APPENDIX 13.2
OBSTRUCTIVE LIGHTLING ASSESSMENT

2. Appendix 13.2 – Obtrusive lighting Assessment

2.1 Introduction

An obtrusive lighting assessment has been carried out for the proposed development.

2.2 Methodology and assumptions

The *ILP*[1] *Guidance Note GN01 (2020): Guidance Notes for the Reduction of Obtrusive Light* is used to inform the assessment criteria.

This assessment is based on the review of the document *Design Book 02H from May 2022 by EQ2Light*, which sets the strategy for the lighting design of the future development, against the ILP criteria, and the *design and access statement*, dated May 2022, by ACME architects.

The assessment uses the baseline data, collected on site by measuring the existing lighting conditions, to determine the environmental zone. This has been found to be Zone E2, consistently with the character of the area, which is suburban/rural.

The following metrics are used to characterise obtrusive lighting when a design is defined:

- Light spill is the spilling of light beyond the boundary of the development site. Units: illuminance (E), measured in lux. This is reduced by aiming the lighting within the site, avoiding overspill and keeping light levels to the minimum recommended, without over providing.
- Façade Luminance: how bright an illuminated façade appears to the observer. The ILP Guidance Note GN01 details limiting values of façade luminance for different environmental zones. Assessment is required to establish that the limiting values are not exceeded. Units: Luminance (L) measured in cd/m2. Façade luminance can be controlled by reducing the power of the installation to a suitable output.
- Source Intensity: how bright the light source appears to an observer. The brightness of luminaires can impact the view towards the development site and affect the ability of road users to see essential information. The installation should be assessed to ensure that visible luminaires comply with the limiting values of ILP GN01. Units, Intensity (I), measured in candelas (cd). This is controlled by selecting luminaires with suitable photometrical curves, aiming, dimming, and by ensuring that the intensity towards the observers is kept below the recommended values.
- Skyglow: a combination of Direct Upward Light and Indirect Upward Light. This effect is seen as a glow in the night sky and reduces the view of the stars. The skyglow is quantified in the ILP GN01 by the percentage of the luminous output emitted above the horizontal plane. This is controlled by limiting the illuminance to the minimum recommended values and by ensuring that luminaires are aimed downwards and have suitable photometrical characteristics.

As the design is not yet finalised, but still represented as a strategic intervention, the numerical evaluation of the above criteria is not possible. However, a review of the strategy document has been carried out to inform the assessment on the likely effect of the proposed development.

[1] Institute of Lighting professionals.

2.3 Baseline data

A lighting survey has been carried out on the 24th of February 2022 at 20:00, to assess the baseline condition. The evening was clear and with dry weather.

The survey included measurements of illuminance and luminance with the following equipment:

- Calibrated illuminance meter (Minolta CL-200A)
- Calibrated luminance meter (Minolta LS-160)
- Bracketed digital photography (Canon 5DII fitted with Canon 17-35mm f2.8 L)

The illuminance data has been collected in the vertical plane, at 1.5m, and on the ground. The location of the measurements is marked on a GPS plan, and images of the site are used to contextualise the measure.

Furthermore, the bracketed digital photographs have been processed to create high dynamic range images and scaled to the correct values based on the calibrated luminance meter readings. The resulting images allow to see the distribution of luminance at the site.

A combination of high dynamic range imaging, and illuminance reading, has been used to estimate the illuminance on the existing façade of the Novotel Cambridge North.

From the data collected, the following observations can be made:

- The light spill from road and park lighting is extremely low and the illuminance values are below 1 lux at the boundary of the site.
- The luminance of the Novotel Cambridge North building façade is below 5 cd/sqm.
- The façade includes illuminated signs, this is significantly brighter than the façade itself, but within ILP guidance.
- The horizontal illuminance in the pedestrian area just outside of the station has peaks of more than 100 lux.
- The horizontal illuminance in the other walkways is approximately 10 lux (position A) and 20 lux (position D).
- The spill lighting from the car park to the Novotel Cambridge North windows is approximately 3 lux. This is consistent with ILP pre-curfew targets.

Figure 10 - Plan showing the illuminance measurements locations (A,B,C,D,E,F,G) and positions of high dynamic range images (1,2,3,4,5,6,7,8,9).

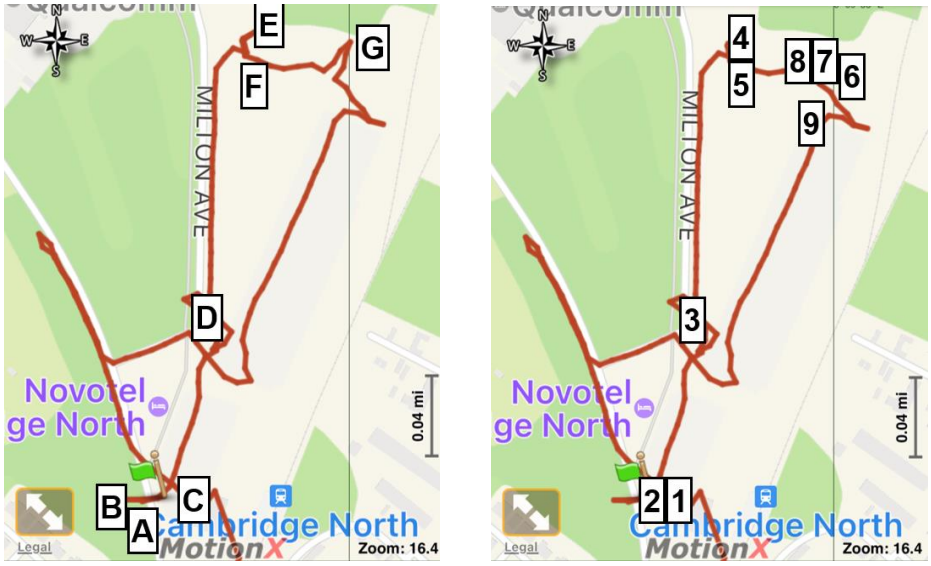


Figure 11 - Positions for illuminance readings.

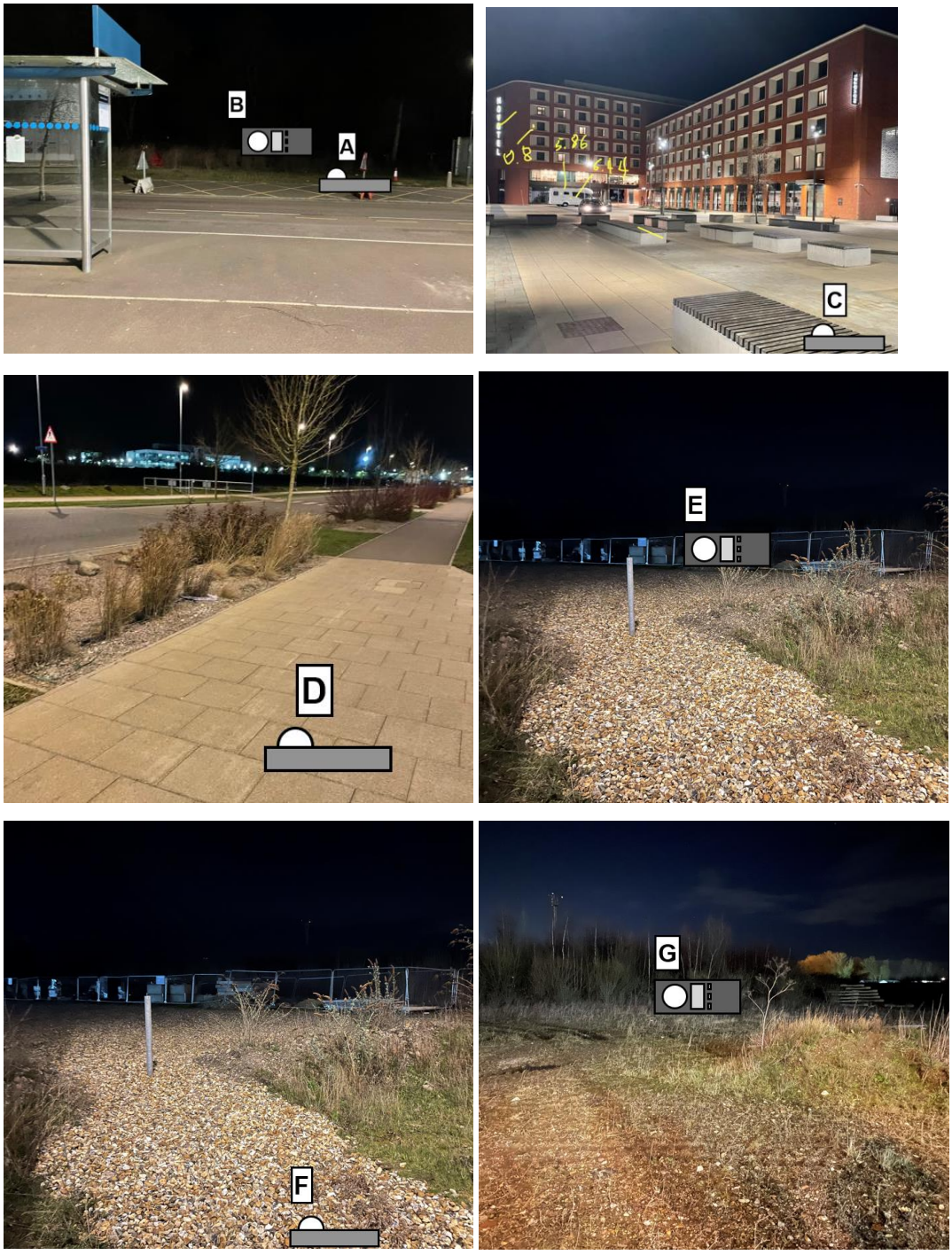


Table 4 - Illuminance measurements.

Position designation	Illuminance	Correlated Colour Temperature
A	9.9 lux (horizontal)	3900K
B	1.2 lux (vertical)	n.a.
C	126.6 lux (horizontal)	3900K
D	20.5 lux (horizontal)	2700K
E	0.7 lux (vertical)	n.a.
F	11.6 lux (horizontal)	2500K
G	0.3 lux (vertical)	n.a.

Figure 12 - Estimated illuminance on Novotel Cambridge North building façade (values in the rectangle are lux levels).

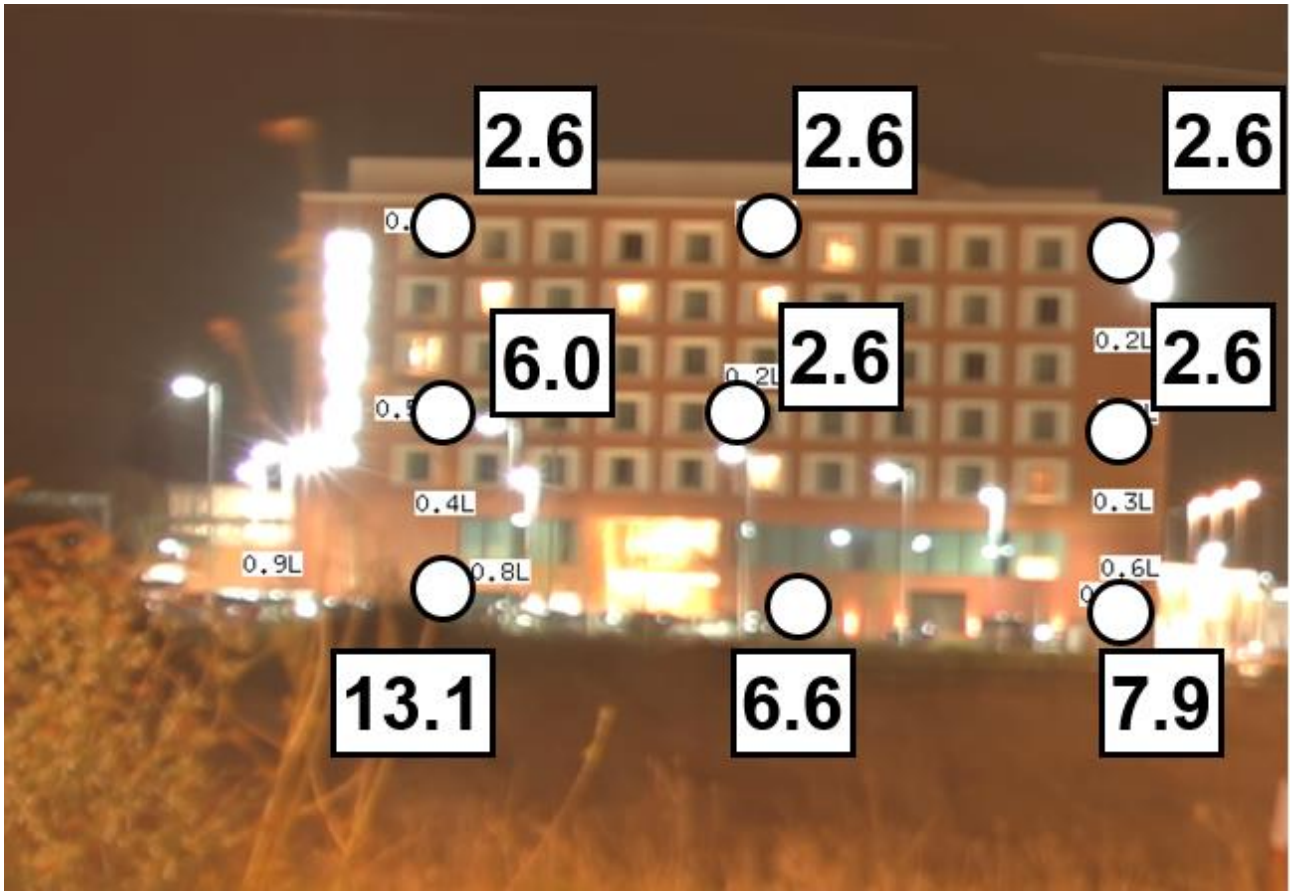


Figure 13 - View 1 luminance distribution.

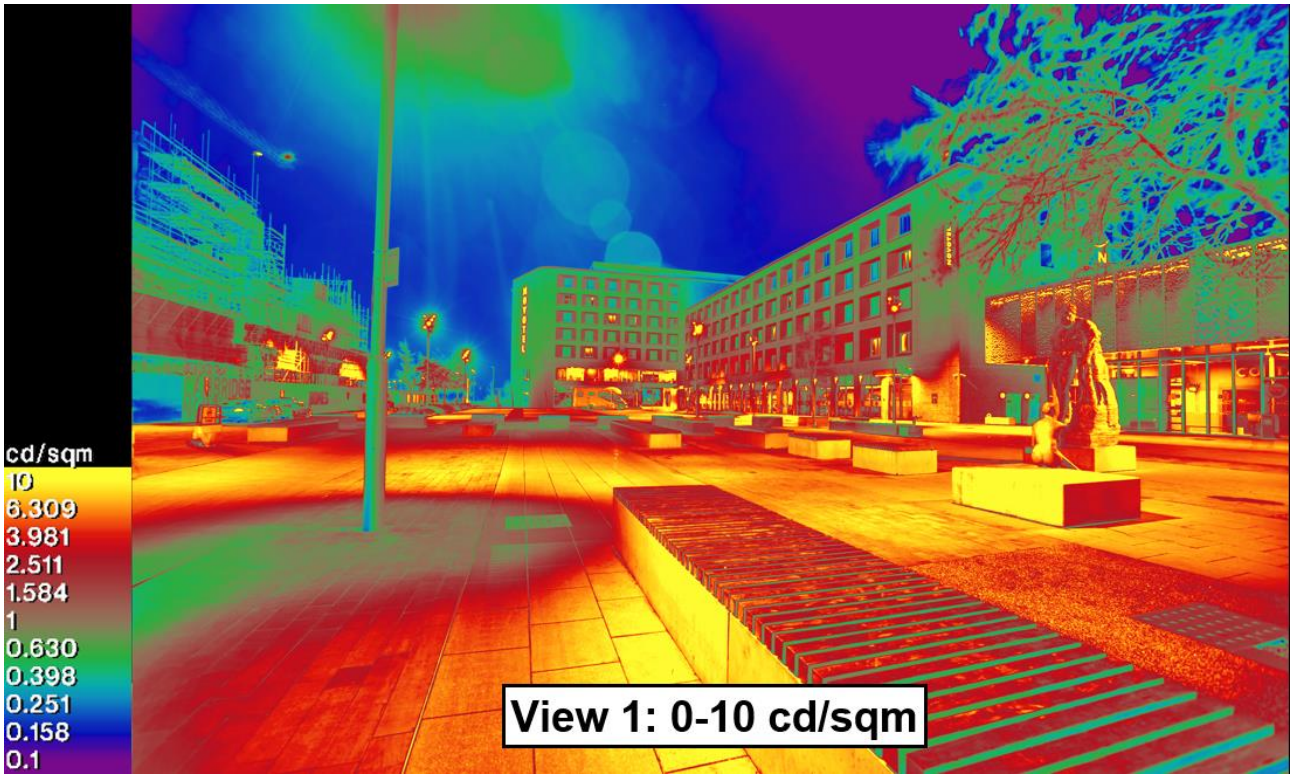


Figure 14 - View 2 luminance distribution.

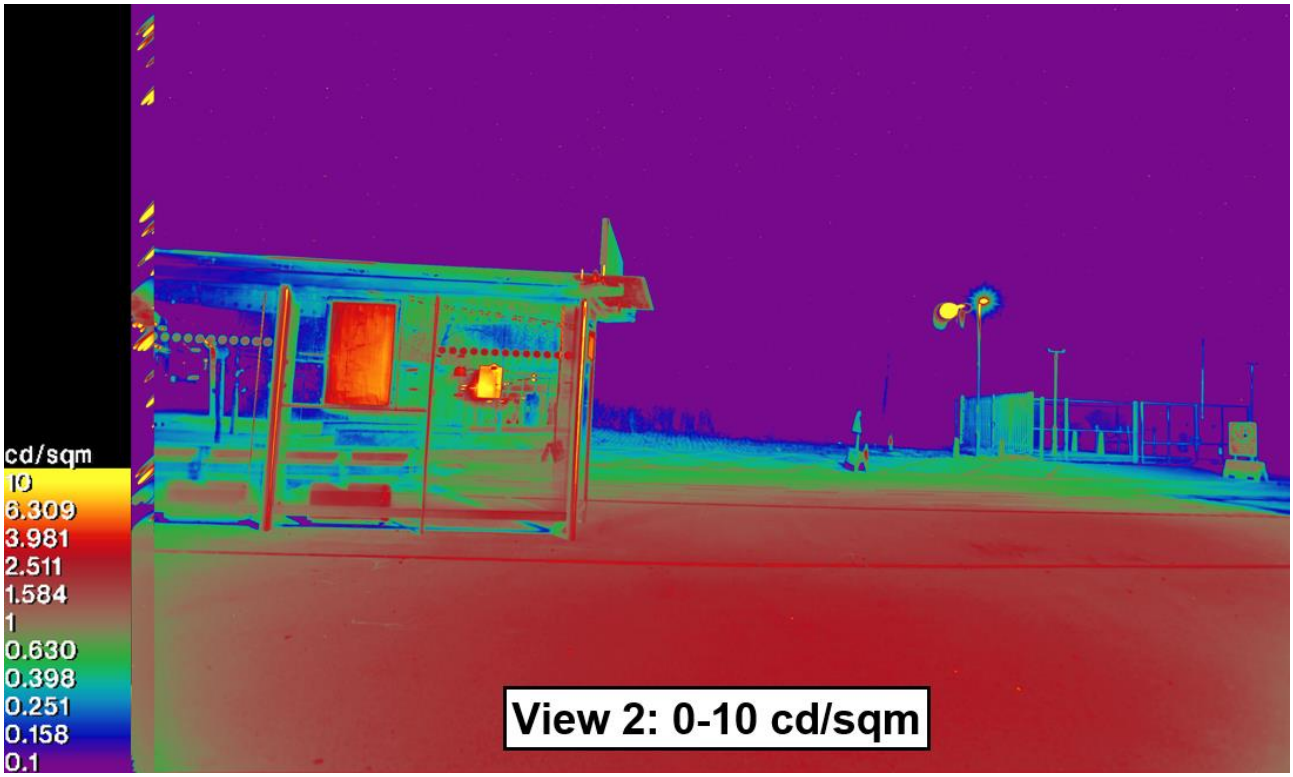


Figure 15 - View 3 luminance distribution.

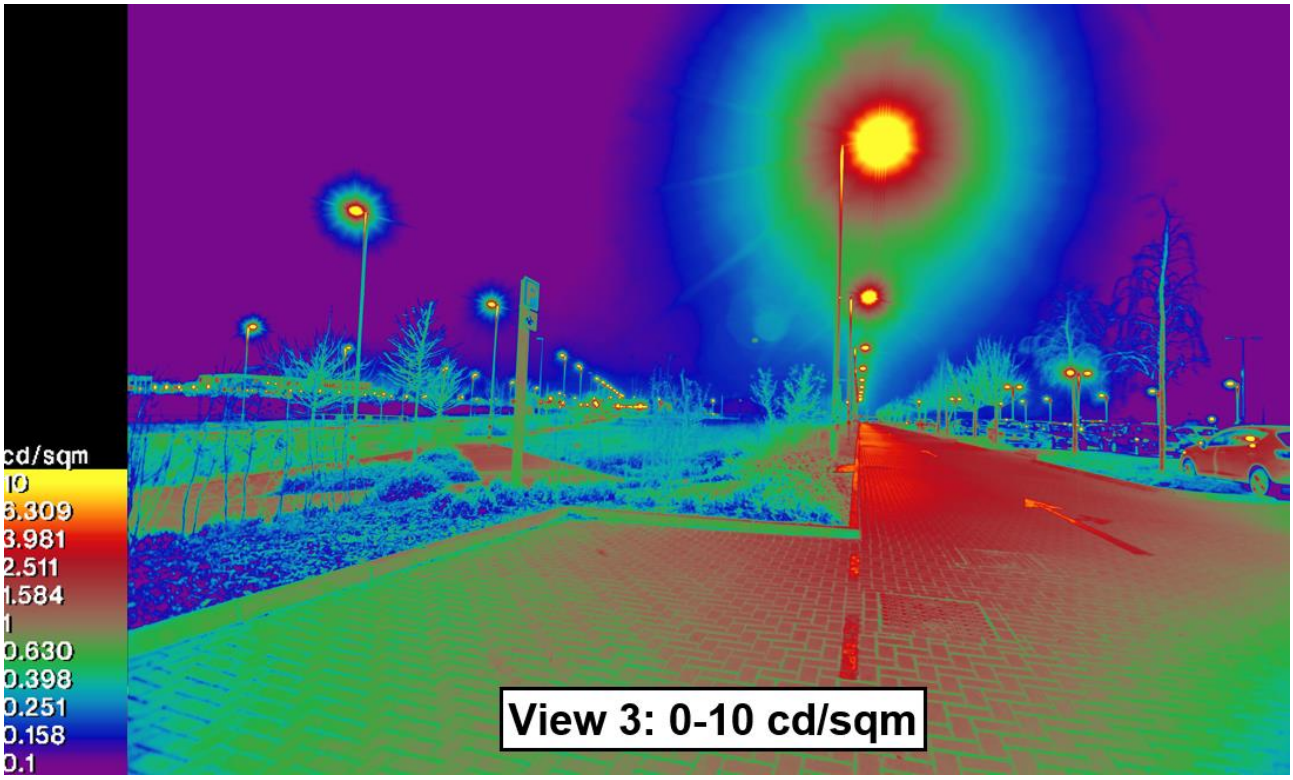


Figure 16 - View 4 luminance distribution. Note the scale is 0-1 cd/sqm.

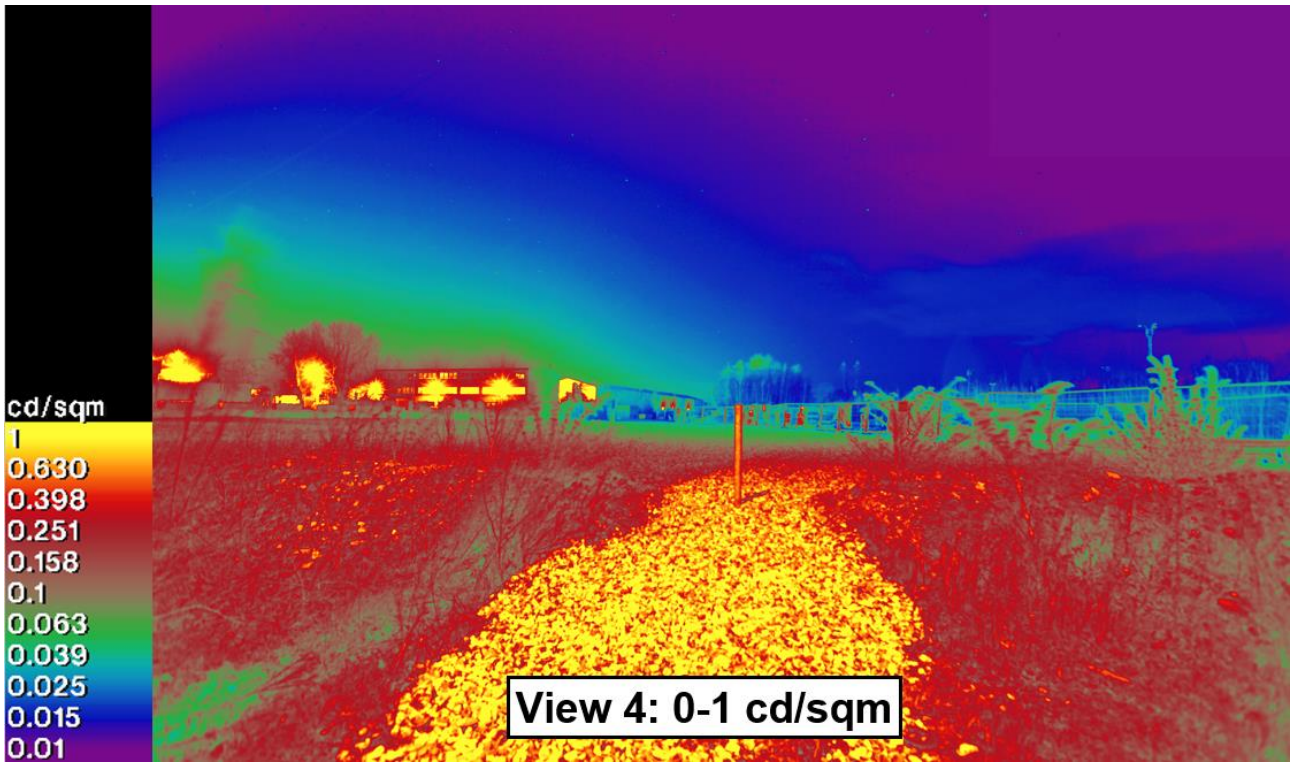


Figure 17 - View 5 luminance distribution.

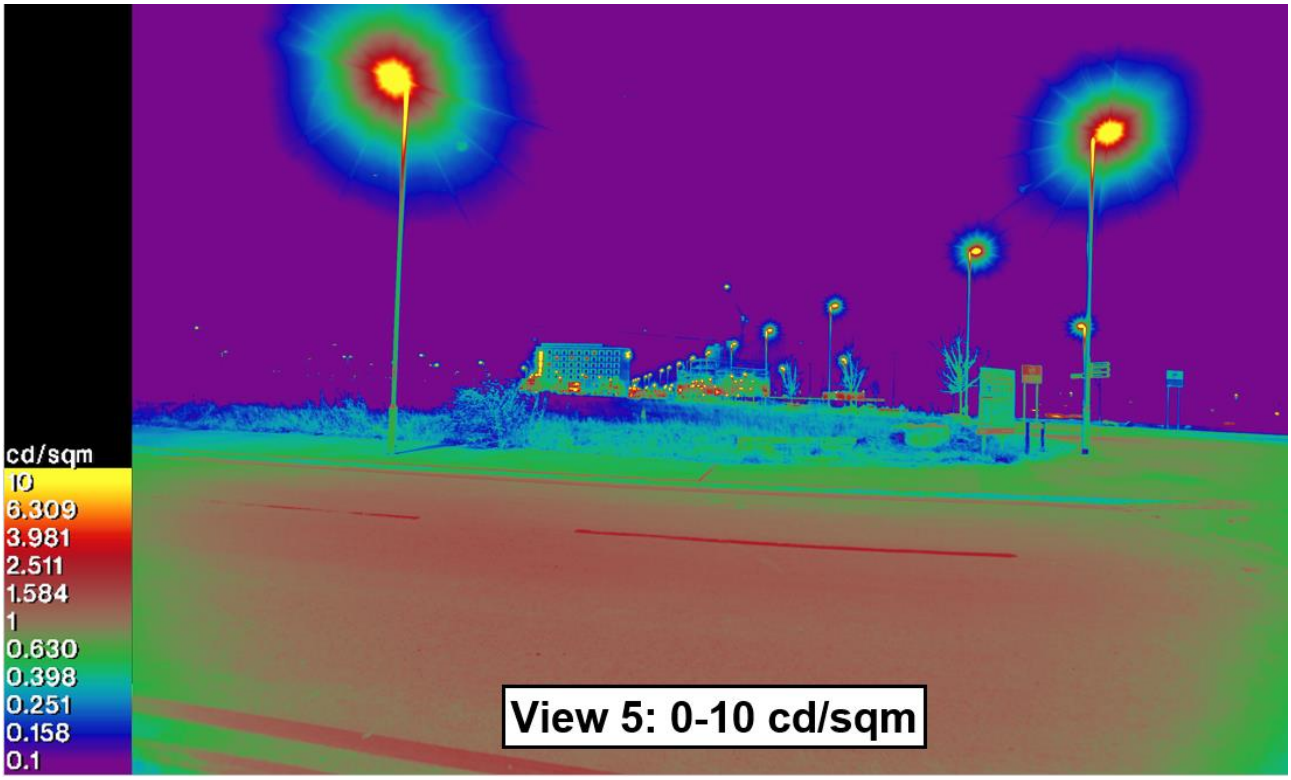


Figure 18 - View 6 luminance distribution. Note the scale is 0-1 cd/sqm.

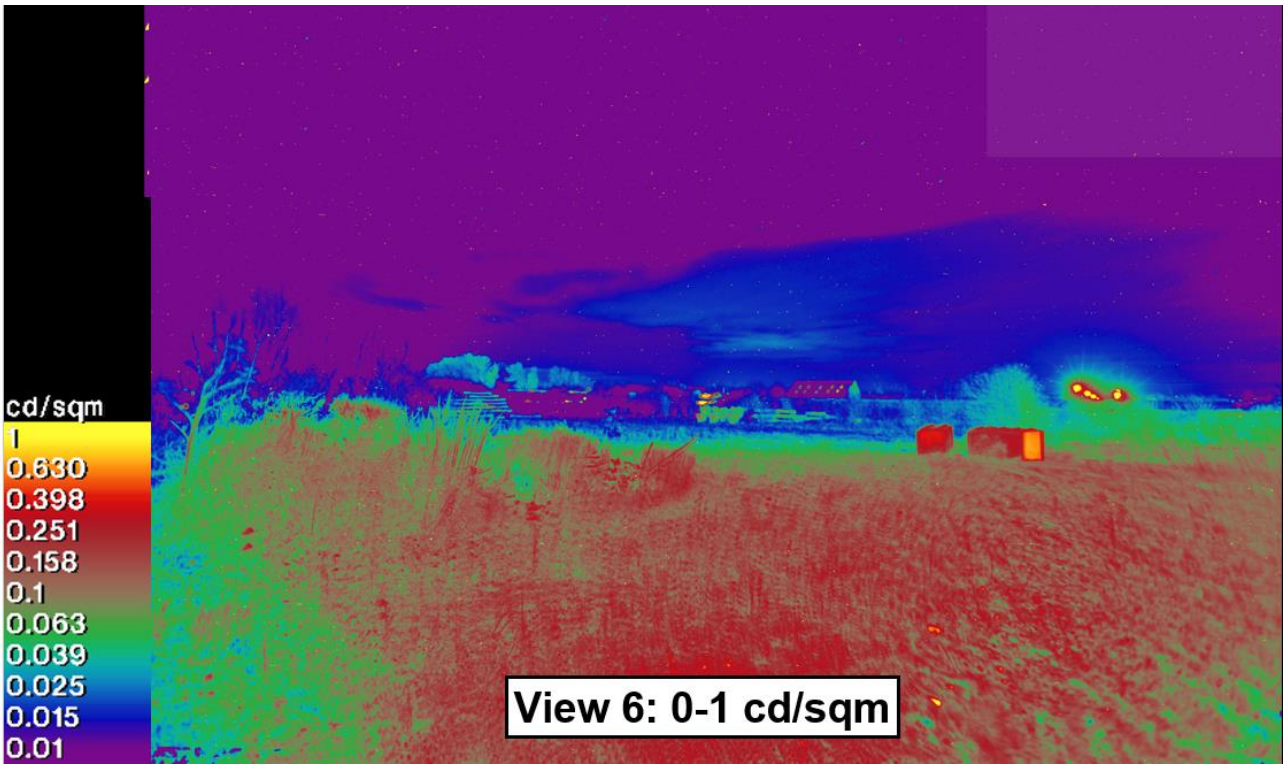


Figure 19 - View 7 luminance distribution. Note the scale is 0-1 cd/sqm.

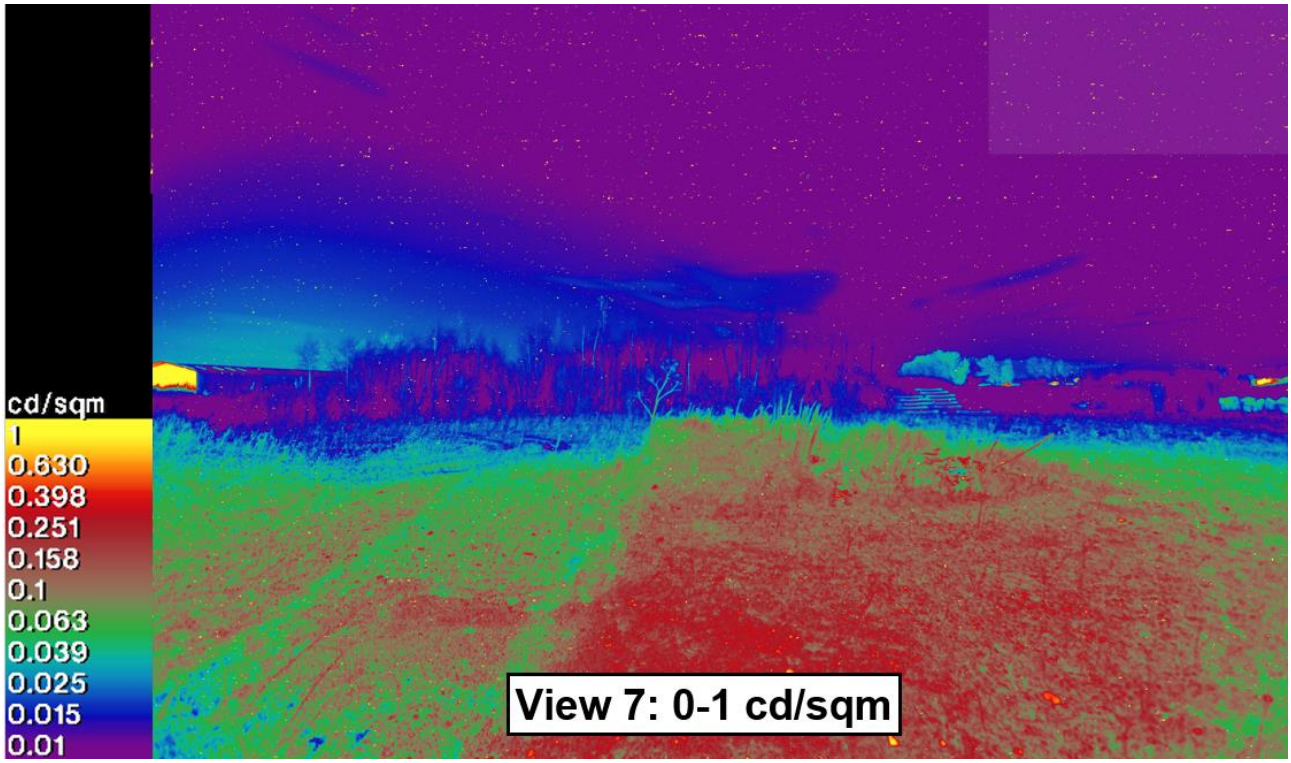


Figure 20 - View 8 luminance distribution. Note the scale is 0-1 cd/sqm.

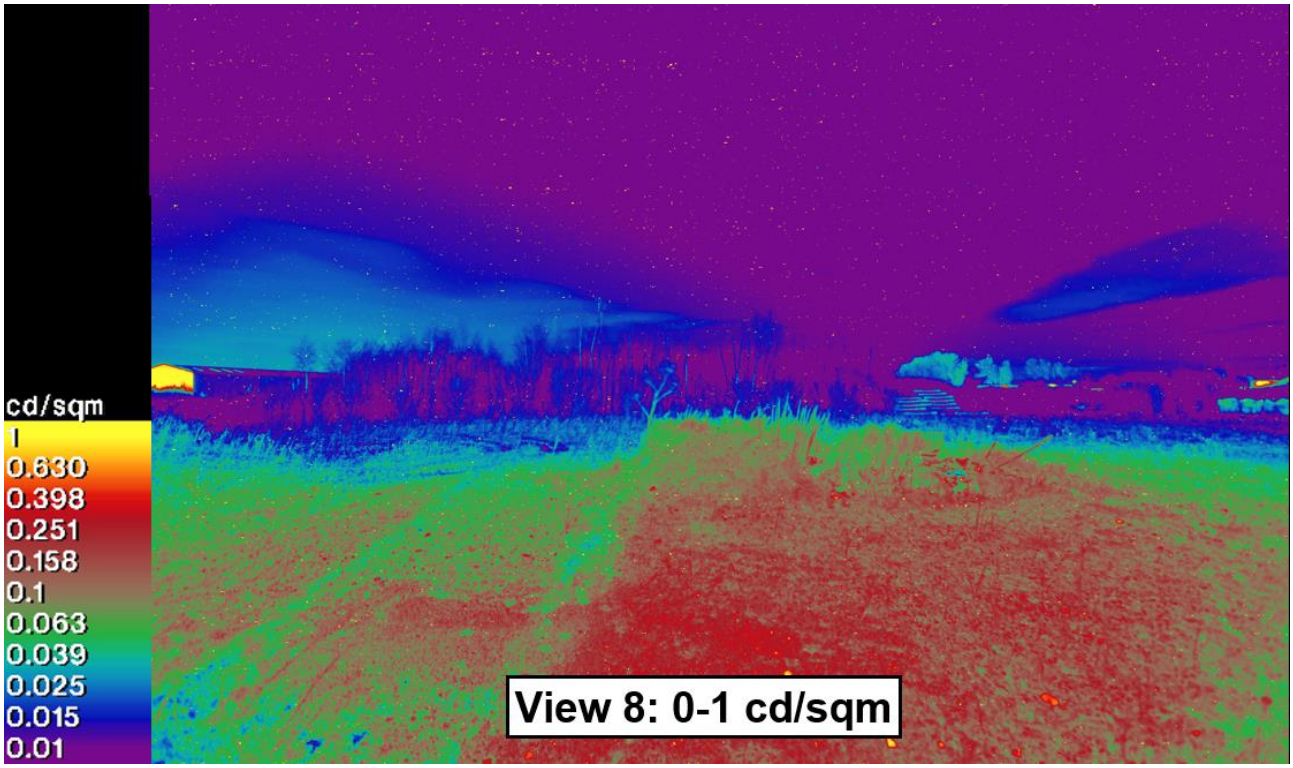
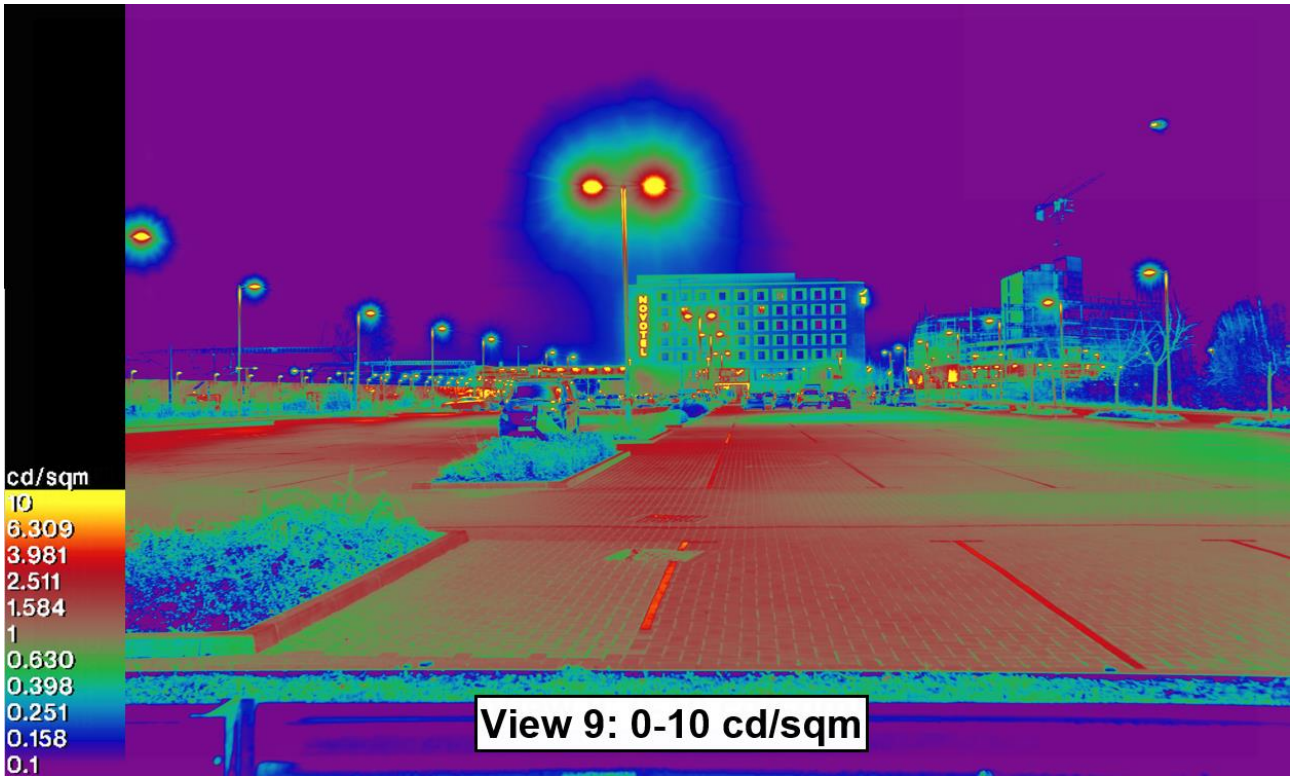


Figure 21 - View 9 luminance distribution.



2.4 Design review

The lighting strategy document shows the structure of the proposed design, from the base lighting components to the enhanced lighting systems of the central site spine, to the special area lighting, which is used to activate open areas, within the site, to the feature lighting used to enhance specific architectural/artistic intervention, across the site. These elements are shown in a series of diagrams.

The lighting strategy suggests that this scheme will comply with ILP requirements for environmental zone E3. In doing so, the proposed design, continues and adopt the existing road lighting to the boundary of the site.

This approach is agreeable as it can ensure compliance with the ILP requirements for environmental zone E2, for the surrounding receptors, whilst providing more flexibility for the lighting within the development. It is noted that the strategy explains how lighting systems will be controlled, allowing dimming at selected times and based on activities and site use.

The design team has provided reassurance regarding the spill lighting from the multistorey car park to the Novotel Cambridge North. It is proposed to provide suitable luminaires (with sufficient cut-off) and by using opaque parapets to block the car headlights. As the façade of the car park includes perforations, these will need fine tuning towards the hotel, and to the east elevation, to avoid the residual lighting spill.

The strategy document proposes to use accent lighting to the building elevations and renderings are provided. These confirm a careful use of accent, with controlled up lighting to some of the architectural features. From these visualisations the impression is that the façade luminance will be well within the ILP guidance, being the areas of accent a very small fraction of the façade extent.

Figure 22 - Lighting components of the proposed design.

Figure 23 - Base lighting, it is noted as this element continues the existing lighting systems ensuring compliance with E2 at the site boundary, as measured in the baseline assessment.

Figure 24 - Central lighting systems, these will not have any impact on the buildings and areas outside of the proposed development site.

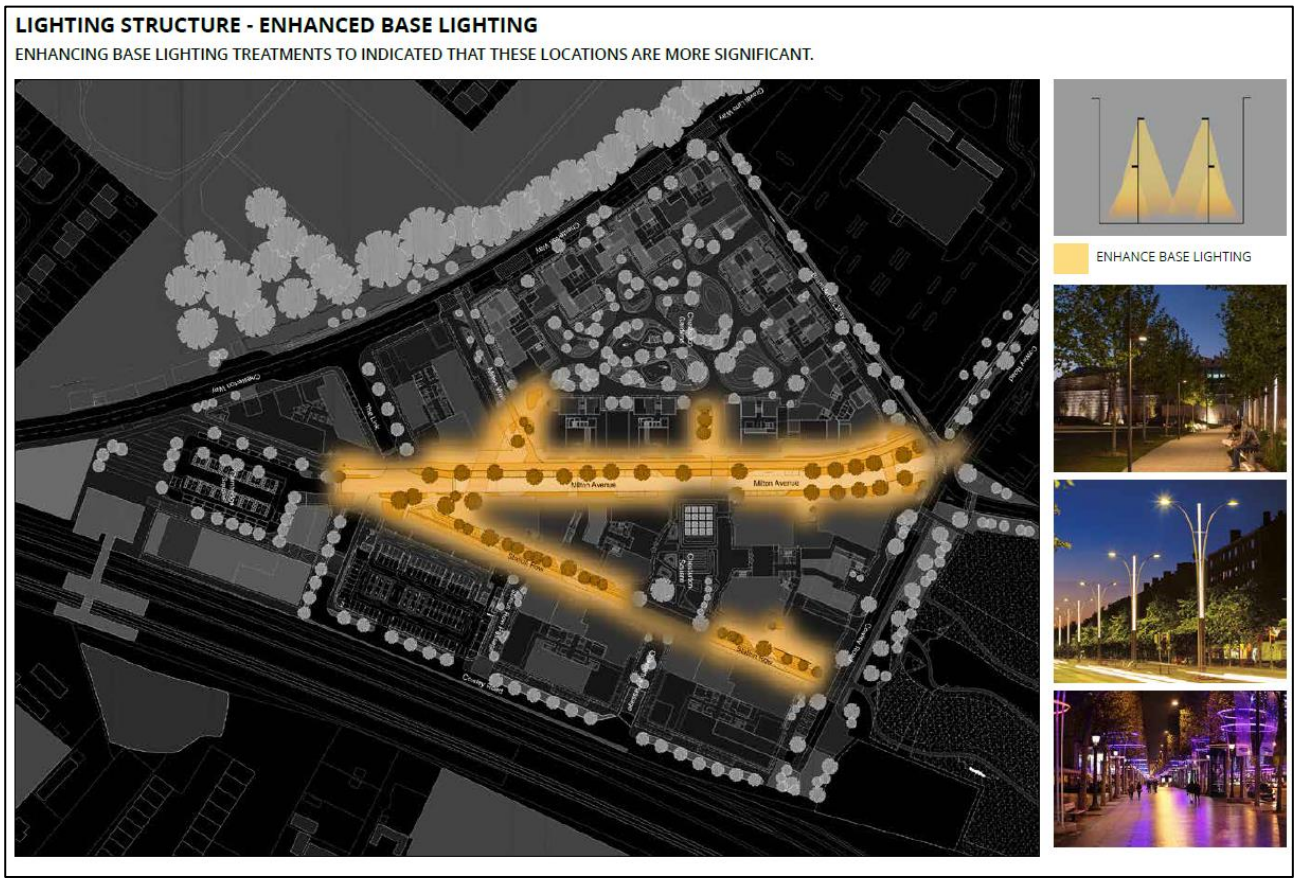


Figure 25 - Enhanced lighting systems, these will not have any impact on the buildings and areas outside of the proposed development site.

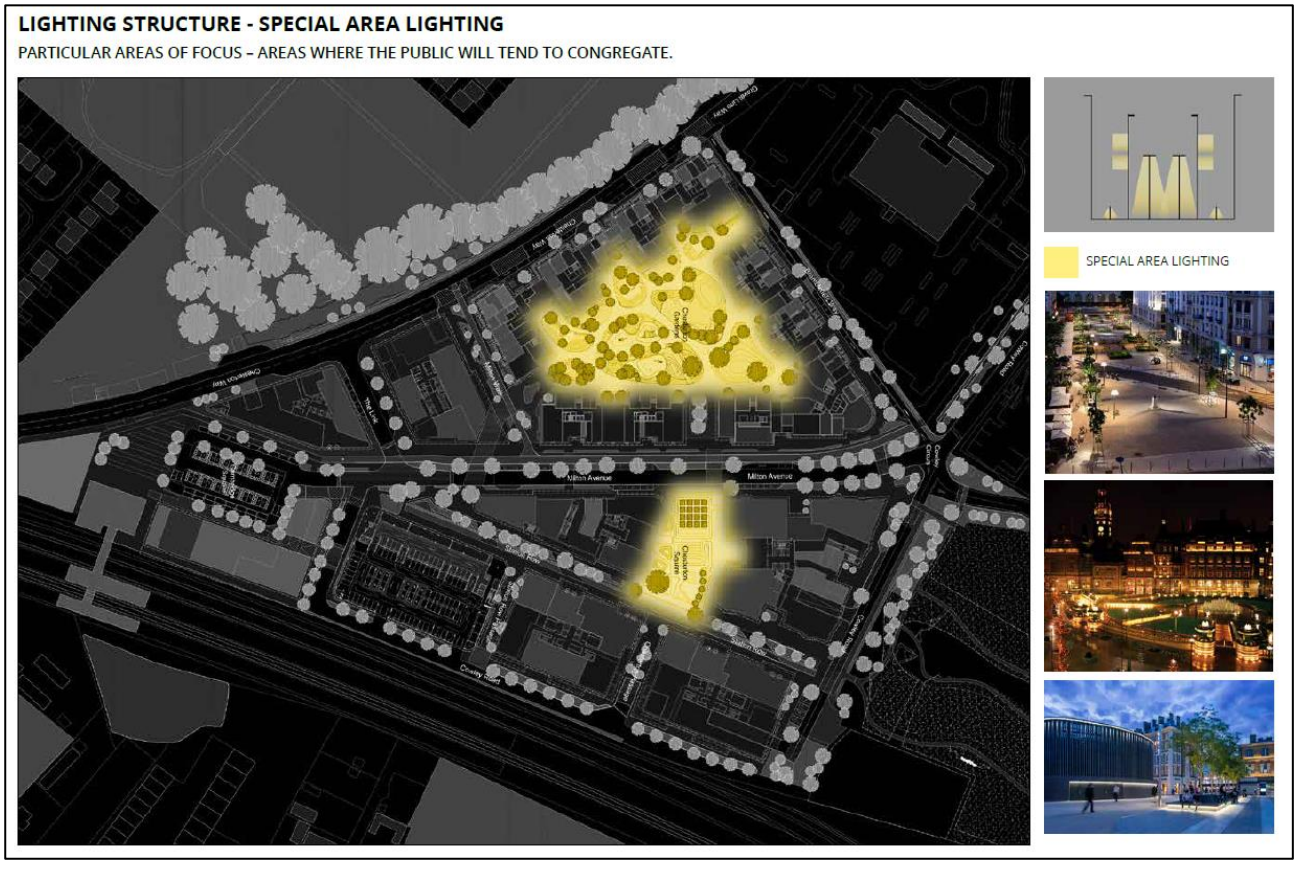


Figure 26- Feature lighting, these will not have any impact on the buildings and areas outside of the proposed development site.

Figure 27 - Ensamble view of the proposed component for the lighting at the site.

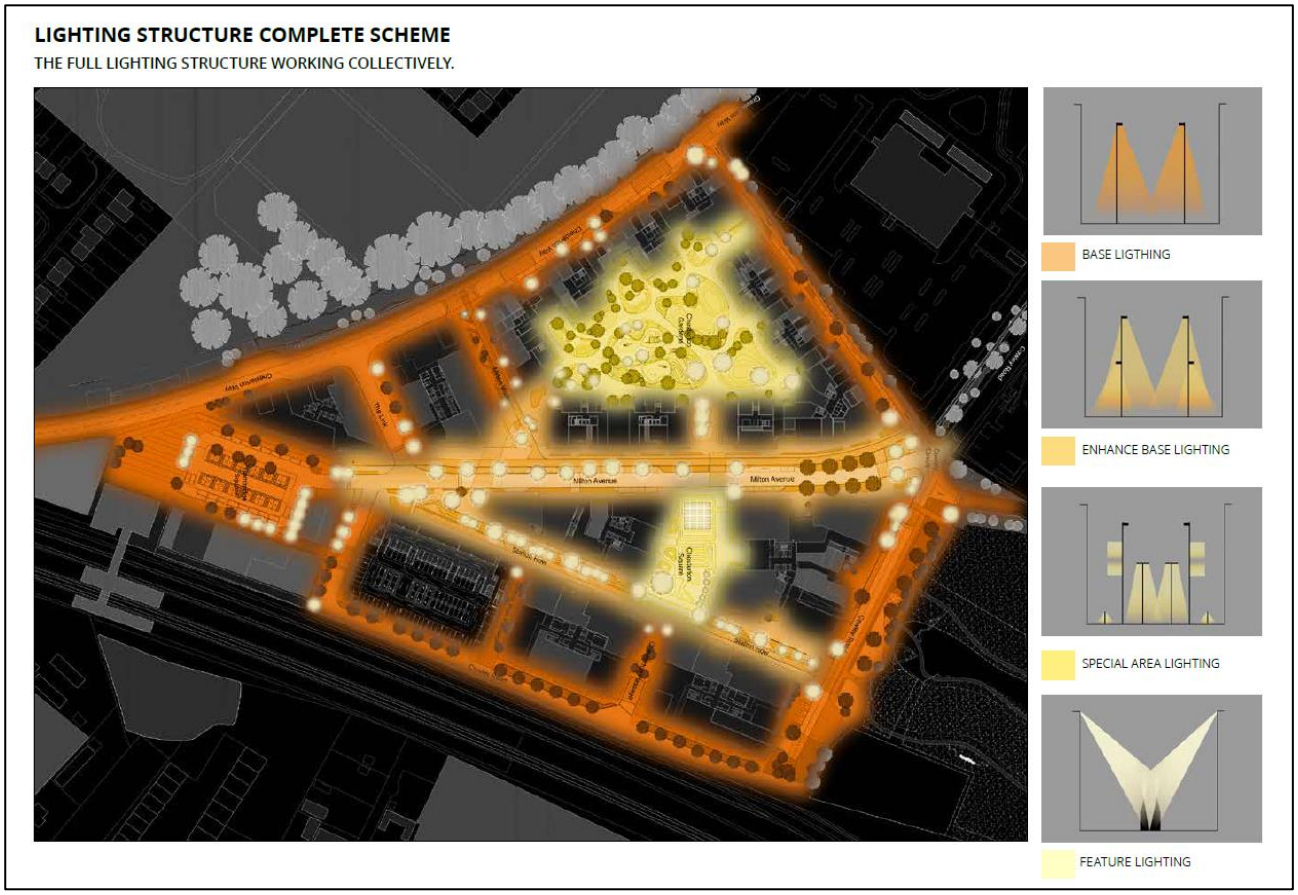


Figure 28 - Extract from the Design and Access statement by ACME showing the strategy used to limit obtrusive ligthing from the proposed multy storey car park.

Figure 29 - Artistic impression of the night-time accent lighting for the facades of the Lab Buildings.