city for all mixed pedestrian/ traffic areas and for major two-way traffic routes.

3. King’s Square

Lighting will be a fundamental part of promoting the heart of Gloucester. The proposal is to introduce lighting features that help establish a clear identity and



enhance the physical aspects of Kings Square.

The lighting needs to provide more vertical illumination than street lighting, to enable the visitor to orientate themselves easily by recognising the physical structures in the Square. These will include all of the building facades and any further hard features brought to the Square also the existing planting and of course other people using the square.



This requires the lighting to be examined in a holistic manner, recognising the complexity and diversity of the environment and providing a balance between the following criteria;

1. Image & Identity
2. Safety and security
3. Spectacle
4. Way Finding
5. Commercial Activity
6. Sustainability

1. Image & Identity

Without light, by night the public space is formless. Light has the power to reveal or conceal buildings, landscape and topographical features, define routes and boundaries and emphasise views and features. This lighting strategy aims to develop a considered hierarchy within the square and its approaches which will be responsible for making this a key location when visiting Gloucester City centre during the hours of darkness.

2. Safety and Security

Lighting will play a key role in matters of both safety and security at night. Significant issues concerning safety and security lighting which will be addressed include:

- the desire to illuminate buildings, streets, and squares
- concern about potential problems of vandalism

- the need for a continuing relationship between lighting and CCTV
- the need for minimum basic standards of lighting to be adopted throughout
- vehicle and pedestrian conflict areas
- hazard areas within pedestrian usage (ie steps, ramps etc)
- perceived risk areas
- actual risk areas

3. Spectacle

The creative possibilities offered by dynamic lighting including colour, projection and movement are limitless. Lighting spectacle is part of the future vision bringing entertainment, excitement, richness and diversity to Gloucester. This lighting strategy highlights the possibilities for the creation of permanent and temporary lighting spectacles throughout Gloucester. Kings Square will be a focus for much of this and should use the new technology available to interact with visitors to the square.

An example of this maybe the use of buried spot LEDs laid randomly throughout the Kings Square. As the numbers of visitors using the square varies then the intensity, colour and number of lit LEDs could react in a differing way at each visit, thereby making each visit a unique event.

4. Way Finding

Gloucester City centre needs to exist both as a single entity and as a focus for the City. The lighting will need to be a focus and an attraction in itself. When the visitor is in the Square, it is intended that lighting be used in imaginative and stimulating ways to guide users to the other key areas within the City and once inside, to encourage the discovery of all the key areas and to convey information regarding the centre, its commercial activities and neighbouring areas.

5. Commercial Activity

One of the primary objectives of the lighting strategy is to enhance and stimulate the development of the night time economy. As our cities rapidly move towards a twenty four hour economy, the number of trading hours during the hours of darkness will increase. The dynamic lighting within the square will create a night-time environment which attracts potential customers, provides an enjoyable backdrop for those using the City as well as provide a focus for the sensible illumination of commercial operations within the centre.

6. Sustainability

Energy consumption, sky glow and the cost of maintenance and equipment disposal are all by-products of any lighting scheme. This lighting strategy has a separate section promoting a positive approach to sustainability and provides guidelines on minimised energy use and the control and reduction of energy waste and light pollution through the following;

- improved lighting design
- the use of high efficiency luminaires with high performance optical systems with reduced light spill and light trespass
- the use of high efficacy lamps and LED's
- the use of energy efficient electronic control gear
- the use of flexible control systems
- the guidance of strict lamp and luminaire maintenance and replacement regimes

4. Gate Streets

The four 'Gate streets' constitute the central pedestrianised retail and leisure areas within the City – as well as containing many of its important historic sites. As outlined in **Section 1.7**, they also constitute a large part of the main pedestrian cross-route from the railway station/bus station to the Docks and Canal Corridor regeneration

area. Their effective lighting, in the manner outlined in the Introduction to this section, is therefore crucial to the revitalisation of the City centre.

As **Section 1.10** demonstrates, the current lighting is inadequate. While it does have the merit of being 'white light', the high wall-mounted floodlight-style lanterns are inimical to the visual needs of pedestrians and create high horizontal uniformity, with poor lighting of the all-important vertical surfaces and with a degree of glare that has been dubbed 'the Colditz effect'. The lighting scheme is not supplemented by any other form of publicly provided illumination.

So how might it be changed to offer a more pedestrian-friendly environment?

• Back to Columns

Due to the width of the Gate streets, the best lighting ambience can only be achieved by reverting to lanterns mounted on columns at six-metres maximum height (preferably lower). This will bring the lighting back down to a human scale and create a friendlier, more interesting environment. The columns could be staggered down each side of the street and could be less uniformly arranged to follow the street fence lines, for example. This would create more variety in the street scene and would enable columns to be grouped around seating areas or other features.

The recommended lighting unit for these streets is the Dundee variant of the Optima range from DWW Windsor mounted on aluminium tapered columns, with a ceramic halide lamp with a maximum wattage of 70W to avoid glare. Stylistically this lantern has the right balance of tradition and modernity to blend with the Gates street scene – yet it relates stylistically to more contemporary lanterns in the Optima range, which are recommended for the Quays and Canal Corridor in **Section 2.2.3**.



*The Dundee fitting from DW Windsor
– recommended for the Gate streets*

- **Re-use the Existing Wall-mounting Positions**

As the wall-mounting positions for the old street lanterns have existing wayleaves, the positions could be re-used, where suitable, for one or two new fittings. These could be small (70W maximum, preferably 35W) narrow-beam metal halide spotlights, equipped with louvres and/or cowls, for good glare control, which could be used to highlight features within the street scene – interesting building details across the street, seating areas, planting, sculptures etc. They would create added pools of visual interest into the street scene and if they were well-controlled, it would not be apparent where the lighting was actually coming from.

The suggested fitting range here is the Meyer Superlight range, which is suitably compact, has good optical control and offers a wide range of beam distributions for tailoring the beams to specific lighting tasks – and excellent control accessories, to avoid glare and unwanted light spill.

- **Selected façade lighting**

Some of the more interesting facades within the street could be selected for a dedicated uplighting treatment from first floor level, above the shop fascias.

The prominent building on the corner of College Street, leading to the Cathedral, would be obvious candidates. Again versions of the Meyer Superlight, such as the smaller Meyer Superlight Compact Mini series, which uses the new 20W CDM-Tm lamp, could be specified.

- **Illuminated Landscape Details**

To enrich the night-time scene further, a number of selected landscape details at ground level could also be illuminated, using small, carefully integrated light fittings. For example, selected trees in Eastgate could be subject to a sensitive uplighting treatment using 35W narrow-beam metal halide burial fittings. The photos in the introduction to **2.2.2** show some of the kinds of lighting features that could be added.



Meyer Superlight for the upper walls and feature lighting

A computer-generated representation of the overall ensemble, and the desired lighting effect on a section of Westgate street, looking down towards St Nicholas Church, is shown on the next pages.

5. Cathedral Precincts

The Gloucester Cathedral precincts are currently lit with period-style columns and lanterns that, in general, have little control and cause some light trespass to perimeter buildings. The walk behind the Cathedral, through from the Infirmary Arches, is lit in a more modern manner – again they are period style lanterns, but they offer somewhat better light control.

Westgate as visualised under the new lighting scheme



As the key feature and visitor attraction in Gloucester, the Cathedral requires a safe and attractive night-time ambience that will encourage visitors to linger at night – this will form part of the proposed ‘Cathedral Lighting Walk’ (see **Section 2.2.1**).

Appropriate lighting needs to be provided, while retaining the unique ambience of this ecclesiastical environment. To achieve this it is proposed to use period cast-iron columns of around four metre height with period ‘square’ lanterns, offering modern and variable optical control. These are designed to put light only where required and to eliminate all spill light to surrounding properties.

The light source should be the new Cosmopolis lamp that produces crisp **white** light with a ‘warm’ appearance to create a welcoming atmosphere.

The positioning of the new lighting adjacent to the Cathedral could allow illumination of the Cathedral’s lower walls, to help highlight this wonderful structure at night – at least until a full, high quality floodlighting scheme can be provided. If and when that is installed, the adjustable



optics (see box and diagram overleaf) can be amended on site, to control light in the direction of the cathedral itself, so as not to conflict with the new architectural lighting.

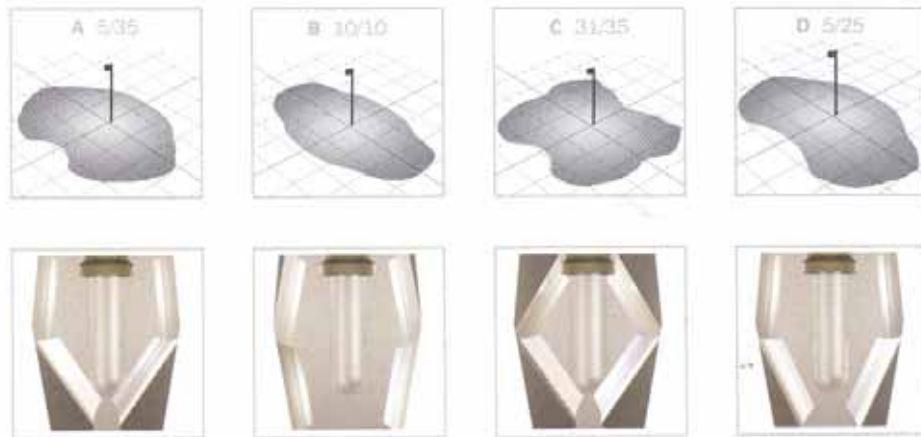
The precinct is primarily pedestrian, with some vehicle access and a car park near the entrance. The light levels will need to reflect this differing usage and will need to be enhanced around the car parking to provide safety and security for all visitors. The use of variable controls to modify the light levels would be a most useful method of ensuring appropriate lighting during evening events in the Cathedral – and a lower level for safety and security when the Cathedral is not in use.



The existing Cathedral precincts fittings



One of the pathways with existing column

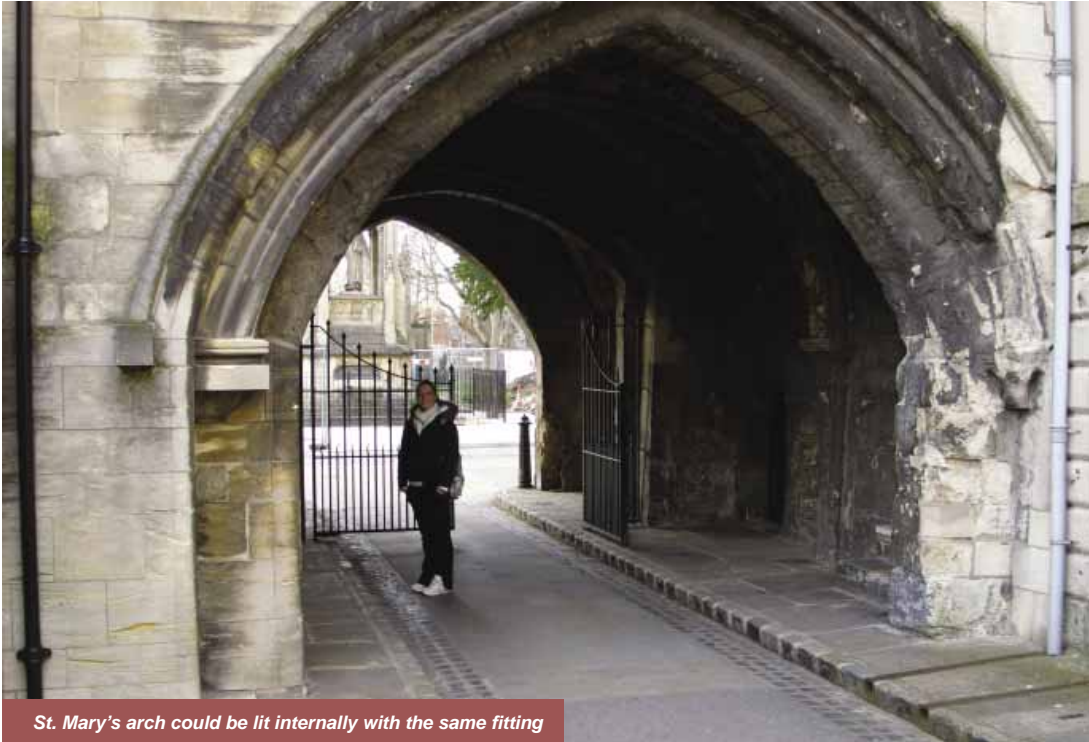


The DW Windsor Diamond Optic® reflector system was conceived to provide a flexible solution to light control. Instead of the lamp moving, the four reflector elements are independently adjusted to achieve a wide range of light distributions appropriate to most lighting applications. Tailoring light distribution in this way gives the designer more freedom when positioning luminaires in a scheme, enabling column spacings to be increased and the total units required to be reduced by as much as 30%. There are three basic positions for the reflector that can vary the distribution from a wide rectangular pattern, for wide roads or car parks, a long rectangular pattern for footpaths or malls and a square distribution for open pedestrian precincts. However the reflectors are fully adjustable to achieve the desired outcome.

The recommended fitting, to match the style and ambience of the area, is the DW Windsor Oxford column with the Windsor Street lantern, housing a 60W Philips Cosmopolis lamp, operated on variable electronic gear. A bracket-mounted version of the same fitting would be suitable for mounting within St Mary's arch (photo opposite) and the second arch within the precinct, which are currently very poorly lit with old, wall-mounted bulkheads.



The chosen fitting – the DW Windsor Street lantern on the Oxford column



St. Mary's arch could be lit internally with the same fitting

6. Docks Entrances and Docks Circulation Spaces

While the historic docks may be a visitor destination by day, by night the ambience changes completely to something more sombre and threatening. The inadequate lighting of the Docks area must contribute quite substantially to its low visitor numbers after dark – and will surely prove a huge obstacle to developing a vibrant evening economy in the area.

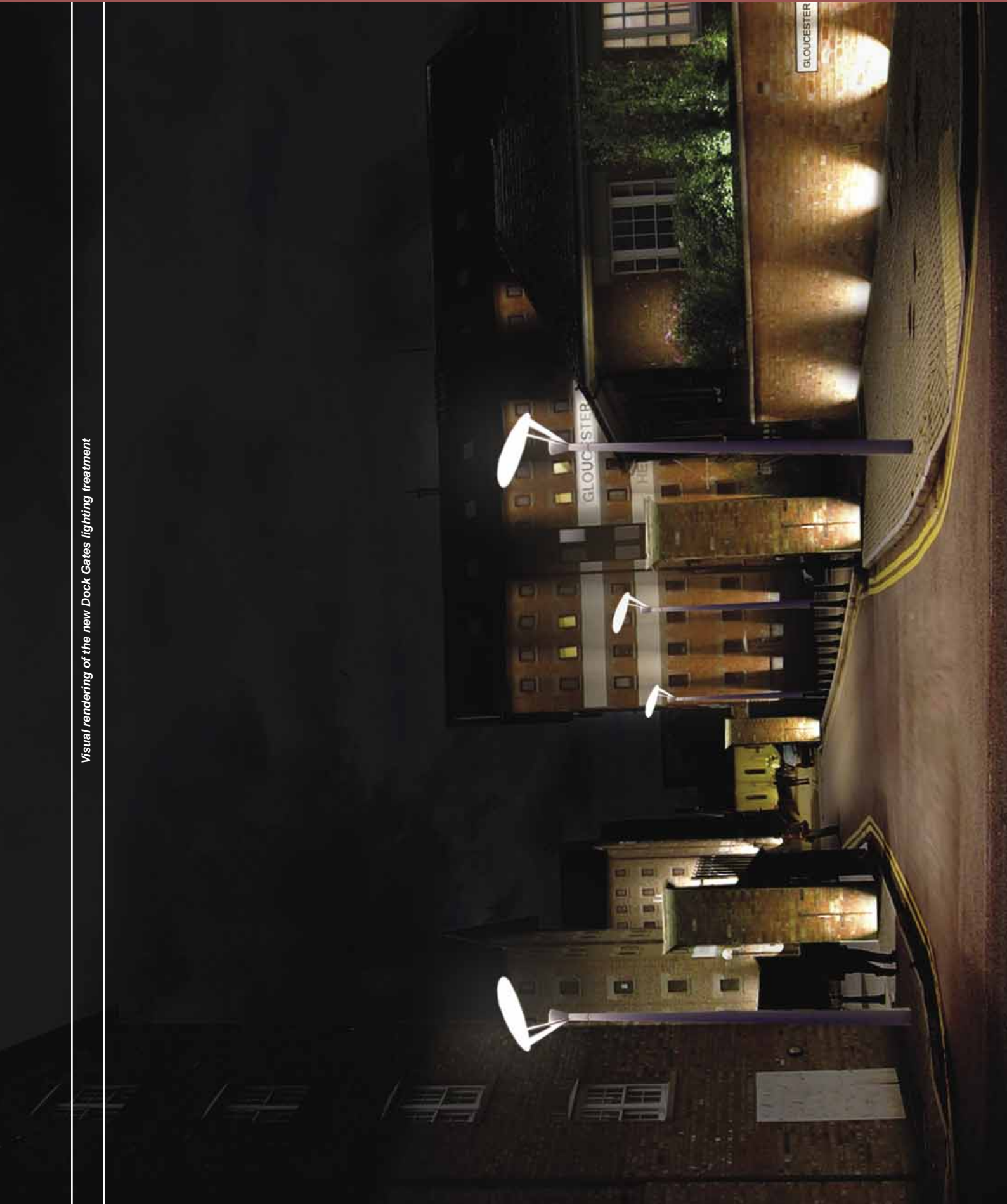
There has been some attempt to install feature and ambient lighting schemes in the central area of the Docks around the Mariner's Church – the failed 'Infinity Pools' lighting installation (**see Section 2.5.1**), using LEDs, a fibre optic colour change treatment to a low wall, some creative uplighting of other walls, plus wall-mounted pedestrian lighting. The specification of the wall-mounted pedestrian fittings is inappropriate – their light output is insignificant and does not contribute significantly to a feeling of safety and visual comfort. They can just be seen in photo (right).

Most importantly, the ensemble of lighting is largely invisible from the three main entrances to the Docks – one on Southgate Street and two on Commercial Road – photos of these night-time views are shown in **Section 1.10**



The Docks – limited uplighting has had some success

Visual rendering of the new Dock Gates lighting treatment



Any Docks' lighting scheme must be carefully designed, because it will inevitably be driven by two conflicting imperatives, which lie at the heart of the area's dual personality: (i) the requirement to attract visitors into the Docks, to boost the evening economy; and (ii) the desire to avoid projecting light into the windows of the residential properties housed in the upper floors of almost all the warehouse buildings, particularly to the east of the basin.

Lighting Proposals:

- The three main pedestrian entrances to the Docks need signalling far more prominently, with illuminated signage, plus uplighting of the brick gateway piers at the two Commercial Road entrances.
- More attention needs to be given to lighting the facades of the buildings which are most visible from the exterior roads – on Commercial Road this means giving the Council-occupied warehouse buildings a significant architectural lighting treatment, as they act as the main visual barriers to the Docks Basin.

- The successful, but limited, uplighting of walls within the central Docks area, needs to be extended to walls which are close to, and visible from, the main pedestrian entrances. The overall effect of all these elements, when applied to the main Commercial Street road entrance, can be seen in the computer-generated visual.
- The main walkways within the docks, particularly around Merchant's Quay, need to be illuminated more brightly, while taking care not to spill light into the windows of residential properties. Here the existing indirect lighting column (bottom left) does a very good job, in creating soft, diffuse lighting – and its use should be extended in preference to the low output wall-mounted fitting mentioned above, which add nothing to the overall visual ambience of the Docks when seen from medium and distant views, for example from the other side of the water.
- Finally, the existing column-mounted globe fittings (bottom right) on the north side of the water are both very



The present indirect light fitting should be used more widely



The old globe lanterns create glare and light pollution and must be replaced

outdated in style, as well as creating a considerable amount of upwards light pollution and should be replaced as an urgent priority.

- The overall secret of improving the night-time ambience is to put more light onto the most prominent vertical facades. However, any additional architectural lighting, particularly of the warehouse buildings, should (a) respect the historic style of the properties; and (b) must be done with close-offset fittings, which will not be perceptible from within the apartments.

7. Cathedral to Docks Sub-route

The direct route from the Cathedral area to the Docks, via Berkeley Street and Barbican Road – or Berkeley Street, Longsmith Street and Ladybellegate Street – is a popular subsidiary day-time route for tourists in particular. If the Cathedral Lighting Walk gets under way, then it could also become a better used night-time route, following a tour of the Cathedral area. Therefore, it would be important to light it in a way that would serve to draw people along it, rather than discouraging them.

Most of the latter route – Berkeley Street/ Longsmith Street/ Ladybellegate Street – is part of the Via Sacra, so new lighting for that City feature will serve to light this route as well. However, it would be beneficial to have some kind of illuminated signage at the junction of Blackfriars and Ladybellegate Street, to offer walkers two optional destinations.

The other route – Berkeley Street and Barbican Road – is more problematic. Barbican Road in particular is extremely unprepossessing, with a car park on one side (due for development as part of the Blackfriars scheme, but with an uncertain time-frame) and the blank walls of Gloucester Prison on the other. The route

is also not overlooked along the majority of its length. The walker needs firstly to have a good view of the lit Dock Gates area. Also the visible section of the route ahead needs to contain interesting feature and amenity lighting, to draw them down. In particular, illuminated signage might help to inspire pedestrian confidence.

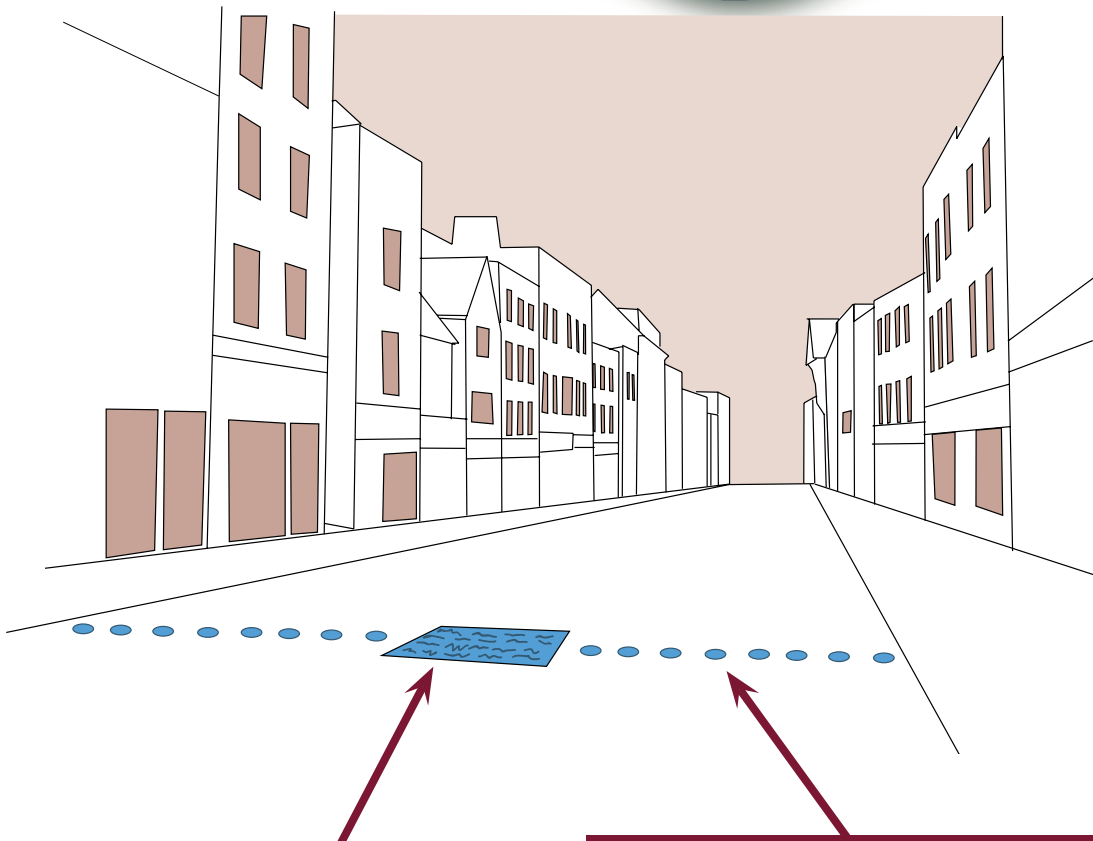
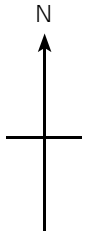
Other Streets and Features

City 'Gateways'

The historic City gateways, dating from Roman and medieval times, whose sites lie in the four Gate streets, are long since gone. With the exception of the East Gate, whose remains are revealed in the glazed viewing chamber in front of Boots, their positions are neither publicly recognised nor celebrated. One idea to offer a wonderful piece of interpretation to mark their positions would be to use an informational device which could be visible and readable by both night and day.

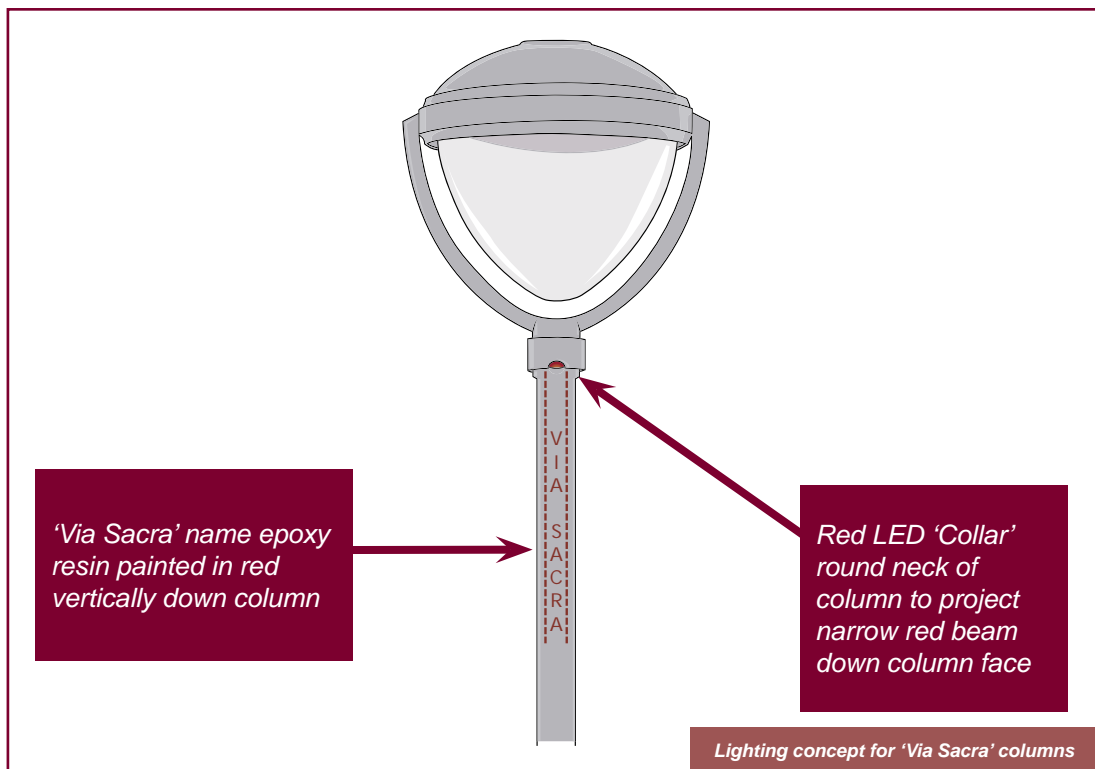
The idea for this would be to design an internally illuminated, waterproof chamber with a tough drive-over glass front panel which would be recessed flush into the ground somewhere on the line of the old Gates on each of the four Gate Streets. This would contain an interpretative panel, with readable text and images about the history of the Gate in question – the text and images would be backlit by night using fluorescent tubes inside the box.

In addition, a line of drive-over LED marker lights, perhaps 500mm apart (a different colour for each gate) could mark the line of the old gate across the street in both directions from the illuminated panel.



Recessed watertight interpretation panel lit from inside explaining the Gate's history – readable by day or night

Row of recessed drive-over LEDs marking the line of the old City Gate



The 'Via Sacra'

Although the Via Sacra route was largely an invention of the Jellicoe redevelopment plan for Gloucester in 1961, it does circumscribe, or link together, some of the most important historic sites in the City – and roughly marks the line of the old City Walls.

As such it is a pedestrian route that is worth preserving and marking in some form. Previously this was done through a distinctive chequered pavement pattern. However, this was difficult to follow after dark – and in many places the pattern has been dug up or covered by subsequent road works.

The proposal in this report is that the route will be marked by custom adaptations of a new street light column, using graphics and a special LED downlight, so that the route is recognisable and easy to follow by day and night. The new street light would be the DWW lantern on a tapered aluminium column, identified earlier in this Section. This would have the words 'Via

Sacra' inscribed vertically on the column in red lettering, close to the top on both sides, facing each way along the axis of the street. This would provide good day-time orientation.

Two small red LED downlights would be mounted on either side of the column – or possibly integrated into the lower arm of the lantern. These would illuminate at night, projecting a narrow beam of red light down the upper face of the column. This would pick out the red 'Via Sacra' lettering very boldly and again provide a highly visible means of orientation. The single driver for the two LEDs could be installed in the base of the column, with the other control gear.

The same device, using different letters and colours, could easily be adapted for other streets or areas within the city, providing an excellent and colourful means of orientation for all night-time pedestrians.

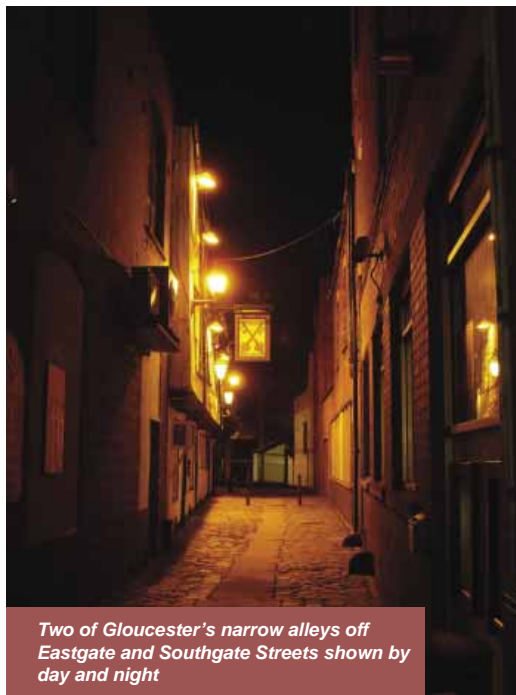
Organ's Alley and Cross Key's Lane

The City contains a number of dark, narrow alleyways, almost certainly of medieval origin, which emanate from the old Gate Streets, Organ's Alley, off lower Eastgate Street, and Cross Key's Lane, off Southgate Street. These are just two of the most notable (or notorious) examples. Most of these alleys offer rather unprepossessing pedestrian through-routes, or short-cuts, by night, due to their poor or non-existent lighting.

Being too narrow to accommodate column-mounted, or in some cases, even bracket-mounted lanterns, they should be lit using a durable, direct wall-mounted fitting that also has some aesthetic presence – rather than simply functional, amenity bulkheads which reinforce a threatening image of toughness and possible danger.

These should be mounted at a maximum height of four metres on the walls and at an adequate spacing for good lighting uniformity, with no dark shadows. More powerful, widely spaced lanterns simply project a poor quality lighting environment and create patches of glare, followed by areas of relative darkness.

The fittings would probably use high-wattage (38W+) fluorescent lamps, for a soft, diffuse lighting effect – if low wattage (35W) metal halide sources were used, they would need good diffusers or louvres, to avoid glare at such close quarters.



Two of Gloucester's narrow alleys off Eastgate and Southgate Streets shown by day and night



Four possible wall-mounted lighting options for the narrower alley ways

2.2.3 Medium-term GHURC Developments Introduction

Of the seven proposed major redevelopment zones identified in the GHURC plan, there are two for which plans are well advanced – and whose construction is likely to fall entirely, or largely, within the medium-term (four year) time-frame set by this document. These are Gloucester Quays and the Canal Corridor zones.

Given the existence of more detailed development plans for these two zones, the report will use these projects as the principal illustrations, and exemplars, of a number of strategic lighting proposals for street lighting, area lighting and architectural lighting. These could be given statutory weight by being embodied in SPDs (**see Section 3.2**) for any future detailed planning proposals within these zones.

This step would then require developers, architects, landscape architects and lighting designers to broadly comply with these proposals in future building projects within the zones. This would help to create a unity of style, design approach and lit quality, rather than creating the kind of fragmented, ‘anything goes’ night-time ambience that one sees so often in development areas involving different owners, building professionals and other specifiers. This is particularly true, when, in many cases, in the absence of lighting design professionals, non-lighting specialists (e.g. landscape designers and architects) can often be responsible for the resulting lighting.

These strategic lighting proposals will constitute:

- Recommendations for a number of specific styles and types, of street, area and pathway lighting units which could

be applied to different areas within these zones – e.g. traffic routes, mixed pedestrian/traffic areas, pedestrian pathways, residential developments, open squares, waterside pedestrian/cycle routes etc.

- Broad recommendations for ways of lighting buildings and other vertical features, in a manner which will avoid light pollution, light trespass and glare to users. There will also be some more specific concepts for specific known buildings within the site.
- A number of binding technical requirements to ensure the long-term quality and future durability of the most common types of lighting equipment likely to be used within these zones – street lighting units, floodlights/spotlights, burial fittings and smaller lighting details which might be integrated into landscape features etc.

By extension, similar lighting principles and technologies will, in turn, be applicable to the other GHURC developments in Gloucester, when they come on stream, to ensure a co-ordinated night-time appearance across the city – and in order that they will also marry stylistically with the lighting between these developments (i.e. in the City centre and Gate streets). However, the successful application of these lighting design standards and principles beyond Gloucester Quays and the Canal Corridor will largely depend on how rigorously they are adopted and enforced – and how well they are embodied in the City’s planning ‘culture’, prior to the current generation of planners moving on.

Therefore in 2.3.1, on lighting for the other GHURC zones, whose style and built form – and even street layout, in some cases – is largely unknown, the report will simply refer to the same broad concepts included here. However, the report will try and comment on specific issues that may arise from some of the known characteristics of



these zones (e.g. listed buildings that will undoubtedly remain).

The Future is Coming Faster

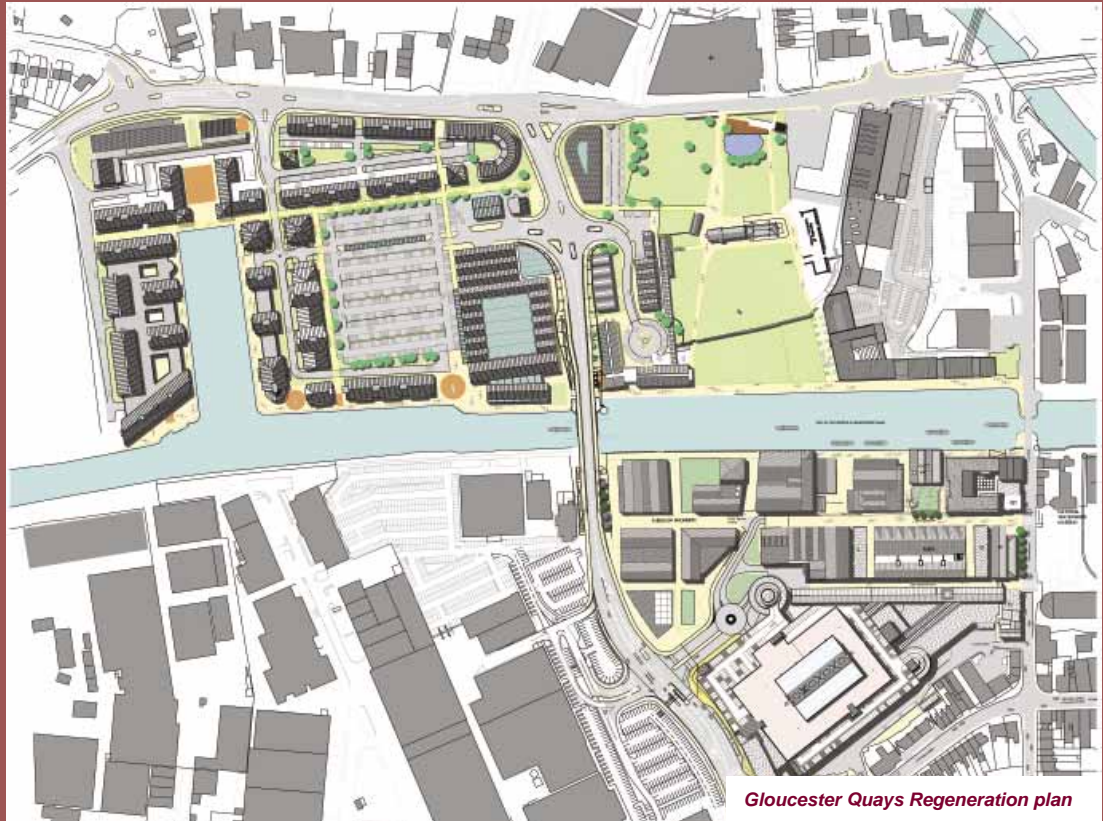
However, an important caveat must be offered at this point. Developments in lighting technologies (and lighting standards) are accelerating at a frightening pace – much faster than at any time in the past. This means that whereas urban lighting strategies developed only 10 or 15 years ago could be applied on a ten-year timescale, this is no longer possible. Due to the arrival of a number of rapidly improving lighting innovations – e.g. LEDs, remote control and monitoring systems, solar-powered lighting units – and changes in lighting standards and legislation, this strategy can only realistically be applied to an approximate five-year timescale, before it will almost certainly need extensive revision.

Therefore it might be a mistake to stick rigidly to these strategic proposals for GHURC developments beyond, say, 2012, for fear of actually preventing future regeneration areas from benefiting from the most innovative and useful technological developments.

A Strategy is Not a Design

Finally, it should be stressed that, no matter how thorough and comprehensive the broad strategic lighting principles for an area are, it will not necessarily mean that the area is well-illuminated. A general strategy applied to a two-dimensional plan is no substitute for a detailed lighting design, based on the specific known architecture and structure of a real site.

The importance of using qualified lighting professionals as part of their design team, alongside architects, landscape architects and other building professionals, must be emphasised. Such input, mediated by and framed within the overall lighting strategy for the City, will ensure the best, most long-lasting results.



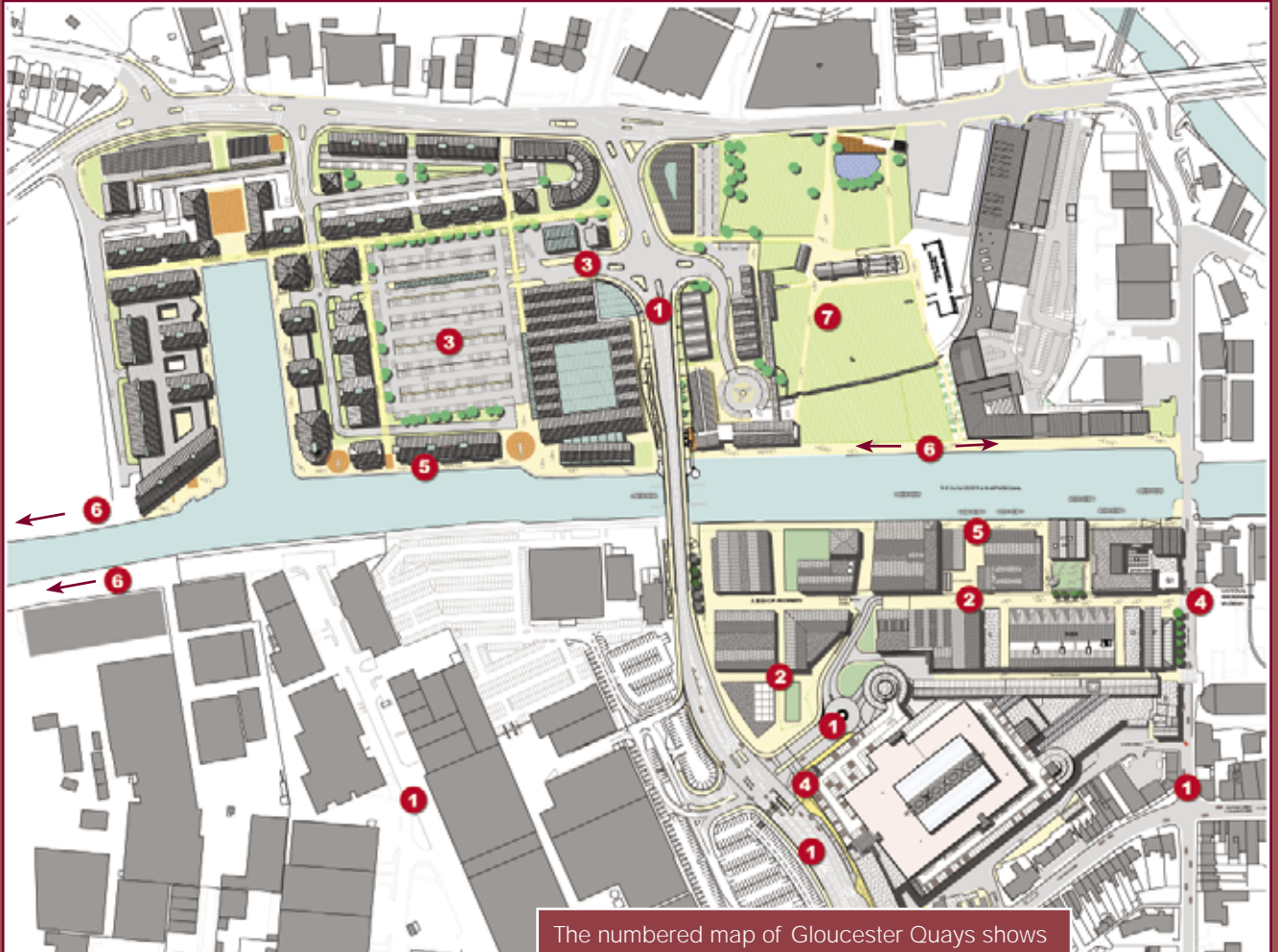
Gloucester Quays Regeneration plan



Gloucester corridor plan with close-up detail

Gloucester Quays and the Canal Corridor

For the purposes of this strategic report, the lighting proposals will be applied to both the Gloucester Quays and the Canal Corridor zones together. Although there are obvious differences between them – there is a strong emphasis on leisure/ retail/ residential in Gloucester Quays, while the Canal Corridor will comprise more light industry and residential – the precise details of the Canal Corridor scheme are less well developed.



The numbered map of Gloucester Quays shows seven main classifications:

1. Main traffic roads (e.g. the St. Ann Way road bridge), access roads into the Designer Outlet and associated car parks, the main heavy goods routes within the Canal Corridor industrial areas.
2. Narrower mixed use pedestrian and occasional traffic roads on site.
3. Car parks and streets within residential areas.
4. Key entrances and 'gateways' – e.g. the entrance to Gloucester Quays from the Docks, across Llanthony Road.
5. Waterside walkways fronted by buildings within the Quays.
6. Canalside paths for pedestrians and cyclists
7. Open pathways across fields and open spaces – e.g. Llanthony Priory grounds.

Street and Area Lighting Recommendations

The strategy will attempt to offer a hierarchy of lighting styles and equipment types according to how the different types of road, street and area within these zones are classified. (NB: at this early stage, the consultants have had to make some untested assumptions about the precise use of some of these roads and areas. These may, of course, be modified prior to completion of the developments).

1. Main Traffic Routes

Here the use of the Urbis Sexton fitting is recommended on a tapered aluminium column at a maximum eight-metre height. Sexton's variable bracket configurations and lantern types will permit a range of lighting options to suit different types of road and area of this type. Fixtures such as banners and baskets could also be added, for example on the bridge approach routes.



2. Narrower mixed use traffic and pedestrian (or pedestrian only) streets

The main streets of this type lie within the main Quays development between the new Designer Outlet and the canal. They are all quite narrow and run between new-build properties and converted historic warehouse buildings, but their modern uses and location in a leisure/retail area require a more contemporary lighting feel. Here the DW Windsor Stratum lantern from the Optima family is recommended, mounted on simple brackets on the buildings at a maximum of five metres, to keep the streets clear of lighting equipment.



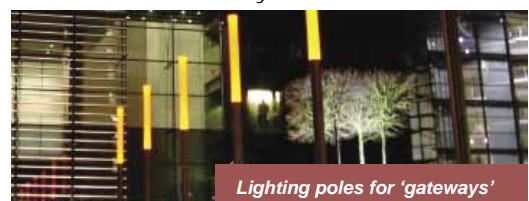
3. Car parks and streets within residential areas

The largest concentration of residential streets and an associated car park is at Monk Meadow Dock, to the south-west of the site. An important criterion here is to avoid light spill into the upper floors of residential properties, so good downwards optical control would require a totally 'flat glass' lantern. The DWW Dover lantern from the Optima family is recommended – it has a totally 'flat glass' variant (not shown). The Mounting heights should be kept below five metres, again to minimise light spill, and the Diamond Optic light control device should be designed to reduce backwards light spill around the perimeter of the car-park in particular.



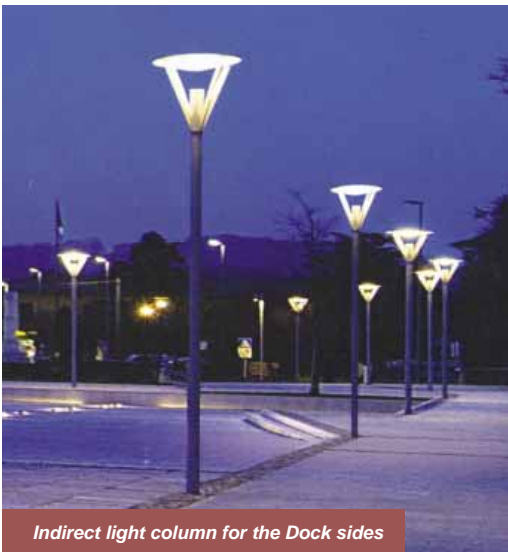
4. Key entrances and 'gateways'

There are a number of important 'gateway' locations into the Quays – most importantly the entrance to Gloucester Quays from the Docks, across Llanthony Road and the traffic entrance into the Designer Outlet from the new bridge approach road. These might be marked using the same type of light pole 'totem' concept used to signal the pedestrian crossings across the ring road in **Section 2.2.2** – but this time using a designated colour, rather than white light. Here too, the columns could be mounted on either side of the relevant route, opposite each other, to create a ceremonial 'gateway' effect. The immediate approaches to the new bridge might also be marked in this way.



5. Waterside walkways fronted by buildings within the Quays

Along the busy waterside walkways within the Quays, the strategy would recommend the continued use of the indirect light column, with upper reflector, used in some of the central areas of the Docks. This would provide some visual linkage between the Docks and the Quays, when viewed from across the Canal.

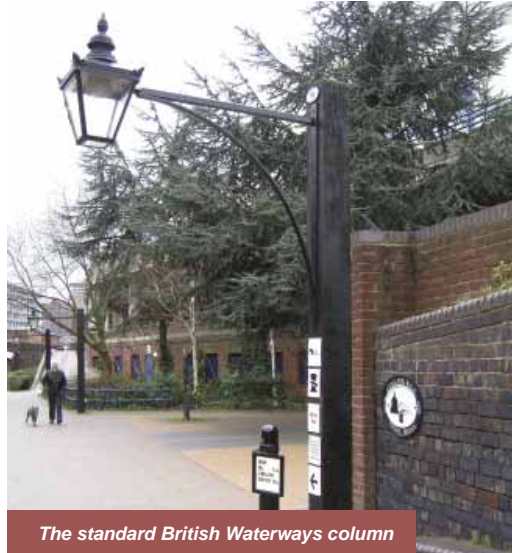


6. Canalside paths for pedestrians and cyclists

When completed, the Canal will have extensive waterside pathways for mixed pedestrian and cycle use, which will extend from the Quays through the Canal Corridor and miles to the south – in some areas on both sides of the canal.

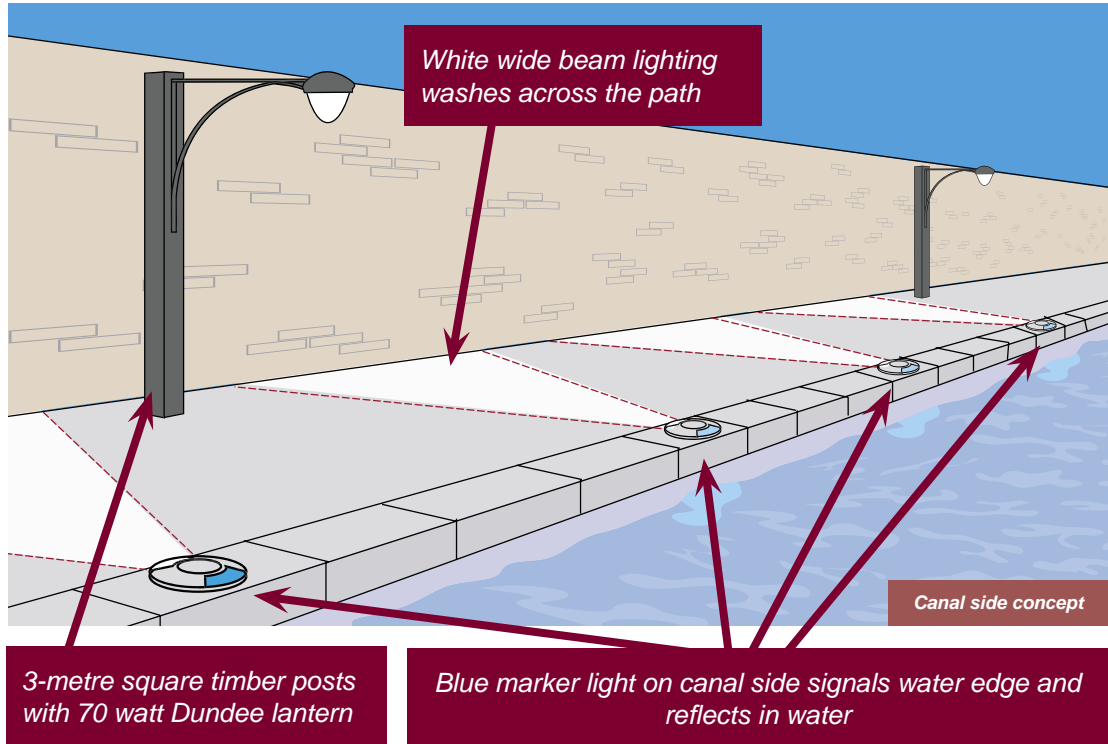
Within the main populated areas in the Quays and the Canal corridor, where power can be supplied to the canal side, the strategy proposes a very distinctive 'dual' lighting treatment:

- a) Mounted every 24 metres will be a three-metre high square timber column, at the back of the pathway, of the type used extensively by British Waterways elsewhere in the UK. This might have added directional or mileage signs, as shown here, but a different lantern.



- b) This will be fitted with a short-bracket mounted DWW Dundee lantern, fitted with a 60W Philips Cosmopolis lamp – and the Diamond Optic configured to offer a long, narrow cycleway distribution laterally along the path.
- c) Every 8 metres between these conventional columns, a low-profile marker light will be ground-recessed on the canal side edge of the pathway. This will offer a wide-beam wash at low level back across the pathway in white (LEDs or a 20W metal halide capsule); on the opposite side of the marker light segment, along the canal edge, a blue light will create an interesting edge detail, which will be reflected in the water. The effect can be seen in the concept drawing on the next page.





- d) On the canal paths beyond the Canal Corridor area, where mains power is inaccessible or expensive to install, the use of solar-powered pathway lighting units should be considered, as outlined in **Section 3.1**.

7. Open pathways across fields

The main example of an informal pathway across fields or open land lies within the grounds of Llanthony Priory. To prevent interference with daytime views, this should



be illuminated using a suitably tough, low-level bollard with single-sided distribution – and no upwards light emission above the horizontal. A similar bollard might be used to mark traffic boundaries within other Quays areas.

Architectural Lighting Recommendations

Section 3.5 and **Appendix E** contain many design recommendations for the lighting of buildings and other vertical features, in a manner which will avoid light pollution, light trespass and glare to passers-by. In addition the next section lays down some minimal technical standards which should be applied to the specification of lighting equipment for architectural use.

Within the close-grain context of the Quays, the report would further stress:

- Use the minimum wattage (and brightness) equipment for the job in hand.
- Walls in residential areas should only be lit with light fittings mounted in a close-offset position, to avoid light spill into windows.
- Always consider the downwards view of lighting equipment from upper windows and balconies



Integration of lighting into bollards, handrails and other features should be considered at all times (all photos by Woodhouse)

- Adjustable glare control devices – louvres, baffles and cowls – should be fitted to all lighting equipment, to allow the beam to be retrospectively ‘trimmed’ later, if necessary.
- Indiscriminate colour on historic buildings should be avoided.
- Integrate lighting into landscape features and conceal it from public view wherever possible (see photos).

Multi-Storey Car-Park Lighting

Multi-storey car parks are a necessary blight on the urban environment – and in the case of Gloucester Quays, the new multi-storey lies directly adjacent to the new ring-road extension over the new canal bridge. However, their visual impact on the environment at night can be disastrous to any sensitively designed night-time scene, with their bands of bright light interspersed with dark floor slabs. Furthermore, most car-parks are still lit 24/7, which increases the visual nuisance and wastes considerable amounts of energy.

Section 3.1 of this document has already detailed the availability

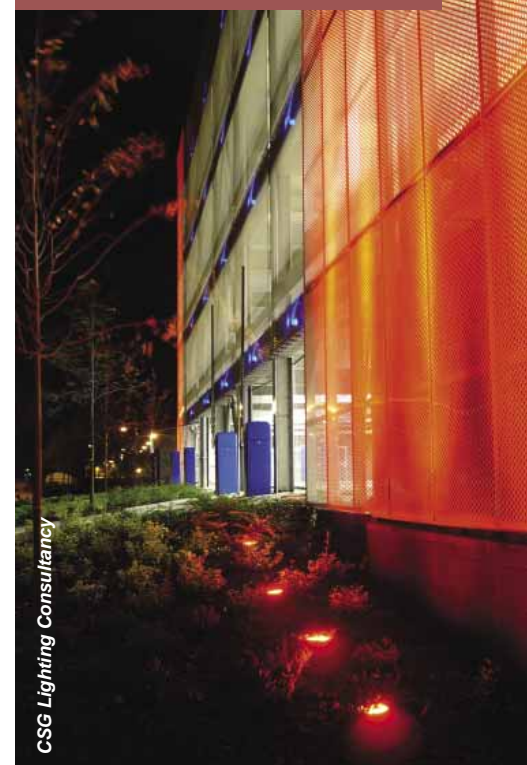
of digitally-controlled presence detectors, which don't require the lighting to be continually burning. Gloucester City Council could ensure that such equipment is installed in the new car-parks in this location. Fitting such equipment in a new-build project is much cheaper and easier than retro-fitting it later, when the car-park is in operation. However, car-parks don't have to look bad after dark. In a minority of cases, car-park owners/ operators have made some attempts to ensure that the integration of suitable façade materials and well-designed lighting, can mitigate against their worst visual effects. The photos show two such instances where the car-park was turned into a decorative night-time feature, which actually enhances the environment. Again a little forward-planning and design on the part of the operators could help realise such a pleasing effect.

One project might be to make the design of the façade and lighting the subject of a local or national design competition as discussed in **Section 2.5.5**.



Pinniger & Partners

Car Parks as interesting lighting features



CSG Lighting Consultancy

Lighting Equipment Technical Standards

This section lays down a set of minimum technical standards for the major types of lighting equipment that are likely to be used within Gloucester Quays/ Canal Corridor and other GHURC developments. To be effective, these standards should be embodied in SPDs, to ensure the long-term quality and durability of future Gloucester lighting schemes.

a) Street Lighting

- All street lighting to be designed within the standards set out in the current EN BS5489 (2006) Code.
- 'White' light sources to be used throughout – high pressure sodium should be avoided. This means ceramic metal halide, Philips Cosmopolis or fluorescent lamps.
- Tapered aluminium columns to be used for all street lighting – this is the most attractive, durable and sustainable option.
- All lanterns to have a minimum ingress protection rating of IP65.
- Apart from routes that are principally utilised by traffic, lanterns should be mounted at a maximum height of six metres – preferably four to five metres in exclusively pedestrian spaces.
- Street lighting units should be specified that do not project light above the horizontal.
- Electronic control ballasts to be used throughout on energy-saving grounds.
- Remote monitoring and dimming systems should be considered, to allow variations in lighting levels for different times of the week or night – and to save energy.
- Street lighting schemes should be carefully designed to avoid light spill into nearby residential or commercial properties – and if necessary rear baffles or other forms of shielding should be considered to 'trim' the offending part of the beam.

b) Architectural Lighting

Ground-recessed burial fittings:

- Minimum ingress protection rating of IP68 (not IP67).
- Top glass temperature should not exceed 72° C.
- All burials in public locations should have non-slip glass covers.
- Burial fittings should have adjustable reflectors.
- Fittings close to pedestrian pathways or routes should have internal louvres.

Spotlights/floodlights:

- Spotlights/floodlights should have a minimum ingress protection rating of IP65.
- Wide-beam floodlights (above 30° beam angle) should be avoided close to residential properties.
- If used, wide-beam floodlights should not be inclined above the horizontal plane.
- All spotlights and floodlights should be equipped with honeycomb or egg-crate louvres and anti-glare cowls, to minimise glare to residents or passers-by.

c) Landscape Lighting Features

Bollards:

- Bollards should be specified with either internal louvres or an indirect reflector, to avoid glare to pedestrians.
- Bollards should not project their light above the horizontal plane.
- Bollards should be plinth-mounted where damage from cars is likely.

Linear Lighting Features (linear burial fittings or wall-mounted wash lights)

- Long-life fluorescent tubes (minimum 18,000 hours) should be specified.

LED Marker Lights:

- All LED marker lights should have an ingress-protection rating of IP68 (not IP67).
- Ground-recessed LED marker lights should be of 'drive-over' standard, except for purely pedestrian pathways which are inaccessible to traffic.

2.2.4 Private Sector Projects

If the long-term viability of the Gloucester Lighting Strategy is to be assured, it is vital that the private sector becomes involved, to a greater or lesser extent, rather than all the funding being drawn from limited public sector finance. Local businesses need to be persuaded that the success of the lighting strategy in contributing to the city's long-term vitality is in their long-term commercial interest. Part of the remit of the proposed City Lighting Manager (see **Section 3.3**) would be to negotiate with local businesses to contribute towards the ongoing implementation of the Strategy proposals.

One of the most obvious contributions that certain key city centre businesses could make would be to light their own buildings in an appropriate manner, according to the broad precepts of the Strategy. Within the city centre there are four immediately obvious candidates who could be encouraged to illuminate their properties at an early stage, three of whom are large banks (see below). There may be other smaller businesses or concerns which the council could identify through closer analysis. However, it is important that those businesses are chosen on the basis of the architectural quality of their premises and the importance of their location, not simply on the basis of their willingness to participate.



HSBC Bank

Located in a very attractive building on a key site at the centre of the city, on the corner of Northgate and Westgate – and opposite St Michael's Tower, which should also be lit within the next few years – this building would make a prime contribution to the night-time scene if illuminated in a sensitive manner.

Lloyd's and Natwest Banks

These two banks are located side-by-side in two handsome late Victorian buildings, in contrasting styles, on Eastgate Street, which also adjoin the Guildhall with C&G bank on its ground floor. The lighting of these three facades as an ensemble would make a huge visual contribution to Eastgate Street – and the effective and well-executed lighting of the Guildhall might be a powerfully persuasive tool in encouraging participation.



Debenhams

Gloucester's largest department store takes up a huge chunk of city centre space between King's Square and Northgate Street. While not as architecturally impressive as the three banks, large sections of its mainly blank upper walls present a superb opportunity for playful colour-change and image projection, on a permanent or even temporary basis (e.g. for annual events and festivals) – equipment could be mounted on the first floor canopy itself. **Section 2.5.2** will discuss some of the ways that lighting



One possible lighting treatment for Debenhams as part of a Gloucester festival or event



could be used to underline and support local Gloucester events – Debenhams could be a prime site for some of this activity. One possible treatment is shown on the previous page.

The long King's Square façade of Debenhams would have offered a superb location for the proposed *son et lumiere* (section 2.5.3), but for the row of large trees which block a view of the façade from King's Square itself. At the time of preparing this report, it is not clear how many of these trees will remain after the redevelopment of King's Square and its environs. Currently this report is looking to Llanthony Priory as the most promising *son et lumiere* site within the city, but

this site within King's Square might be reconsidered, in the event of future developments.

However, there is one very obvious feature on the King's Square façade which it would be worthwhile to approach Debenhams about lighting – the matrix of square slots on the south-west corner. Each of these could be cleaned out, repainted in white and fitted with a small LED colour-change unit, all programmed with a DMX controller. An infinite range of dynamic colour-change effects could be achieved, for different times of the week, evening or season. The approximate effect is shown opposite.

Getting the Private Sector on Board

If private sector building owners are to be persuaded to take part, it is firstly important to ensure that the council has a good relationship with someone in authority within the company who has the power to make the necessary investment. Unfortunately, in the case of national chains or multi-national companies, this person may not be located in Gloucester. In the case of the three banks above, they may simply lease the building in question – in that case the property owners themselves may have to be approached, but the bank could still be asked to contribute financially.

Secondly, it would be useful to go along to any meeting with **approximate** costs for the lighting equipment, installation and ongoing running/ maintenance.

Thirdly, a potentially important tool for persuading building owners to take part would be a digital rendering of the intended lighting effect – these can now be commissioned for a few hundred pounds and could prove to be a very cost-effective investment.

Finally, some sort of financial inducement might be important too – these are discussed in Section 3.6 but the most appropriate ones for relatively large, affluent companies might be:

(a) to underwrite or part-subsidise the detailed design of the scheme by a competent lighting designer – that way the council retains control over the quality of the scheme.

(b) 'Commuted' sums for future energy/ maintenance (see **Section 3.6**) carried out by competent contractors – again this will ensure the long-term appearance of the scheme is assured.



2.3 Long-term Lighting Projects (2011 onwards)

Introduction

This section spells out very general proposals for the lighting of the other major GHURC redevelopment proposals which will probably be started, or will be substantially constructed, after 2011. While the report endeavours to lay down broad prescriptions for how these areas might be lit, the unknown nature of the buildings and street layout, and the rapidly evolving nature of current lighting technologies, will invariably mean that these projects must be re-visited and re-considered closer to the time of commencement.

2.3.1

Outline Design Proposals [road/ street lighting]

Section 2.2.3 of the Strategy outlines a number of specific lighting proposals for Gloucester Quays and the Canal Corridor development areas. This includes

recommended lighting equipment types, plus general lighting design principles and minimum technical standards for the main types of equipment. It is envisaged that these broad lighting recommendations would be applied to any new developments within Gloucester within the next five years (but might be subject to revision around 2011-12, due to advances in lighting technology). These main advisory standards would be laid down in SPGs and SPDs for those developments. This would ensure a continuity of lighting approach, a common family of lighting equipment and an established quality of lighting design and specification across the City.

Although the precise architectural style and structure of the remaining GHURC developments is largely unknown at this point, all the redevelopment areas have some distinctive existing buildings and structures which will need special lighting attention. What follows is an attempt to flag up those specific features and offer some 'broad brush' lighting design recommendations for their eventual treatment.

Railway Triangle

Following the collapse of the proposed community stadium deal in early 2007, the Railway Corridor development has suffered a considerable reverse and its redevelopment will be subject to a re-think over the coming period. However, it is still likely to involve the construction of a new landscape area containing a major pedestrian/cycling route out from the city centre to any new development on the triangle site to the east of the railway station. To encourage the use of such a pedestrian/cycling route after dark, this needs to be lit in a manner which is not just safe and functional, but is also innovative and interesting, with extensive uplighting of planting (possibly in colour – see photo) and integrated landscape lighting details, as outlined at the beginning of Section 2.2.2.



Plant uplighting could enliven the Railway Triangle

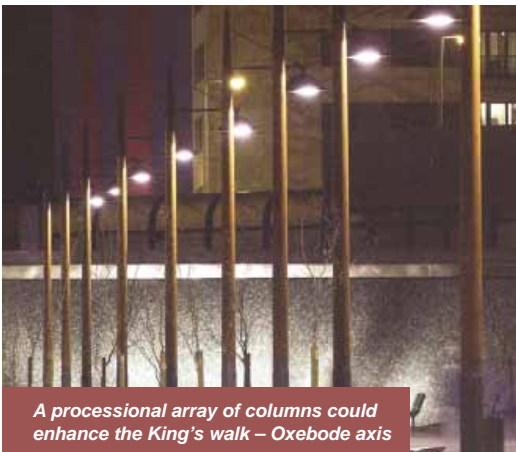
Gloucester Docks

Re-lighting proposals for Gloucester Docks are discussed at length in **Section 2.2.2** and do not need re-iterating here. The important new developments around the old Dry Dock area should be subject to a similar design approach.

King's Square/ Bus Station

Section 2.2.2 offers a broad lighting design approach for the lighting of the Bus Station and King's Square as part of the key cross-city pedestrian route from the station to the Docks. Although the precise re-modelling of the Square itself, and the shape and form of the surrounding commercial buildings, is as yet unknown, enough is known to point to the following ways in which lighting might help in the re-representation of the space:

- Use of lighting to emphasise the new physical/visual link from King's Walk up the Oxeboode to Northgate, following the removal of the Iceland building. This might comprise a distinctive, single-sided processional array of columns (see photo) in conjunction with lighting treatments to the Post Office and the Oxeboode façade of Debenhams and the symmetrical façade opposite.
- Co-ordinated uplighting of the new and existing trees in the square.
- A new lighting treatment of the King's Square façade to Debenhams – a simple



A processional array of columns could enhance the King's walk – Oxeboode axis

concept for part of this façade is shown in **Section 2.2.4**.

- Imaginative landscape lighting features integrated into walls, planters benches and so on, as outlined in **2.2.2**. Any new water feature should include specially commissioned lighting.
- A new public art work, incorporating lighting, within the central space.
- If the central space is to be used for leisure activities such as roller-skating, ice-skating, concerts or a public market, then a flexible, permanent theatrical lighting system (rated for exterior use) should be installed to make the most of such activities after dark – and to avoid the necessity of closing parts of the square to install temporary lighting rigs on a regular basis.
- Finally, any new office developments around the north-east sides of the Square should be required to submit visual renderings of their intended night-time effect as part of their planning application (**see Section 3.2**) to ensure that they don't mar or over-power the night-time visual ambience of the area.



A King's Square water feature should have sparkling, integrated lighting

Blackfriars/Westgate Quay

There are number of key historic buildings within the geographical scope of this development – most notably Blackfriars itself, Bearland House, the Fleece Hotel, Ladybellegate House and the Mercer’s Hall. These should be subject to sensitive new lighting treatments as part of any future re-development. In the case of Blackfriars itself, a new lighting scheme must take into account (i) the important listed status of its fabric and possible underlying remains and (ii) the proposed new function for the building, which would have an important bearing on any lighting scheme.

There is a proposed new public square located north of Blackfriars which should be lit according to the general principles established in this report.

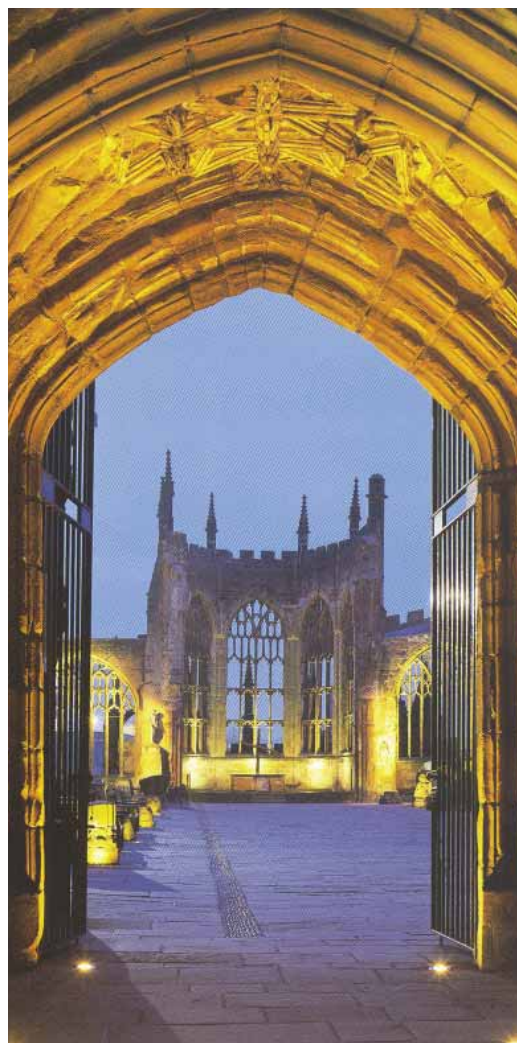
There are proposals to bring the narrow link routes to Westgate and Southgate back into greater use and here the wall-mounted lighting treatment proposed in relation to Organ’s Alley and Cross Quays Lane in **Section 2.2.2** should be adhered to.

The report has already discussed proposals for the re-lighting of the Via Sacra, which cuts through the site, and the important Cathedral-Docks sub-route in **Section 2.2.2**.

Finally, it is important that the lighting of any new developments in Blackfriars – and in particular the frontage of Westgate Quay – should be designed in such a way as not to interfere with, or dominate, the important views of the Cathedral by night from the West and north of the City. This requirement is explained in the following **Section 2.3.2**.

Greyfriars/Gloscat

As much of this area will eventually comprise a mix of residential and commercial properties, extensive new lighting, beyond street and pathway lighting, would not be advisable. However, the remains of Greyfriars itself could be turned into an attractive night-time destination, if imaginatively and theatrically illuminated. An example of the type of treatment that might be attempted is shown in this photo – from Coventry. The report has already considered the re-lighting of St. Mary de Crypt, but the churchyard behind and the area bounded by the Eastgate shopping centre are presently very poorly presented and could be vastly improved through re-lighting.



Speirs & Major

2.3.2 Protecting Gloucester's 'Scheduled Views'

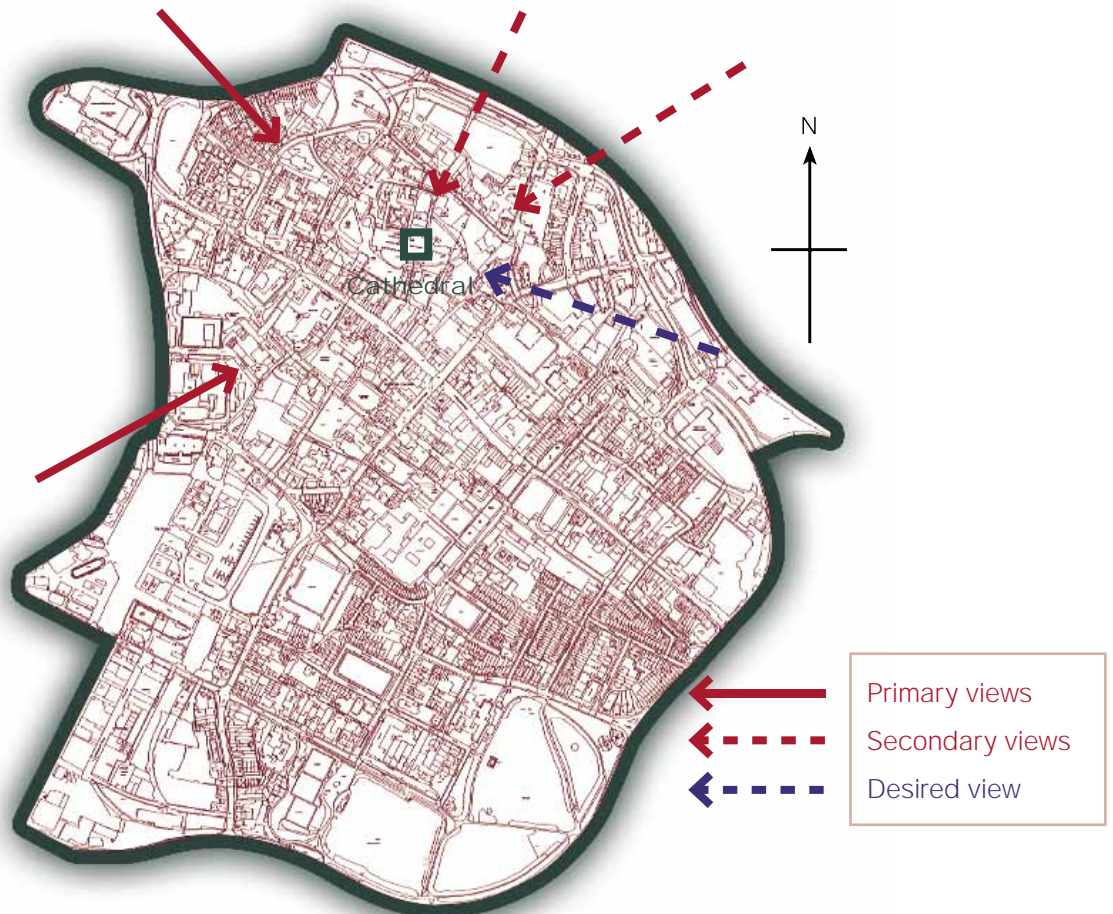


As discussed in the Analysis (**Section 1.2.5**) the key signature views of the Cathedral are predominantly from the west and north-west sides of the city. With the imminent re-lighting of the Cathedral tower, these night-time views will be doubly important.

Sadly, crucial night-time vistas in many UK cities have often been spoilt or degraded by intrusive, over-bright or inappropriate lighting within the main fields of view. It is crucial to the effectiveness of this Strategy – and for their maximum enjoyment by both Gloucester visitors and residents – that some form of planning protection is applied to these important signature views. This is particularly true where considerable sums of money are to be allocated to improving their night-time appearance.

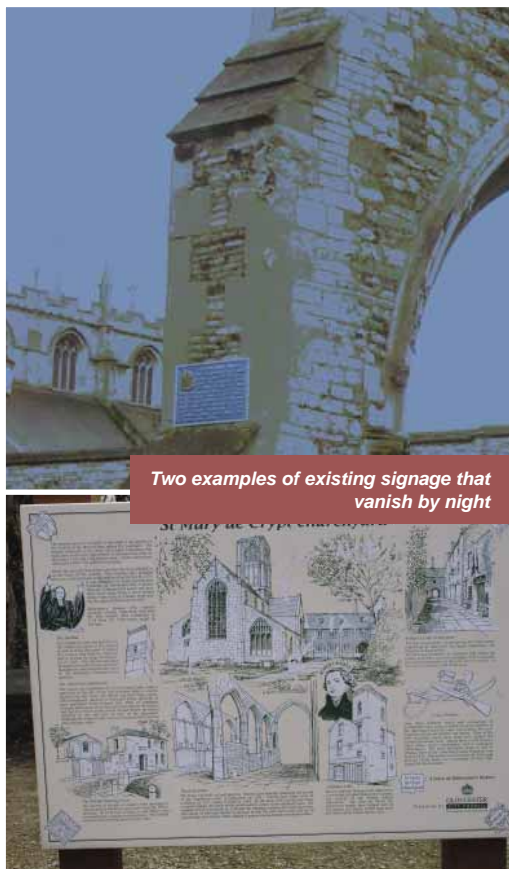
Within Gloucester's planning framework, these main views could perhaps be given the status of 'scheduled views', which would mean that any development proposals within those fields of view – for example in the Docks area, along the Quay and in the Blackfriars area – should be subject to an audit of any accompanying street or architectural lighting, to ensure that it does not impinge on or spoil the night-time appearance of the city and the Cathedral Tower in particular.

Such proposals should be assessed by a competent lighting designer and if necessary, computer-generated visual renderings should be requested from the developer involved as part of the planning submission, to demonstrate the lack of visual interference with the scene after dark.



2.4 Lighting and Historic Interpretation

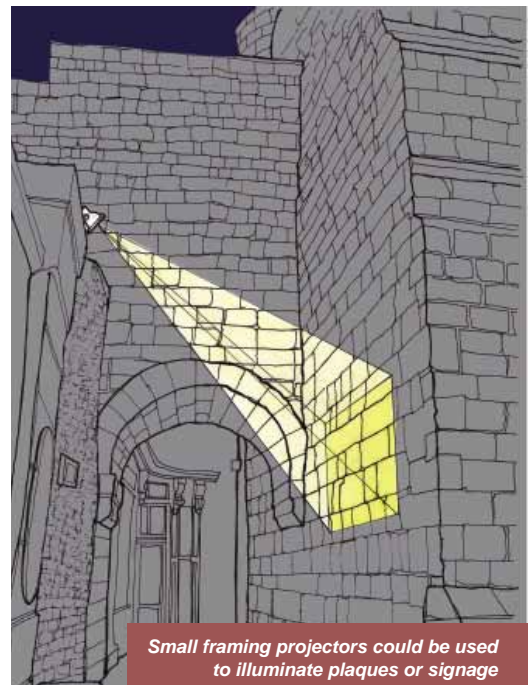
In any historic city that is attempting to encourage greater night-time tourist use, well-designed lighting has a triple role to play. Not only must the areas and features themselves be lit in a way which feels safe and secure, lighting can also play an important role in terms of both orientation and historic interpretation. For example, most street signage (e.g. finger-posts) are unlit at night and this can often discourage pedestrian exploration of historic areas. At the same time, interpretative signage – information boards, plaques etc. – are similarly neglected in lighting terms, so that information can simply not be read (or only read with difficulty) after dark.



Two examples of existing signage that vanish by night

Lighting New or Existing Signage

Lighting could play a vital role here, either through its incorporation into signage or adding it to existing signage. For example, interpretative information might be achievable through backlighting or lighting projections or other devices. The precise execution of any proposals of this type would need to be developed in conjunction with signage specialists or industrial designers.



Small framing projectors could be used to illuminate plaques or signage

Dynamic Lighting Projection and Sound

A more adventurous technique that could be explored at key historic locations, would be to use a small exterior-rated image projector, mounted either on a small column or a convenient wall (above easy interference height) to project a short show of selected archive images of events associated with the history of that area. Locations that suggest themselves include:

- The Docks
- Bishop Hooper statue
- Blackfriars
- Greyfriars

The cycle of images, lasting say 1-2 minutes, would be accompanied by a

short commentary transmitted through a small loudspeaker. The projector should be switched on (i.e. powered) with the street lighting, as it goes dark – but the cycle of images/commentary could be activated by a local button on the wall.

Lighting as an Interpretative Tool

Both these techniques outlined above are extensions of conventional informational signage. However, lighting could be used as a more interpretative tool, to express or make visible actual historic structures or remains in a lively and interesting way – in this way the night-time exploration of the city could be given an added dimension that is not available by day.

Three possible applications of this technique are:

a) The City 'Gateways'

This project has already been discussed in **Section 2.2.2**. Points of light in the ground could be used to outline the old line of the walls, in conjunction with some backlit interpretative signage recessed into the ground.

b) Eastgate Remains Viewing Chamber

While **Section 2.2.1** has already made recommendations for an improved lighting scheme for the chamber, based on simple floodlighting techniques, the idea could easily be enhanced through the use of interactive digital control technology. A tough, durable control panel could be installed next to the plinth, which includes a small recorded sound playback system. Using a simple button, visitors could listen to a short recorded history of the remains, which could be synchronised with gradual

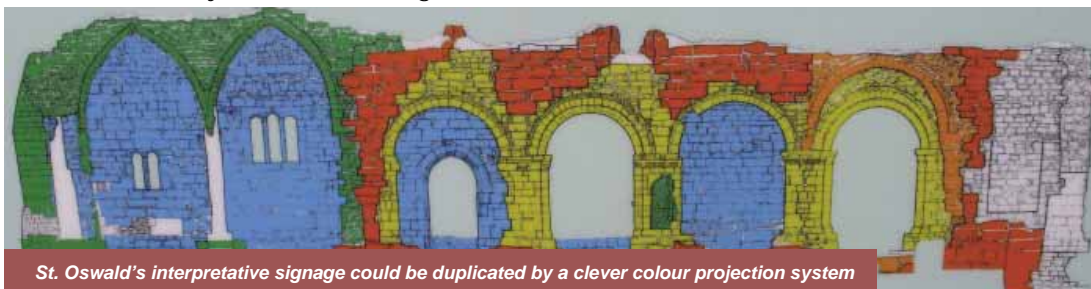
fading and switching of the lighting within the Chamber, to emphasise the feature or historic period being spoken about.

c) St. Oswald's Priory

The report has already outlined a short-term architectural lighting scheme for St Oswald's Priory, (**Section 2.1.1**) which should be implemented in 2007-8. However, long-term St Oswald's could be subject to a more creative and interpretative lighting treatment.

This could be based on the existing colour-coded informational signage that is currently used to explain the site to visitors – which uses different colours to designate the different periods and ages of the existing remains, which span four centuries of history.

The same colour coding, or a simplified version of it, could be actually projected onto the structure, using one, or possibly two, special gobo-projectors, which would have to be housed in special protective housings recessed into the grass in front of the monument. The colour projections could be run in sync with a short recorded commentary, housed in a plinth or low column, to explain the history and development of the Priory. The cycle of colour projections onto different parts of the walls, accompanied by the commentary, might last for 4-5 minutes and could be activated by using a button on the plinth or column – or via a visitor-activated sensor in the ground, which triggers the programme as night-time visitors approach.



2.5 Added Value Lighting Installations and Events

2.5.1 Lighting and the Public Art Strategy

While Gloucester has commissioned a very ambitious strategy document for the use of public art within the city (*A Place for Art* 2006) the funding and implementation of that strategy is still at a very early stage, with no actual projects in a fully designed state. Therefore it is difficult in this report to go beyond some very general proposals for how lighting could both support and be fully integrated into such projects. However, there are a number of observations which any public art commissioners or practitioners could usefully take on board.

Durability Issues

- As the report underlines, successful public art can make a huge contribution to increasing the vibrancy, attractiveness and civic identity of our towns and cities. Moreover, public art that is either lighting-based or is sensitively illuminated, can extend those benefits in the after-dark period, thus maximising the aesthetic and social value of their investment.
 - However, with some rare exceptions, such as Peter Freeman and Martin Richman, artists are very rarely experts in lighting. Even artists who have experience of using lighting successfully in indoor, gallery environments, can struggle when they try to apply their artistic creativity to the outdoor environment. Toughness and durability issues are paramount, due to wind and rain, accidental damage and vandalism,
- to mention only the most obvious environmental pressures.
- As a result many art works using lighting, either as a primary (i.e. integral lighting) or secondary component (i.e. illumination of an existing non-lighting installation) are often blighted by durability, vandalism, electrical, maintenance or water ingress problems, which reduces their useful life enormously. The country's towns and cities are littered with lighting art installations which look fabulous for the public switch-on but which rapidly deteriorate to become potential blights on the public environment (and purse) in a very short period of time.



- One local example which illustrates this perfectly is the 'Infinity Pools' installation in the Docks, which suffered water ingress problems at a very early stage and which will probably have to be replaced by another installation. The precise details of why the units were insufficiently water-tight may be complex, but nevertheless the fact remains that an artist commissioned the units from a company that obviously had insufficient experience in such construction.
- A common issue is the under-specification of standard components within art works – for example, LED burial lights which have too low a

water-ingress protection rating or are only specified in 'walk-over' versions, because they are located in supposedly pedestrian precincts. Such specification doesn't allow for the fact that such streets are often driven down by service and emergency vehicles, so 'drive-over' versions should have been specified.

Technical Collaboration and Monitoring

- To avoid this fate for lighting art installations in Gloucester, this strategy document would propose that all art installations involving lighting technology should, as a condition of commission, be subject to either direct consultation review or technical monitoring at an early stage by competent lighting design and/or engineering consultants.
- The main aim of such review or monitoring would be to facilitate the artist's vision (the desired lighting effects and so on) rather than undermining or transforming it. However, in the case of publicly funded art commissions, or art installations located in the public domain, which use specialist, and often sensitive lighting equipment, it is not unreasonable that the Council should insist on informed, professional scrutiny of the design and specification of such equipment. The small additional expense that might be incurred for often high-cost projects would usually be a sound, cost-effective investment in the long run, if it ensured a much longer life for the artwork in question.
- Similar measures should also be adopted where lighting artists propose to illuminate their sculptures or art pieces more conventionally, using spotlights or floodlights. Such

installations should also be subject to professional consultation and review, at an early stage, to ensure that the lighting complies broadly with the lighting strategy and that light levels are appropriate for the project in question – and the installation avoids upwards light pollution or light trespass into nearby properties.

Lighting Art Possibilities within the Strategy

Obviously, there is considerable overlap between some of the more creative lighting proposals within the strategy report and the kind of projects that lighting artists would undertake – and here there is potential for full collaboration between lighting design consultants and lighting artists within Gloucester at an early design stage. The most obvious examples from Section 2 are:

A. The lighting proposals for marking the old City 'gateways' with backlit interpretative panels and a line of LEDs embedded in the road surface – see **Section 2.2.2**.

B. The lighting proposals for the Via Sacra (and possibly other streets) where a coloured LED downlight could be added to a lighting column, to pick out a graphically presented street or area name printed onto the column – see **Section 2.2.2**.

C. The creation and elaboration of a *son et lumière* for the grounds of Llanthony Priory or elsewhere – see **Section 2.5.3**.

D. Temporary image and colour projection on the side of Debenhams (see visual rendering) – see **Section 2.2.4**.

Lighting Art Installation Locations

Having analysed the City structure and character in Section 1, the consultants believe that there are a number of key locations where lighting art (or lighting with art), in conjunction with improved area and architectural lighting, could help to animate the night-time scene and attract people back onto the streets.

1. King's Square

This is a key location identified by the 'Place for Art' report and this strategy would underline that requirement. However, until the precise redevelopment proposals for the area are finalised, it would be difficult to specify precisely how such an intervention might look. The report has already come up with some concept proposals for lighting the grid of slots on the King's Square façade of Debenhams, using LEDs, which could make a contribution to visually enhancing the space.



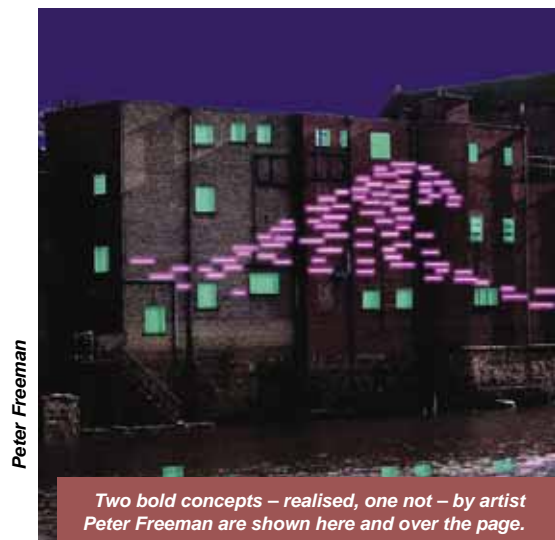
Suggested LED colour-change treatment for the Debenhams facade

2. Docks

It is the consultants' understanding that a new art and landscape installation (form unknown) is planned just to the East of the inner basin in the Docks, on the site of the existing car-park. This feature is intended to constitute part of a new, attractive pedestrian route from the city centre to the Docks and should, therefore, be accompanied by a sensitive ambient lighting scheme, which both enhances the art and landscape work itself, as well as making the walking route safe and interesting for pedestrians. It is suggested that discussions takes place between the consultants and the artists involved at the earliest possible opportunity.

2a. Dockside

In addition, the Docks would also benefit from at least one other light sculpture of some kind, in or around the main basin area – behind the Council offices for example – as a means of enhancing the main dockside and taking advantage of the reflective properties of the water. This might have a very broad, abstracted marine or water-related theme, such as the riverside concept shown here. It should also be more three-dimensional and totemic than the rather low-key 'Infinity Lights' installation near the Mariners' Chapel, which could not be seen from any distance away.



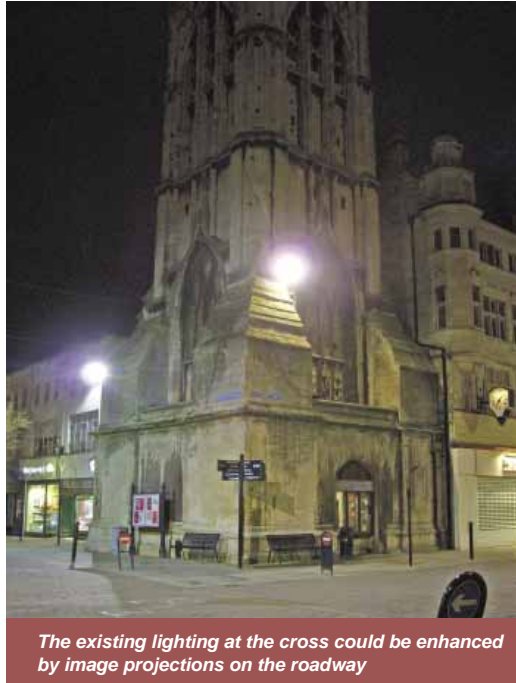
Peter Freeman

Two bold concepts – realised, one not – by artist Peter Freeman are shown here and over the page.



3. The Cross

The Cross, at the junction of the four Gate streets, constitutes the central point within the city. Although enhancements of the lighting on the Gate Streets, and the possible lighting of St. Michael's Tower, will help to bring a new night-time emphasis to the area, there is another simple and creative lighting idea, with an artistic dimension, that could make a contribution. The projection of a relevant, symbolic image on to the ground at the centre of the Cross at night from projectors mounted on two of the corner buildings at the Cross (but not St Michael's Tower). Such an installation might be permanent, or more likely temporary – for example during the long winter evenings around Christmas. Special gobos (cut-out light stencils) could



The existing lighting at the cross could be enhanced by image projections on the roadway

be used within exterior-rated projectors to throw simple images and patterns on the floor, in colour or mono. The projectors might even be fitted with gobo changers, so that the images could shift and overlap throughout the evening.

A competition might be run for local artists or school children to design a winning image which could then be made up into a gobo for light projection at The Cross.

4. Cathedral Precincts

The Cathedral has been very active over the last few years in mounting various art installations within the Cathedral and the Cloisters. In conjunction with the lighting strategy, and the proposed refurbishment of the precincts and Cathedral Tower lighting, a lighting-related art installation could be attempted within the Cathedral precincts themselves – either in College Square or in the Gardens area to the north-east of the Cathedral. This would most likely be a temporary project (but it might be permanent, depending on the nature of the work and funding) and might have an ecclesiastical or historic theme, related to the Cathedral itself. If publicised, such an

installation would take its place within the Cathedral Lighting Walk (**Section 2.1.1**) and would certainly serve to draw more people into the area by night.



Possible site for Cathedral precincts lighting art work

2.5.2 Linking Lighting into Gloucester's Festivals and Events

One of important spin-offs from popularising and developing a successful lighting strategy would be to spread the 'culture' of lighting – and the benefits it can bring – to broader activities and events across the City. This process of popularisation and promotion of lighting would be one of the essential long-term tasks of the City's Lighting Manager.

For example, other major festivals held within the City might incorporate a lighting element within their activities:

- The annual Rhythm & Blues Festival
- The three-yearly staging of the Three Choirs Festival in Gloucester
- The Gloucester Summer Festival
- The annual Cajun & Zydeco Festival

Inevitably, perhaps, with the exception of the last festival listed, all these fall within the span of a few weeks in Summer, when, of course, nights are much shorter. Nevertheless an attempt to temporarily light up venues or to use lighting to promote events in other ways (creatively illuminated banners and signage, for example) around the city could be a good way of raising the event's profile on a wider city stage. Theatrical lighting equipment can easily be rented from and installed by a number of specialist companies for short periods of days or weeks.

Taking the above list, two obvious lighting 'events' suggest themselves:

Three Choirs Festival

For this event, the Cathedral building itself could be given a temporary, colourful lighting treatment, possibly with image projection on to the walls.

Rhythm & Blues Festival

One obvious lighting treatment here might be to illuminate the venues and/or a number of key structures on the main routes into the city (bridges, the station, car-parks, even trees – see photo below) in a similar blue wash – an immediate visual association with the event which would have considerable news-worthy impact.



Blue trees and features could be created for the Rhythm & Blues festival



Son et lumiere image projections from Caernarvon and Dublin



2.5.3 Son et Lumiere: a New Night-time Attraction

As its name suggests, the concept of the *son et lumiere* is of French origin – and has established itself in France as a major form of evening attraction, both inside buildings such as cathedrals and outside, on castles and other historic sites. Caernarvon, has recently established an event of this type, but it is perhaps too early to judge its long-term success. Chiswick House in west London has also mounted a smaller, one-off event.

Given Gloucester's fascinating history and exceptional architectural fabric, such an event could form a very successful and potentially lucrative addition to the night-time scene, which would work to bring a broad spread of people into the city during the evening.

Broadly speaking there are two types of *son et lumiere*: large-scale image projections onto a temporary screen or actual building facade, with commentary and music, creating an illustrated narrative of the history of the place in question; or ones that tell a similar narrative, using a wider palette of images, sound, controlled dramatic lighting effects and even pyrotechnics, across an entire site (for example, the one mounted each year at the Egyptian temple of Karnac on the Nile).

Following a survey of possible sites within the City, it has been concluded that an event of the latter type, using a temporary screen and projection equipment, would be the most practical option.

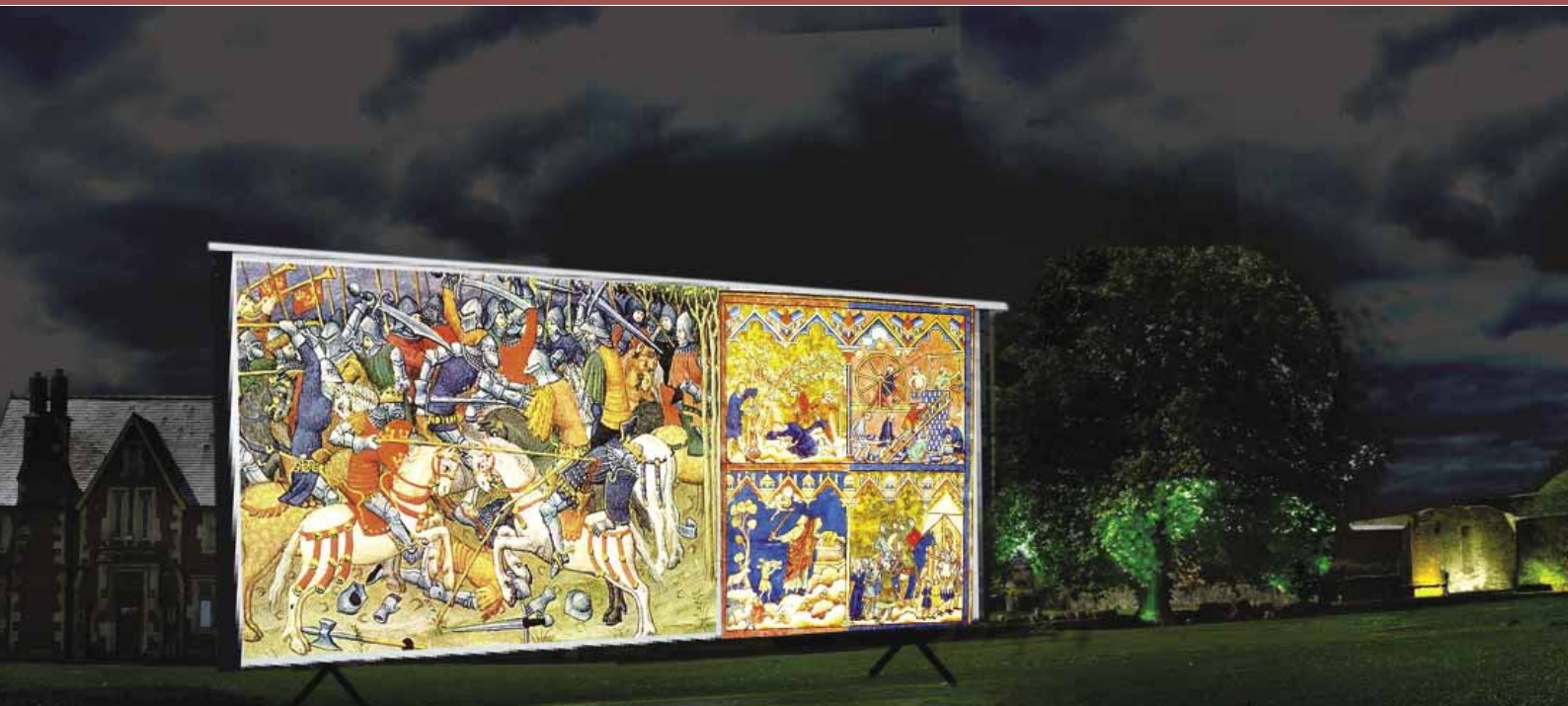
Content

A provisional concept and title might be 'Beneath Your Feet – a 2000-year History of Gloucester in Images and Sound' covering the history of the City from Roman times to the present.

Timing

Initially, the *son et lumiere* might be associated with an existing City festival – the Three Choirs festival for example, where there is already a 'captive audience'. However, this event only visits Gloucester once every three years.

Alternative options might be a limited period (say 3-4 weeks in the high summer season – July-August) at 10.00pm each night; or one of the 'shoulder' seasons of Spring (April-May) or Autumn (September-October), which would help to increase visitor numbers in these less popular periods. In spring and autumn, presentations could also start earlier in the evening (8.00-9.00pm) each night. It would not be feasible to run the event just over the weekends in the summer, because the equipment mounting/de-mounting costs and the security costs of guarding the projection equipment would be too onerous.



Site Location

The ideal requirements for a site are: (a) a large existing wall or surface for projecting on to – or a large space for erecting a projection screen; (b) a space large and safe enough to take an audience of several hundred people standing up; (c) controllable entrances/ exits to level an admission charge; (d) an available power supply.

There are three possible options within the city:

- i) Against the north-east wall of the Cathedral itself, although the audience space around there is relatively limited.
- ii) Llanthony Priory – this has a number of advantages, in that there is a substantial, flat audience space on the canal side of the main building, with controllable entrances/exits – and it is also distant from residential properties, so would present little sound/visual nuisance.



Site1: Cathedral Gardens and north-east wall

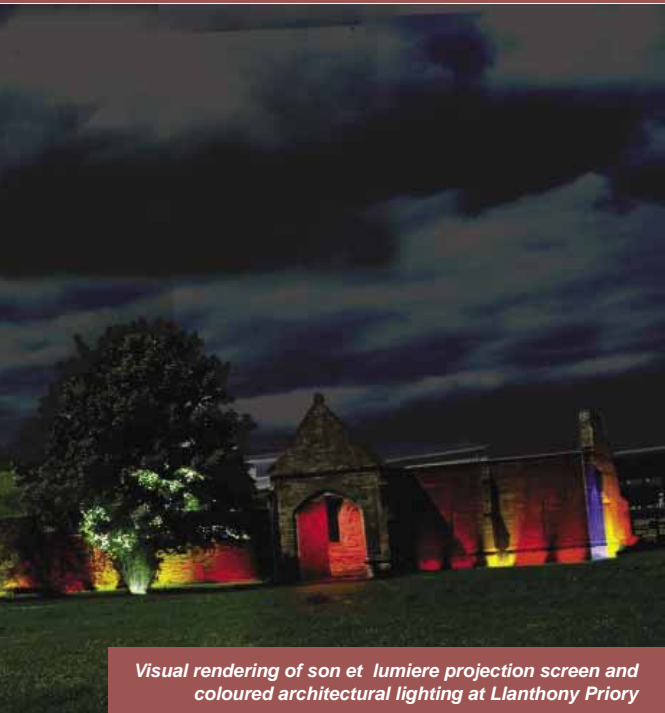


Site2: Llanthony Priory grounds

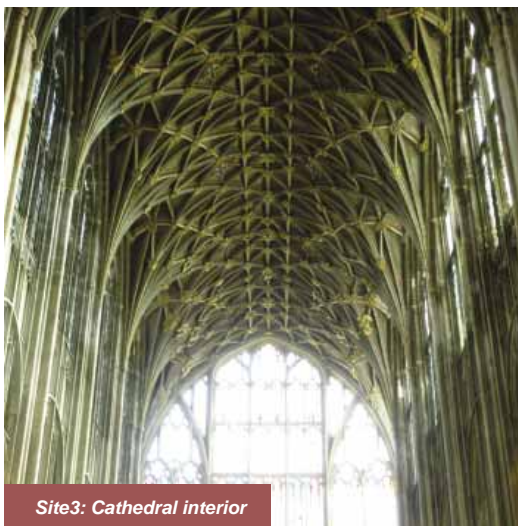
In addition, it would be feasible to add in an extra visual dimension by applying a temporary, colourful theatrical lighting treatment to the ruins on the north side of the site, adjacent to the new GlosCat.

A computer rendering of the kind of effect that might be achieved is shown above.

iii) Another option, which would imply an event of a slightly different type, might be a *son et lumiere* inside the Cathedral itself. A good model for this kind of event is offered by Reims Cathedral in northern France, which mounts a superb *son et lumiere* of this type in the summer months each year. The advantage of such a venue would be reduced security and protection costs for the projection/ sound equipment – and no exposure to the vagaries of the English weather for the audience. Such a proposal would have to be pursued at greater length with the Cathedral authorities.



Visual rendering of son et lumière projection screen and coloured architectural lighting at Llanthony Priory



Site3: Cathedral interior

Costs/ Revenue

It is not possible, within the scope of this document, to estimate likely research and set-up costs or income, without further discussion as to the exact content, form, length and audience size that is envisaged. However, initial set-up costs, for research and treatment, could be significant in addition to other costs, such as stewards, projectionists etc. Revenues may initially be more limited, depending on how well the event was promoted and the likely audience size.

Therefore, it might be necessary for the Council to seek sponsorship for such an event, if it is to remain cost-effective in the first 3-4 years operation.

2.5.4 Local Gloucester Lighting Awards Scheme

One of the important tasks that the City Council needs to achieve, using the lighting strategy, is to raise the awareness and enthusiasm for lighting among both the general public and, in particular, private building owners in the City. Such a campaign would help to make Gloucester's residents as a whole more conscious of the role that better lighting could play in improving the appearance and attractiveness of the city and its buildings.

A useful activity for helping achieve this would be the establishment of an annual Gloucester Lighting Awards scheme, run by the Council, possibly in conjunction with a sponsor (from the lighting industry nationally and/or a local city business). This is an event which has worked very well on an annual basis in Leeds, following the implementation of the lighting strategy there in the early '90s.

The idea is that every year the Council, via its publications and public notices, in conjunction with the local press, invites the public to nominate the best lit building or structure in Gloucester. The long list of candidates is then visited by a team from the Council, including the local lighting engineer, and whittled down to a shortlist of six or eight. The Council then invites a 'guest' judge from the lighting industry – a lighting designer or other notable figure – to visit the six or eight schemes, along with representatives from the Council and the sponsors, to decide on the winner.

The designers and owners of the winning scheme could then be presented with their plaque or trophy at a public meeting in a prestigious venue, with the media in attendance. Pictures of the ceremony, with pictures of the winning scheme, could then be widely circulated to the press in the broader Gloucestershire area, to publicise the event for next year.

2.5.5 A National/ International Lighting Design Competition

The idea of organising an 'international lighting design competition' for key lighting schemes in Gloucester was mooted in the original strategy document, out of which this report developed. While the idea might seem like a good way of stamping the City's name on the lighting map, it is a very ambitious proposal and needs some careful thought:

1. The commitment, resources and funding required to prepare, promote, judge and reward such a project would be considerable.
2. Apart from the Cathedral itself it is not clear which building in the City would have the necessary profile to appeal to an international lighting design community.
3. If the Cathedral were chosen as the subject of such a competition, the considerable financial resources to actually implement the winning design would be vital.
4. Such a project would also require the full commitment of the Cathedral authorities – and English Heritage.

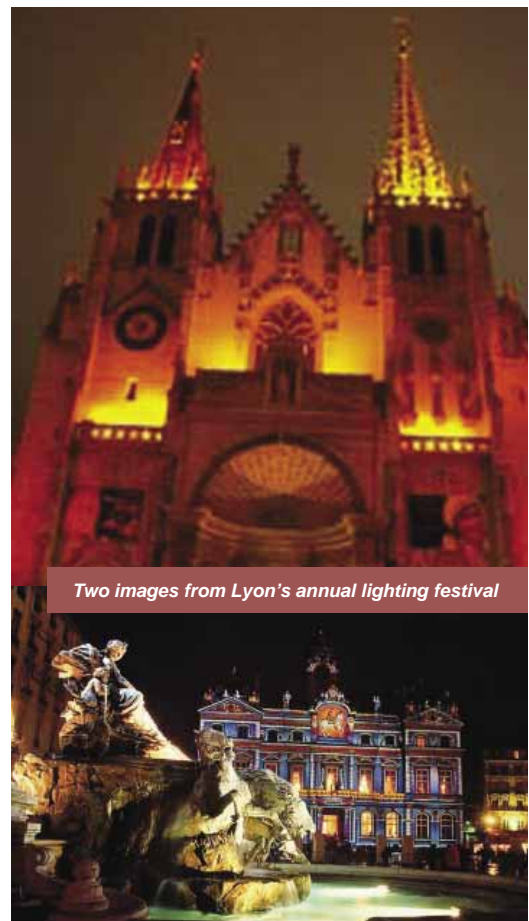
2.5.6 Towards an Annual Lighting Festival

It would be good to end this main section of these strategy proposals with a vision for the future. The ambitious idea of an annual lighting festival, to rank alongside the Three Choirs, for example, in the Gloucester calendar, was also mentioned in the original strategy document which emerged from the Council some 18 months ago. It is a laudable aim and one that should be kept in mind, as the critical mass of lighting installations and lighting-related events builds in the City.

The precedents for such developments are worth commenting on. The European city that has done most to put lighting

strategies on the map – Lyon in France – also pioneered an annual lighting festival, with its annual four-day event around December 8. This happens to be the day of a 19th century thanksgiving festival, where everyone puts a lighted candle in their windows. The modern 'Fete des Lumieres' comprises several specially commissioned lighting art installations, projects by international lighting artists and practitioners – and more conventional, highly colourful temporary lighting schemes (some implemented by the city authority itself).

Since then some UK cities have taken up the lighting festival on a lesser or greater scale – most notably the York event in November, which runs along similar lines to the Lyon event, although generally involving a more local base of artists. Glasgow too mounted an event in late 2005, as part of



Two images from Lyon's annual lighting festival

the promotion for its emergent city lighting strategy – although it was reportedly under-funded and doesn't appear to have been repeated.

In summary, the main issue can be summed up by the conflict between practicality and resource availability versus vision and ambition. Possible ways forward include:

- Liaison between the City Lighting Manager and those involved in commissioning and administering the visual arts in and around Gloucester.
- The establishment of a venue for local and national lighting artists to exhibit existing pieces of their work – or within a short time-scale within the City. This exhibition of lighting art might be mounted outdoors, but within a covered venue (to avoid disruption by poor weather).
- An alternative format might be to invite say, three or four teams of lighting designers/ artists combined with sound and light companies specialising in the technology, to mount installations on

key landmarks in the City, for example, the period of one of the existing festivals or events (or at Christmas).

If developed intelligently, such moves could grow into a full-blown lighting festival. However, such initiatives must be undertaken in parallel with the continuing refurbishment and improvement of the city's area and architectural lighting – and not at its expense. To have a spectacular, high-profile three-day lighting festival in the city, in the midst of a mediocre lit environment which will stick around for the other 362 days, would be an embarrassing anomaly – and one which would be an unacceptable scenario.



Closer to home – colour lighting in York and Glasgow as part of their lighting events





Introduction

Lighting Strategies are not a magic panacea for improving a City's lighting. No matter how creative, detailed and precisely targeted they are, there are a number of vital pre-conditions for their success:

- Influential local 'champions' to drive the strategy
- Sufficient funding to achieve a 'critical mass' of high-profile projects in the first two years
- The commitment of the private sector and private building owners
- A degree of public involvement and 'ownership' of the plan, through local bodies
- The close integration of lighting with other urban improvements (e.g. regeneration plans)
- The involvement of public lighting engineers and planners in the evolution and enforcement of the strategy
- Linkage of the strategy with a town or city's existing culture and traditions

Most importantly, there must be a coherent long-term lighting management policy embodied in the plan – issues addressed in Sections 3.3 and 3.4

The owners of the Strategy, in this case the City Council, assisted by GHURC, must take responsibility for the long-term plan – and integrate it carefully into several important areas of its work. **Section 1.1** spelt out a number of priority areas of GCC/GHURC activity where lighting could play an important role – most importantly, crime prevention/social exclusion, transport improvements, heritage and conservation, regeneration and planning.

To sum up, the Gloucester Lighting Strategy will inevitably under-perform – or fail in its long-term goals – if it is not adequately funded and managed in a professional manner.

This section looks at ways this might be achieved.

3.1 Lighting and Sustainability

The issue of sustainability has risen inexorably up local authority agendas in recent years and it is vital that future lighting schemes within the city are as sustainable and environmentally friendly as possible. Sustainability has four main aspects in the context of exterior and public lighting:

1. The first meaning of 'sustainable' concerns the design life of the project, which needs to be extended to the maximum extent. Is the specified lighting equipment durable and vandal and weather-resistant? Can it be maintained easily and cheaply? **Will** it be maintained and cleaned and re-lamped on a regular basis?

The initial specification of the lighting equipment is obviously in the hands of the lighting designer or architect or landscape designer – which is why, in **Sections 2.2** and **2.3**, we have laid down strict specification and installation standards, for most types of common lighting equipment that might be used across the city centre – and within the new GHURC developments.

However, the vital follow-up maintenance, re-lamping and repair regime is in the hands of the local authority and/or the developer – and while all schemes designed by the consultants will include a recommended schedule of maintenance, the actual carrying out of such works must be overseen by a responsible person within the city – preferably the City Lighting Manager. Various carrots and sticks that could be applied to private lighting

installations, to encourage them to systematically maintain their schemes, are outlined in Section 3.6

2. The second meaning of 'sustainable' in relation to lighting concerns the materials and construction of the lighting equipment itself. What impact does it make on the environment and material/energy resources in production? And can it be recycled at the end of life? All major lighting manufacturers in the UK will now have signed up to the European WEEE (Waste Electronic and Electrical Equipment) Directive and optimum materials use, recyclability and ease of disassembly are now key issues in the manufacture and construction of modern lighting equipment.

While the WEEE Directive is applicable to all lamps, light-fittings and lanterns, it should be mentioned that lighting columns themselves are not covered. This is why this study recommends the use of aluminium lighting columns within future lighting installations, because, in addition to its other benefits (strength, lightness and passive safety characteristics) aluminium is easy to melt down and re-use. Re-cycled aluminium uses a mere 10% of energy in its manufacture, compared to new aluminium refined from bauxite.

3. The third meaning of 'sustainable' lighting concerns its effects on people and the environment around it. If those effects are damaging or unacceptable, then the scheme is clearly unsustainable because there will be demands for it to be changed or turned off altogether. Is the lighting visually comfortable for users? Does it avoid light spill into surrounding properties? Does it avoid upwards light pollution into the sky? Some of these latter effects can be controlled through the Clean Neighbourhoods

Acts 2006 (see Section 3.2) but public lighting does not fall within the scope of the Act.

4. Perhaps the most important meaning of 'sustainable' relating to lighting does, of course, concern energy consumption. The first thing to say, however, is that in absolute efficiency terms, most modern light sources used in **exterior** lighting – notably high pressure sodium, ceramic metal halide and fluorescent – are among the most energy-efficient sources available, so very few savings can be achieved through the switching or substitution of lamps. More inefficient incandescent, tungsten sources are very rarely used in the outdoor environment, due to their inefficiency and short burning life.

However, there are several further measures that could be taken to reduce energy use – including several which involve modern electronic control ballasts for street lighting in particular. These are:

a) Remote Monitoring and Control of Street Lighting via Wireless Signal

This technology allows constant monitoring of the energy use and the condition of the lamp and ballast (including any faults or malfunctions) from a central location, so the optimum conditions for best energy use can be maintained.

b) Remote Dimming of Street Lighting

More importantly, remote controlled electronic ballasts allow remote dimming and switching of individual lanterns, which means that, for example, light levels could be lowered during selected periods of low use (midnight until 4.00am, for example) as permitted under the new CEN Code for road lighting, thus saving energy. Another option is to burn the lighting at, say, 75% of maximum throughout off-peak periods, with a lighting increase up to 100% for peak traffic and pedestrian periods – and again reducing light levels to 50% after midnight.

Currently Gloucestershire County Council is not using such technology on its roads, but as energy costs rise and pay-back periods shrink, the financial argument for investing in these systems will become inescapable. The consultants would recommend early adoption of these technologies within the city, to offer greater control and flexibility of lighting, for different periods of use, with associated energy reduction paybacks.



A digital presence detection system for car parks from Oxford Automotive Technologies

c) Presence Detection Switching of Lights in Car Parks

Conventionally, on personal safety or crime prevention grounds, lighting in surface

and multi-storey car parks is kept on all the time (in the case of covered car parks) or throughout the night, or period of use, in surface car parks. This is very wasteful of electricity. Technologies now exist which use sophisticated digitally-controlled presence detectors to switch on the lighting only when the car park is in use, which can reduce energy use by up to 50%.

d) A Rational Switching Regime for Architectural Lighting

In contrast to street and pedestrian lighting, architectural and feature lighting, whether public or private, should not be kept on all night. All-night burning of lighting for buildings, trees, water features, monuments etc. doesn't only waste energy, it will substantially increase the maintenance and re-lamping requirement for the scheme. Normally all such installations should be controlled by an astronomical time-clock, which switches the scheme on at dusk, or 15 minutes after dusk, and off at a pre-determined time – probably 11.00pm during the week and midnight on Friday or Saturday.

e) 'Green' Energy

Many councils throughout the country have now gone over to 'green' energy use from either specialist or mainstream electricity suppliers. While the generation of electricity from renewable sources is currently more expensive than conventionally generated energy, the differential is shrinking all the time.

f) Solar-powered Lighting Units

For relatively remote locations, a long way from a mains supply (the canal side paths might be prime candidates in Gloucester) one of the new generation of solar-powered lighting columns could provide a very cost-effective solution.



New solar-powered lighting units by Solar Tech UK Ltd

3.2 Lighting and Planning

It is perhaps surprising that such an environmentally powerful tool as exterior lighting is, in the UK, subject to very little direct planning legislation, guidance or constraint. While it is now the norm for Planning Departments to require visualisations of the intended daytime appearance of new buildings or structures, few require architects, developers or building owners to supply visualisations of the appearance of the same building after dark. This is despite the fact that in the UK, it will be seen under night-time conditions for a substantial proportion of any 24-hour period – particularly in the winter months. A poor exterior lighting scheme can completely negate or reverse the intended architectural effect by night – and even **interior** lighting, if ill-thought out, can have a substantial negative effect on buildings, particularly those with extensive glazed facades.

At present the only detailed planning and environmental health controls on exterior lighting relate to:

1. The physical attachment of light fittings to Listed Buildings, under conservation legislation.
2. The appearance and brightness of illuminated advertisements – see Appendix C.
3. Light spill and light nuisance into adjoining properties is now a statutory nuisance under the Clean Neighbourhood Act 2006 and is enforced by the Council's Environmental Health Department. While such legislation applies to private developments and residential properties, it does not apply, as yet, to public street/road lighting provided by local or highways agencies.

In the absence of any direct legislative planning controls, some far-sighted planning authorities have started to insert lighting specifications and design requirements as Supplementary Planning Guidance (SPGs) and, more recently, Supplementary Planning Documents (SPDs) to be followed by architects and developers on all new-build projects. In Huntingdon, for example, the local planners and lighting engineers have collaborated to use SPGs very effectively to ensure the quality and style of exterior lighting within new housing developments.

In one case, a developer, who had not followed the SPG guidelines, was forced to entirely replace the installed street lighting, which was mounted on columns of the wrong material that were also too high – and used yellow-gold high pressure sodium lamps, rather than the stipulated white light sources. With new street lighting, of course, the local authority also has an additional weapon in its armoury to force compliance – the threat of non-adoption for maintenance and replacement purposes.

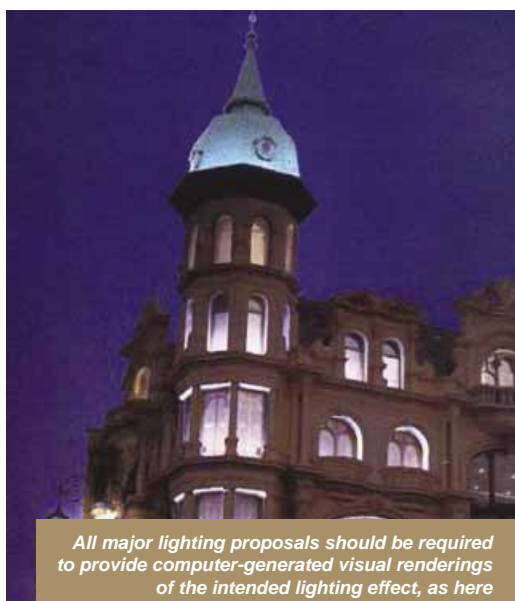
This is a promising new development in the UK and one that could give urban lighting strategies, such as Gloucester's, a new-found force and authority. In the past, planning departments have either not known about lighting strategies (often commissioned by the tourism or economic development department) – or have ignored their recommendations, usually through lack of experience in dealing with lighting. This has meant that they have often sat on the shelf, unread and unused, despite considerable investment in their preparation – and subsequent lighting developments within the cities or towns in question have been undertaken in an ad hoc and unco-ordinated manner.

The fact that the Planning Department at Gloucester City Council is the main instigator of this lighting strategy gives the city a huge advantage, in terms

of incorporating its main proposals – particularly for future redevelopment and regeneration projects – into the planning framework. It is intended that various lighting recommendations and design standards, particularly those detailed in **Section 2.3**, will be embodied in Supplementary Planning Documents, both as a specific topic-based guidance, setting standards for development control – and for application within Gloucester's main regeneration areas. In this way, the same unity of style and quality of installation can be maintained across the city.

Visualisations Required

One important requirement that planners could impose on future developers within the city, is the necessity to provide a night-time visualisation of the intended appearance of any building or area, in addition to day-time views. This would immediately serve to put lighting design firmly on the design and planning agenda at an early stage – and might compel developers and/ or architects to think seriously about their exterior lighting, and invest in the necessary lighting design expertise. Such visualisations would also provide a clear and visible benchmark against which future lighting installations could be judged.



3.3 Management and Implementation

Management Strategy

A new approach to the lighting of Gloucester dictates a new method of implementation. The perceived benefit of this new approach lies in the maximisation of the City's night-time visual potential, in order to enhance not only individual properties and architectural assets but also create a cogent and memorable image for the visitor.

Currently no mechanism exists to evaluate the desirability of lighting any one individual element within the City. Nor is it currently possible to monitor the likely qualitative results of any proposed lighting scheme. The current situation enables any building to be lit in any style, to any brightness, in any colour, without reference to its neighbours or its context within the cityscape as a whole. It is therefore essential that guidelines contained in the Strategy are popularised and adopted by all concerned.

Lighting Management

The implementation of the broad Lighting Strategy will take place over seven or eight years, depending on the ability of local and central government, corporate, commercial and private property owners to provide the necessary funding.

It is vital that a planned and integrated approach is adopted, covering building, landscape, pedestrian and street lighting in all areas of the City. Since there is no single body or authority whose remit includes the implementation of the whole of the lighting strategy, one possible way of overseeing this approach would be through the creation of a new role and function, which could be integrated into existing bodies – the City Lighting

Manager. This role is covered in more detail in **Section 3.4** below.

Scheme Design and Approval

In common with much of the design of the built environment, lighting design is undertaken by a variety of professions, trades and commercial concerns. Much of what passes as 'lighting design' is, in practice, no more than lighting equipment specification with little or no consideration given to the interpretative, psychological or creative aspects of the design process.

To obtain the best results, lighting design/specification for projects in Gloucester should be undertaken by those who provide a design service independent of commercial interest. These would include:

- (i) Architects and landscape architects
- (ii) Electrical or lighting engineering consultants
- (iii) Independent lighting design consultants
- (iv) Lighting artists and urban designers

It can also be undertaken by companies or individuals with a direct financial interest in the equipment specified. These include:

- (v) Lighting equipment manufacturers
- (vi) Electrical contractors
- (vii) Electrical and lighting equipment distributors and sales organisations

The over-riding concern must be that those responsible for the lighting design procedure are:

- Aware of the aims of the Lighting Strategy as defined in this report.
- Capable of designing the installation in broad compliance with the Design Guidelines as defined in this study and which form an intrinsic part of the Lighting Strategy.
- Experienced in the production of lighting plans and proposals to a standard which enables others to assess the likely visual outcome of the installation.

There can be no firm guide as to which of the professions or trades detailed above are likely to prove most capable in fulfilling the requirements of the strategy. However, employing practitioners who make profit from the sale or distribution of lighting does carry the danger that they will specify the lighting equipment that is most easily available – or, even worse, lighting equipment that gives them the best financial return – rather than the equipment most suitable for the project. It is only common sense that a professional design service, which is paid for, will produce more competent results than might emerge from a 'free', sales-related, design service.

Lighting design, particularly in the external environment, is an imprecise art and, as such, it is important to allow time and money to carry out adequate field tests, to demonstrate the principles and lit effect of the design in actuality. A great deal of the satisfactory detail of an external scheme can only be defined by on-site experimentation. This requirement should not be viewed as an abrogation of predictive design, but as an important extension of the designer's skills – and a useful means of promoting the better use of light. Lighting design can involve some, or all of the following services:

- Preparation of a lighting concept that complies broadly with the aims of the lighting strategy and its related design guidelines.
- Preparation of an initial lighting layout, plus luminaire, lamp and control equipment specification.
- Assessment of capital and annual running costs.
- Presentation of the scheme to building owner with, if appropriate, visualisations and/or images to convey likely outcome of scheme.
- Presentation of scheme to Planning Officer or Committee, where necessary.

- Arrangement and supervision of site trials and assessments.
- Preparation of full final layouts, equipment mounting details, written/drawn specifications and quantities for tendering or contract negotiation purposes.
- Where necessary and appropriate, liaison between designer, architect and electrical engineer.
- Monitoring of the site installation procedure and agreement of any necessary modifications to original design.
- Commission of the completed installation, including the aiming and focusing of the lighting equipment
- Programming of control system, as appropriate.
- Handing over to building owner or his representative.

The degree to which the above detailed services are required on a project will vary in accordance with its scale. However, it should be appreciated that even on the smallest of projects, the visual results need to be predicted and the lighting system sympathetically integrated into the building structure.

The Approval Process

In order to encourage maximum adherence of individual schemes to the principles of the Strategy, it is proposed that building owners be invited to submit applications for funding support for their lighting schemes wherever possible. In order to qualify for such support the schemes should:

- Fall within the framework or the lighting strategy area and objectives
- Be designed by an approved professional
- Be presented to the Council for assessment and approval

Approval of the scheme and contributory funding should be contingent on:

- The degree to which the building structure or area relates to the overall objectives of the Plan.
- The quality of the scheme proposals in relation to their adherence to the Plan's design guidelines.
- The availability of other funding sources.

A climate should be created within which approval and associated financial support is considered to be a reflection of design excellence on the part of the designer and civic responsibility on the part of the building owner. This can be achieved through imaginative and vigorous promotion of the strategy to the City at large.



3.4 The Role of the City Lighting Manager

Managing and implementing a lighting strategy is a difficult and complex job. No matter how committed and enthusiastic the personnel who commissioned the strategy – and whether they come from a planning, economic development or leisure services background – it is the consultants' experience that taking on the role of running the strategy, in addition to their normal job, is impossible. Inevitably, the double workload starts to tell and the implementation and management of the lighting strategy suffers.

This is why, for more than 15 years, UK lighting strategists have propounded a new managerial role within, or alongside, the local authority – the City Lighting Manager. This officer, who could be employed full- or part-time – or could even be taken on in a freelance consultancy basis – would play a vital part in ensuring the successful implementation of the lighting strategy, as well as helping in the improvement of all areas of local lighting. To date, such a role has not been developed in the UK – although there are successful examples of the role in other countries, the best-known being Malmö in Sweden.

However, recent UK developments could mean that the time of the City Lighting Manager has come:

(i) Many local authorities are devolving their lighting departments to outside contracting bodies, or to PFI-funded operations, which often means a reduction of in-house lighting expertise (and a point of local contact).

(ii) In the quest for a higher competitive profile, many building owners are showing an increasingly reckless, *laissez faire*

attitude to lighting their buildings, as lighting technologies proliferate and become ever-cheaper and more available.

(iii) The use of lighting for security in both the commercial and residential sector is growing too – and in the absence of any local advice and information, many installations are poorly designed, specified and installed.

(iv) As a result, planning and environmental health departments are becoming increasingly concerned about lighting problems – or are being asked to take decisions on lighting installations, as part of redevelopment proposals, for which they have no expertise.

(v) The Government itself has recognised this growing problem of light as a social nuisance, and the need to control it, in the form of a section of the Clean Neighbourhoods Act 2005. Unfortunately, however, the Act excludes many of the worst offenders, such as transport termini, sports facilities and road lighting.

Who to Appoint?

The kind of person who might be appointed to the post of City Lighting Manager (CLM) would be someone with considerable experience of lighting design or lighting engineering, but they must have a general interest in all areas of lighting. They would need good negotiating and diplomatic skills and should be confident in presenting ideas in the public context. If the city could not afford a full-time officer, someone working two or three days a week would be an acceptable compromise. A part-time freelance consultant might also be considered, on a renewable one- or preferably two-year, basis. Someone working on a freelance basis, three days a week, could probably be hired for £30,000-£35,000 – if the person was successful and effective, such an investment would be far more beneficial, in terms of taking the strategy forward, than the same amount of money spent directly on lighting equipment.

In such circumstances, a likely candidate might be someone from the lighting business in their 50s, who was approaching retirement but who could usefully bring their years of experience to bear on a wide range of lighting-related tasks.

In the absence of direct funding, or the availability of only partial funding, the role of Lighting Manager might well be one which would be successfully funded by private or corporate sponsorship. The advantage of such an approach would be to ensure the continued independence of the person involved.

It is suggested that the consultants be invited to attend the selection interviews for the post, in an advisory capacity.

What Would a City Lighting Manager Do?

They would certainly not be under-employed. Better lighting in Gloucester will only come about through more rigorous control and planning – and through improved advice and greater encouragement. The CLM would be central to this ‘carrot and stick’ approach. The creation of this role, in the form of someone with both aesthetic and technical expertise in lighting, could be an important component of the success of the Lighting Strategy. In fact, their over-riding priority would be to promote and popularise the main proposals within the plan – and to help integrate lighting into council policy in a number of key areas. This would be done initially through formal and informal presentations to other council officers, particularly within planning and regeneration departments, and to local councillors.

On a day-to-day basis, the job would involve co-ordinating the views and activities of the City Centre Manager, the City Council, the County Lighting Engineers, the Planning Department, local heritage and conservation bodies, retail and private enterprise companies, the police and the GHURC.

Equally importantly, the CLM would raise the public and media profile of the strategy, and its benefits, among the broader public and the private sector, through presentations and discussion at a range of local organisations and other forums.

At the same time, it would be the CLM's job to ensure the main framework of the Lighting Strategy was carried through into all future city developments, by:

- Overseeing the contracting and installation of the short, medium and long-term lighting proposals embodied in the plan
- Liaising with the County lighting department on both current public lighting issues of concern to the City – and future road and street lighting proposals, to make them fit the framework of the Strategy more closely
- Advising the City's building owners on future lighting proposals, in part through the distribution and popularisation of the Lighting Design Guidelines (Section 3.5)
- Offering support to the Planning Department on lighting-related issues – in particular, overseeing and advising on the lighting components within planning submissions. This might also involve technical/aesthetic assessment of lighting schemes presented for approval and/ or funding assistance.
- Close collaboration with GHURC on future phases of the City's regeneration – and the drafting of lighting proposals as part of those developments, in order to co-ordinate the Lighting Strategy with all phases of such developments.
- The encouragement of private sector financial input into the implementation of the Lighting Plan – e.g. through sponsorship of lighting schemes or through direct funding of lighting for companies' own buildings (HSBC, Debenhams etc.)

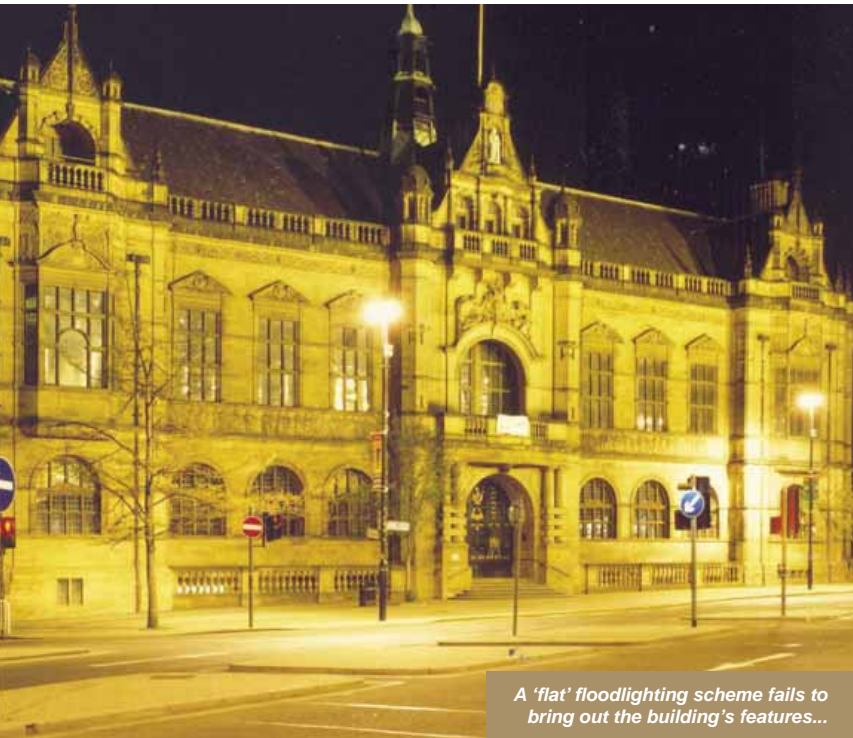
- If affordable, be principally responsible for drafting and overseeing any Grant Aid system for lighting – and overseeing applications
- Develop and oversee a programme of lighting maintenance for all non-street lighting projects, to ensure that lighting schemes are regularly serviced and kept in a fully operational condition
- Working with local arts officers and organisations, plus the tourism department, to develop lighting arts installations and other lighting-related events, as outlined within Section 2.6 of the strategy

- Liaise with the police and other anti-crime organisations on the improvement of lighting in crime and disturbance 'hot spots'; and act as the local lighting 'trouble-shooter' by fielding local complaints and surveying and advising on light spill or light trespass issues

The central components of these proposals are likely to be implemented by the various public bodies involved. This implementation will be achieved by the use of capital grants to cover design and installation costs of selected installations. It is hoped that the installation of these Stage 1 schemes will encourage building owners, both public and private, to initiate their own schemes.



Lighting art installations, such as this one in Newcastle by Thomas Heatherwick, could be developed in conjunction with the City Lighting Manager



3.5 Lighting Guidelines for Building Owners

Introduction

This section is intended to assist building owners, commissioners, funders and all those responsible for the implementation of lighting schemes in the City of Gloucester. Its aim is to ensure that the finished designs meet common criteria and adhere to the Strategy's main objectives [many of the terms used in this section are explained in *Appendix D: Glossary of Lighting Terms*]. The guidelines will be important criteria in the creation of a vital and exciting night-time environment.

These guidelines do not and cannot detail how to light each building or feature but they do define a framework within which the work should be carried out.

Basic Ground Rules

- Illuminate only those buildings of sufficient architectural interest – or those that contribute significantly to distant and local views.
- Always seek the professional advice and guidance of a lighting consultant or planner.
- Do not illuminate buildings where lighting could be a nuisance to surrounding residential properties.
- Ensure that exterior lighting installations are as discreet as possible and do not compromise the architectural integrity of the building being lit.
- Ensure that exterior lighting installations cause no physical damage to listed buildings.
- Design the lighting scheme to accord with the special architectural characteristics and details of the building in question.
- Design the lighting scheme to take into account the existing illumination of adjacent buildings and to have regard for the total lighting effect of the area – in 'low light' locations, with little competing illumination, a little lighting can go a long way.
- Ensure that the colour and strength of the lighting is appropriate for the nature of the building materials to be illuminated.
- Ensure that each proposal is as environmentally friendly as possible, maximising energy efficiency and minimising light pollution.
- Ensure that where required exterior building lighting schemes are designed as an integral element of any new development.
- Seek the relevant planning or listed building consents.
- Plan a careful switching regime, taking into account energy use, patterns of visitor/resident use and the potential for

glare nuisance to adjacent properties during normal sleeping hours.

- Always ensure that the scheme design adheres to the principles set out in the Gloucester Lighting Strategy both in general and in particular.
- Always devise a written management and maintenance programme that details the types and numbers of fittings and lamps, and when they should be cleaned and changed, in order to ensure the consistent and continued use of the lighting scheme if necessary this should be accompanied by a risk assessment statement for maintenance staff and the public.

Lighting Techniques

The exterior lighting of buildings is frequently referred to generically as 'floodlighting', from the idea that the building is bathed or submerged in light. However, this image is very misleading and has done a great deal to create inappropriate, over-bright lighting treatments to many buildings.

It is vital that the lighting scheme for a building or feature is developed according to a specific style. It may be that the desire is to give the building a general wash or glow to reveal the overall shape and form, but this should be the specific aim rather than a convenient solution.

The following are examples of a number of alternative lighting styles:

Floodlighting: As already discussed, this involves the use of powerful, wide-beam 'floodlights' most often positioned on the ground, or on posts, along the front and/or sides of the building, so that all the building is covered evenly with light. As well as being associated with glare and 'light pollution', this technique often creates surfaces that are over-bright and flattens out all the building detail.

In some circumstances, it may be acceptable to create a softer overall wash

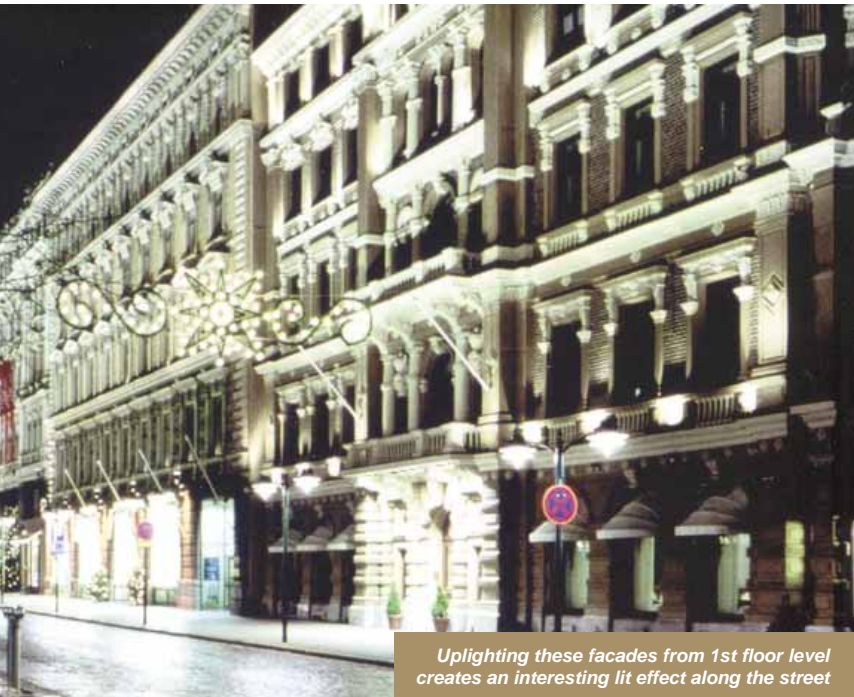


... while accent lighting of facade details on this building creates a much more pleasing effect

effect to a building in this way, to reveal its form, using less powerful fittings – but these should be fitted with louvres and shields to limit any spill of light outside the building structure. In such cases, the overall wash should be supplemented by selective, brighter accent lighting of building details, to create a much livelier, more interesting effect.

Accent Lighting: Could be referred to as 'spotlighting'. It is the technique of highlighting and picking out specific building features. Narrow-angle, well controlled luminaires are used to restrict the light to the feature selected for accentuation and to prevent light spilling into adjacent areas.

Outlining: This is the technique of just sketching in the outline of the building and some of its features using one of the new light line products, such as side-emitting fibre optics, LEDs or electro-luminescent strips. This is generally an inappropriate technique for historical buildings.

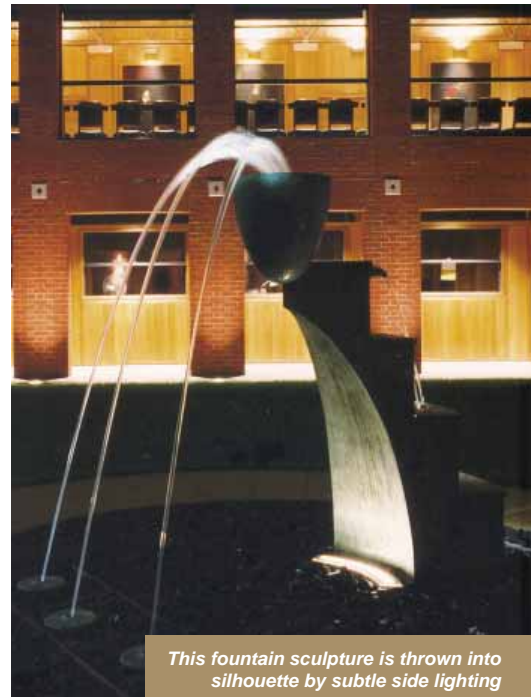


Uplighting these facades from 1st floor level creates an interesting lit effect along the street

Uplighting: As its name suggests, this is a technique of projecting light up the building from low level – for example from ground level or just above the ground floor windows – to highlight the upper features. It has the advantage of minimising the likelihood of glare and ‘light trespass’ to passers-by or neighbouring properties; on the other hand it must be done very precisely to avoid ‘light pollution’ to the sky above your property and/or light entering your own windows.

For this reason, fittings with narrow beams are preferable and the fittings should be equipped with louvres, cowls or other forms of shielding to cut off the beam very precisely. If lighting the building from ground level, direct burial light fittings recessed into the ground are one possible option.

Modelling: This is the technique of rendering a building so that its form and features appear fully three-dimensional, through the use of light **and** shade. It is generally achieved through illuminating the building at an angle, rather than full on at 90 degrees, and from more than one direction.



This fountain sculpture is thrown into silhouette by subtle side lighting

Lighting Design: Pinniger & Partners

Enhancement: The technique of subsuming the lighting to the architecture. Often the building may not actually appear lit because the lighting is an integral architectural feature. Examples include the use of interior light shining out through the windows as a prominent exterior feature; and the use of overtly decorative, historic light-fittings, possibly with additional concealed light sources to illuminate the building discretely.

Silhouetting: The technique of throwing all or part of a building into darker relief against an illuminated background – for example by lighting the columns on the front of a building from behind. It is generally most successful when viewed from one position. The proposed lighting treatment of Infirmary Arches (**Section 2.1.1**) relies on this effect.

Brightness and Contrast

These are key elements in exterior lighting. Current planning regulations can limit brightness in advertising signs but not in lighting of buildings. A careful consideration of this subject will reap enormous benefits. Too much light is

frequently projected onto a building destroying the appreciation of its architecture, while lower levels can be far more revealing and sympathetic. There are two concepts of brightness, **objective** and **subjective**. Objective brightness is the measurable brightness of the surface in candelas per square metre (cd/m²), taking into consideration the colour and reflectivity of the surface. Lighting designers can measure this precisely using a **luminance meter**. Darker surfaces will need much more light applied to them to make them appear bright than light-coloured surfaces. Cleaning or re-painting a building's surface will obviously have a considerable effect on the brightness of any lighting scheme – and may be cheaper or easier than replacing the lighting equipment.

Subjective brightness is the effect experienced by the observer. This depends, in part, on the objective (measured) brightness, but is modified by the size of the area emitting light, the brightness of the surrounding environment and the position of the viewer in relation to the object. The experience of subjective brightness is a key effect to establish in any lighting scheme.

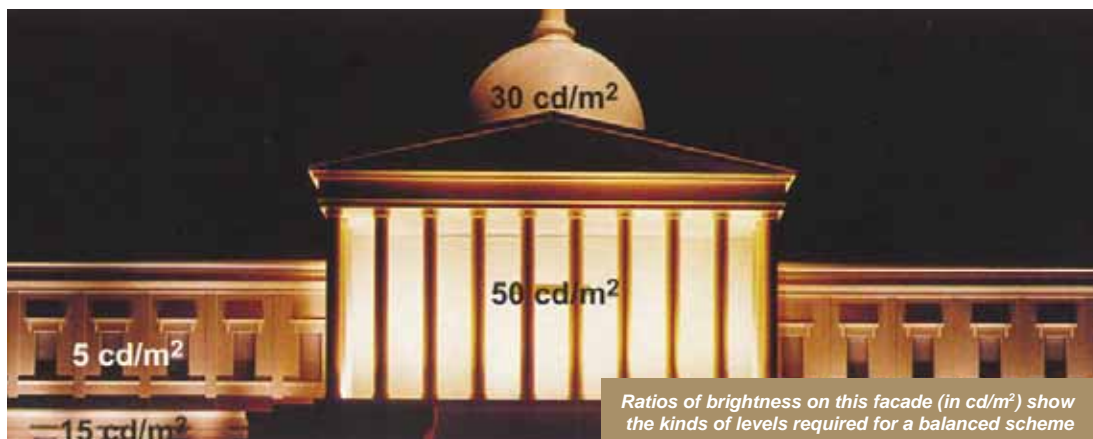
Lighting the Environment: a Guide to Good Urban Lighting, published in 1995 by the CIBSE (Chartered Institution of Building Services Engineers) and the ILE (Institution of Lighting Engineers) offers some useful current advice on objective brightness in architectural lighting:

'For Functional and Amenity lighting the standards set by BS5489 and CIBSE LG6 should be used. This will ensure the lighting level is appropriate to the task. However the levels used for Architectural or Promotional lighting are more subjective and will depend on the relative brightness of the surroundings or character of the area. Specific luminance levels have therefore been recommended which relate to a classification of environmental zones. The choice of design luminance can have a great influence on the economics of a lighting installation and, indeed, whether it can be realistically achieved. As general guidance, the values set out in the following table should be used. The values given in this table are expressed in terms of luminance and, using average and maximum designed luminances, will confirm that the quantity of light is commensurate with the area, ensuring the subject is not overlit. In addition, the ratio between the average and the maximum will determine the degree of contrast in the subject. This is referred to as the luminance contrast ratio'

Figures greatly exceeding these, 300-500 cd/m², will generally appear too bright. Adherence to these brightness criteria is important for the overall implementation of the Lighting Strategy. The prominence of buildings should be decided by the designer in relation to design criteria **not** by the building owner in relation to commercial criteria.

Luminance Levels for Architectural Lighting

Environmental Zone	Average Luminance (cd/m ²)	Maximum Luminance (cd/m ²)
E1 Countryside	0	0
E2 Urban Fringe	5	10
E3 Town	5–10	60
E4 City	10–25	150



The Effect of Luminance Contrast Ratio

Luminance contrast ratio is a measure of the highest and lowest brightness areas within the visual field. Low contrast schemes (i.e. where the lighting is fairly uniform) will be flat and rather uninteresting, while high contrast schemes will be dramatic and interesting, but can in certain circumstances create glare and extreme visual imbalances that the eye finds difficult to deal with.

1:1	Not Noticeable
1:3	Just Noticeable
1:5	Low Drama
1:10	High Drama

'In the case of a building facade lit to an average level of 10cd/m², the highlighting of a small portion to a luminance of 30cd/m² will only just be noticeable. Increase the luminance to 50cd/m² and the effect becomes more dramatic.'

It must be remembered that these ratios relate to the amount of light reflected from the surfaces. If the building facade is red brick with a reflectance of 0.3 and a feature is a white plaque with a reflectance of 0.9, and they are lit to the same illuminance, there will be an intrinsic brightness ratio of 1:3. The illuminance on the feature will have to be increased by only 67% to have a brightness ratio of 1:5 and not the fivefold increase that may have appeared necessary at first sight.'

In calculating the amount of light to project onto the building to achieve these brightness figures, the following points should be considered. Most importantly, the reflectance of the surface – the percentage of light falling on it that is reflected back as visible light – needs to be assessed. CIBSE suggests the following figures:

- **White brick or plaster 0.8**
- **Portland stone 0.6**
- **Middle stone or medium concrete 0.4**
- **Dark stone 0.3**
- **Granite or red brick 0.2**

The condition of the surface also needs to be assessed, whether it is clean or dirty, and the appropriate factors applied. A reasonable assessment of the utilisation factor, in order to assess the quantity of fittings needed. A rule of thumb of 0.3 is often used but can result in far too much light if not carefully considered.

A check on specific brightness must be made by point source calculation to ensure the ratio between brightness levels is not too great. Point calculation may reveal strong contrasts, often indicating the use of an inappropriate fitting. This will not preclude strong contrasts that are a deliberate part of the design intent, for example highlighting columns with darkness left between.



Light Pollution

These guidelines are not only intended to improve the design quality of lighting schemes but are also intended to reduce light pollution. The two subjects are directly linked. The majority of offensive light pollution results from bad design using inappropriate luminaires in the wrong locations. The results can be seen in the above photo.

An increased awareness will help people to realise that the preservation of the night sky and the reduction of obtrusive and trespassing light would promote better visibility, eliminate uncomfortable glare and save energy resources and money. Pursuing this is not incompatible with the promotion of a Lighting Strategy.

The Institution of Lighting Engineers, in collaboration with the British Astronomical Association, has drafted a set of guidance notes for the reduction of light pollution **[see Appendix E]**. In addition to the recommendations in the guidelines of this report, these guidance notes should always be consulted when designing schemes.

Glare

Poorly sighted 'floodlight' fittings frequently cause glare. Their light is relatively uncontrolled and their location frequently allows direct views of the lamps. This glare can destroy the desired effect by interfering with the view. There is no reason why this should happen. The use of louvres and shields can do much to cut out glare. Even more effective is the use of appropriate fittings angled in a sensible manner. The photo below shows the uncomfortable effects of glare from floodlights mounted at the top of a building.



The optical design of the fitting must be geared to the job it has to do. For example if the light needs to be projected from ground level up a church steeple, then a narrow-beam fitting is required rather than a wide-beam 'floodlight'. It is often better to use a greater number of well placed but lower wattage fittings rather than a single high wattage one. It should always be remembered that light which overspills a building goes somewhere – it can result in light trespass and inevitably wastes energy.

Lighting Equipment Types

An enormous variety of equipment of British and foreign manufacture is available, but optical performance and reliability can vary widely. Unfortunately designers often restrict their choice of equipment to a few types, particularly when the equipment of only one manufacturer is used.

The size and weight of equipment is very important in relation to the building on which it is mounted. In order to minimise its visual bulk, it should be as small as possible in relation to the desired light output.

The use of decorative equipment should be considered carefully. It is too easy to choose a common type of 'historical' fitting without assessing its historical accuracy against the period of the building and its surroundings. It is possible to conceal projector fittings within decorative fittings in order to create more mystery. It is also possible to conceal fittings behind building features, such as parapets.

Light Sources

The choice of light sources (technically referred to as 'lamps') is critical to the process of lighting design. The type of sources available is constantly changing with new ones continually being produced. There are six factors to be taken into consideration when choosing an appropriate source:

- 1. Efficacy:** the output of the lamp in relation to its energy usage, measured in lumens per watt (lm/W). This is often the main consideration in choosing sources, for economy reasons – often at the expense of the lit effect.
- 2. Lamp Life:** The average life of a lamp in a large installation. This has important implications for maintenance costs and the continued visible quality of the lighting scheme over time.
- 3. Colour Appearance:** This refers to the colour of the light beam itself and is very important in creating the overall effect.
- 4. Colour Rendering:** This refers to the ability of the light to render the colour of other materials accurately. Although less important in exterior lighting, poor colour rendering can have a deadening effect on an area.
- 5. Lamp Shape and Coating:** The shape of the lamp will dictate much of the luminaire design, while the existence of a phosphor coating can change the quality of the light.
- 6. Cost:** While cost should never be allowed to over-ride a lamp's technical features, the capital replacement and running cost of a lamp needs to be considered, in addition to the above factors.

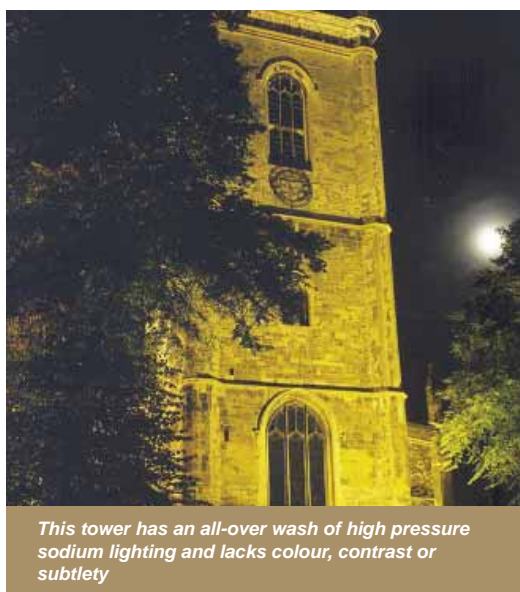
Here is a brief guide to the variety of light sources for exterior lighting:

Low Pressure Sodium (SOX)

- High Efficacy
- Long lamp life
- Monochromatic yellow colour
- Non-existent colour rendering
- Long, narrow, clear lamp
- Should only be used for street lighting where appearance does not matter

High Pressure Sodium (SON)

- Medium/high efficacy
- Long lamp life
- Orange-gold colour, with some slightly whiter
- Poor colour rendering
- Compact lamp with clear or phosphor coating
- Ubiquitous lamp used for street lighting and exterior lighting
- Tends to distort surface colour and remove subtle differences between contrasting stonework
- Useful if used with care



Metal Halide (MBI or HQI)

- Medium-high efficacy
- Good lamp life
- White colour, some lamps being cool and some warm
- Good colour rendering
- Compact lamp with clear or phosphor coating
- Less efficient than high pressure sodium but far superior in performance, particularly the new ceramic versions (CMH)
- There is a choice of 'warm' or 'cool' white and a large range of wattages. The result is well worth the extra cost

Mercury Discharge (MBF)

- Medium efficacy
- Good lamp life
- White colour, mostly cool but some warm versions
- Poor-medium colour rendering
- Compact lamp with phosphor coating
- Mercury lighting is used in street lighting, particularly on the continent and in America, where it signifies local area lighting.

Linear Fluorescent

- Medium-high efficacy
- Long lamp life (in some cases 18,000-50,000 hours)
- Full range of colours
- Full range of colour rendering.
- Long tubular lamp
- Linear fluorescents are useful for the illumination of horizontal and vertical architectural features, such as cornices, balustrades and window reveals etc

Compact Fluorescent

- Medium efficacy
- Medium lamp life
- Range of colours
- Moderate to good colour rendering
- Compact size
- Not much used in exterior architectural lighting. New, high wattage compact versions are increasingly favoured for lighting side streets and amenity areas

Tungsten Halogen

- Low efficacy
- Low lamp life
- White colour
- Excellent colour rendering
- Small tubular lamp, or compact low voltage lamp
- Cheap lamp which is expensive to run, due to its low efficacy. Its visual performance is excellent both in colour, colour rendering and its ability to work in precise optical systems – useful on a small, limited scale for architectural accent lighting



In contrast to the scheme on the previous page, this building is well modelled using white metal halide applied sensitively to the main details

Light Emitting Diodes (LEDs)

- Low-to-medium efficacy (but rapidly increasing)



One of the new generation of linear LED wall washers

- Extremely long lamp life
- Vast range of colours, including warm and cool white
- Easily dimmed and switched
- Moderately good colour rendering
- Small point light source, most often arranged in clusters
- The very latest lighting technology, LEDs are very rugged and although expensive are virtually 'fit-and-forget' due to their 50,000+ hour life-Linear versions, projecting very narrow beams, are very useful for uplighting walls and other surfaces

The Use of Colour

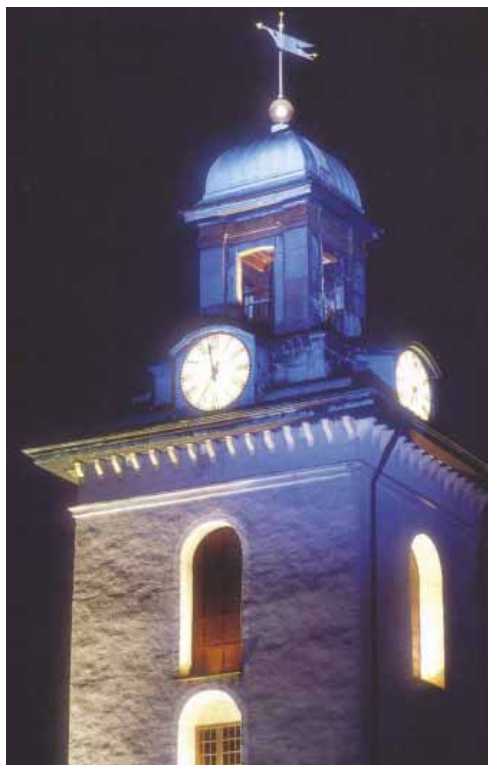
The use of coloured lighting has become increasingly popular in our towns and cities, as colour projecting lighting equipment has become ever cheaper and more available. Yet the successful use of intense colour is both difficult and controversial, as colour application are



Garish, incoherent pub colour scheme (above) and sensitive church tower lighting (below)

entirely arbitrary and often bear no relation to the original architecture – and can also distort natural materials and planting and landscapes. It is also very difficult to predict the visual brightness of a coloured lighting scheme, which can lead people to considerably increase the wattage of colour luminaires, in comparison with their 'white' counterparts. The result is energy wastage and an unbalanced visual scene.

The two pictures here illustrate the contrast between a garishly incoherent coloured lighting treatment on a public house and a more sensitive colour scheme for a church tower. In general, coloured lighting should be used very sparingly, if at all, on historic buildings (and in fact English Heritage may veto such use). Coloured light on modern buildings and retail and leisure facilities is more acceptable. As a general rule, intense colour should be used in very small areas for best effect – whereas pale, diffuse colour can be effectively used on wider areas.





This floodlight on Gloucester Guildhall is too large, and poorly located so it mars the daytime view

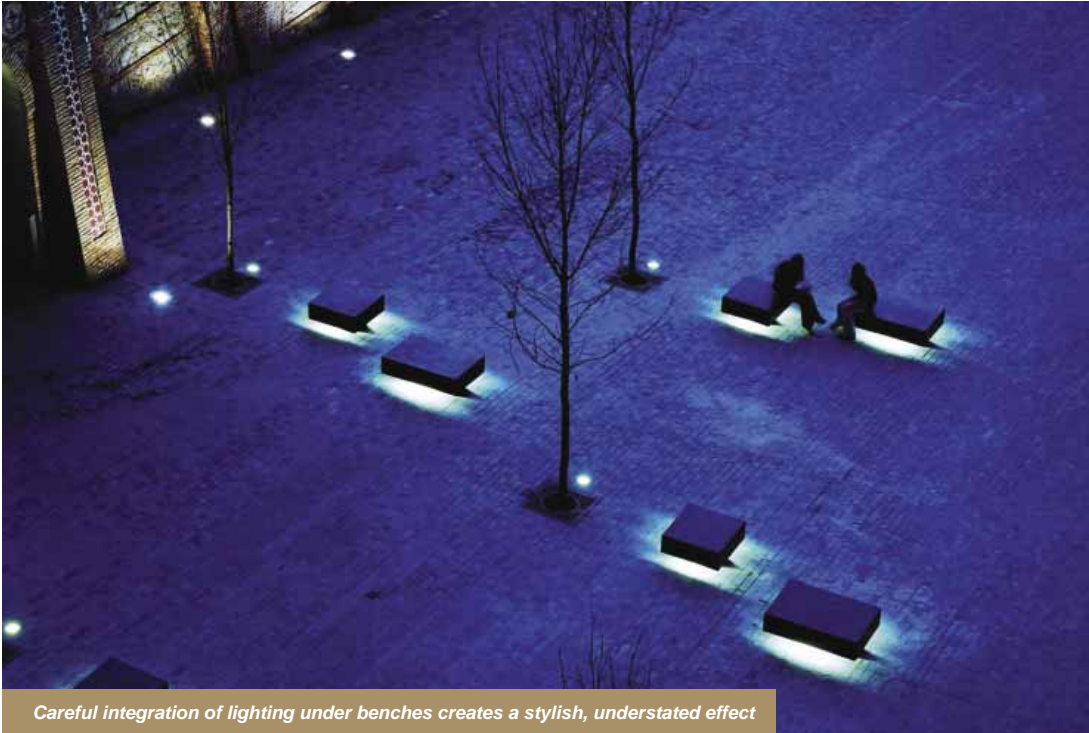
Equipment Location

The location of all lighting equipment needs to be carefully considered. Primarily the choice of location should be based on creating the most pleasing effect possible. However the daytime appearance of the fittings on the building must also be considered, so that the lighting units and associated wiring are as discreet as possible, if not completely hidden – this is particularly important in an historic city like Gloucester. In locating equipment the following points should be considered:

- The location must not be chosen just because there is a convenient place to put the fitting. Too often the lighting is compromised because there is a convenient canopy or shelf for mounting the fitting.
- The location must relate to the architecture, so the fitting is sympathetically positioned.
- The location must have its own validity. Too frequently equipment positioned to light a feature does not in fact do so, due to an inappropriate combination of



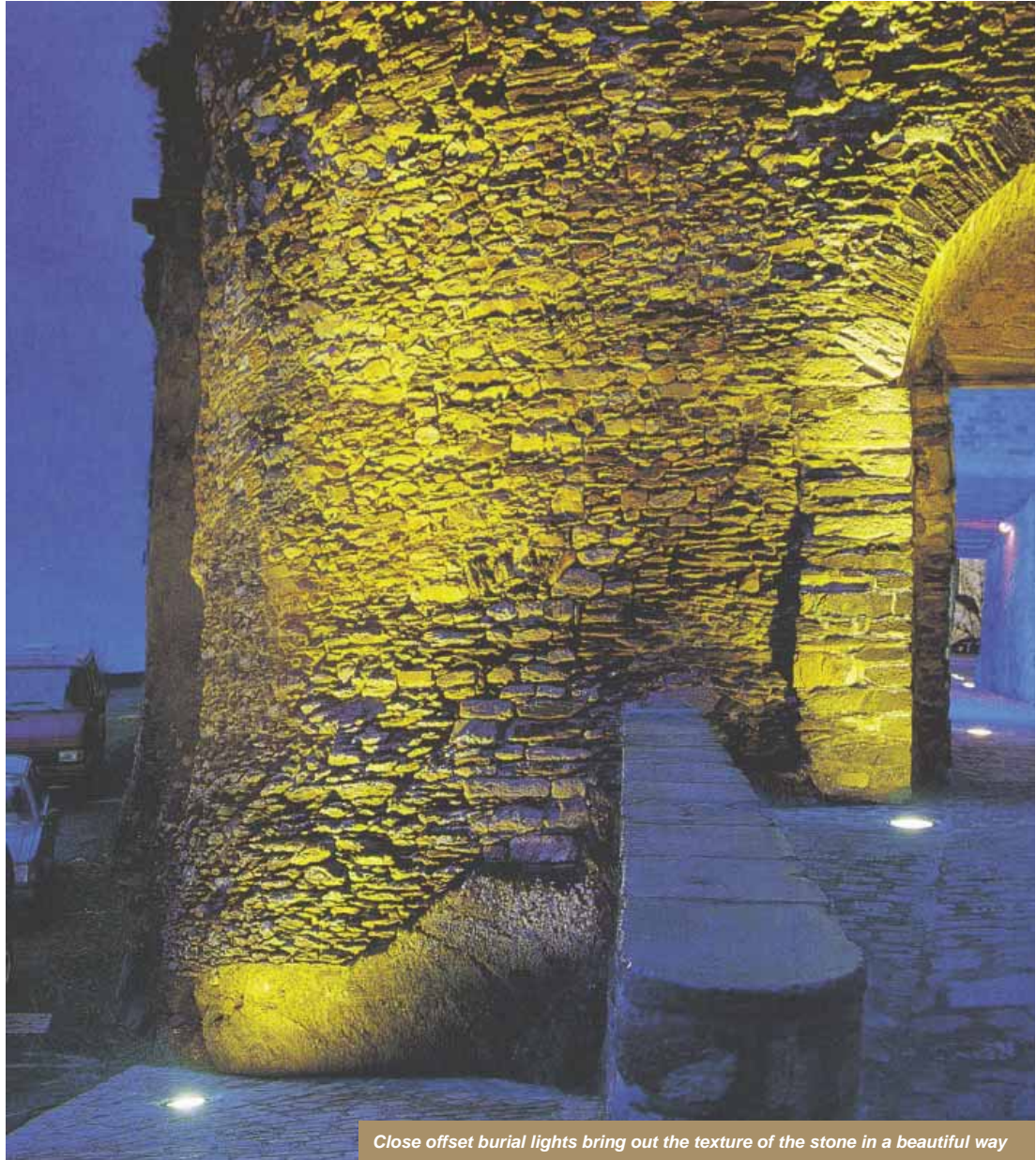
Left: White floodlights against a dark background are highly visible, right: a white spotlight against pale stone blends in



Careful integration of lighting under benches creates a stylish, understated effect

position and optical system. An example can be seen in the photo of Gloucester Guildhall. It is common to see columns being highlighted with wide-beam fittings that project most of their light through windows located between the columns – instead of with narrow-beam fittings located either side of columns.

- The location must be chosen with due regard to access, maintenance and cable routes.
- Light fittings should be painted the same colour as the building material, so that they are as camouflaged as possible.
- Fittings mounted at ground level should be set flush in the ground surface, hidden in planting or concealed in area wells.
- The location should be concealed as far as possible. The frequent use of large floodlight fittings often makes concealment impossible. It is worth seeking out smaller, more compact fittings to achieve concealment, particularly when using close offset fittings.
- The location should pay due regard to potential glare. Fittings should not be located high up and pointing down if they cause glare to the viewer or if they distort the view of the building
- The light fittings must be installed with due regard for the fabric of the building. For example, close offset lighting of stonework and brickwork can be very effective in bringing out the texture of the material, as can be seen in this photo. Mounting the light fittings further away would tend to flatten the effect.
- Corrosion is a serious problem in buildings, particularly with stonework, stucco, terracotta and brick – and careless installation can exacerbate the problem. Combinations of different metals can cause electrolytic action and poor mechanical installation can cause cracking or failure of the building fabric.
- As already discussed, the attachment of light fittings to buildings may be subject to Planning Approval. In the particular case of listed buildings, Listed Building Consent will need to be obtained from the Planning Authorities.



Close offset burial lights bring out the texture of the stone in a beautiful way

Economics

The design process is a balancing act between appearance and cost. The specification of fittings needs to be informed by the capital and running costs of the installation. It is however possible to use apparently expensive combinations of lamps and fittings while keeping within budget. These are a few methods which can be employed:

- The use of dimming when using tungsten halogen lamps will greatly extend lamp life, reducing maintenance costs and lowering running costs.
- The design of variable lighting schemes where different amounts of lighting are used at different times of the week, month or year. This can again reduce running costs on a potentially expensive scheme, without compromising design intent.
- The installation of inexpensive astronomical time-clocks to accurately

control the switching of schemes at the correct time throughout the year – usually on at dusk and off at 11.00pm or midnight.

- The reduction in surface brightness and the use of lower wattage fittings. Much modern floodlighting is too bright, wasting valuable energy with high efficacy lamps.
- The selective highlighting of a building or feature rather than the flooding of it.

Installation, Operation and Maintenance

The installation of a scheme should be carried out by a competent electrical contractor on a contract let by the building owner, with professional supervision by designers and/or engineers.

The building owner may be responsible for the cost of the electricity supply of the lighting installation, unless otherwise agreed. These costs can vary enormously

according to the type of tariff used.

Schemes are often on the ordinary 'general block' tariff instead of using 'maximum demand' or 'evening and weekend' tariffs, resulting in unnecessarily high costs. The choice of tariff is the owner's, but he must be encouraged to seek the help of the energy supply company in making his decision.

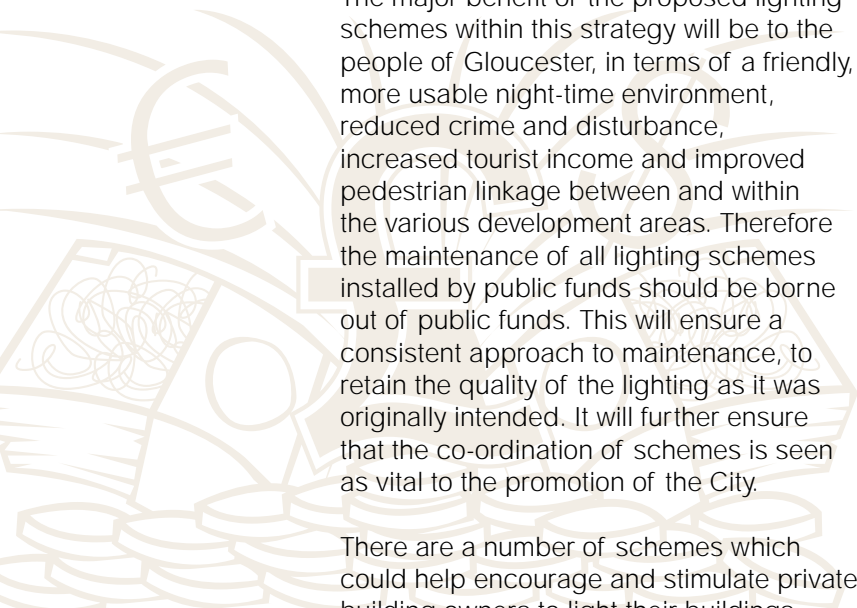
The maintenance of an installation is of vital importance to the strategy. Whether the maintenance is organised centrally or by the building owner, it is vital that it is correctly carried out. This maintenance must include cleaning and re-lamping on an agreed schedule, with regular inspections at an agreed time interval. Typically this might involve an annual clean, re-lamp every one to three years, depending on lamp type, and a three-monthly inspection to repair and re-angle fittings as necessary.



Lack of regular maintenance can lead to scenes like this, with sections of the architectural lighting in darkness

3.6 Sources of Funding

Revenue Funding



The major benefit of the proposed lighting schemes within this strategy will be to the people of Gloucester, in terms of a friendly, more usable night-time environment, reduced crime and disturbance, increased tourist income and improved pedestrian linkage between and within the various development areas. Therefore the maintenance of all lighting schemes installed by public funds should be borne out of public funds. This will ensure a consistent approach to maintenance, to retain the quality of the lighting as it was originally intended. It will further ensure that the co-ordination of schemes is seen as vital to the promotion of the City.

There are a number of schemes which could help encourage and stimulate private building owners to light their buildings within the broad framework of the Strategy:

1) Energy Subsidy

One system that might be considered is that adopted by the City of Lyon in France, where the City finances the energy costs of all lighting schemes for the first five years, whether they are publicly or privately funded – provided that schemes are implemented within the broad framework of the lighting plan. This ensures they retain control over the continued quality of all lighting installed.

2. Centrally Organised Maintenance

Maintenance is the bugbear in the continued existence of any lighting scheme in its originally designed state. No matter how good the lighting design is, if it is not maintained it will start to visually deteriorate within the space of a couple of years. It would ease the burden on private building owners and ensure that maintenance is correctly carried out. The Council could put out

to tender a contract for maintenance of all approved installations with the billing going to the individual building owners. This integrated maintenance scheme will provide the benefits of economy of scale, while keeping the financial responsibility with the owners. It may, in certain cases, be possible for the County Highways Department to carry out the maintenance on a contract basis.

This maintenance must include cleaning and re-lamping on an agreed schedule, with regular inspections at an agreed time interval. Typically this might involve an annual clean, re-lamping every one to three years (depending on lamp type) and a three-monthly inspection to repair and re-angle as necessary.

As part of this maintenance process, it might be appropriate to use new technology, such as remote monitoring (see **Section 3.1**) to ease the inspection process. The use of computerised monitoring systems would mean that the maintenance operation for the whole city centre would be controlled from a central office by a single operative.

In Gloucester it is likely that the individual building owners will be required to fund the operating costs for individual schemes, although this might be ideal case for a major sponsorship effort to support the strategy. The funding might be achieved either from the owner's resources or from sponsorship arranged by them, and would be promoted as a positive contribution from organisations and businesses in the City.

3. Commuted Sums

This is a variation of the above arrangement, which has worked very well in Birmingham and other places. It is suitable for situations where a developer has funding for lighting and has been encouraged by the Council to illuminate the building in question. If the project

is undertaken in line with the strategy guidelines, then the City offers to take on the maintenance and energy requirement. The annual cost is calculated and the developer makes an upfront payment of, say, 10 (or more) years and the scheme is then looked after by the council, for the life of the installation, including all energy costs. However, it is important that the connection point/isolation point is accessible if the council is to take on maintenance.

4. Bulk Buying of Equipment

In streets where the building stock is similar (Victorian or Georgian terraces for example) the bulk purchase of lighting equipment, with substantial trade reductions, could help to persuade building owners to take part in the re-lighting project.

Grant Aid

Even with the aid of the Strategy proposals, the City will be faced with ongoing choices about which specific schemes should be designed and installed. Where the owners cannot afford to carry out the full proposal, it might be worth considering a Grant Aid scheme, something which was applied successfully on a small scale in Scarborough in the late '90s. Although clear rules are necessary in the allocation of grants, a degree of flexibility will be necessary in order to realise central aspects of the strategy. The following funding levels might be considered:

- A 100% contribution from the City for lighting design fees and up to 100% contribution for equipment and installation for buildings that are publicly owned, owned by charitable or non-profit making organisations or for public use, such as churches, museums etc. This is effectively already happening in the case of St Nicholas Church, the Cathedral Tower, the Bishop Hooper statue and St Oswald's Priory.
- 100% contribution for lighting design fees and up to 35% contribution

for equipment and installation for commercial buildings and buildings that are privately owned and have no public use.

As the Strategy becomes publicly recognised, more building owners will come forward with ideas and schemes for lighting their buildings. This would be especially encouraged for buildings which follow the broad lines of the Strategy, with support and funding being applied in relation to their degree of Strategy compliance. No funding should be provided for those schemes which don't comply.

There will always be more potential schemes than money available to fund them. It is therefore helpful to establish a system of priorities which is flexible enough to continue for many years and to respond to changes in ideas and building development over that period. An assessment of priorities would be based on the following criteria, marked according to an agreed 'points' system:

- The location of the building according to the ideas defined in the Strategy
- The visibility of the building from major viewpoints
- The local visibility or prominence of the building
- The architectural importance of the building
- The historic or civic importance of the building
- The relationship of building lighting to other local lighting schemes

The receipt of Grant Aid, where relevant and available, should be conditional on the acceptance of certain conditions by the building owners. These conditions will be subject to a binding legal agreement between the funding body and the organisation receiving the grant. Normally these conditions will lapse after five years, but the length of time could be negotiable, bearing in mind the needs of the strategy and the finances of the owner.





Appendix A: Learning from Elsewhere

Caernarfon: the Son et Lumiere Comes to the UK

Following a site trial in 2005, Caernarfon began running a regular son et lumiere show, projected onto the castle walls, in 2006. The show depicts the history of Wales from the mists of time up to the arrival of Edward 1st. The town describes its motive as providing 'an event of international significance to help the regeneration of North West Wales... and bring an even greater sense of pride to Caernarfon and the surrounding area. Events such as this, notably in France, have always resulted in a much longer "season" and... it is anticipated that this region too will benefit from the extra bed nights, length of stay and visitor spend.'



'Light Visions', Frederikshavn, Denmark

For seven days in November 2006, the seaside town of Frederikshavn in North Denmark hosted 'Light Visions', an international symposium and light workshop arranged with cooperation of the international lighting design organisation, ELDA. Students of architectural lighting from around the world teamed with prominent lighting designers to create six intriguing architectural lighting environments around the city – UK lighting designers led two of the teams. Besides creating visually stimulating settings for the public's enjoyment, 'Light Visions' established Denmark as a centre of lighting and lighting design education. Birmingham carried out a similar exercise in February 2006 – ELDA is always looking for civic partners for these exciting events.



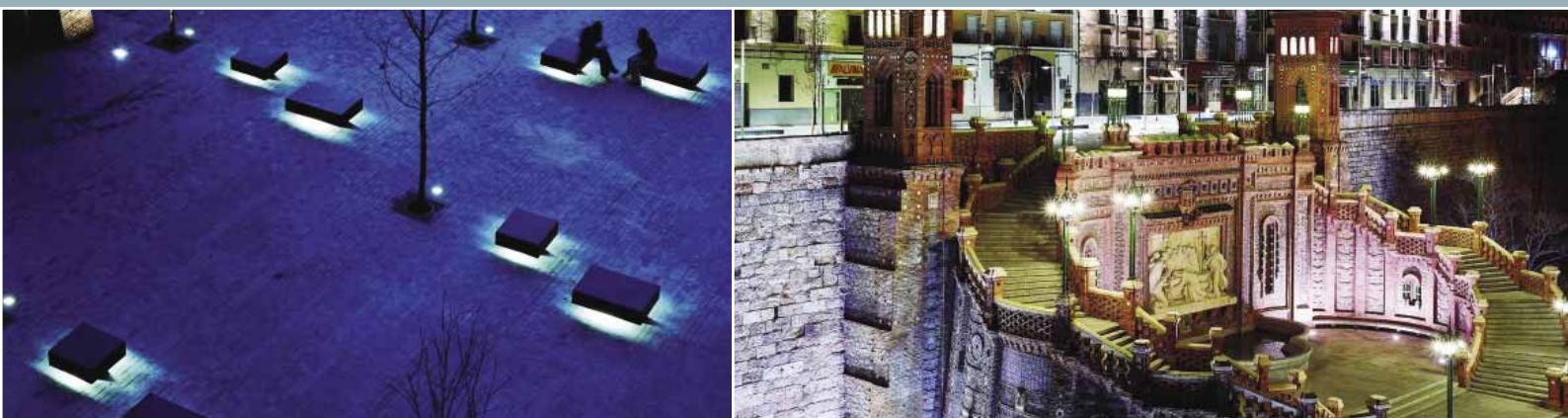
Lyon: Pioneering the Lighting Strategy

In many ways, Lyon in France has set the benchmark for the success of a lighting strategy in Europe. It commissioned its strategy back in the late 1990s and has since invested millions of Euros in ensuring the highest standards of lighting, both for buildings and pedestrians, all rigorously controlled by the city's local administration. In the last few years it has organised an increasingly popular lighting festival for 4-5 days in early December, for which it commissions temporary lighting installations, performances and art works from designers and artists all over Europe. Some of the results are seen here, in addition to some of the permanent architectural lighting projects in the city.



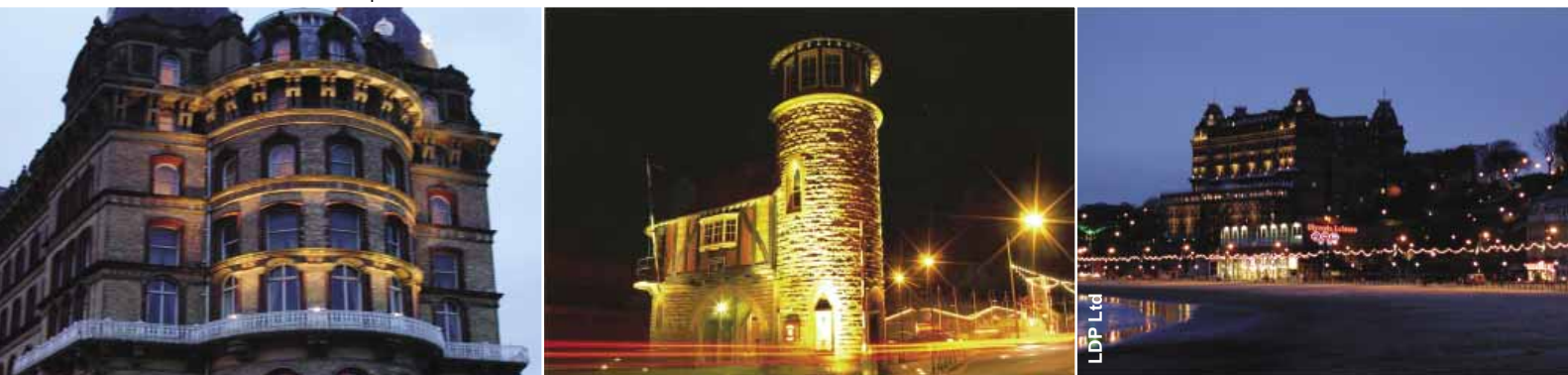
Ovalo in Spain

Ovalo is a relatively small town near Barcelona in northern Spain. Its town centre was recently re-designed by UK architect, David Chipperfield, with a new high-tech elevator to take residents and visitors from the upper part of the town to the square below. The architectural improvements were accompanied by an extensive re-lighting scheme for the area designed by a Spanish lighting design practice, including building lighting, light fittings integrated into benches and other features. The effect has been to totally re-animate the area at night, in addition to presenting the town's architectural assets in a new light.



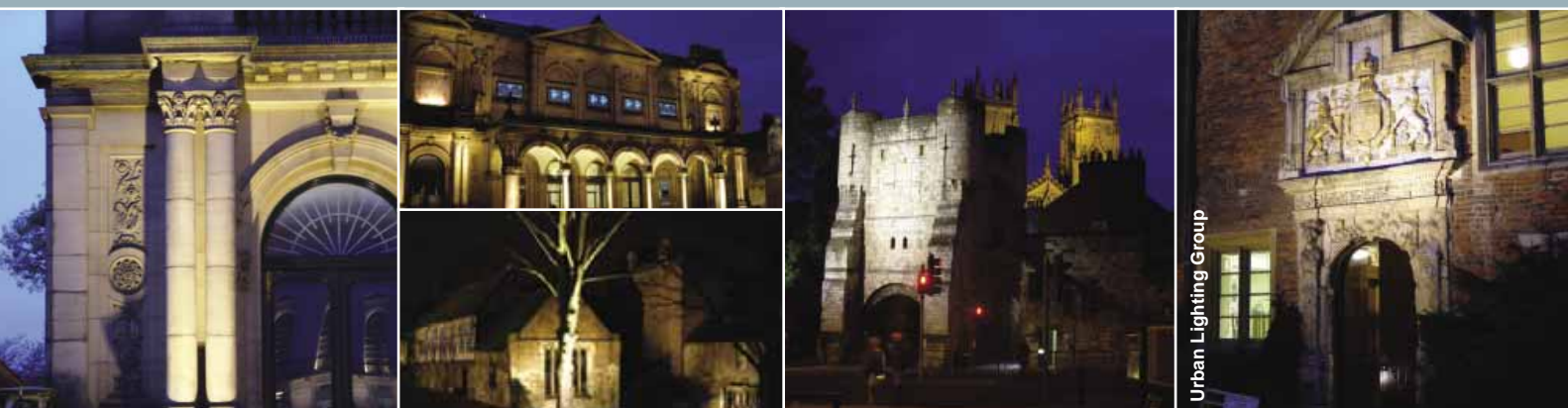
Scarborough – Small Can Be Beautiful

Scarborough in north Yorkshire demonstrates that even small towns can benefit from a well-conceived lighting strategy. Back in 1996-7, the town commissioned a lighting strategy from consultants, Lighting Design Partnership (LDP) to help the town retain middle-class visitors into the evening hours, particularly in the off-season months. The proposals included new lighting schemes for the Grand Hotel, the Toll House, the Spa Footbridge, the Castle and other prominent buildings – as well as improved pedestrian and traffic lighting, particularly along the Foreshore and round the Harbour. A substantial proportion of the architectural lighting works were completed. Carl Gardner, one of the consultants involved in the Strategy Report.



York – a New Vision for a Historic City

The historic City of York commissioned a lighting strategy for the City back in early 2004, in a bid to increase the number of affluent UK and overseas visitors and to help present its heritage assets after dark. A consortium of three consultancies, including CSG Lighting Consultancy Ltd, won the project. A central part of the Strategy proposals was the development of 'lighting walk' around the City, which acted as a 'spine' to rationalise the first phase of lighting investment from Yorkshire Forward, which amounted to about £450,000 in 2004-6. By the end of 2006, some 18 buildings or structures had been re-lit, including one of the bridges on the River Ouse, the nearby Guildhall, the Art Gallery, two of the city gates and a number of churches. At the same time, York implemented an annual lighting art festival in November, which has attracted a substantial number of winter visitors – the 'Heart of Yorkshire' installation on the Minster from November 2005, was probably the most successful of these works.



Appendix B: Summary of Major Public Lighting Standards

British Standard 5489-1: 2003
Code of Practice for the design of road lighting

Document Overview

The latest version of the British Standard for road lighting was issued in 2003 and incorporates the European code EN13210 which for the first time establishes a unified approach to road lighting across the EU. The fundamentals of the BS5489 1992 have been retained with additional guidance on which type and level of lighting should be used through out the document. These include:

- Type of road
- Traffic flow per day - vehicles per day
- Traffic flow per day – pedestrians and cyclists
- Presence of conflict areas
- Crime risk
- Ambient light levels

In addition the variations in lighting levels have been extended, generally including

additional lower levels of lighting for both the main traffic routes and the residential roads. The following tables indicate the guidance for each class additional lighting levels now included in the BS.

Guidance of Classes

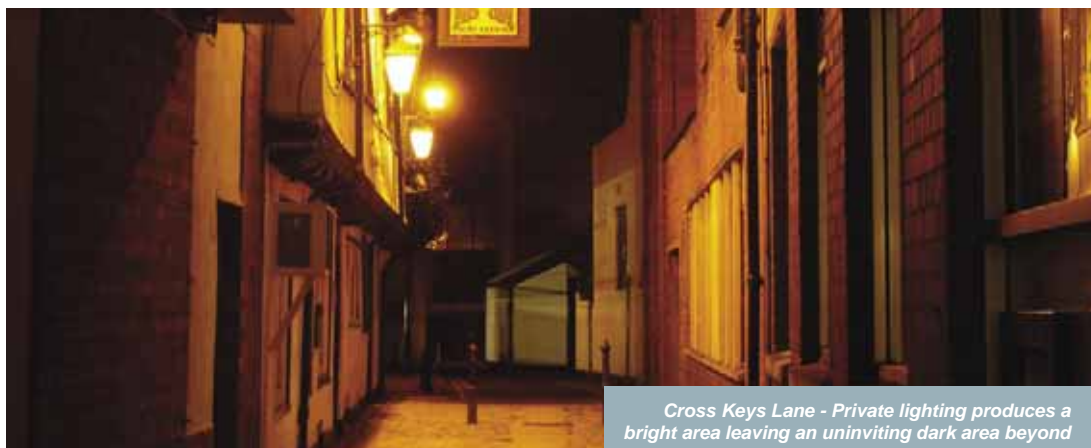
There are a number of factors that need to be taken into consideration in deciding the appropriate lighting levels for any given section of highway.

For traffic routes it is primarily the traffic flow and the environmental zone (which are detailed in the ILE technical leaflet in the appendices) and the list below gives a brief overview of the standards and guidance:

ME Class Lighting

For the subsidiary roads, including footpaths and cycleways there is further guidance taking into account again traffic and the environment but also local crime rates. This table also allows the designer to prescribe lower lighting levels when using a lamp with a rating of Ra60 or above – that is when using white light source. It is very common to see lighting designed around a medium crime rate with normal traffic in an urban setting (E3/E4). This is often due to lack of accurate information

Road Hierarchy	Road Description	Details	Traffic Flow (ADT)	Light Class
Strategic	Trunk / Principal 'A' roads	Speed limits >40mph, few junctions, ped crossings controlled	<15000	ME3a
			>15000	ME2
Main Distributor	Major Urban network	40mph or less, linking urban centres, limited parking, ped crossing under control	<15000	ME3a
			>15000	ME2
Secondary Distributor	B & C Roads, Local bus routes	30mph –high level of pedestrian use, parking allowed	<7000	ME3c
			<15000	ME3b
			>15000	ME2
Link Roads	Linking main & secondary roads, frequent junctions	residential/industrial access road with random pedestrian movement		ME4b S2 – S1



on traffic and crime, but also indicates many designer play safe when deciding which lighting level will be most appropriate

S Class lighting

Crime Rate	Ra value	Low	Traffic	Normal	Traffic	High	Traffic
		E1/E2	E3/E4	E1/E2	E3/E4	E1/E2	E3/E4
Low	Ra<60	S5	S4	S4	S3	S3	S2
	Ra>60	S6	S5	S5	S4	S4	S3
Medium	Ra<60	S4	S3	S3	S2		S1
	Ra>60	S5	S4	S4	S3		S2
High	Ra<60	S2	S2	S2	S1		S1
	Ra>60	S3	S3	S3	S2		S2

Conflict Area

The concept of Conflict areas have been introduced with prescribed lighting requirements for differing conditions.

Conflict areas are generally regarded as locations where vehicles cross, such as roundabouts and road junctions, or where pedestrians/ cyclists interface with vehicles, such as pedestrian crossings or mixed usage areas – pedestrianised zones that allow traffic under certain conditions.

Lighting Classes for City centres

Type of Traffic	Normal	Traffic	High	Traffic
	E1/E2	E3/E4	E1/E2	E3/E4
Pedestrian only	CE3	CE2	CE2	CE1
Mixed vehicle & pedestrian	CE2	CE1	CE1	CE1
Mixed vehicle & ped on same surface	CE2	CE1	CE1	CE1

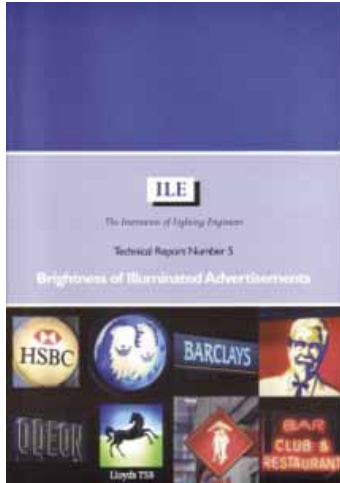


Gloucester Lighting:

Within Gloucester it is recommended that the following hierarchy should apply to the roads and streets of the City Centre. These guidelines can be fine tuned to suit particular locations which may have high or low traffic, pedestrian usage and elements of crime. Detailed design levels should be completed through the full BS5489 design process to derive actual light levels and full requirements

Location/ Road type	Light Class	Light Class Dimmed	Average lighting Level	Uniformity	Comments
Main Roads			L incd/m ²	UI	
Inner Ring Road	ME2	ME3a	1.5	70%	High lit Pedestrian crossing points
Distributor Roads/ Bus Routes	ME3b	ME3c	1.0	60%	Ensure good vertical illumination levels
Linking Roads	ME4b	S3	0.75	50%	

Subsidiary Roads			E in Lux	E _{min} in Lux	
Mixed Usage City (Typically gates)	CE3	S2	15	40% U _o	High degree of vertical illuminance and variation to produce interest in street
Sides roads principally Traffic	S3	S4	7.5	1.5	
Pedestrian Routes	S5	S6	3	0.6	Low levels but good uniformity required
Mixed Usage Docks & Quays	S4	S6	5	1	Principally ped routes with occasional traffic
Canal Footpath	S6	n/a	2	0.6	Low levels where uniformity is important



Appendix C: Regulations on the Lighting of Illuminated Signage

Local planning authorities in England are given powers to control advertising by the Town & Country Planning (Control of Advertisements) Regulations 1991 (Statutory Instrument 1992 No 666) as amended by the Town & Country Planning (Control of Advertisements) (Amendment) Regulations 1994 (SI2351) and Town and Country Planning (Control of Advertisements) (Amendment) Regulations 1999 (SI1810).

Regulation 6 and Schedule 3 of the Town & Country Planning (Control of Advertisements) Regulations, Schedule 3 (part 1) specify details of those advertisements which may be displayed under deemed consent – all others require the consent of the planning authority.

The *Institution of Lighting Engineers* has produced a detail technical report which recommends luminance levels for all

illuminated advertisements which provides guidance on the uniformity (or evenness) of the luminance of signs which should be followed in all cases.

The uniformity of luminance of advertisements shall be :

- Externally Illuminated signs
 - Ratio of 10:1 area in excess of 1.5m²
 - Ratio of 6:1 area in less than of 1.5m²
- Internally Illuminated Signs
 - Ratio of 1.5:1

The recommendations for maximum illuminance (cd/m²) are linked to the accepted environmental zones. For Gloucester City centre these will be zones E3 or E4. For the Docks and Quay areas Zone 2 may be applicable.

With viewing points across the City centre of key landmarks within Gloucester, care of siting and maximum brightness of any advertisements which would occur within the viewing angle, needs to be exercised when considering consent through planning permission.

Illuminated Area	Zone E1	Zone E2	Zone E3	Zone E4
Up to 10.00	100	600	800	1000
Over 10.00	n/a	300	600	600

Appendix D: Glossary of Major Lighting Terms

Accent Lighting

Often used as synonym for spotlighting; a technique of creating more intense areas of illumination on objects or surfaces.

Adaptation

The physiological process within the visual system, which allows it to adjust to varying brightness or colour intensity within the visual field. The term is also used, usually qualified, to denote the final state of this process. For example 'dark adaptation', which is very important at night, denotes the state of the visual system when it has become adapted to a very low luminance.

Ambient Lighting

Lighting that produces general illumination across an area.

Apparent Colour

Of a light source; subjectively the hue of the source or of a white surface illuminated by the source; the degree of warmth associated with the source colour. Lamps of low correlated colour temperatures are usually described as having a warm apparent colour, and lamps of high correlated colour temperature as having a cold apparent colour.

Backlighting

A technique of lighting an object so that it is located between the viewer and the source, with the result that it is seen in relief or in silhouette.

Baffle

Device, often adjustable, attached to the front of a luminaire to limit light spill – often used synonymously with louvre.

Ballast

The device that controls the current to run discharge lamps (fluorescent, high pressure sodium, metal halide).

Beam Angle

The measurement of the width of a light beam. The angle is defined in terms of the outer limits of the beam where the light intensity declines to 50% of maximum.

Brightness

The subjective response to luminance in the field of view dependent upon the adaptation of the eye.

Brightness Constancy

Sometimes referred to as 'lightness' or 'whiteness' constancy. The condition achieved under adequate illuminance, where the apparent lightness of objects remains relatively unchanged through fairly large changes of illuminance. For example, a dimly lit sheet of matt white paper may have a lower luminance than a brightly lit sheet of matt black paper but the former will still look white and the latter black.

Candela

The standard unit of luminous intensity, equal to one lumen per steradian.

Cold Cathode

The proper technical name for what is popularly known as neon.

Colour Appearance

The apparent colour of light emitted by a particular light source – often expressed in terms of 'cool' and 'warm'.

Colour Constancy

The condition resulting from the process of chromatic adaptation, whereby the colour of an object does not appear to change greatly under a wide range of lighting conditions, either in terms of colour quality or luminance.

Colour Rendering

A general expression for the appearance of surface colours when illuminated by light from a given source compared, consciously or unconsciously, with their appearance under light from some reference source. 'Good colour rendering' implies similarity of appearance to that under an acceptable light source, such as daylight.

Contrast

Subjective experience of the brightness between an object and its background – or two areas in the visual field. Too high a contrast difference can lead to glare.

Cut-off Luminaire

Usually a street light fitting in which the light emission is limited to angles below the horizontal, to prevent upwards light pollution.

Diffuse Lighting

Lighting which emanates evenly in all directions, with no predominant direction.

Direct Lighting

Lighting where most of the light from the luminaires reaches the surface directly, rather than being reflected from other surfaces.

Efficacy

The measured effectiveness of a lighting installation in converting electrical power to light, usually measured in lumens per watt (lm/W).

Glare

The discomfort or impairment of vision experienced when parts of the visual field are excessively bright in relation to the general surroundings.

Group Lamp Replacement

A maintenance procedure in which all lamps are replaced at one time, regardless of whether they have failed or not. The best technique for retaining the intended lit effect of the scheme. This method has visual, electrical and financial advantages over the alternative 'spot replacement', in which lamps are replaced as and when they fail.

High Intensity Discharge Lamp

Efficient, common type of light source for the exterior environment – includes sodium, mercury and metal halide lamps.

Illuminance

The amount of light (luminous flux) falling onto a surface, measured in lux (lumens per square metre).

Indirect Lighting

Lighting in which the greater part of the light reaches the surface only after reflection from other surfaces.

LED

The LED, or light emitting diode, is a sophisticated, solid-state light source, in which crystals of gallium phosphide (GaP) or gallium indium nitride (GaInN) produce substantial amounts of light energy, when stimulated by a low voltage electric field, due to a complex sub-atomic quantum effect. LEDs produce their light in a very narrow spectrum. In the last few years their rapidly increasing efficiency and long life have made them the most important new light source on the market.

LED Driver

The device that powers and controls an LED.

Lamp Life

Manufacturers' stated operational life, at which (usually) 50% of lamps are expected to fail under test conditions. Different manufacturers use different test conditions, so claims may vary for the same type and wattage of lamp.

Light Pollution

Term designating the wasteful and unwanted spillage of light upwards above the horizontal, which can contribute to 'sky glow'.

Light Trespass

Term designating a common source of nuisance, whereby unwanted light from a lighting installation spills (usually at angles below the horizontal) onto nearby properties or through nearby windows.

Louvre

A screening device of vertical or horizontal (or both) blades, usually of aluminium or plastic, which cuts off the light beam at certain angles and prevents unwanted light spill.

Lumen

The standard unit of luminous flux, used in describing a quantity of light emitted by a source or received by a surface.

Luminaire

Technical term for a light fitting – the apparatus that controls the distribution of light from the lamp source. It includes all the components necessary for fixing and protecting the lamps and for connecting them to the supply circuit.

Luminaire Maintenance Factor

The proportion of the initial light output from the luminaire that occurs after a set time, due to dirt deposition on and in the luminaire. Lamp luminous flux maintenance is not included.

Luminaire Output Ratio (LOR)

Measure of the efficiency of a light fitting – expressed as the percentage of useful light actually emitted by the luminaire, compared to the quantity of light produced by the lamp within the luminaire.

Luminance

The photometric, as opposed to perceived, brightness of a surface or light source. The physical measure of the stimulus which produces the sensation of perceived brightness, measured in candelas per square metre (cd/m²).

Luminous Flux

The amount of light emitted by a light source, or reflected off a surface, measured in lumens.

Luminous Efficacy (or efficiency)

Measure of the efficiency of any light source, measured in lumens per watt (lm/W) – the amount of light emitted for each watt of energy.

Lux

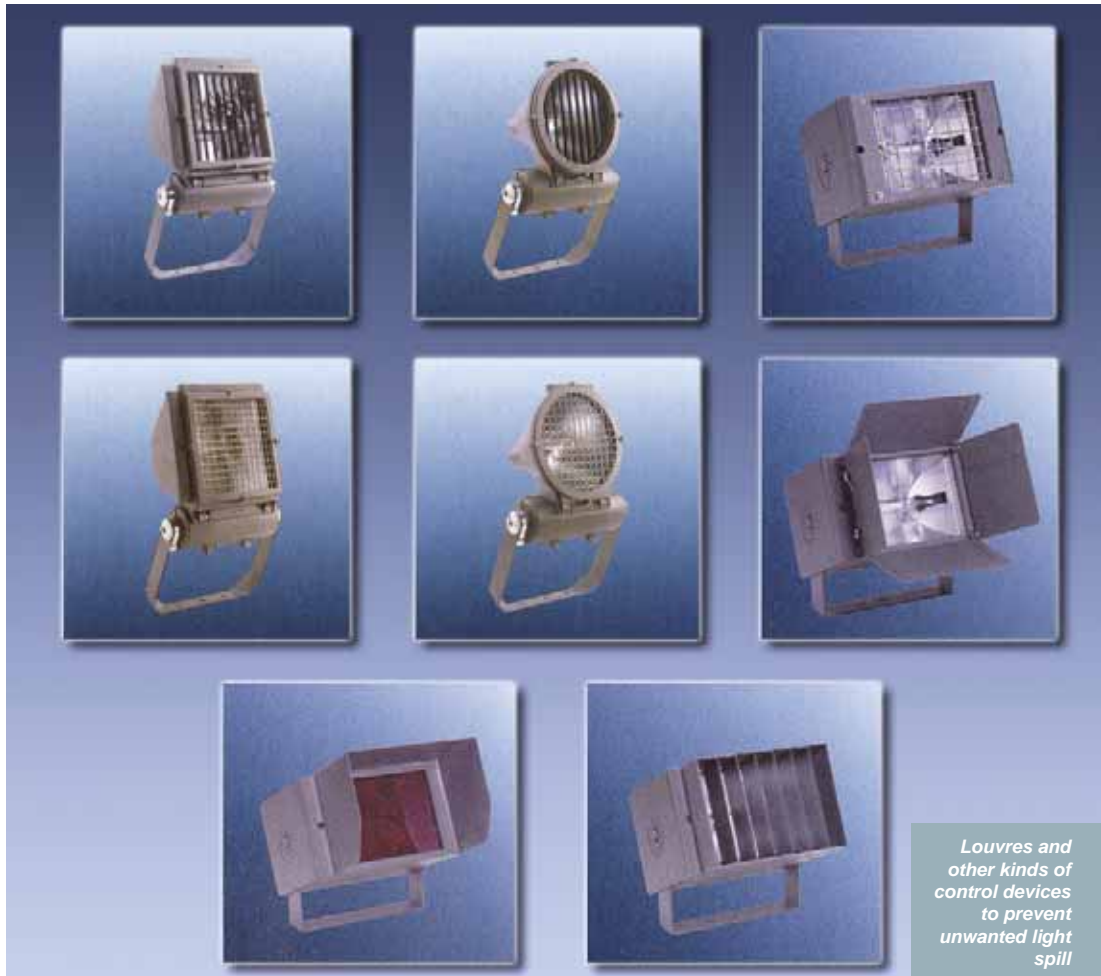
The standard unit of illuminance – equal to one lumen per square metre.

Maintained Illuminance

The average illuminance over the reference surface at the time maintenance is carried out by replacing lamps and/or cleaning the equipment and room surfaces.

Reflectance

A measure of how effectively a surface will reflect light back, expressed as the ratio of light (lumens) falling on it and the light reflected off it (e.g. a reflectance of 0.8 is high, while 0.2 is low).



Spot lamp change (burn to destruction)

A maintenance procedure where individual lamps are only replaced as and when they fail. This can be seen as a cheap alternative to planned maintenance, however there are a number of factors to take into consideration when considering this approach:

- Light output reduces from lamps as they age, and the actual levels may be far lower than designed when the lamp actually fails
- To allow for the above point the design would need to be amended and would result in additional lamps being required
- Maintenance costs for repeat visits to individual lamps

- Discharge lamps can have catastrophic failure when they reach the end of life and have been known to ignite
- Lack of uniformity, especially as system ages
- Consistent outages being reported during life of installation

Spill Light

Stray light from a luminaire which incidentally illuminates nearby objects or surfaces – in the public environment, this can be a major cause of 'light trespass'.

Uniformity

The ratio of the minimum illuminance to the maximum illuminance.

Appendix E: ILE Guidelines against Light Pollution



The Institution of Lighting Engineers

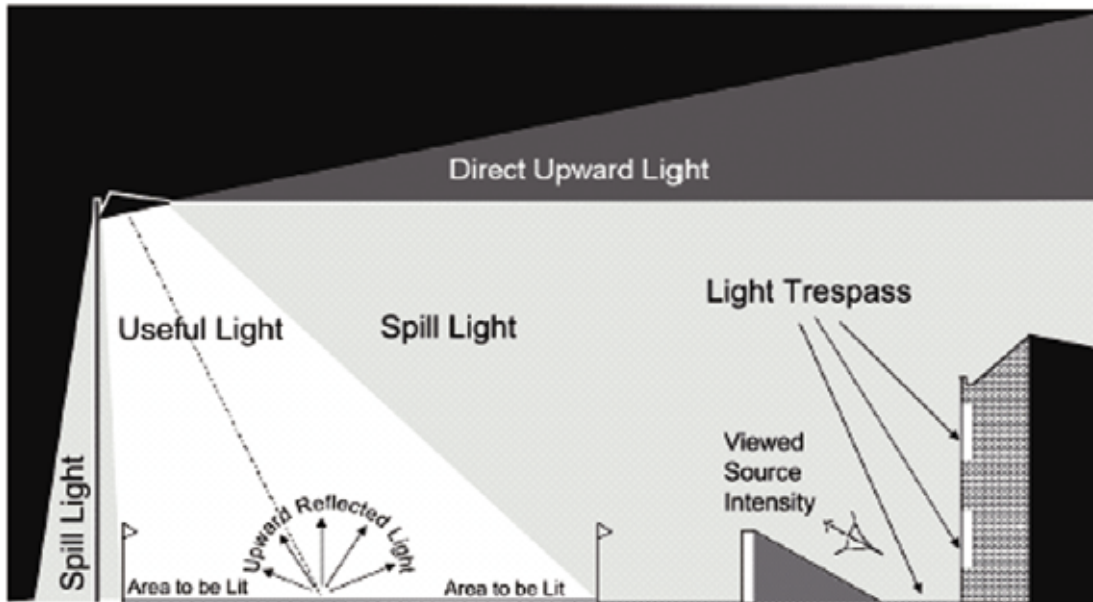
E-mail ile@ile.org.uk Website www.ile.org.uk

GUIDANCE NOTES FOR THE REDUCTION OF OBTRUSIVE LIGHT

ALL LIVING THINGS adjust their behaviour according to natural light. Man's invention of artificial light has done much to enhance our night-time environment but, if not properly controlled, obtrusive light (commonly referred to as light pollution) can present serious physiological and ecological problems.

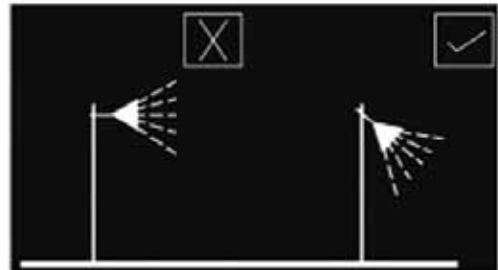
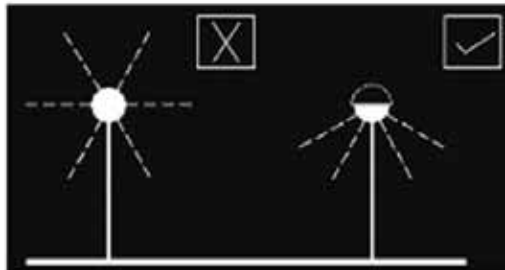
Obtrusive Light, whether it keeps you awake through a bedroom window or impedes your view of the night sky, is a form of pollution and can be substantially reduced without detriment to the lighting task.

Sky glow, the brightening of the night sky above our towns, cities and countryside, Glare the uncomfortable brightness of a light source when viewed against a dark background, and Light Trespass, the spilling of light beyond the boundary of the property or area being lit, are all forms of obtrusive light which may cause nuisance to others, waste money and electricity and result in the unnecessary emissions of greenhouse gases. Think before you light. Is it necessary? What effect will it have on others? Will it cause a nuisance? How can I minimise the problem?



Do not 'over' light. This is a major cause of obtrusive light and is a waste of energy. There are published standards for most lighting tasks, adherence to which will help minimise upward reflected light. Organisations from which full details of these standards can be obtained are given on the last page of this leaflet.

Dim or switch off lights when the task is finished. Generally a lower level of lighting will suffice to enhance the night time scene than that required for safety and security.



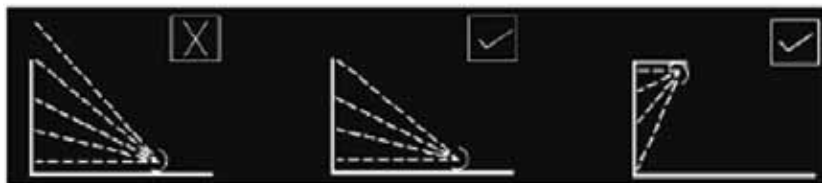
Use specifically designed lighting equipment that minimises the upward spread of light near to and above the horizontal. Care should be taken when selecting luminaires to ensure that appropriate units are chosen and that their location will reduce spill light and glare to a minimum. Remember that lamp light output in LUMENS is not the same as lamp wattage and that it is the former that is important in combating the problems of obtrusive light

Keep glare to a minimum by ensuring that the main beam angle of all lights directed towards any potential observer is not more than 70°. Higher mounting heights allow lower main beam angles, which can assist in reducing glare. In areas with low ambient lighting levels, glare can be very obtrusive and extra care should be taken when positioning and aiming lighting equipment. With regard to domestic security lighting the ILE produces an information leaflet GN02 that is freely available from its web site.



The UK Government will be providing an annex to PPS23 Planning and Pollution Control, specifically on obtrusive light. However many Local Planning Authorities (LPA's) have already produced, or are producing, policies that within the new planning system will become part of the local development framework. For new developments there is an opportunity for LPA's to impose planning conditions related to external lighting, including curfew hours.

For sports lighting installations (see also design standards listed on Page 4) the use of luminaires with double-asymmetric beams designed so that the front glazing is kept at or near parallel to the surface being lit should, if correctly aimed, ensure minimum obtrusive light. In most cases it will also be beneficial to use as high a mounting height as possible, giving due regard to the daytime appearance of the installation. The requirements to control glare for the safety of road users are given in Table 2.



When lighting vertical structures such as advertising signs direct light downwards, wherever possible. If there is no alternative to up-lighting, as with much decorative

lighting of buildings, then the use of shields, baffles and louvres will help reduce spill light around and over the structure to a minimum.

For road and amenity lighting installations, (see also design standards listed on Page 4) light near to and above the horizontal should normally be minimised to reduce glare and sky glow (Note ULRs in Table 1). In sensitive rural areas the use of full horizontal cut off luminaires installed at 0° uplift will, in addition to reducing sky glow, also help to minimise visual intrusion within the open landscape. However in many urban locations, luminaires fitted with a more decorative bowl and good optical control of light should be acceptable and may be more appropriate.

ENVIRONMENTAL ZONES:

It is recommended that Local Planning Authorities specify the following environmental zones for exterior lighting control within their Development Plans.

Category	Examples	
E1:	Intrinsically dark landscapes	National Parks, Areas of Outstanding Natural Beauty, etc
E2:	Low district brightness areas	Rural, small village, or relatively dark urban locations
E3:	Medium district brightness areas	Small town centres or urban locations
E4:	High district brightness areas	Town/city centres with high levels of night-time activity

Where an area to be lit lies on the boundary of two zones the obtrusive light limitation values used should be those applicable to the most rigorous zone.

DESIGN GUIDANCE

The following limitations may be supplemented or replaced by a LPA's own planning guidance for exterior lighting installations. As lighting design is not as simple as it may seem, you are advised to consult and/or work with a professional lighting designer before installing any exterior lighting.

Environmental Zone	Sky Glow ULR [Max %] ¹⁰	Light Trespass (into Windows) Ev [Lux] ¹¹		Source Intensity I [kcd] ¹²		Building Luminance Pre-curfew ¹³ Average, L _{area} ¹⁴
		Pre- curfew	Post- curfew	Pre- curfew	Post- curfew	
E1	0	2	1*	2.5	0	0
E2	2.5	5	1	7.5	0.5	5
E3	5.0	10	2	10	1.0	10
E4	15.0	25	5	25	2.5	25

ULR = Upward Light Ratio of the Installation is the maximum permitted percentage of luminaire flux for the total installation that goes directly into the sky.

Ev = Vertical Illuminance in Lux and is measured flat on the glazing at the centre of the window

I = Light Intensity in Cd

L = Luminance in Cd/m²

Curfew = The time after which stricter requirements (for the control of obtrusive light) will apply; often a condition of use of lighting applied by the local planning authority. If not otherwise stated – 23.00hrs is suggested.

* = From Public road lighting installations only

- (1) Upward Light Ratio – Some lighting schemes will require the deliberate and careful use of upward light – e.g. ground recessed luminaires, ground mounted floodlights, festive lighting – to which these limits cannot apply. However, care should always be taken to minimise any upward waste light by the proper application of suitably directional luminaires and light controlling attachments.
- (2) Light Trespass (into Windows) – These values are suggested maxima and need to take account of existing light trespass at the point of measurement. In the case of road lighting on public highways where building facades are adjacent to the lit highway, these levels may not be obtainable. In such cases where a specific complaint has been received, the Highway Authority should endeavour to reduce the light trespass into the window down to the after curfew value by fitting a shield, replacing the luminaire, or by varying the lighting level.
- (3) Source Intensity – This applies to each source in the potentially obtrusive direction, outside of the area being lit. The figures given are for general guidance only and for some sports lighting applications with limited mounting heights, may be difficult to achieve.
- (4) Building Luminance – This should be limited to avoid over lighting, and related to the general district brightness. In this reference building luminance is applicable to buildings directly illuminated as a night-time feature as against the illumination of a building caused by spill light from adjacent luminaires or luminaires fixed to the building but used to light an adjacent area.

Table 2 – Maximum Values of Threshold Increment from Non-Road Lighting Installations

Light Technical Parameter	Road Classification ⁴⁰			
	No road lighting	ME5	ME4/ ME3	ME2 / ME1
	TI	15% based on adaptation luminance of 0.1cd/m ²	15% based on adaptation luminance of 1cd/m ²	15% based on adaptation luminance of 2 cd/m ²

TI = Threshold Increment is a measure of the loss of visibility caused by the disability glare from the obtrusive light installation

(5) Road Classifications as given in BS EN 13201 - 2: 2003 Road lighting Performance requirements
Limits apply where users of transport systems are subject to a reduction in the ability to see essential information. Values given are for relevant positions and for viewing directions in path of travel. See CIE Publication 150:2003, Section 5.4 for methods of determination. For a more detailed description and methods for calculating and measuring the above parameters see CIE Publication 150:2003.

RELEVANT PUBLICATIONS AND STANDARDS:

British Standards: www.bsi.org.uk	BS 5489-1: 2003 Code of practice for the design of road lighting – Part 1: Lighting of roads and public amenity areas BS EN 13201-2:2003 Road lighting – Part 2: Performance requirements BS EN 13201-3:2003 Road lighting – Part 3: Calculation of performance BS EN 13201-4:2003 Road lighting – Part 4: Methods of measuring lighting performance. BS EN 12193: 2003 Light and lighting – Sports lighting
Countryside Commission/DOE www.odpm.gov.uk	Lighting in the Countryside: Towards good practice (1997) (Out of Print)
CIBSE/SLL Publications: www.cibse.org	CoL Code for Lighting (2002) LG1 The Industrial Environment (1989) L04 Sports (1990+Addendum 2000) L06 The Exterior Environment (1992) FF7 Environmental Considerations for Exterior Lighting (2003)
CIE Publications: www.cie.co.at	01 Guide lines for minimizing Urban Sky Glow near Astronomical Observatories (1980) 83 Guide for the lighting of sports events for colour television and film systems (1989) 92 Guide for floodlighting (1992) 115 Recommendations for the lighting of roads for motor and pedestrian traffic (1995) 126 Guidelines for minimizing Sky glow (1997) 129 Guide for lighting exterior work areas (1996) 136 Guide to the lighting of urban areas (2000) 150 Guide on the limitations of the effect of obtrusive light from outdoor lighting installations (2003) 154 The Maintenance of outdoor lighting systems (2003)
Department of Transport www.dft.gov.uk	Road Lighting and the Environment (1993) (Out of Print)
ILE Publications: www.ile.org	TR 5 Brightness of Illuminated Advertisements (2001) TR24 A Practical Guide to the Development of a Public Lighting Policy for Local Authorities (1999) GN02 Domestic Security Lighting. Friend or Foe
ILE/CIBSE Joint Publications ILE/CSS Joint Publications	Lighting the Environment – A guide to good urban lighting (1995) Seasonal Decorations – Code of Practice (2006)
Campaign for Dark Skies (CDS) www.dark-skies.org	

NB: These notes are intended as guidance only and the application of the values given in Tables 1 & 2 should be given due consideration along with all other factors in the lighting design. Lighting is a complex subject with both objective and subjective criteria to be considered. The notes are therefore no substitute for professionally assessed and designed lighting, where the various and maybe conflicting visual requirements need to be balanced.

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Appendix F: Contact Addresses and Useful Publications

1. Addresses

International Association of Lighting Designers (IALD): UK contact – Emma Cogswell on 01628 631104 or emma@iald.org

Professional Lighting Designers Association (PLDA) – UK contact, Sharon Stammers, 0207 639 5103 or sharon@sharonstammers.wanadoo.co.uk

Institution of Lighting Engineers (ILE), Lennox House, 9 Lawford Road, Rugby, CV21 2DZ. Tel 01788 576492 or info@ile.org.uk

Society of Light & Lighting, c/o CIBSE, Delta House, 222 Balham High Road, London SW12 9BS Tel: 0208 675 5211

English Heritage, PO Box 569, Swindon SN2 2YP. Tel: 0870 333 1181

Royal Town Planning Institute (RTPI), 41 Botolph Lane, London EC3R 8DL. Tel: 020 7929 9494

The Landscape Institute, 33 Great Portland Street, London, W1W 8QG Tel: 020 7299 4500

Lighting Industry Federation, Ground Floor, Westminster Tower, 3 Albert Embankment, London SE1 7SL. Tel: 0207 793 3020

Lighting Association, Stafford Park 7, Telford, Shropshire, TF3 3BQ, UK. Tel: 01952 290905

Electrical Contractors Association (ECA) – ESCA House, 34 Palace Road, London W2 4HY Tel: 02072217344

2. Publications

Appraising the Use of Remote Monitoring (Institution of Lighting Engineers, 2006)

A Guide for Crime and Disorder Reduction... through a Public Lighting Strategy (ILE, 2006)

Brightness of Illuminated Advertisements (ILE, 2001)

Practical Guide to Development of a Public Lighting Policy (ILE, 2005)

Code of Practice for Variable Lighting Levels for Highways (ILE, 2006)

The Lighting of Cycle Tracks (ILE, 1998)

The Outdoor Lighting Guide (ILE, 2005)

SLL Lighting Guide No 6: The Outdoor Environment (CIBSE Society of Light & Lighting)

A-Z of Lighting Terms – Brian Fitt (Heinemann, 1999)

The Design of Lighting – P. Treganza and D. Loe (E&FN SON, 1998)

Lighting the Environment: a Guide to Good Urban Lighting (CIBSE/ILE, 1995)

Lighten our Darkness: Lighting our Cities – Successes, Failures and Opportunities (Royal Fine Art Commission, 1994)

Lighting Historic Buildings – Derek Phillips (Architectural Press, 1997)

Lighting Modern Buildings – Derek Phillips (Architectural Press, 2000)

The Lit Environment – Derek Phillips (Architectural Press, 2002)

External Lighting of Historic Buildings – (English Heritage, 2007)

