External Lighting Statement

Castle Square, Swansea

April 2022

atelier ten

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Executive summary

Atelier Ten have produced this lighting statement to support the planning application for the redevelopment of Castle Square, Swansea.

The statement outlines the external lighting strategy that is proposed for the redevelopment and the measures that will be taken to ensure the lighting is sensitive to its setting, the local ecology and is compliant with the necessary guidance documents.

1 External Lighting Strategy

1.1 Lighting Strategy

The lighting scheme for the re-development aims to provide lighting for safety and security as well as playful elements to enrich the new areas of public realm after dark.

The lighting strategy relies upon a family of multi-purpose lighting columns to provide both functional and decorative lighting elements. These columns use multiple spotlight heads to provide an adjustable and flexible scheme.

The external lighting design has been carefully considered to prevent over-lighting and to minimise obtrusive and spill light, with the strategy being to focus lighting where it is required.

All external lighting is designed to meet the requirements of the ILP guidance notes on the reduction of obtrusive light.

Lighting equipment has been selected with a downward only distribution to ensure that light pollution is kept to a minimum.

At this stage It is proposed that lighting will utilise a warm colour temperature (3000K) which has been found to reduce disturbance to ecology.

The scheme covers the full extent of Castle Square to the west of Castle Bailey Street. No works to the existing Swansea castle lighting scheme are proposed within the scope of this project.

1.1.1 Design Standards

The lighting has been designed to meet the following standards:

- Institution of Lighting Professionals (ILP) Guidance Notes for the Reduction of Obtrusive Light 2021
- BS EN 12464-2:2014 Light and Lighting. Lighting of Workplaces.
- CIBSE Lighting Guide LG 6: The Outdoor Environment
- BS 5489-1:2020 Lighting of roads and public amenity areas. Code of practice
- ILP Guidance note 08/18 Bats and artificial lighting
- BREEAM requirements in particular the following credits:
  - Hea 01 – Lighting zoning and control
  - Ene 03 – External lighting
  - Pol 04 – Reduction of night-time pollution

1.1.2 Obtrusive Light

Lighting has been designed to the recommendations of the ILP guidance on reduction of obtrusive light (2021).

The site is set in a busy urban area with high levels of night -time activity. For the purposes of ILP guidance it is proposed that the lighting design will adhere to the requirements of category E4 (“Urban”).

The design criteria for an E4 zone stated within the ILP guidance note are:

Max upward light ratio: 15%

Light trespass (into windows) pre curfew: 25 lux

Light trespass (into windows) post curfew: 5 lux

The lighting curfew time is to be agreed, however at this stage it is assumed to be 00:00.

All luminaires will have a downwards distribution .

External lighting will be connected to a lighting control system allowing control via photocell and time clock. This will ensure the lighting is switched on at dusk and the non-essential lighting automatically switched off at a pre-determined curfew time.

Lighting for security and safety will remain on overnight and be automatically switched off by the control system at dawn.

All lighting will be dimmable to allow each lighting element to be adjusted during commissioning to minimise lighting levels and ensure the scheme is sensitively balanced to its environment.

1.1.3 Ecology & Bats

The lighting scheme has been designed to be as sensitive to local ecology as possible whilst balancing the requirements for safety and enjoyment of visitors to the Square in the evening.

One of the key measures will be to target and focus lighting where it is required on pathways and hard landscaping rather than the soft landscaping.

The only landscape lighting used will be to illuminate selected trees around the centre of the square.

From the Preliminary Ecological Appraisal all the trees on the site are categorised as providing negligible potential to support roosting bats.

As these trees are not a key habitat for bats the Bat Conservation Trust’s guidance on artificial lighting does not prohibit lighting to the trees. Furthermore the site has extensive existing lighting both from column mounted lanterns and festoon lighting within the trees.

The proposed lighting scheme has been designed to take appropriate measures in accordance with the guidance to be more sensitive to bat activity than the existing lighting.

Proposed measures include:

- Generally avoiding illumination of the soft landscaping
- Reduced quantity of lighting columns from existing scheme
- Controlled spotlight optics for new lighting to minimise spill and ensure downward light distribution
- LED lighting throughout with no UV and wavelengths over 550nm to reduce blue content.
- Warm white colour temperature for functional lighting to minimise disturbance to bats
- Dimmable lighting to allow careful setting of light levels during commissioning
- Lighting controls provided to allow automatic switch off of decorative lighting (including lighting to trees) at curfew time
- Dimming of lighting in the early hours when human activity is reduced

1.1.4 Lighting controls

It is proposed that a lighting control system will provide full control of the lighting columns including white and colour tunable lighting as well as control of the gobo projection within the Square.

The control system will be based around a DMX control system such as a Pharos system or similar.

The system will include a simple touchscreen interface which will be installed within the landlords area. This will provide control of lighting levels and scene selection.

The Control system shall be provided with an astronomical clock so that time and date based lighting scenes can be actioned. Lighting will be automatically switched on at dusk, and then dimmed at a pre-determined curfew time during the night to minimise any disturbance to ecology. All lighting shall be automatically switched off at dawn.

For the columns around the perimeter of the site, it is proposed that they will incorporate wirelessly control using a remote CMS system to match the existing system used by Swansea City Council.

The system shall provide the facility for dimming of the column mounted spotlights during the overnight period to minimise energy usage whilst footfall is low.

1.2 Lighting Layout

1.2.1 Lighting columns

Lighting to the Square and surrounding footpaths will be provided from column mounted spotlights. Columns will generally be 11m high with up to 8 spotlight heads mounted in a spiral formation. On Temple Street lower 6m columns of the same luminaire family will be used. Column positions have been co-ordinated with ACME to minimise their visibility whilst maintaining views across the Square to the castle.

The spotlight heads will be fully adjustable and equipped with medium beam optics and anti-glare louvres. The heads will be aimed on site to provide illumination of the footpaths and central Square.

The spotlights will be individually dimmable so that the lighting levels can be adjusted during commissioning to balance with the surroundings.

It is proposed the spotlights will use a warm white (3000k) light to provide a welcoming aesthetic as well as minimising disturbance to wildlife particularly bats which are known to be less sensitive to warmer colour temperatures.

Refer to the luminaire schedule in section 1.3 for details of the proposed column and spotlight types.

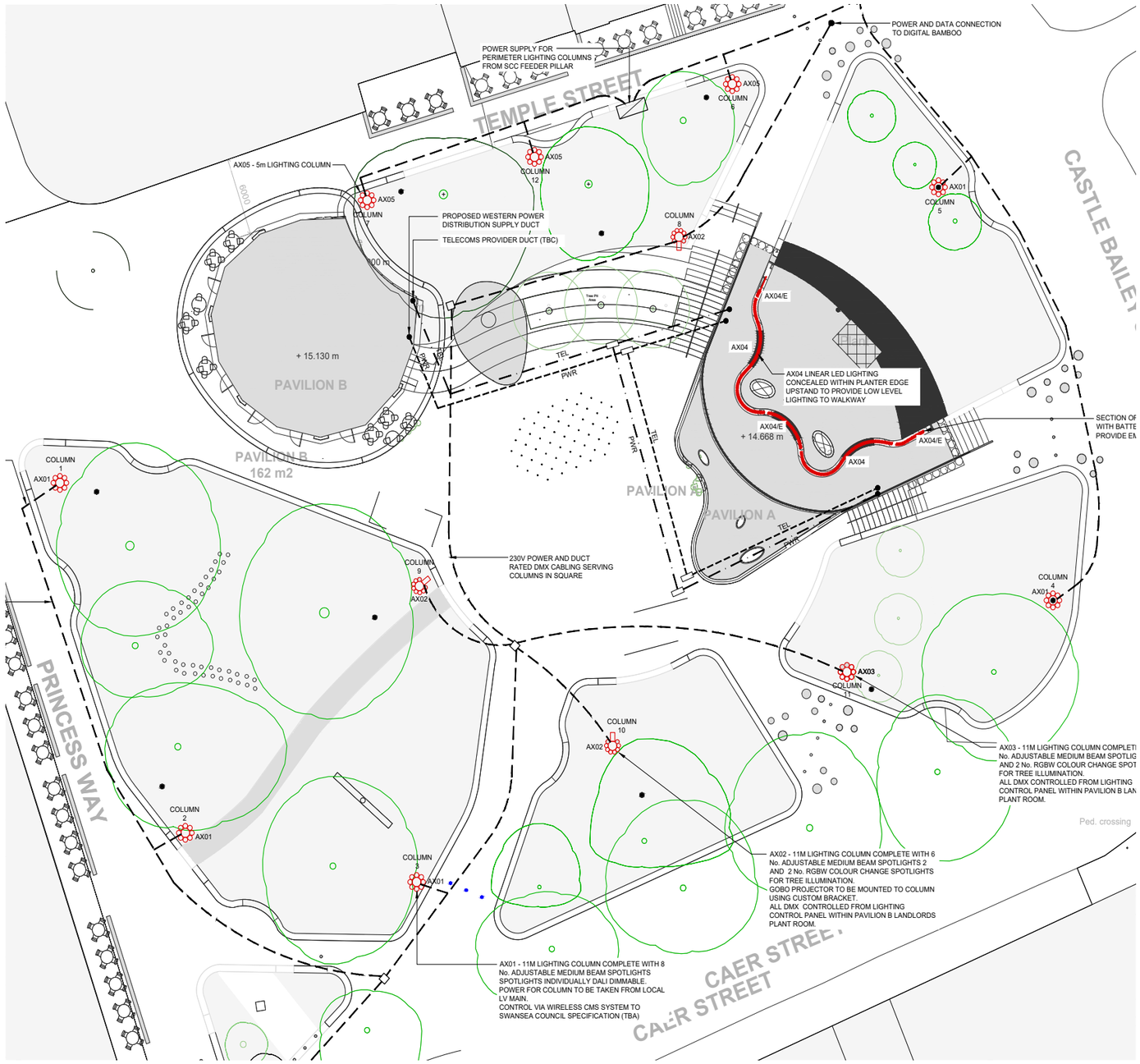


Figure 1.1 Lighting layout plan

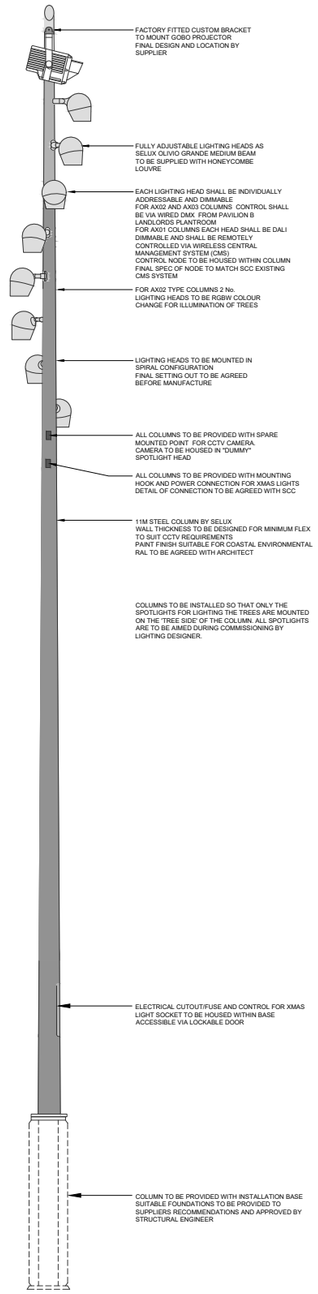


Figure 1.2 Typical column detail

1.2.2 Projection

In addition to the functional lighting, the columns will also be used to provide some playful and decorative lit elements to activate the Square after dark as well as providing a facility for lighting special events.

A set of colour tune-able spotlights will be mounted on the columns within the Square. These spotlight heads will use the same housing as the normal lighting heads but will be equipped with RGBW capability to provide a full range of coloured light. These heads will provide white or coloured light which can be used to illuminate the main trees facing into the Square.

To minimise disturbance to ecology, decorative lighting will be switched off at a curfew time, leaving the tree canopies dark overnight. This curfew time shall be agreed with the Planners and shall be set within the lighting control system to ensure all decorative lighting is automatically switched off.

In addition to the colour tunable spotlights, three purpose made gobo/image projectors are also proposed. These will be mounted onto the columns facing the centre of the Square. The projectors will be capable of producing coloured and patterned light onto the paved central area.

Projected imagery gives the opportunity for interaction and play as well as the potential to reinforce the link between the paving pattern and the heritage of the Square.

Figure 1.3 Images of proposed RGBW spotlight and gobo projector

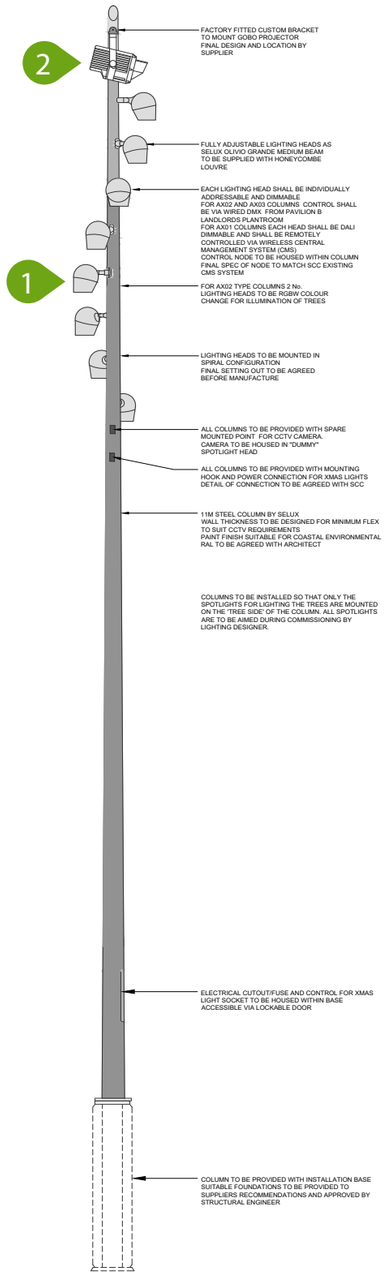
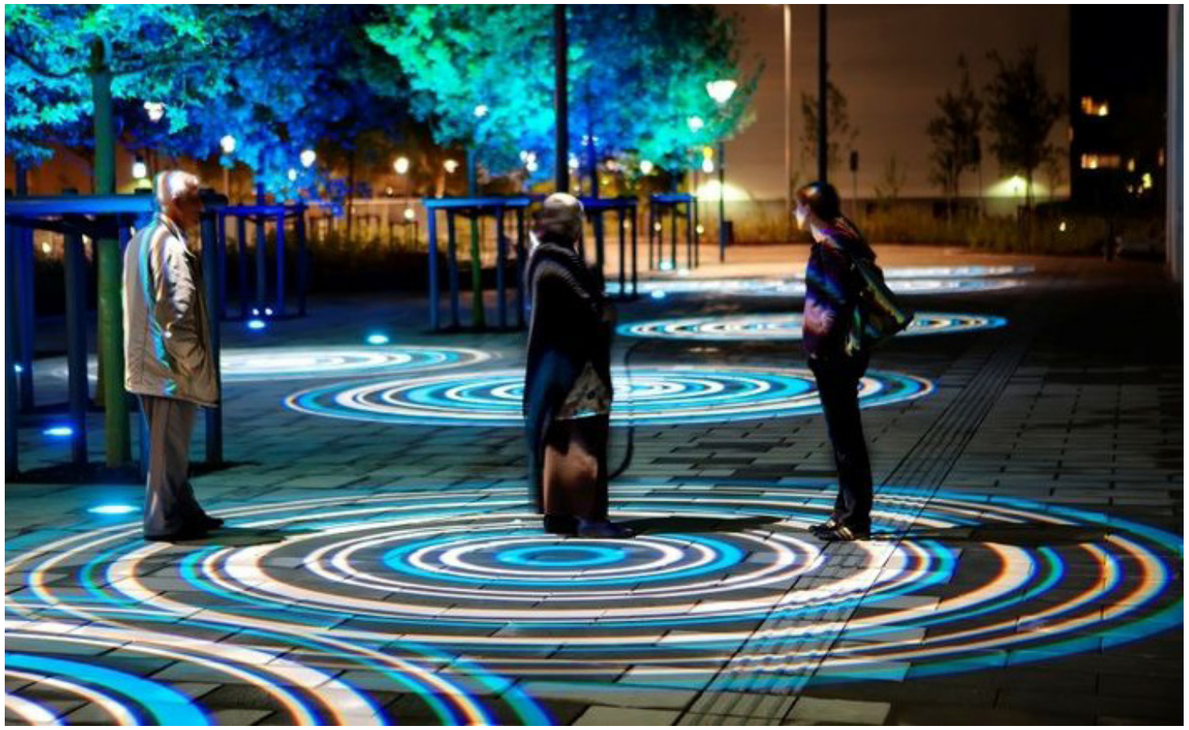


Figure 1.4 Detail of lighting column showing projector location



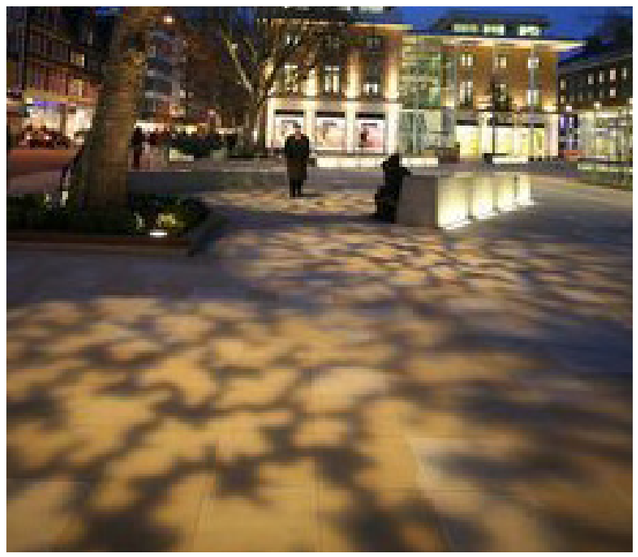


Figure 1.5 Reference images of projection

1.2.3 Multi use columns

In order to minimise the visual clutter of equipment within in the Square, the lighting columns are designed to allow mounting of CCTV cameras and other electrical items.

The proposed lighting column type have the ability for CCTV to be integrated within 'dummy' spotlight housings so that they can match the lighting heads.

Each column will also be provided with a mounting point and power supply to allow connection of Christmas lights or other festoon lighting for special events.

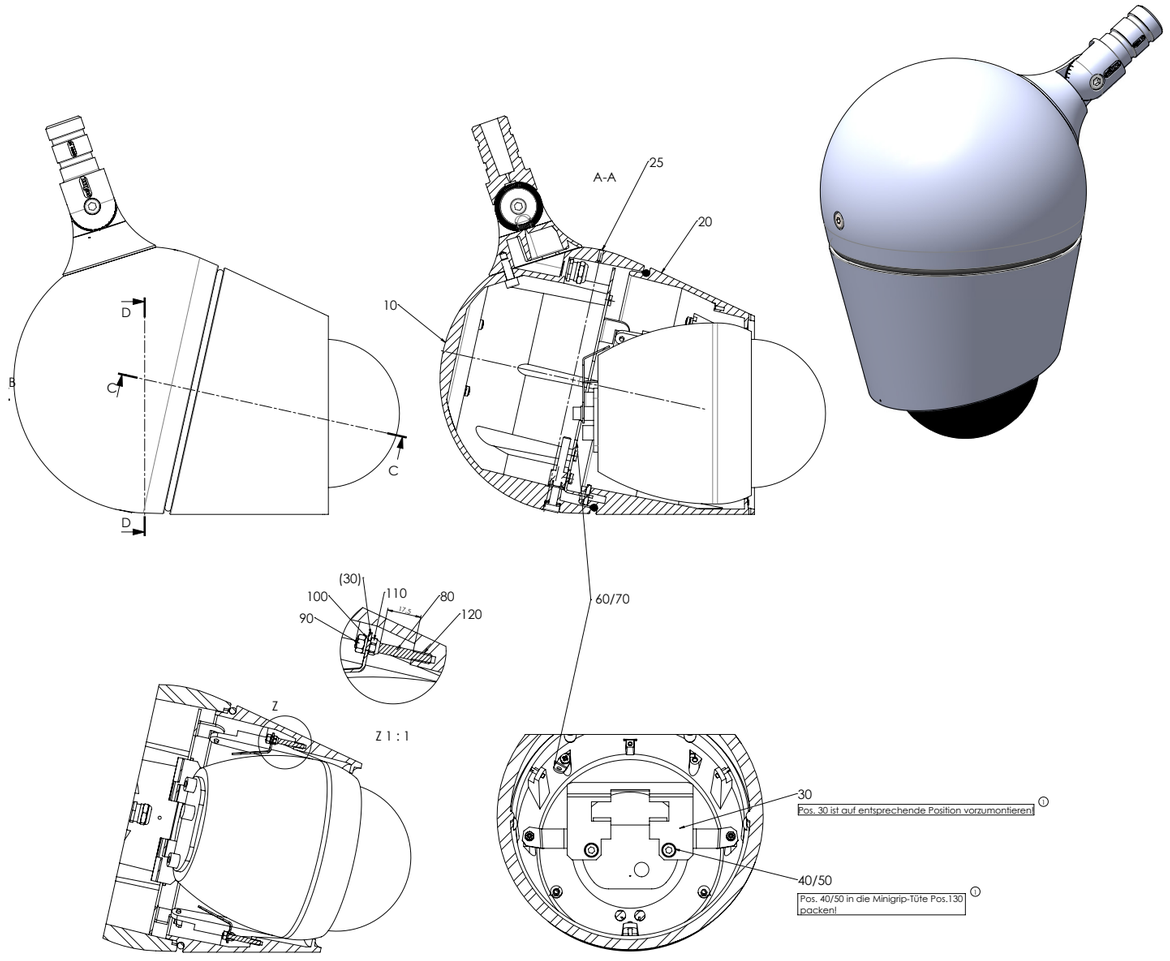


Figure 1.6 Typical integration details for CCTV cameras within "dummy" spotlight housing

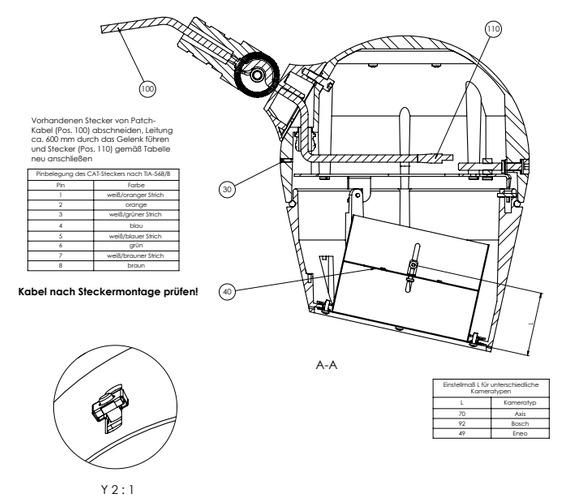


Figure 1.7 Reference image of festoon lighting. Suitable connection points shall be provided on the lighting columns.

1.2.4 Low level lighting

To illuminate the pathway on the roof of Pavilion A, low level linear LED lighting will be concealed within the planter edge to provide a level of safety and emergency lighting. The final design and positioning of this lighting is to be further developed at the next stage.

Lighting will be incorporated into the feature fountains within the Square. This lighting forms part of the fountain package and will be synchronised with movement of the fountain jets.

The fountain lighting will be automatically controlled to be switched off at an agreed curfew time.

1 Concealed linear floor wash lighting to pathway on the roof of Pavilion A

2 Lighting integrated within fountain jets

Figure 1.8 Low level lighting layout

1.3 Luminaire Schedule

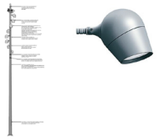
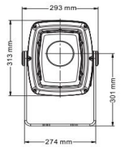
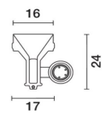
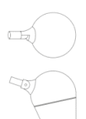
REF	IMAGE	DRAWING	DIMENSIONS	DESCRIPTION	MANUFACTURER	PRODUCT RANGE	FINISHES	OPTIC	ACCESSORIES	IP RATING	LAMP TYPE	CCT	CRI	LUMEN OUTPUT	WATTAGE	EFFICACY	CONTROL	NOTES
AX01			Column: 11m high Lighting Head: Diameter: 205mm Height: 325mm	Lighting column complete with 7 no. adjustable medium beam spotlights and 1 no. ""dummy" head for CCTV. Heads mounted in spiral configuration. Column to be provided with socket and mounting point for Xmas lights.	Selux Contact: Paul Fry Email:Pfry@selux.co.uk Tel:07854652408	Olivio Sistema 3 with Grande heads	To be agreed with architect	Medium	Buried mounting base Spotlights- allow for honeycomb louvres Wireless CMS control node (type TBC to match SCC standard)	IP67	LED	3000K (TBC site trial)	80	4500lm	39W	115lm/W	DALI dimmable - wireless via CMS node	Refer to drawings for further details. Final layout of heads on column and other accessories to be agreed. Supplier to provide manufacturing drawings for approval
AX02			Column: 11m high Lighting Head: Diameter: 205mm Height: 325mm	Lighting column complete with 6 no. adjustable medium beam spotlights, 2 no. RGBW spotlights and 1 no. ""dummy" head for CCTV. Heads mounted in spiral configuration. Custom bracketry to be provided for gobo projector. Column to be provided with socket and mounting point for Xmas lights.	Selux Contact: Paul Fry Email:Pfry@selux.co.uk Tel:07854652408	Olivio Sistema 3 with Grande heads	To be agreed with architect	6no. Medium 2n0. RGBW wide	Buried mounting base Spotlights- allow for honeycomb louvres Custom bracket for projector	IP67	LED	3000K for white (TBC site trial) RGBW for 2 no. spotlights	80	4500lm	39W	115lm/W	DMX dimmable	Refer to drawings for further details. Final layout of heads on column and other accessories to be agreed. Supplier to provide manufacturing drawings for approval
AX02 projector			Length: 582mm Width: 293mm Height: 444mm	Exterior Image/gobo projector complete with colour wheel and gobo wheel	Martin by Harman Contact: Alison Rose Email: Alison.Rose@harman.com	Martin Exterior Projection 500	To be agreed with architect	TBC subject to supplier advice and site trial	Complete with 6 no. gobos TBC	IP66	LED	N/A	70	5000lm	310W	N/A - Display	DMX	Projector supplier to co-ordinate mounting and connection points with column supplier.
AX03			Column: 11m high Lighting Head: Diameter: 205mm Height: 325mm	Lighting column complete with 6 no. adjustable medium beam spotlights, 2 no. RGBW spotlights and 1 no. ""dummy" head for CCTV. Heads mounted in spiral configuration. Column to be provided with socket and mounting point for Xmas lights.	Selux Contact: Paul Fry Email:Pfry@selux.co.uk Tel:07854652408	Olivio Sistema 3 with Grande heads	To be agreed with architect	6no. Medium 2n0. RGBW wide	Buried mounting base Spotlights- allow for honeycomb louvres	IP67	LED	3000K for white (TBC site trial) RGBW for 2 no. spotlights	80	4500lm	39W	115lm/W	DMX dimmable	Refer to drawings for further details. Final layout of heads on column and other accessories to be agreed. Supplier to provide manufacturing drawings for approval
AX04			Length: site measure height: 24mm width: 20mm	Weatherproof Linear flexible LED with homogeneous diffuser to be concealed within planter endge detail. Where required sections to be complete with 3hr remote battery pack for emergency lighting	iGuzzini Contact: Simon Meanwell Email: Simon.meanwell@iguzzini.com Tel: 07899 995910	Underscore InOut Side Bend 16mm	standard	Diffuse	Mounting clips suitable for curved mounting. Clips to be fixed with suitable adhesive	IP68	LED	2900K (TBC)	80	460lm/m	7W	67lm/w	DALI	Driver to be remotely located in accessible position. Section of lighting shall be provided with 3hour emergency battery pack where indicated
AX05			Column: 6m high Lighting Head: Diameter: 163mm Height: 260mm	Lighting column complete with 3 no. adjustable medium beam spotlights. Heads mounted in spiral configuration. Column to be provided with socket and mounting point for Xmas lights.	Selux Contact: Paul Fry Email:Pfry@selux.co.uk Tel:07854652408	Olivio Sistema 3 with Medio heads	To be agreed with architect	3no. Medium	Buried mounting base Spotlights- allow for honeycomb louvres	IP67	LED	3000K for white (TBC site trial)	80	3000lm	27W	111lm/W	DALI dimmable - wireless via CMS node	Refer to drawings for further details. Final layout of heads on column and other accessories to be agreed. Supplier to provide manufacturing drawings for approval

Figure 1.9 Proposed luminaire specifications

1.4 Illuminance Plots

The proposed lighting scheme has been modelled in DIALux EVO lighting software using photometric data for the proposed luminaire types.

It is noted that the calculations have been carried out with all lighting at 100% output to ascertain maximum illuminance levels achievable.

All proposed lighting is dimmable, with the intention being that it will be dimmed during commissioning to achieve a balanced appearance with the emphasis being on the centre of the Square and light levels tapering on the approach pathways.

It is proposed that all lighting would be dimmed from the early hours in the morning to reduce energy usage when footfall is at its lowest.

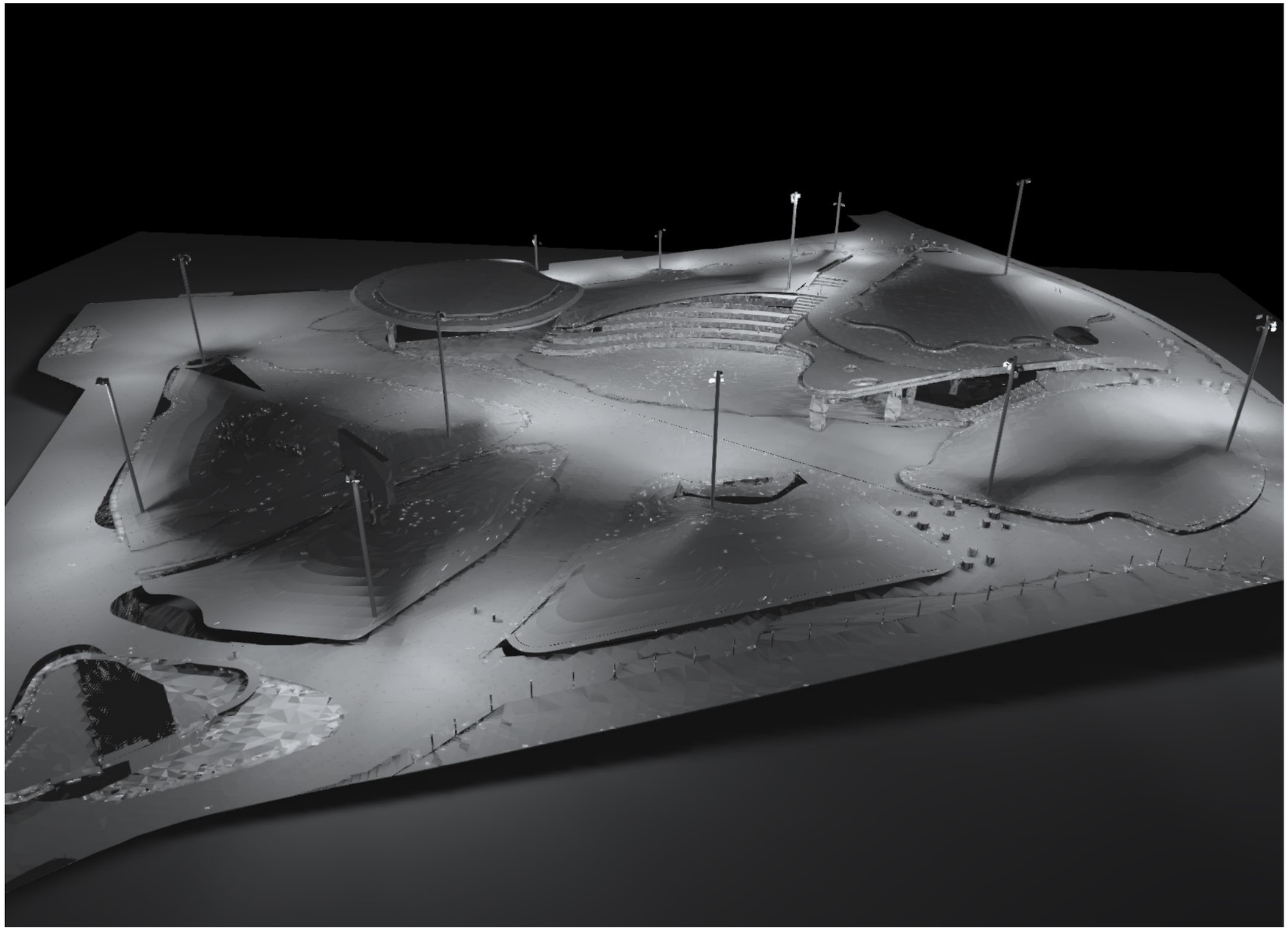


Figure 1.10 Proposed Lighting scheme - render view from lighting model

Figure 1.11 provides a false colour illuminance rendering for the proposed scheme.

A number of observations can be made from the illuminance model:

- With the lighting on 100% output an average illuminance of 20-30lux can be achieved along the pathways and in the centre of the Square. Under normal operation this will be dimmed to 10-15lux.
- With the proposed spotlight scheme lighting is targeted and contained within the boundaries of the pathways. Light levels drop off within the soft landscaped areas as intended.
- Away from the boundaries of Castle Square light levels reduce to 10 lux and less.

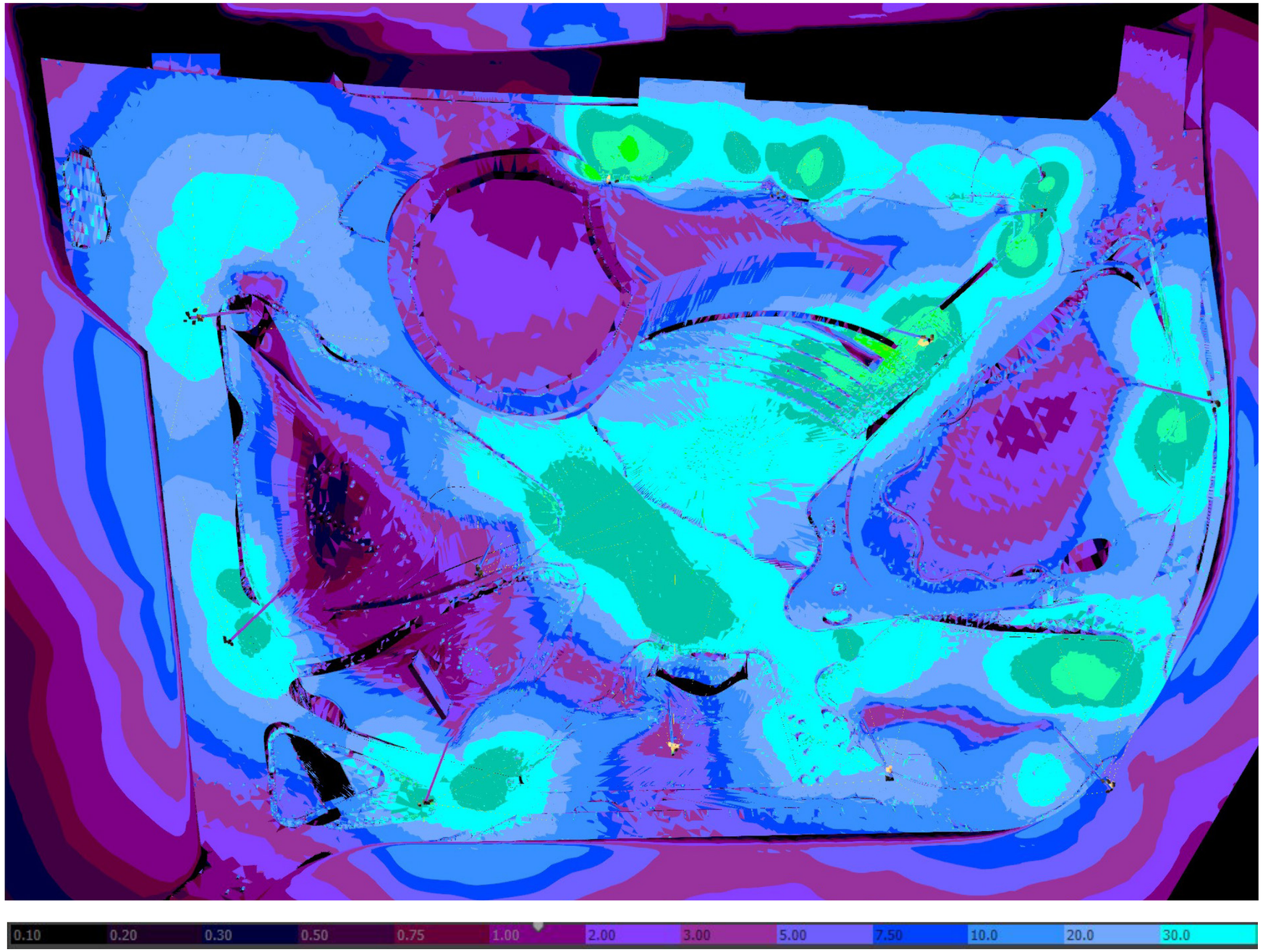


Figure 1.11 False colour rendering indicating anticipated illuminance levels from the proposed lighting scheme