



KIRKLEES CULTURAL HEART

PUBLIC REALM LIGHTING STRATEGY

CDT430201-ARP-ZZ-ZZ-RP-YL-00002

ARUP

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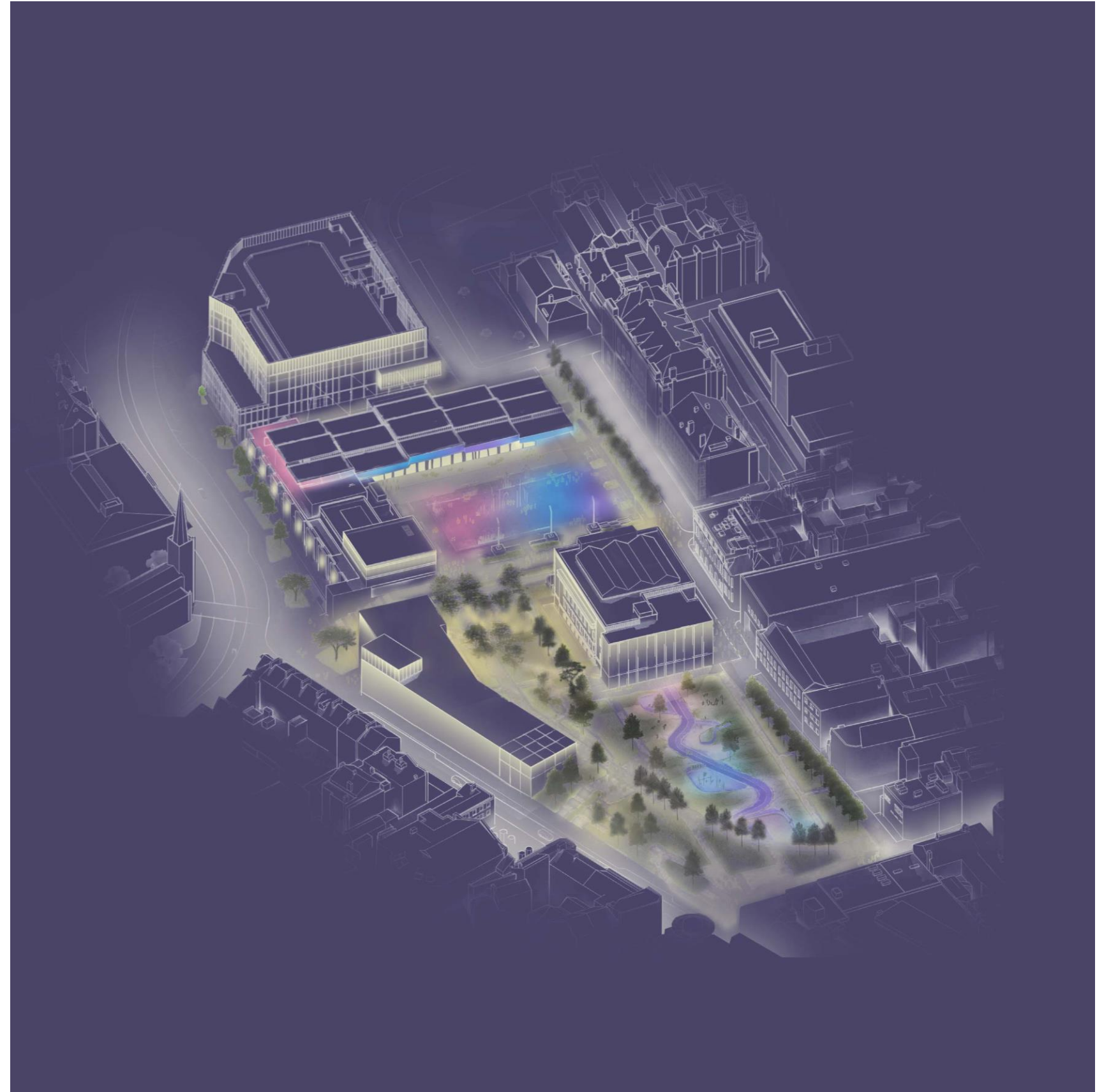
Kirklees Council

Kirklees Cultural Heart

Public Realm Lighting Strategy

CDT430201-ARP-ZZ-ZZ-RP-YL-00002

28 September 2022



Section 1 Public Realm Lighting

INTRODUCTION

This document has been prepared by Arup to support the planning application for the Kirklees Cultural Heart (KCH) development. The Local Planning Authority (LPA) receiving the application is Kirklees Council (KC).

The purpose of this document is to set out the relevant information to the external lighting and design concepts for the KCH. Careful consideration has been made to ensure safety of occupants by incorporating appropriate lighting levels to gathering spaces.

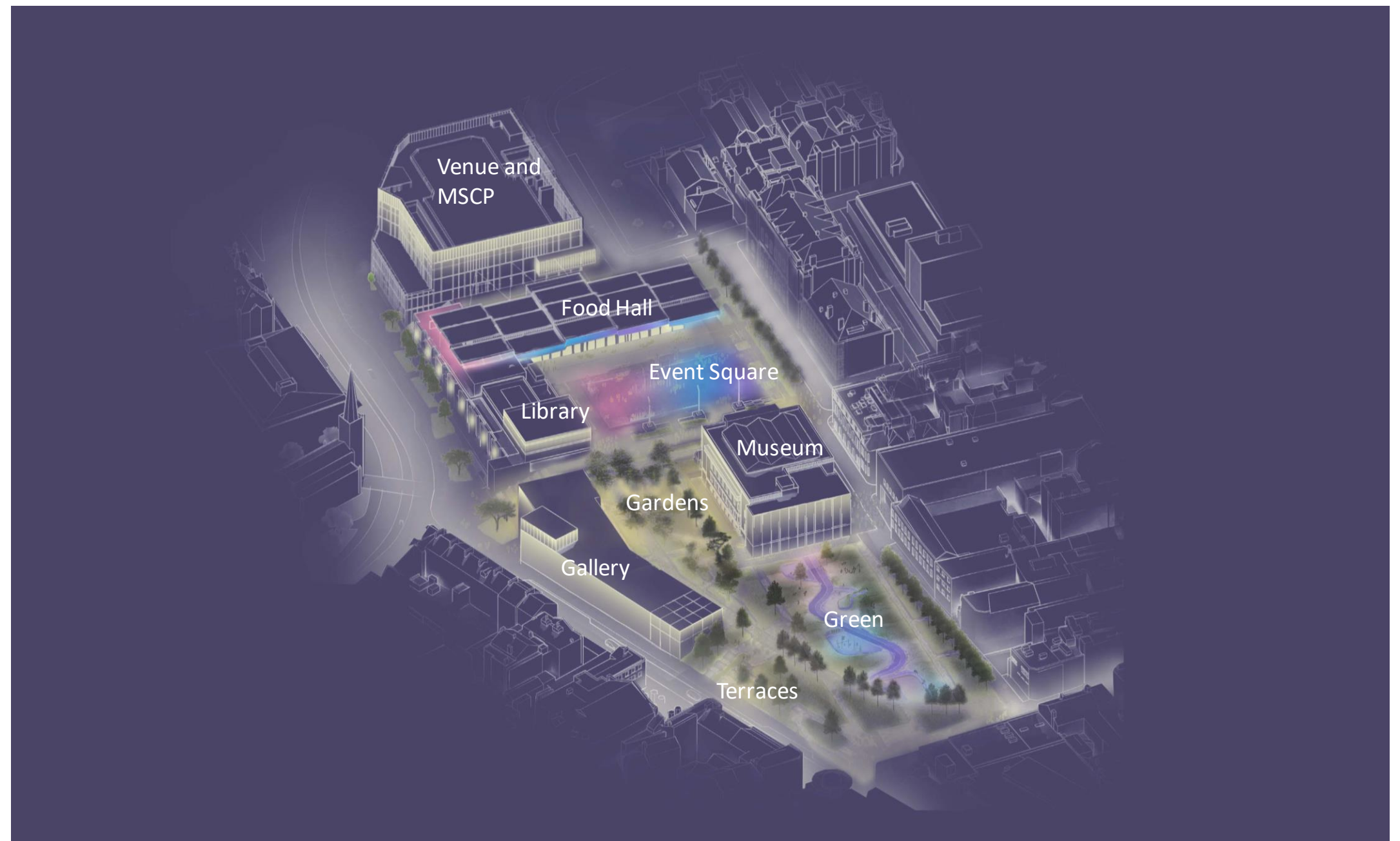
This document presents the holistic lighting strategy vision and schematic lighting concepts for the KCH, an urban park and cultural development in the centre of Huddersfield. KCH is associated with and bounded by the following key destinations:

- The Venue
- The Gallery
- The Museum
- The Food Hall
- The Library

This document outlines the proposed approach to the public realm lighting strategy for the KCH Project and will discuss the following external spaces:

- The Green
- The Gardens
- The Square
- The Terraces
- Princess Walk

The quality of experience in the public realm is as important after dark as it is during the daylight hours. The provision of an appropriate lighting scheme will be a key element of the success of the overall vision for the KCH Project.



Overview of the site

LIGHTING PHILOSOPHY

Without good quality lighting urban spaces often become confusing and disorientating; the texture and colour of materials is lost and the character becomes hostile and uninviting. A clear understanding of the shape and scale of spaces, their mood and atmosphere, textures and colours are therefore critical during the hours of darkness – not only so that people can ‘see’ but also so they can enjoy their environment.

The approach to the external lighting design will focus on the quality of the overall experience, not only for visitors to the venues, but also uses moving through the space. The design will be developed to consider careful integration of the light with the various streetscape, landscape and architectural features within.

The lighting design philosophy is captured by the following core objectives:

- Identity
- Placemaking
- Legibility
- Sustainability
- Safety
- Longevity

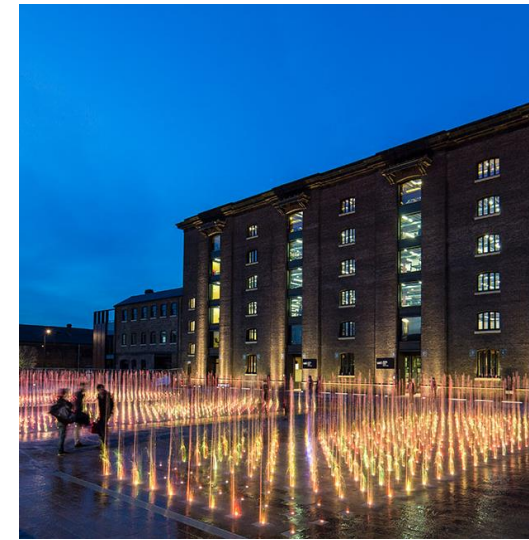
The sections below provide further information and illustrate how these core objectives are envisioned to be achieved in the context of the varying areas and opportunities that can be developed as part of KCH regeneration strategy.

Identity



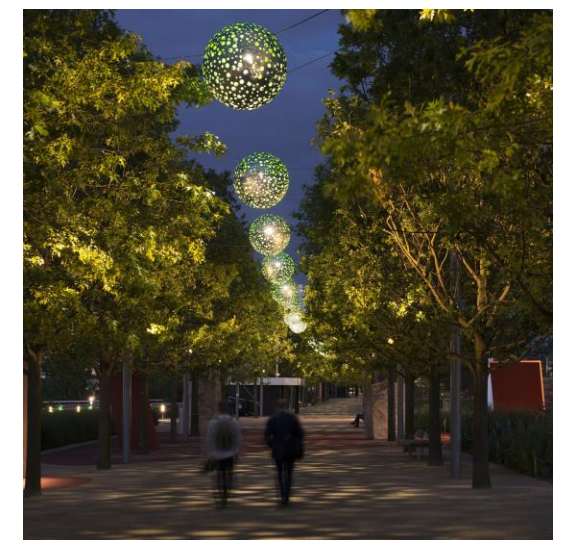
Promoting the unique identity of the development and its constituent areas.

Placemaking



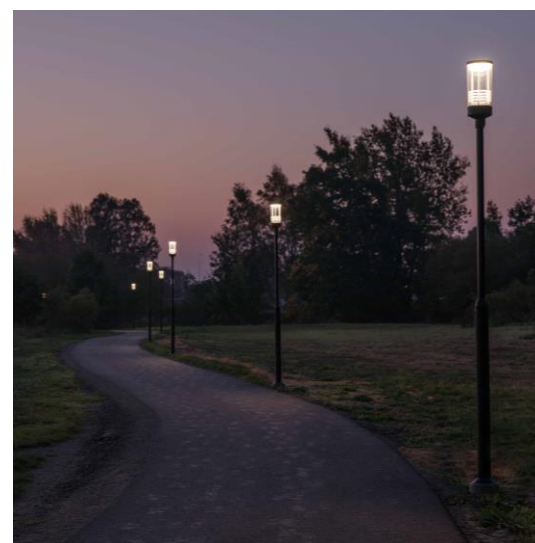
Cultivating the appropriate ambience and mood in each individual space and area.

Legibility



Providing intuitive wayfinding through the highlighting and enhancement of routes and vistas

Sustainability



Utilising the appropriate light, minimising energy use and respecting the surrounding ecology.

Safety



Illuminating to provide a sense of safety and assurance to the users and the community.

Longevity



Designing for ease of maintenance and procurement without compromising on quality.

Section 2 Context

SURROUNDING CONTEXT

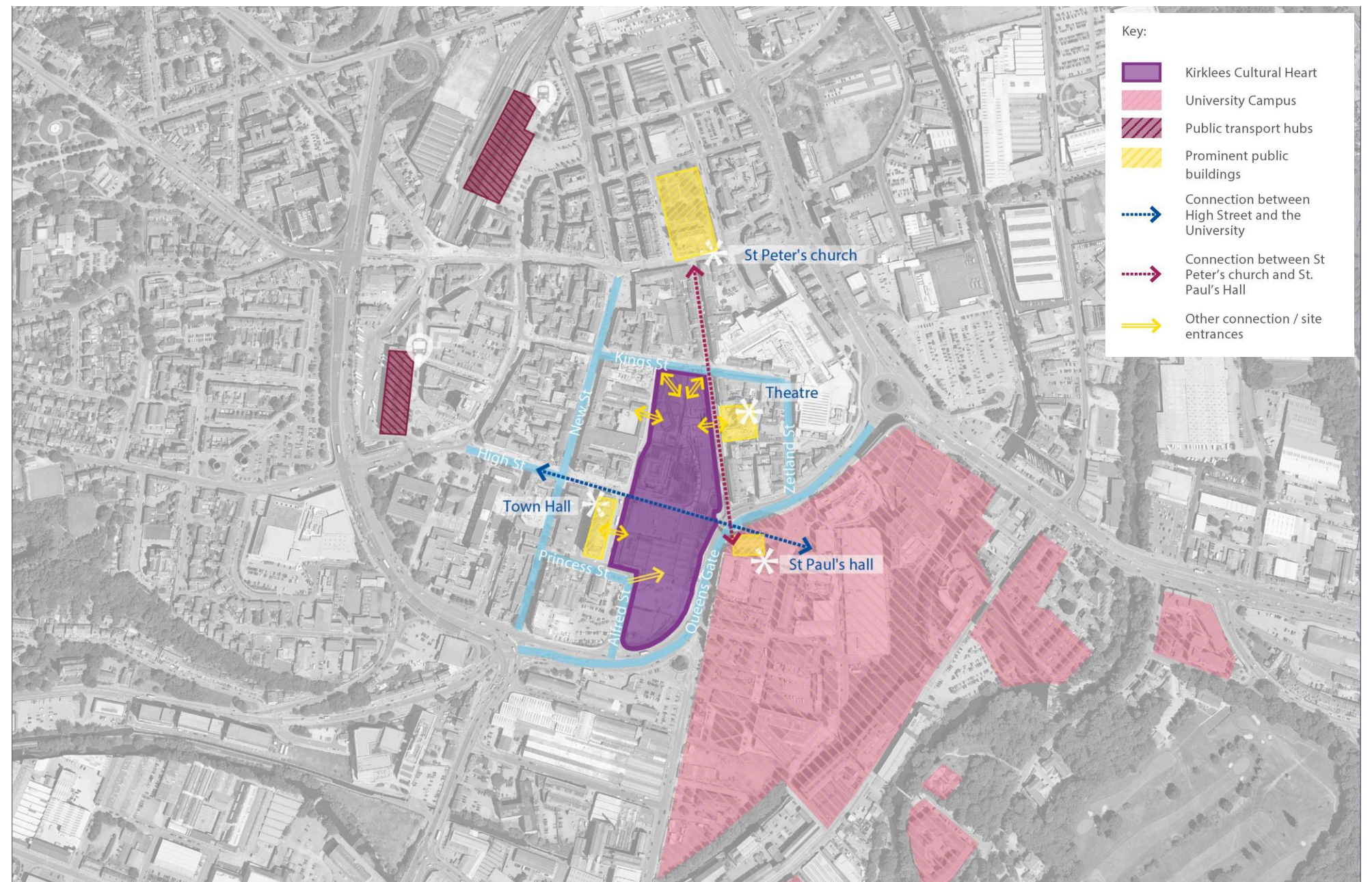
The Kirklees Cultural Heart sits between the university campus and the main commercial district of Huddersfield. There are strong connections between town centre and university on the East West Link.

Buildings outside of scope which have strong connections to KCH include St Paul's Hall, the Town Hall and the Theatre.

There are listed buildings within the site, the Food Hall and the Museum (previously Library). As such, any proposed lighting scheme will be sensitive to preserve the fabric of the structure.

Queensgate road bounds the site to the south and east, as a major distributor road around Huddersfield centre. Lighting along the carriageway roads is of highways standard. The site is bounded on all sides by roads and highway lighting.

The shopping area on New Street is in the process of being redeveloped with new lighting and landscaping. The KCH Project will have its own identity to create a sense of placemaking within the development.

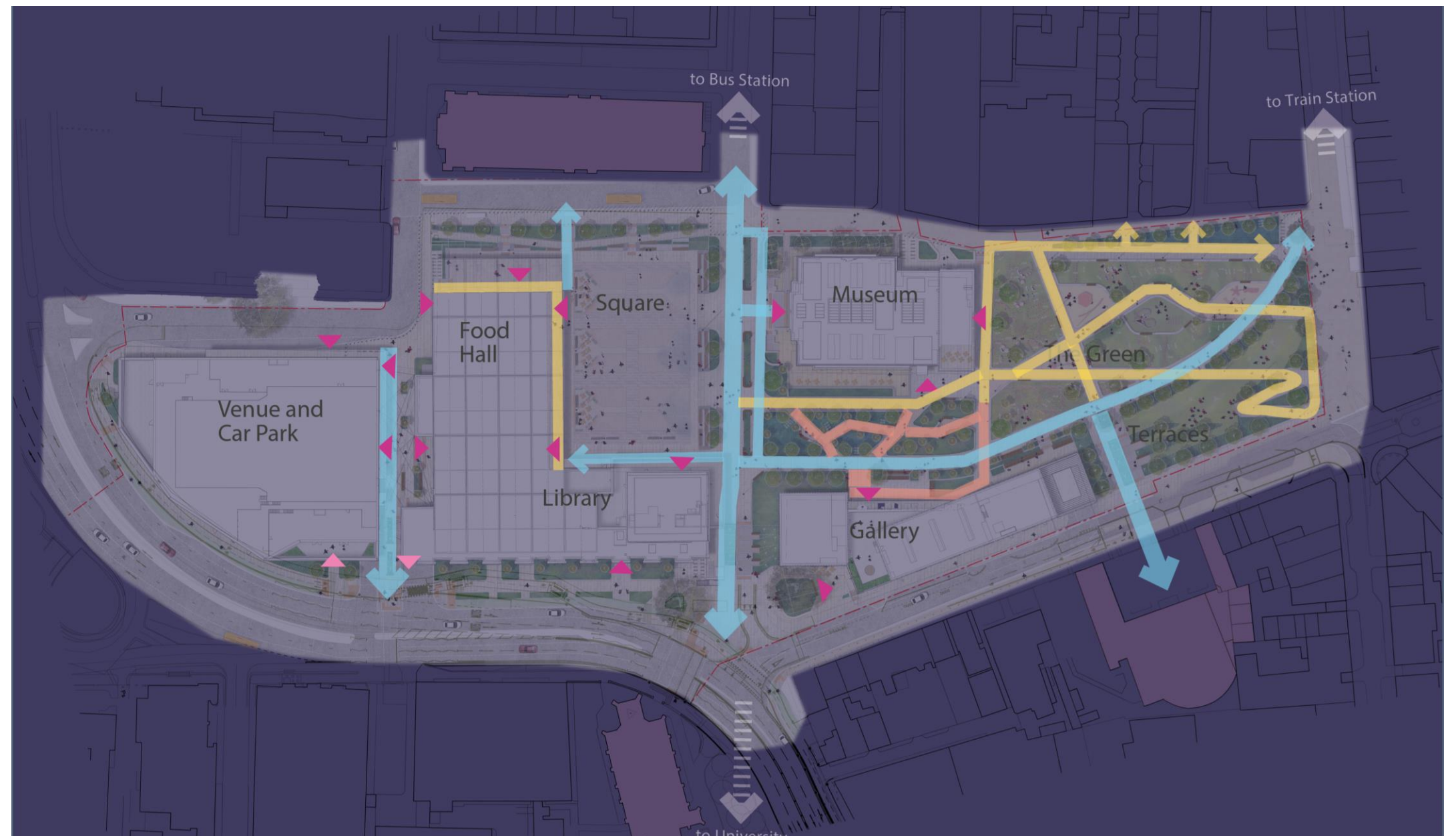


Surrounding Context

BUILDING ENTRANCES AND ROUTES

The plan shows the anticipated movement of people around the new development between the key destinations on site.

The development is fully pedestrianised, with the only vehicular access as routes from the highway, into the car park.



Key:

-  Main building entrances
-  Car park entrance and exit
-  Primary routes
-  Secondary routes
-  Tertiary routes

Routes through site

GATEWAYS, NODES AND DESTINATIONS

The creation of successful destinations, nodes and gateways is essential to creating identity, placemaking and promoting legibility throughout the development, and the lighting is a key ingredient for distinguishing these spaces.

These areas provide the opportunity for contained, unique illuminated characters, such as the use of coloured light, rhythm or dynamic features.

These spaces each have their own function and the duration of time users are expected to stay, which have direct implications on the type and design of lighting to best support the intended function.

The three categories are:

- Gateways
- Destinations
- Nodes

GATEWAYS

- Gateways to KCH
- Provide a sense of beginning, anticipation and understanding
- A brief feature generating interest for passing through
- Lighting for character
- Lighting leads the way, foreshadowing the destination beyond



NODES

- Way points on a route, used to orientate and act as descriptions on a journey
- Creating interest for short visits by hosting permanent or temporary show installations such as public art or interactive features – a place for people to visit
- Lighting for experience



DESTINATIONS

- Encouraging longer dwell times by creating social and play environments - a place for people to stay
- Lighting for ambiance and vitality
- Lighting takes a more permanent nature in the backdrop, allowing for the activity to be organic, front-and-centre
- Provide sense of arrival



GATEWAYS, NODES AND DESTINATIONS

Gate ways:

- Primary gateway from Queensgate - stairs between the Library and the Gallery
- Gateway from Peel Street
- Secondary gateway from Queensgate – between the Venue and the Library
- Gateway at the back of the Venue
- Gateway from King Street
- Gateway from Queen Street through to Terraces

Nodes:




- Gardens
- Play zones within the Green
- Node following the main gateway to site

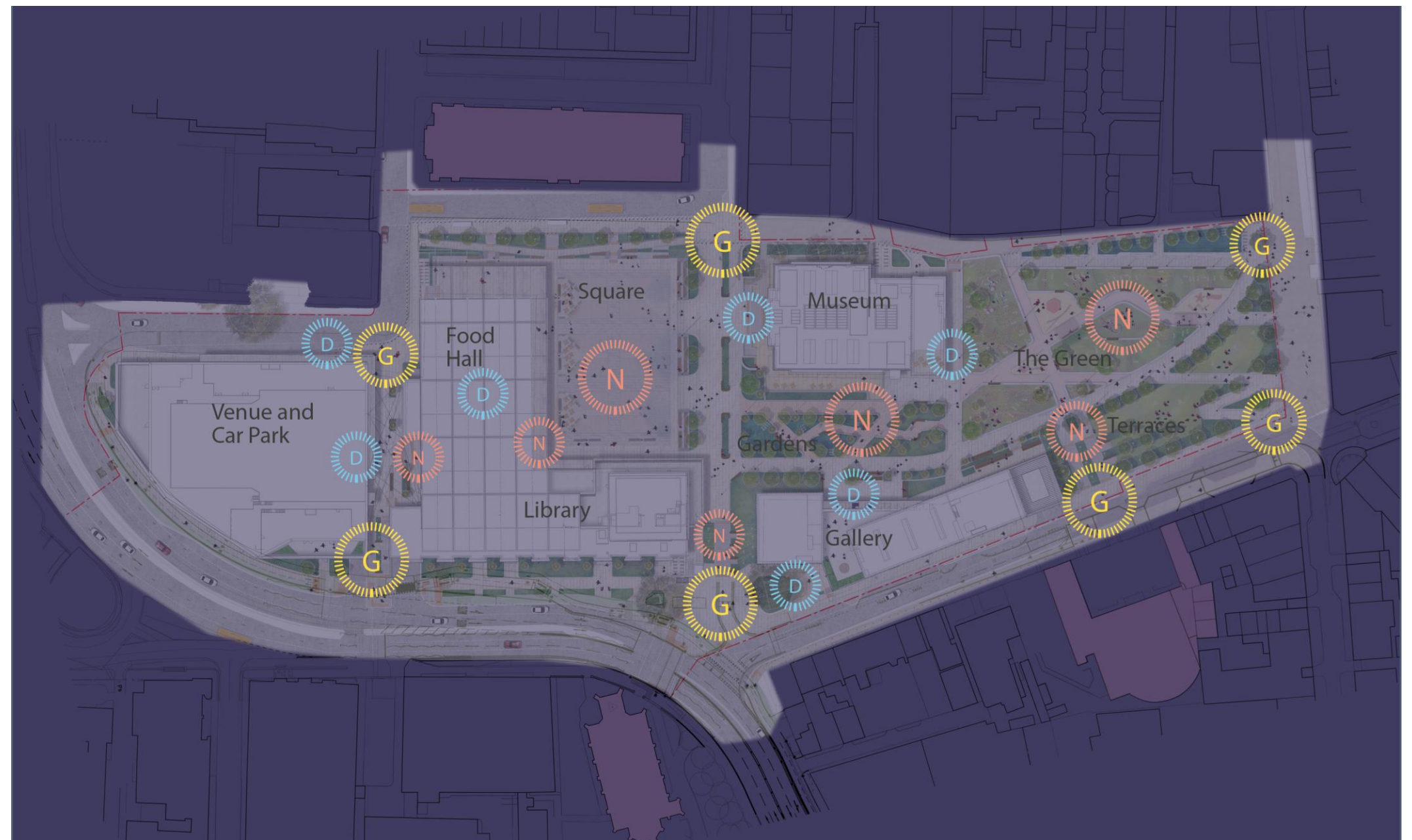
Destinations:

- Gallery spill out
- Museum spill out
- Food Hall spill out
- Event Square

The Event space is a destination when there is an event in the square, but also acts as a node to bring people to the Venue.

Key:

-  Gateways
-  Nodes
-  Destinations



Plan view showing gateways, nodes and destinations

KEY FAÇADES AND VISTAS

Key façades and vistas are important opportunities for Kirklees Council as a platform to promote events, and for the lighting design to shape how the development is perceived in person and in digital media.

They are dominant frontages, backdrops and points of interest and a key component of the destinations, nodes and gateways mentioned above.

The lighting approach in these areas will be carefully considered - ambient and accent vertical illumination layers and the design for a composition with background and foreground are defining opportunities that will be taken.

For example, forefront and historical buildings will have façades illuminated to varying degrees to provide visual interest and identity to destinations. Vertical illumination will not be confined to façades and will be used in other areas such as plazas and streets to support facial illumination and the perception of safety.



Plan view showing key façades and vistas

DYNAMIC LIGHTING EFFECTS AND COLOUR

The colour temperature of the lighting to the facades will tie in with the surrounding public realm to create a cohesive scheme.

Dynamic coloured lighting will be provided to key spaces and facades as a customisable overlay for evening and events; create a more engaging and immersive atmosphere.

For further details of the proposed strategy, please refer to Section 5 of this report.

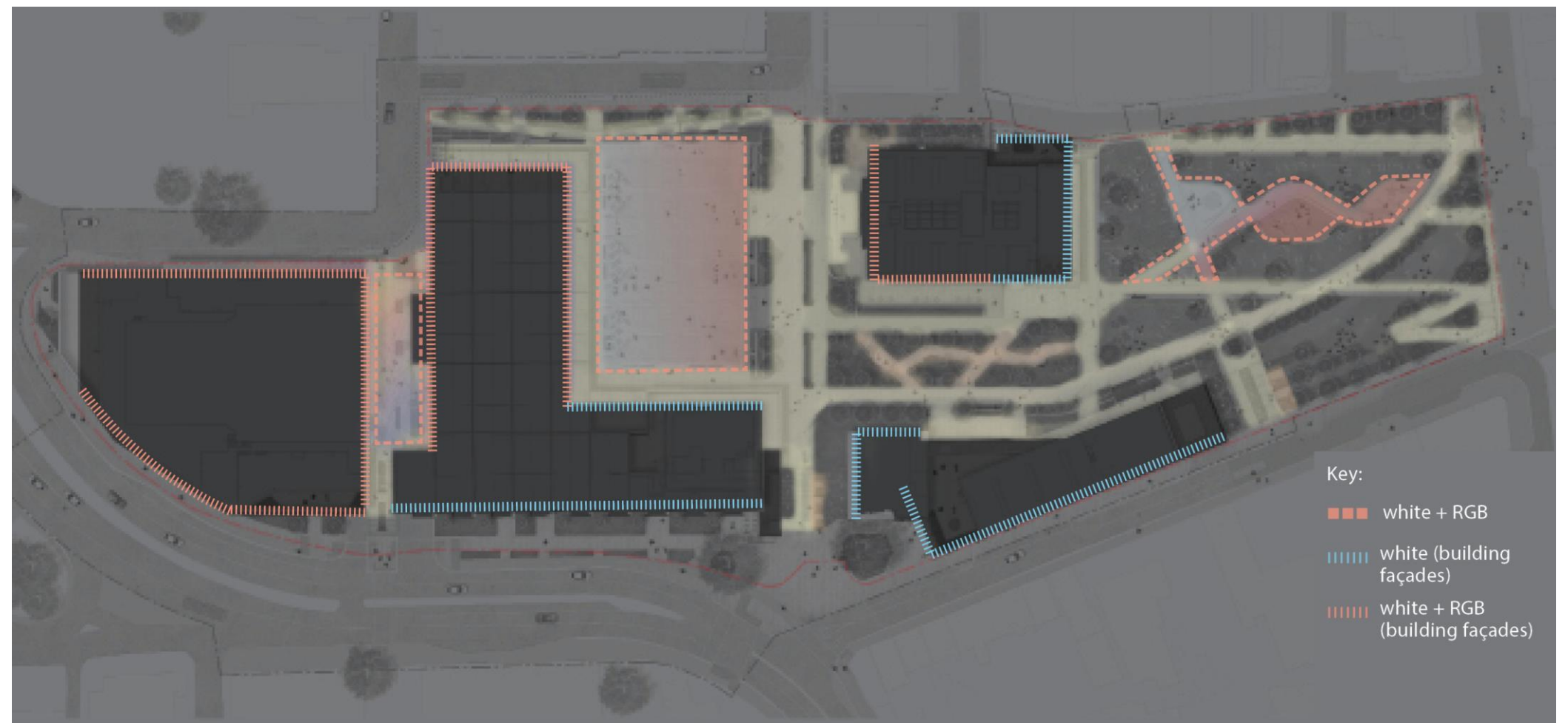


Diagram of the varied dynamic lighting effects and colour temperatures proposed for use within the site

Section 3 Lighting Vision

DESIGN PRINCIPLES AND APPROACH

A layered approach has been utilised to inform a consistent overarching design of lighting within the development. The considered application of lighting layers in conjunction with a cohesive lighting strategy to individual character areas reinforces their unique identities while creating legible and safe environments throughout the development.

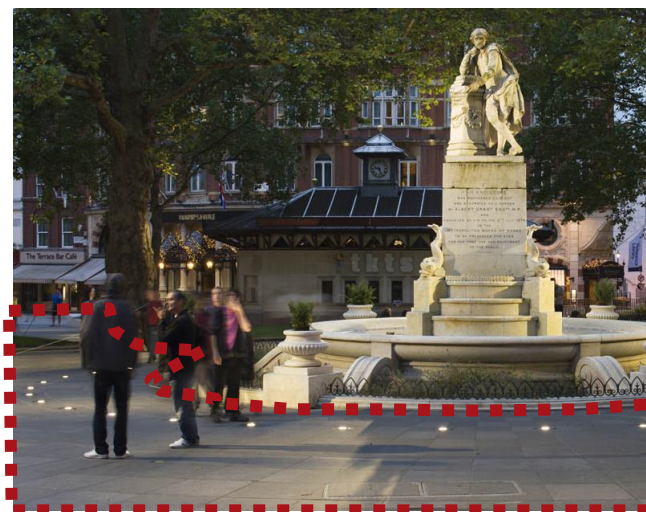
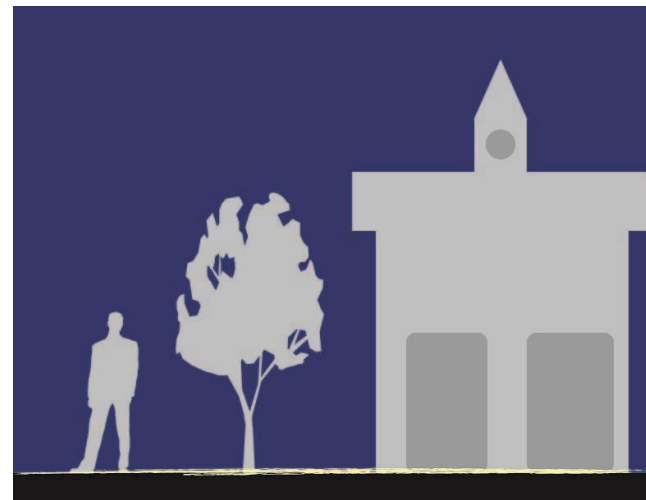
The three key layers of light considered are:

- Ambient horizontal illumination
- Ambient vertical illumination
- Accent illumination

The figures on the right demonstrate the fundamental characteristics of each layer and their contributions to the final lighting composition.

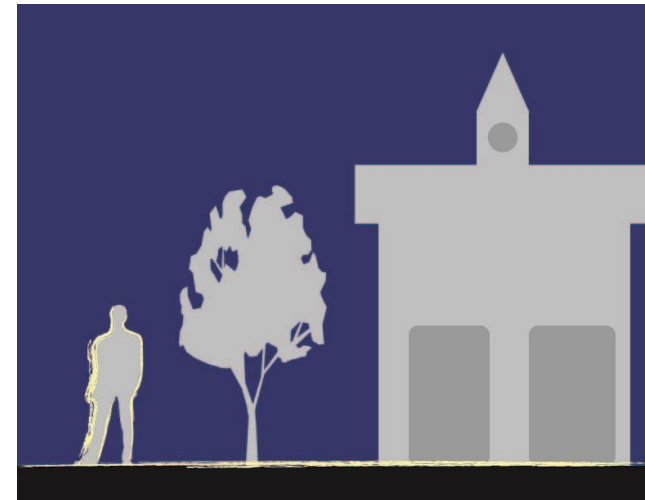
AMBIENT HORIZONTAL ILLUMINATION

- A base layer of light on the horizontal plane (typically the ground).
- Aids wayfinding and promotes safe navigation by illuminating pathways, changes in level, and other potential obstructions and risks of trips/falls along the route.
- Typically provided by the downward portion of a luminaire's photometric distribution.



AMBIENT VERTICAL ILLUMINATION

- A base layer of light to the vertical plane.
- Improves illumination for facial recognition to enhance the perception of safety, a key aspect influencing the use of public realm space.
- Typically provided by the diffuse portion of a luminaire's photometric distribution, or inter-reflection from adjacent surfaces.



ACCENT ILLUMINATION

- Localised highlights of higher illumination (typically to static elements such as monuments, facades, vegetation, street furniture, etc.)
- Encourages the use of public realm space by providing destinations, directing the eye and channelling the movement of people towards surfaces and areas of higher luminance.
- Creates impressions of space, depth and volume.



KIRKLEES CULTURAL HEART LIGHTING EXPERIENCE

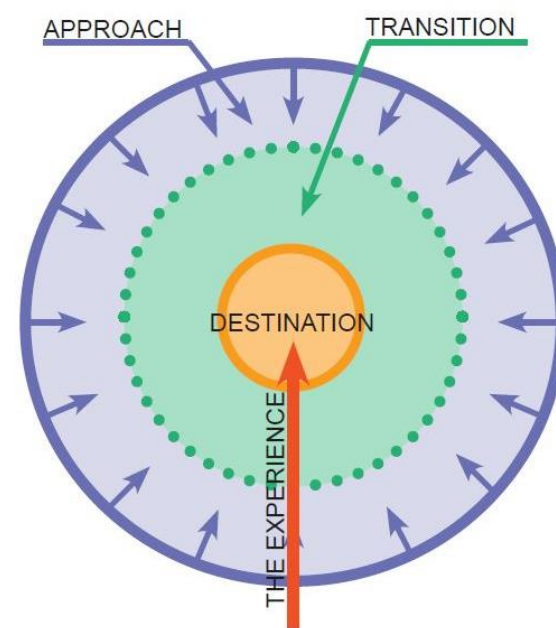
The lighting masterplan has been developed to capture the unique qualities of the existing and proposed development:

- Compact urban form
- Friendly Environment
- Landmark structures
- Landscape setting
- External event space

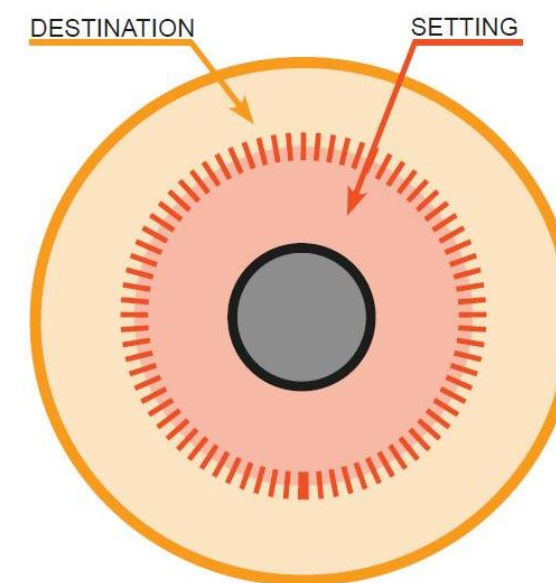
It is the ambition of the lighting masterplan to help accentuate and elucidate these distinctive flavours for both residents and visitors to KCH.

The illuminated experience is crucial in delivering a positive experience lighting character embracing the lighting philosophies outlined above will help to reinforce the identity and functionality. In particular the following elements has informed the development:

- Highlighting of historical facades of the renovated Museum and unique form of the Food Hall and Library structure - reinforcing the identity of the town by drawing attention to the unique fabric and heritage of the city.
- Considering the visual presence of the venue from beyond the site
- Layering of lit facades - providing a legibility to allow users to orientate themselves within their surroundings.
- The considered use of lighting equipment styles - complementing the variety of architectural aesthetics to support key placemaking strategies.



Event Mode



Non-Event Mode



Bradford City Park

OPERATING MODES

Kirklees Cultural Heart public realm has three different operating modes:

- Event at the Venue - High pedestrian movement using the venue main entry points and dwelling/queuing in the public areas and increased foot fall around the food court and public realm.
- Event in the Event Square - High pedestrian usage within the external event space, high footfall in and around the public realm and the food court.
- Day-to-day Mode - Minimal pedestrian footfall related directly to the Venue. The public realm becomes a more transient space to provide access to the Food Hall.
- After Hours Mode – During the early hours reduced levels respond to lower levels of anticipated traffic, lit for safety.

The KCH lighting strategy has provided defined lit spaces that respond to their use, encouraging the public to stop and relax. It provides visual assistance to identify routes, allowing destinations to be reached in comfort.

PLAYFUL AND EVENT LIGHTING

An overlay layer of lighting provides an element of play and interaction with the community, both during the daylight hours and after dark. This lighting overlay is intended to:

- Facilitate temporary event and seasonal usage, flexible lighting provision and control to curate the lit environment
- Creation of dynamic and interactive lit spaces at night.
- Adding playfulness to feature lighting elements e.g. tree lighting
- Linking the community together with communication via light
- Serendipitous play to give more character to transition spaces and engaging a broader range of demographics.
- Providing canvas for artistic interventions and festivals



To deliver these aspirations, different types of playful interventions are considered as part of the lighting strategy, these may include:

1. Passive interactive projections onto the floor in targeted areas
2. Dynamic face lighting/fountain lighting to support temporary and civic events and broader communication with visitors to KCH.
3. Playful interactive street furniture - permanent playful artist developed digital interventions along key routes, to introduce colour at a pedestrian scale and encourage 'play-on-the-way' with young and old alike.



Precedent Images of dynamic and interactive lighting

USE OF COLOUR AND COLOUR TEMPERATURE

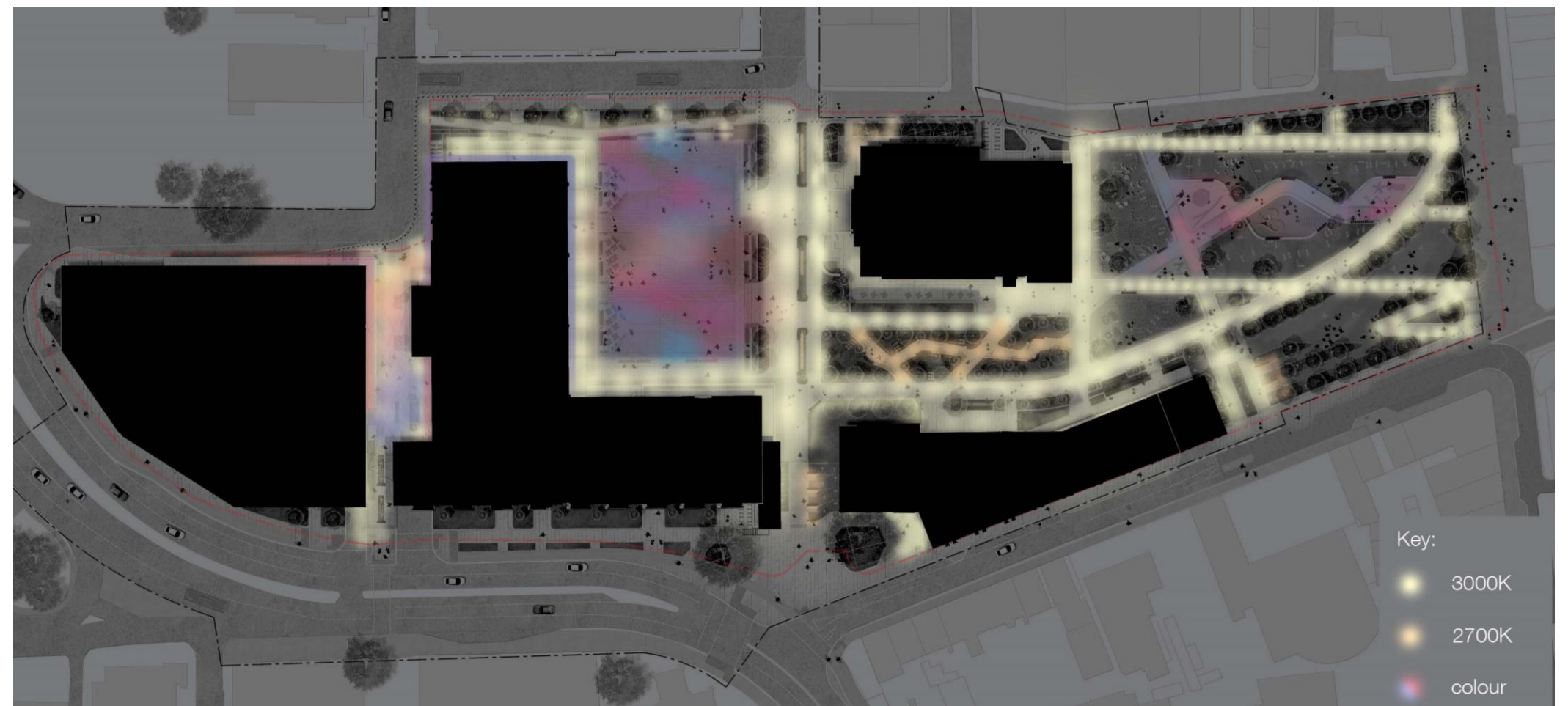
The nighttime overview shows the colour temperatures proposed in the development.

A warm white 3000K provides the baseline colour temperature for the majority of routes and spaces, lighting will be of good colour rendering for CCTV.

The use of warmer 2700K white will differentiate areas for people to stay and enjoy, encourage positive use of the public space and dwell within the gardens and terraces.

Dynamic colour is focused around the event square and the play zones on the Green to attract fun and play and be dynamic to suit the festivities taking place.

There is a water element within the Event Square, coloured lighting and projections create different reflections off the water surface and add to the ambience of the space.



Nighttime Overview plan

SCALE

Varying sizes and height of equipment forms a lighting family which can be applied to different areas and route types.

Scale is important to define primary, secondary and tertiary routes to aid with wayfinding and place-making.

The Journey

The Journey from King Street to the Venue takes people along the Spine route which is lit via 5m columns with flat glass lanterns.

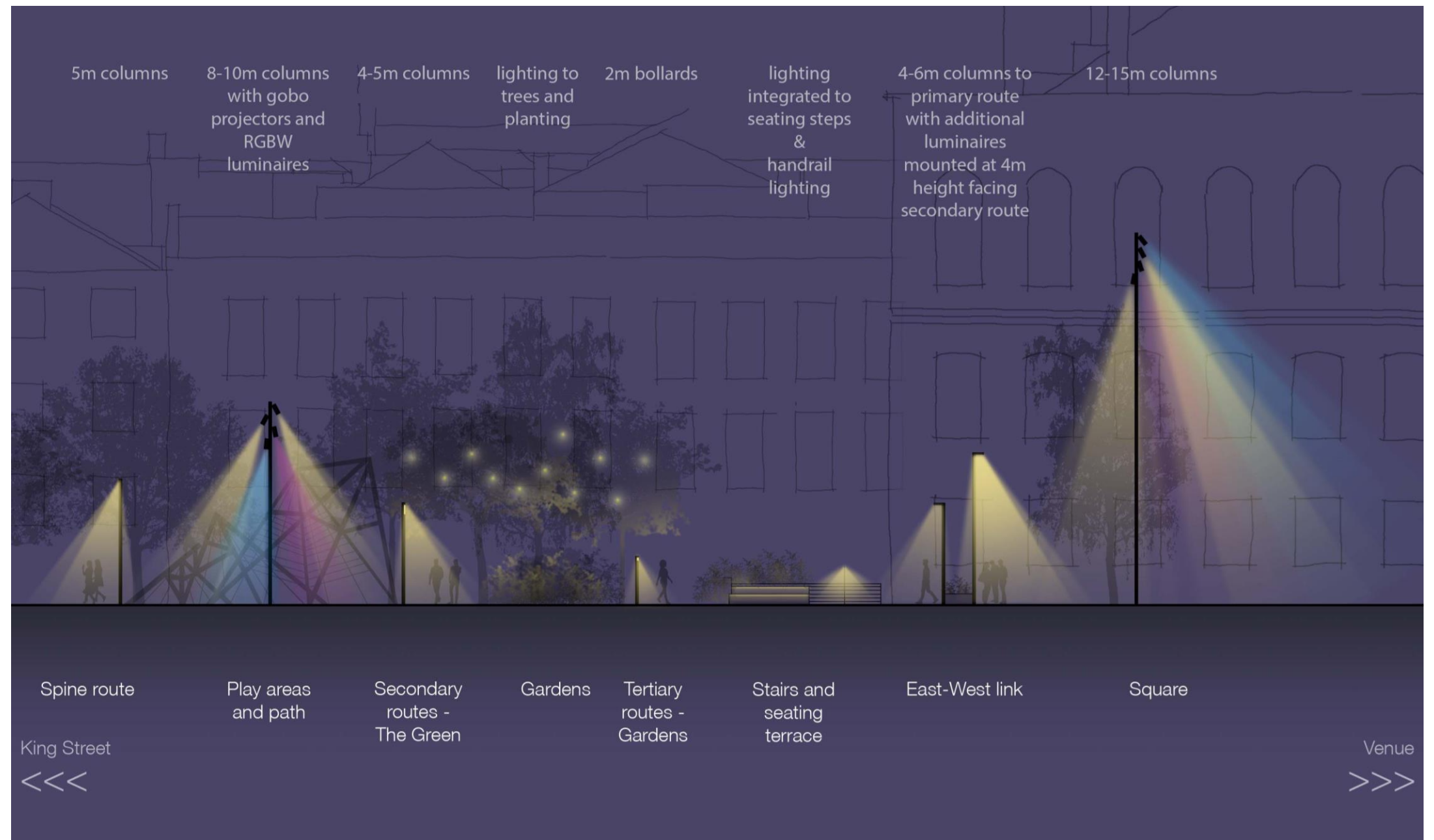
Through the Green there are taller columns situated around the play zones that place colour and pattern over the undulating ground.

Through the Gardens the height of lighting equipment becomes more intimate and human scale, to promote stopping to dwell. Lighting to vegetation at low level offers a backdrop for passive surveillance.

The Terraces are made up of stepped and ramped routes where lighting is enhanced at changes in level. Stepped seating areas have lighting integrated to create areas for dwell.

Through the East-West Link taller columns promote a sense of place, acting as the primary route through the site, increasing the height of equipment to heighten presence and offer wayfinding.

The journey comes to a climax at the Event Square where multiple floodlights are aimed across the square offering opportunities for colour, dynamic displays, and integration of projectors and rigging points for future flexible events.



Scale Diagram

Section 4 Character Areas

PUBLIC REALM KEY SPACES

To create different character areas within KCH, but maintain a cohesive lit environment, the following pages describe the lighting principles for the scheme as a whole and details pertaining to each key area and route type.

The lighting strategy has been developed considering the following priority themes:

- Placemaking
- Longevity
- Safety

The following pages will describe the character of each area within Kirklees Cultural Heart and define the lighting types proposed.

It will discuss the following:

- The Green
- The Gardens
- The Square
- The Terraces
- Princess Walk.



Public Realm – Overview of Areas

THE GREEN

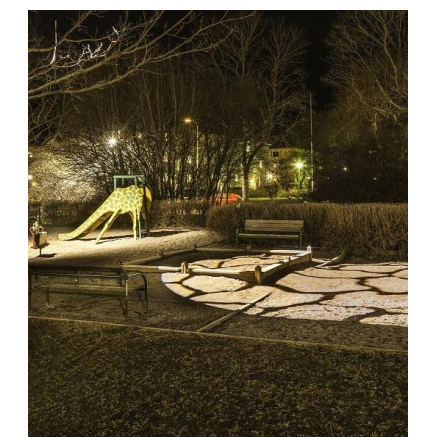
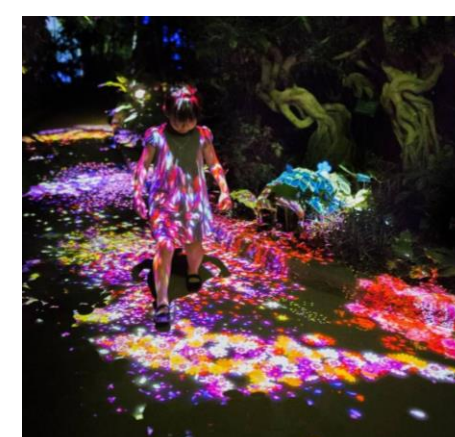
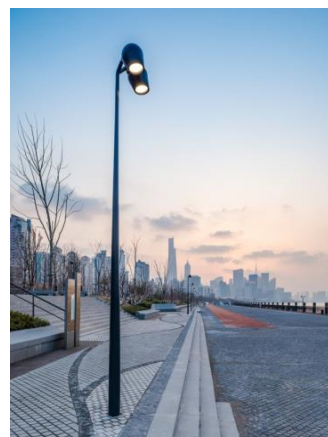
The green is located on Victoria Lane and King Street, there will be an area for skateboarding, play and seating to observe.

Lighting is provided to the play areas and pathway that meanders through the play.

Covered canopies and pergolas have lighting integrated to create little spaces for people to sit and dwell comfortably. Lighting to the front of the space enhances facial recognition.

Multi head columns provide directional light over the pathway and the play areas.

Projections of dappled light and patterns over the play equipment enhances the fun and interactivity of the spaces.



COLUMN LIGHTING

PROJECTIONS | ART INSTALLATIONS | COLOUR

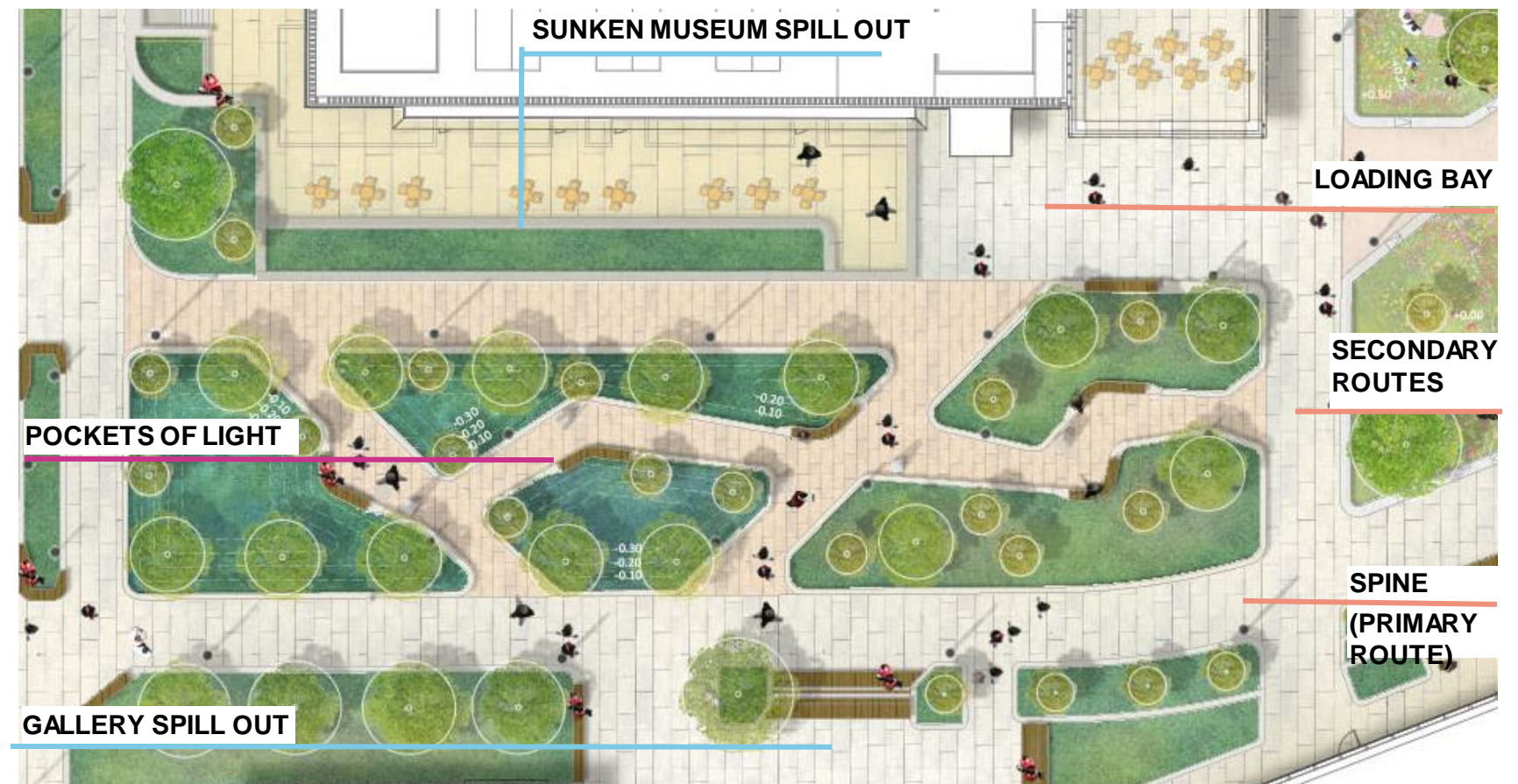
THE GARDENS

The Gardens are located between the Museum and Gallery, where people who are between visiting can go to rest and relax.

Pockets of green are interspersed with benches which have lighting integrated to create a pleasant space for people to sit.

2-m lighting elements provide route lighting, and small floodlights spike mounted within green areas provide lighting to plants.

Lighting is integrated into benches to create moments of dwell and enhanced vertical light levels.



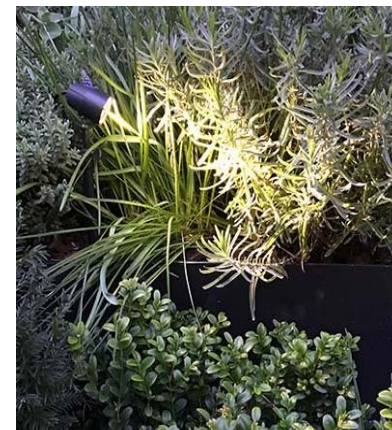
PLANTER EDGES



SEATING EDGES – BENCH LIGHTING



SOFT LANDSCAPE LIGHTING



EVENT SQUARE

The Square is a flexible space for markets, shows and gatherings. The lighting is flexible in nature to allow for different activities to take place.

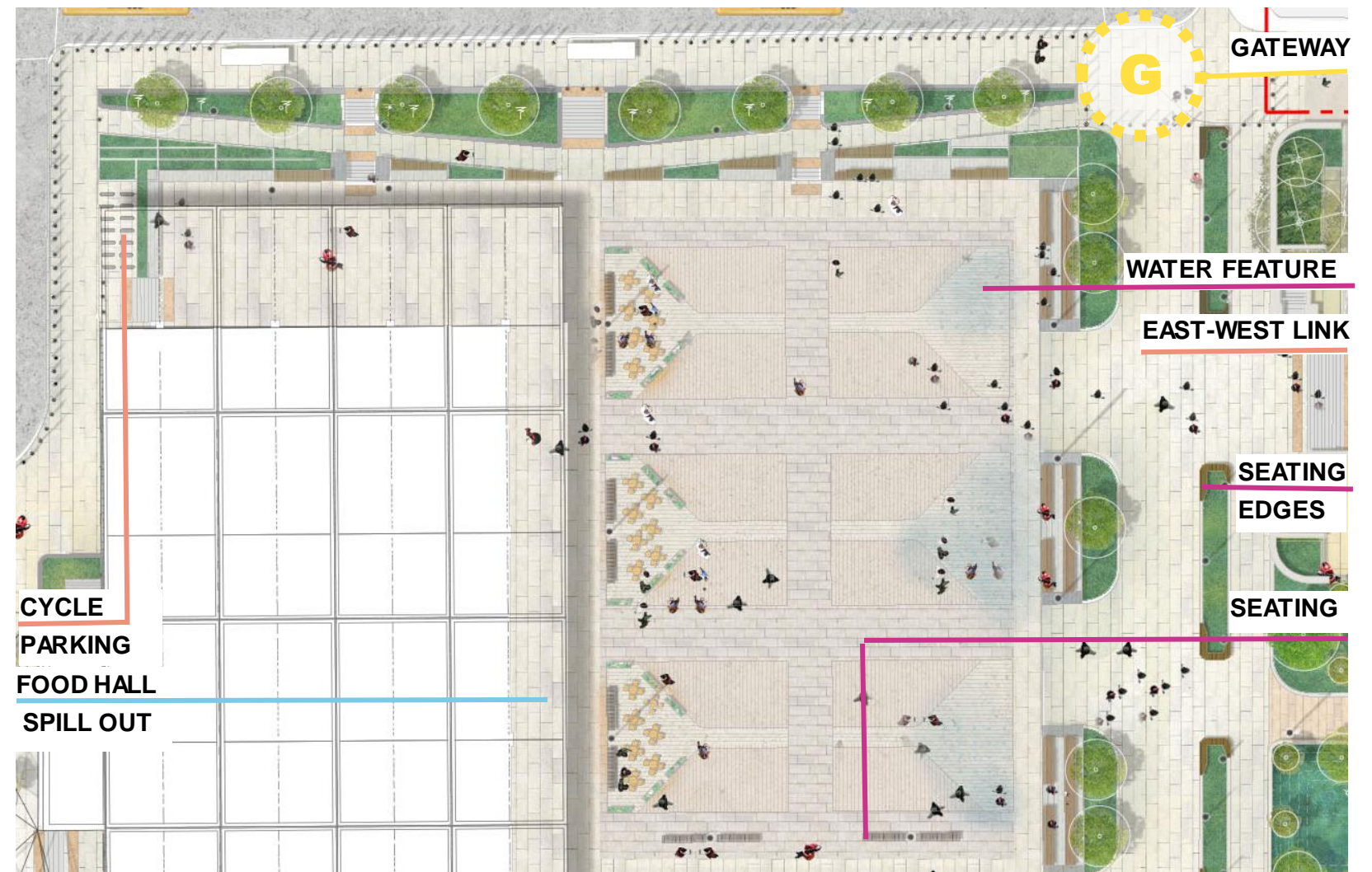
During the 'Event at the Venue' mode, lighting levels increase when people are moving around before / after the event, providing safe levels of light within the square when there are crowds.

During the 'Event at the Square' mode, lighting levels reduce, but there may be an overlaid textural light such as projections or patterns, that move and create interest within the Square and over the wet surfaces of the fountain display.

During the more transient times, i.e. when there are no events on or during the early hours of the morning, the lighting becomes reduced in level to maintain safe light levels through the square, but adapt to the anticipated traffic and reduce the energy consumption.

15m columns and 8m columns with multi-head floodlights provide area lighting to the square for day-to-day and event modes. Projectors are incorporated to provide a textural overlay.

Lighting is integrated into water features to create interest and dynamic effects across the square.

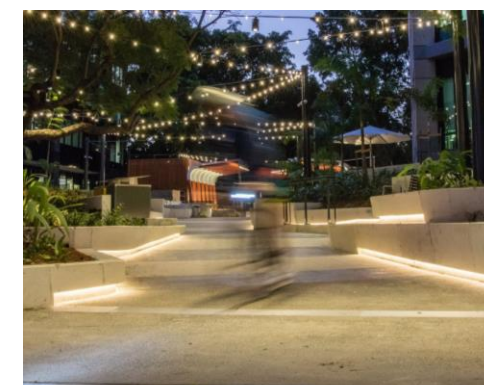


LIGHTING COLUMNS

September 2022



WATER FEATURE



EDGES



PROJECTIONS

TERRACES

Terraces are located in three areas:

1. Queen Street Gardens
2. Queen Street East – West Link
3. Princess Walk

The Terraces act as gateways into the site along the main highway route, and have the following elements that have lighting treatment, to create a sense of arrival and continuity, wherever visitors enter.

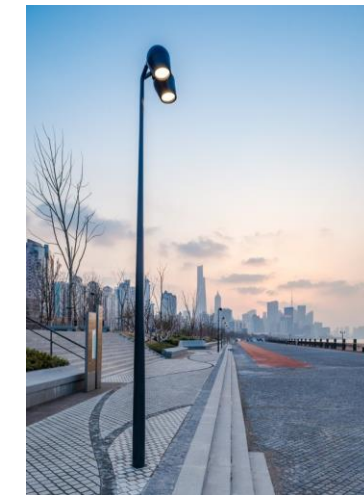
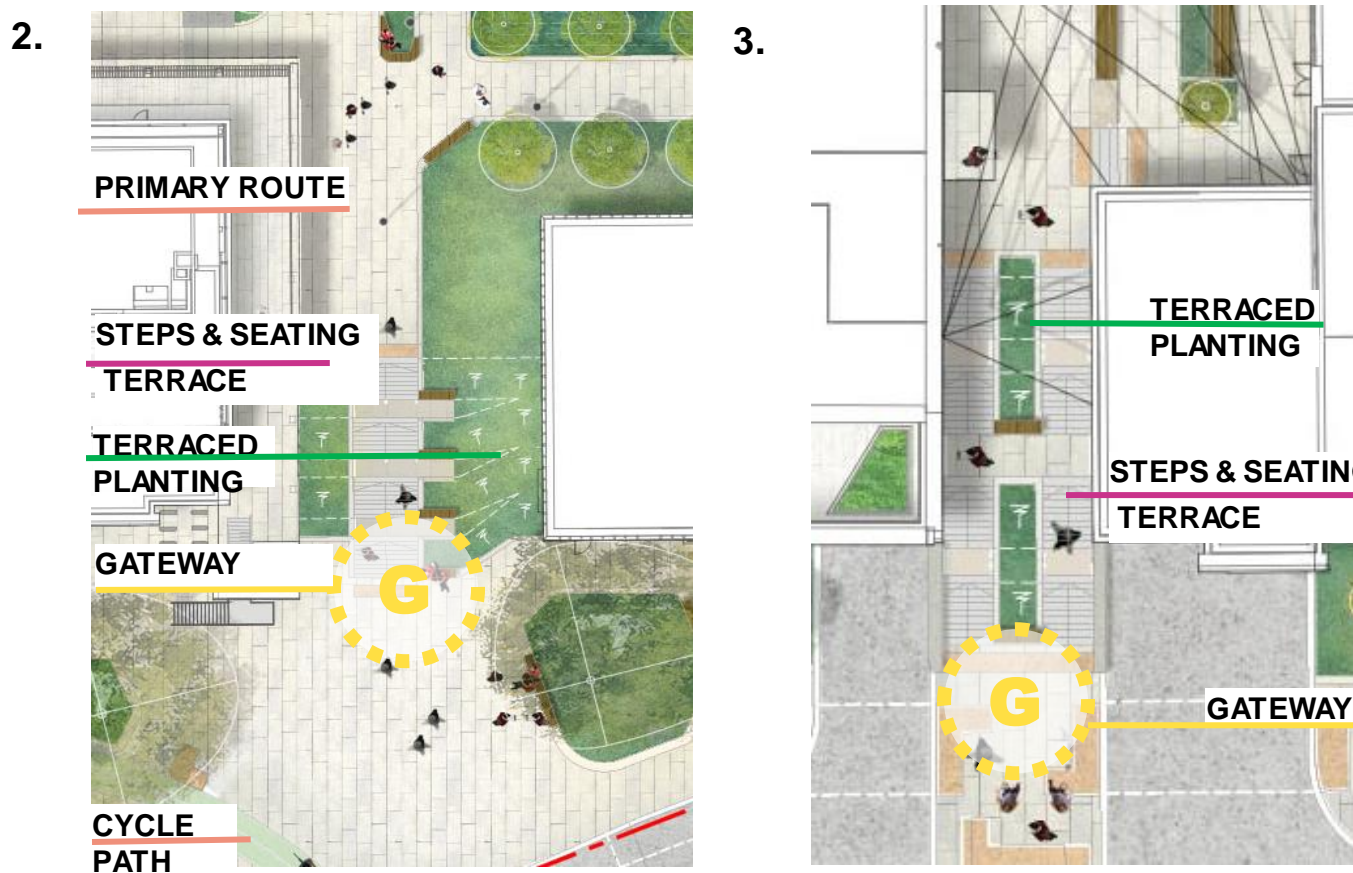
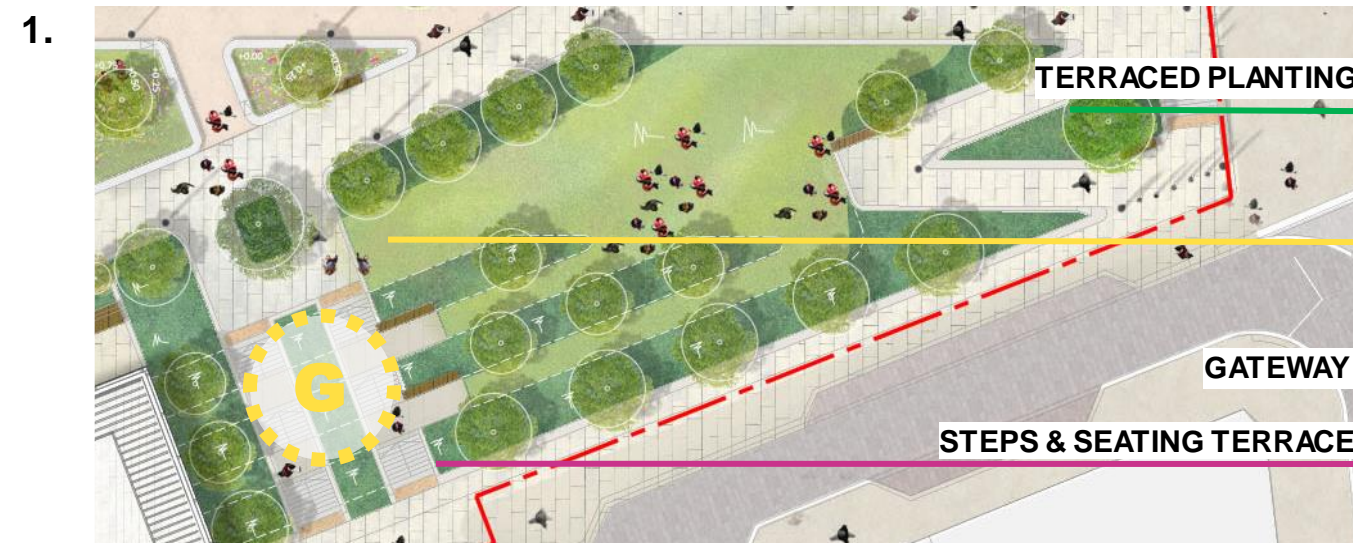
- Steps / ramps
- Seating
- Terraced planting.

By applying lighting to the vertical surfaces of the different elements of the scene, there is a higher ambient lighting level to offer passive surveillance, enhancing the perception of safety.

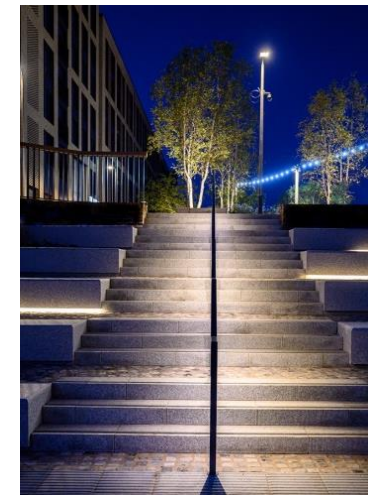
At Gateways where there is stepped access, lighting is integrated into handrails to provide wayfinding, and enhanced levels of light for safety.

At ramps, column mounted luminaires provide lighting to changes of level.

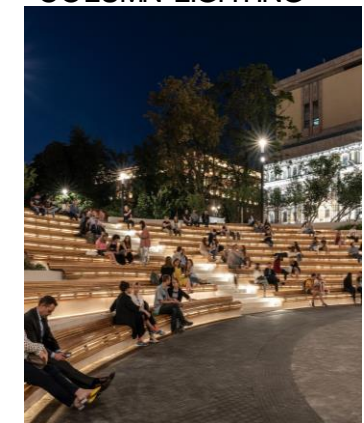
Planting within the terraces and stepped seating is highlighted by integrating lighting to light vertical surfaces to create a backdrop.



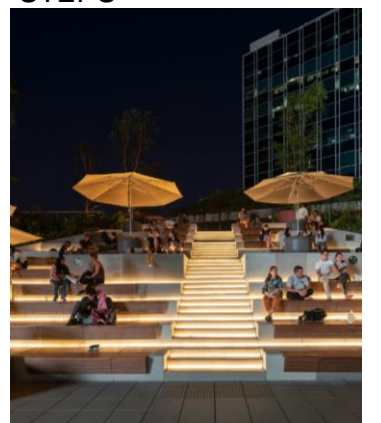
COLUMN LIGHTING



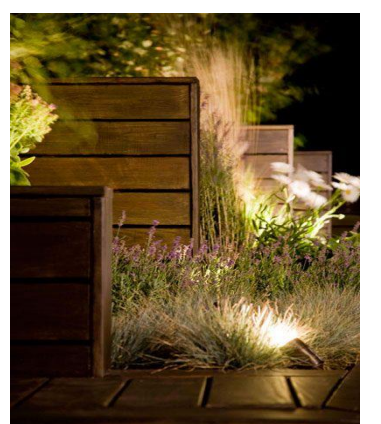
STEPS



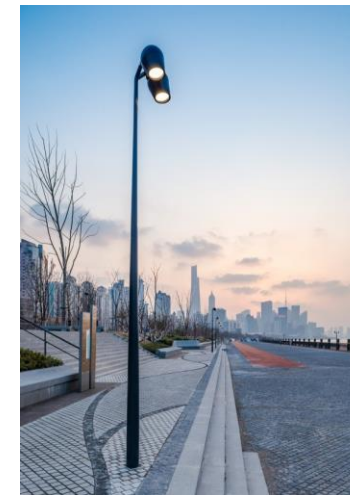
STEPS AND SEATING TERRACE LIGHTING



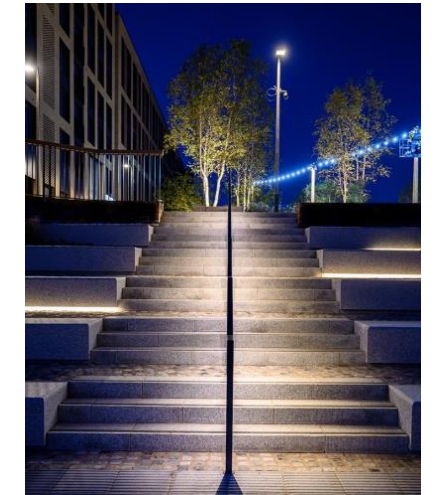
SOFT LANDSCAPE LIGHTING



TERRACES



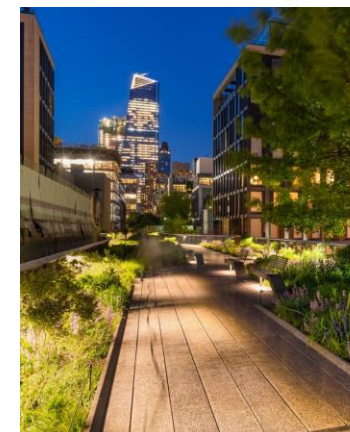
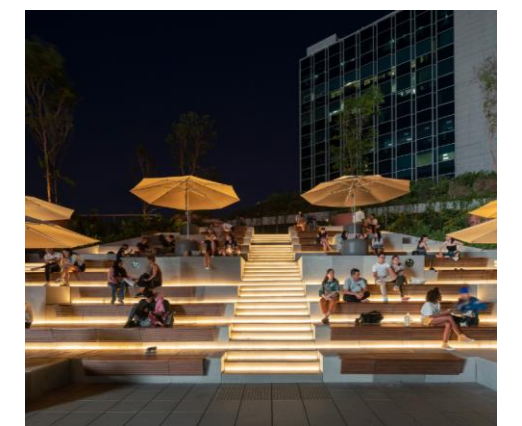
COLUMN LIGHTING



STEPS



STEPS AND SEATING TERRACE LIGHTING



SOFT LANDSCAPE LIGHTING

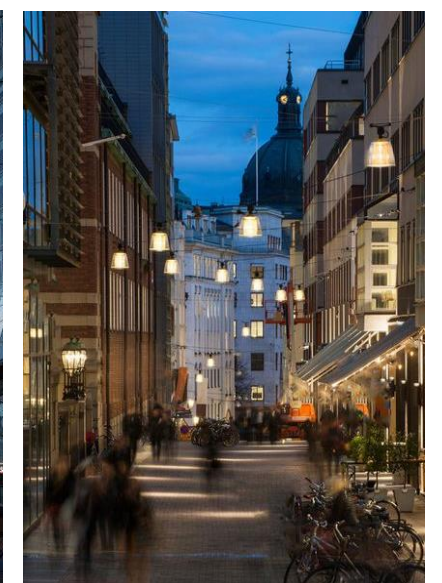
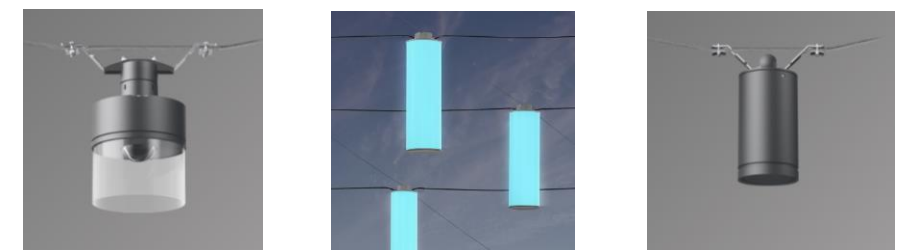
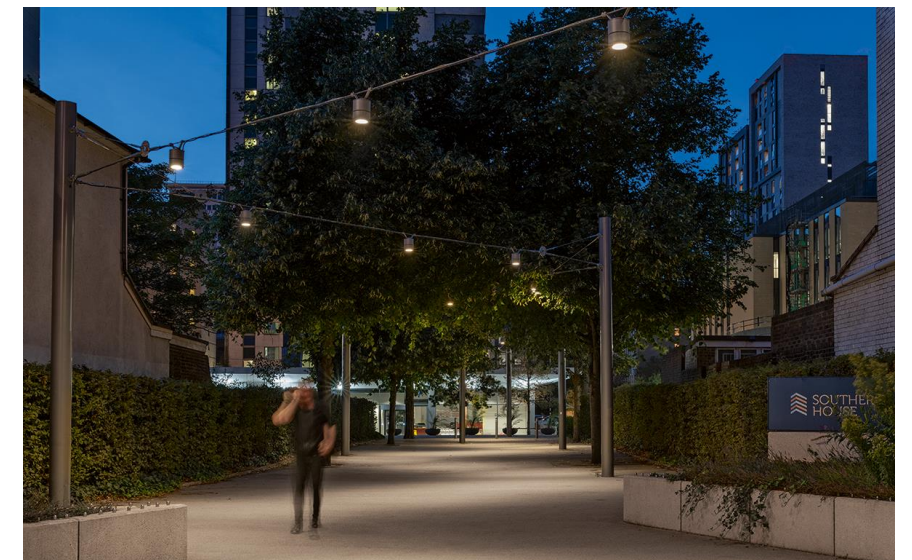
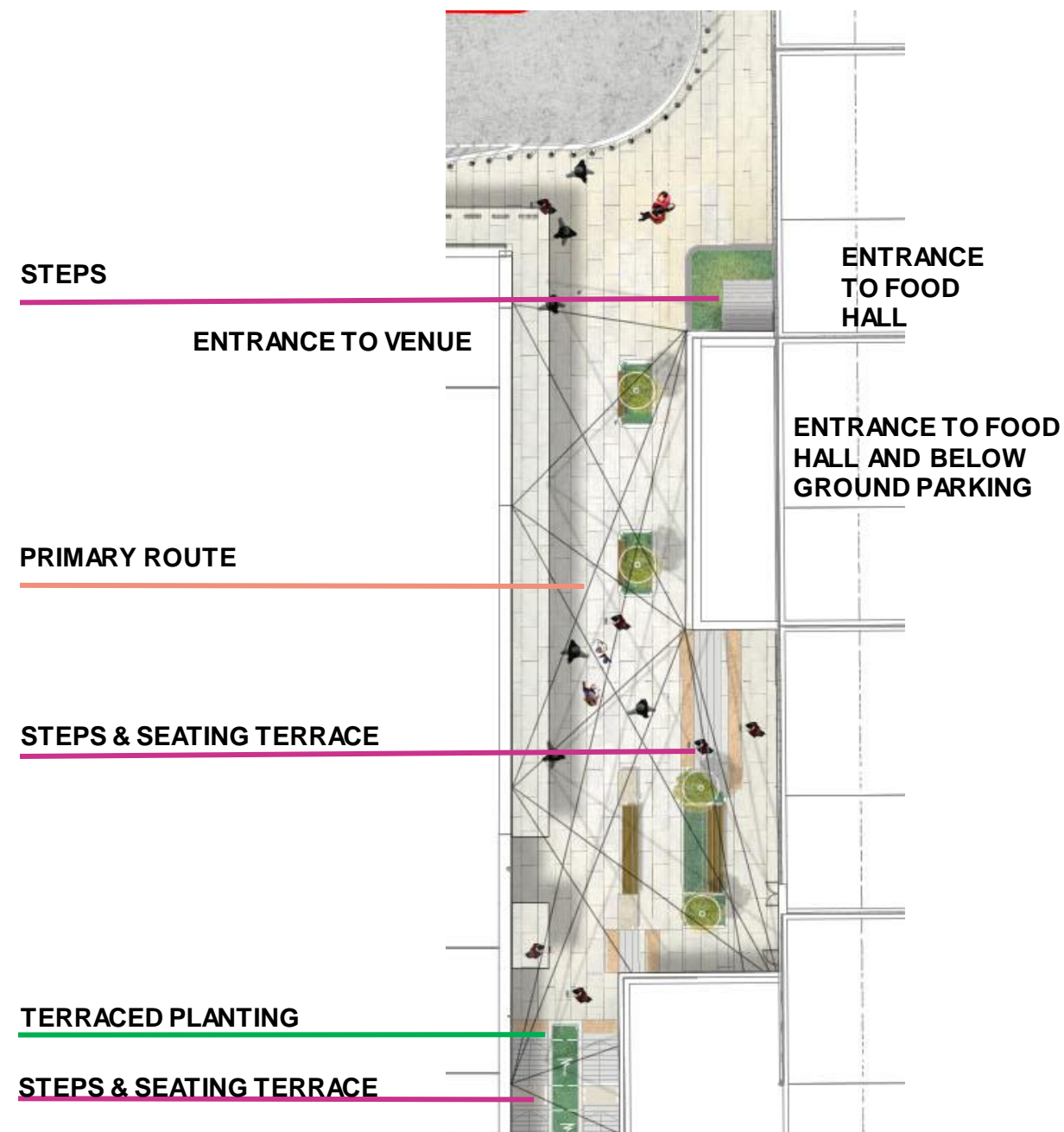
PRINCESS WALK

Princess Walk is bounded by the Venue and MSCP and the Food Hall. To avoid the 'back alleyway' feeling, lighting will bring a sense of fun, playfulness and be colourful to heighten the excitement, pre show.

Venue goers will use this space to wait for friends and family before entering, queuing up and as an access point into the car park.

Catenary lighting is supported by the Venue and Library / Food Hall facades, to create a canopy of lights.

Quantity and frequency of luminaires help define entrances, and create routes for wayfinding.



Section 5 Facades

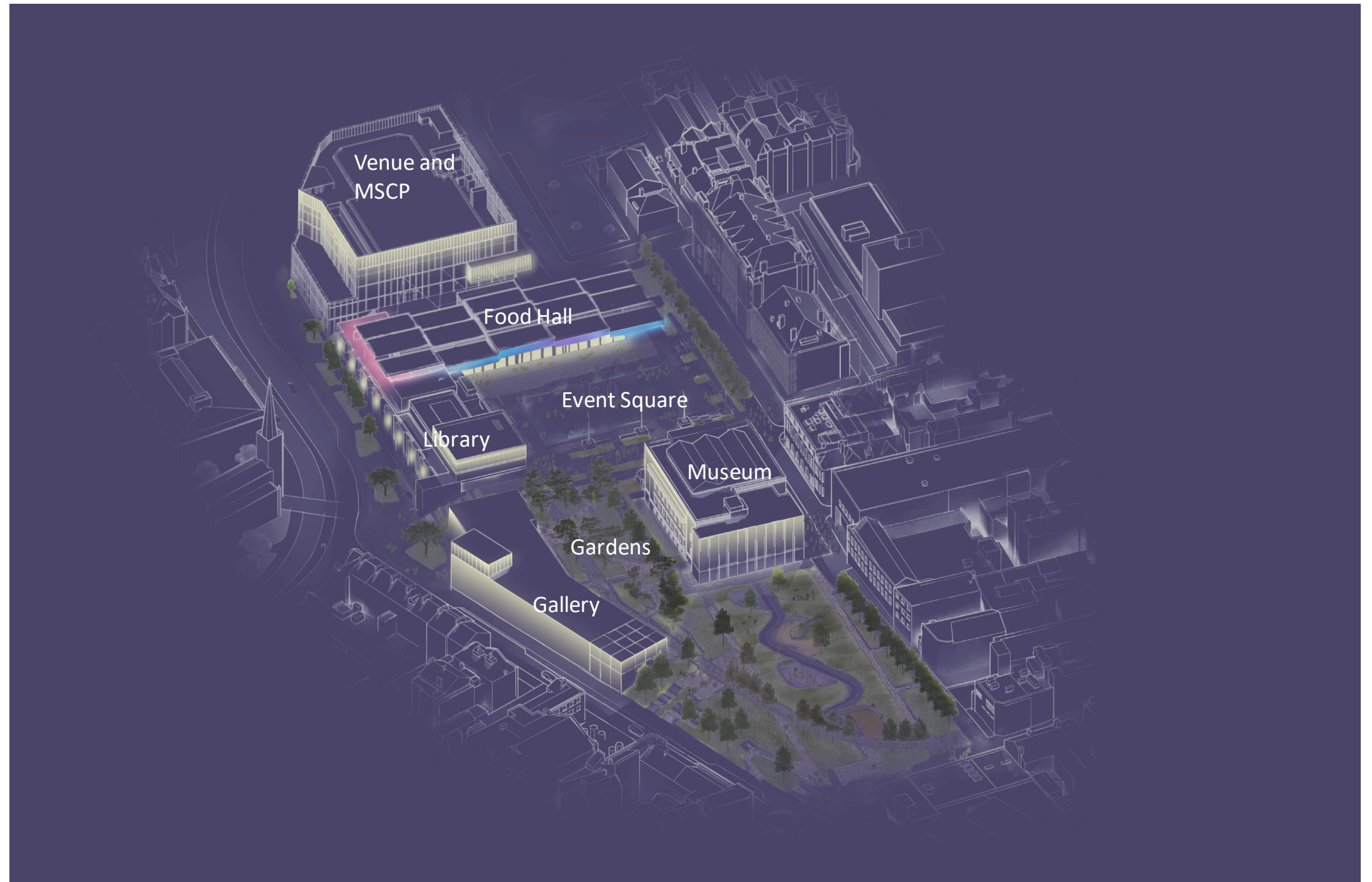
FAÇADES OVERVIEW

The lighting approach to the façade lighting is designed to align with the wider public realm.

This section highlights key Grade II listed façades upon the following buildings:

1. Library
2. Museum

The other buildings within KCH have elements of Façade lighting which will be developed alongside the architecture to create a cohesive backdrop to the public realm lighting scheme.



Overview showing key façades and vistas

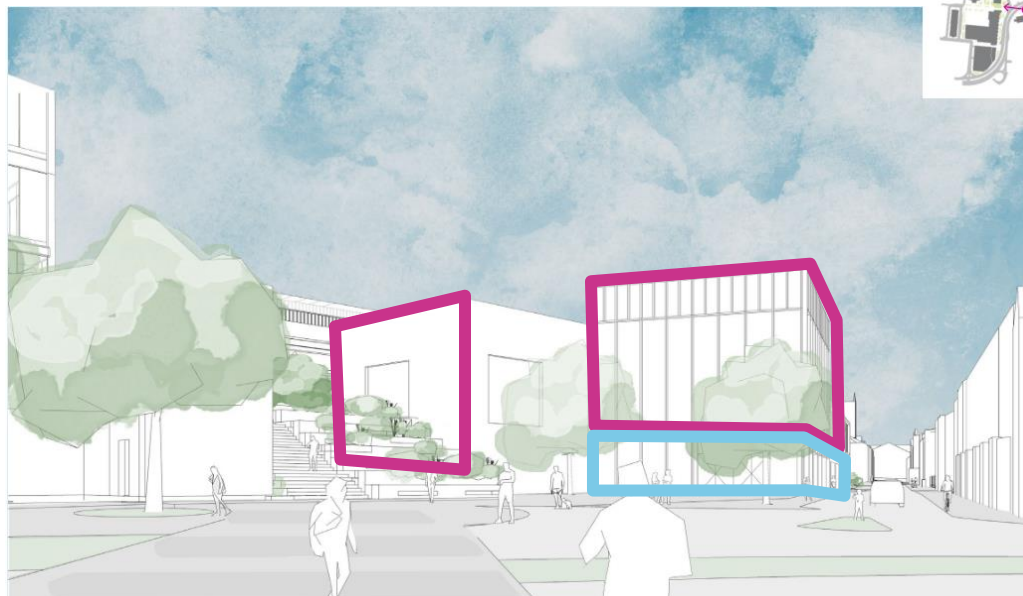
KEY FAÇADE

Key viewpoints have been highlighted as areas which will attract people into the space. Lighting to the façades can create a beacon to attract people from far away, and also help guide people within the area by applying lighting at a lower level.

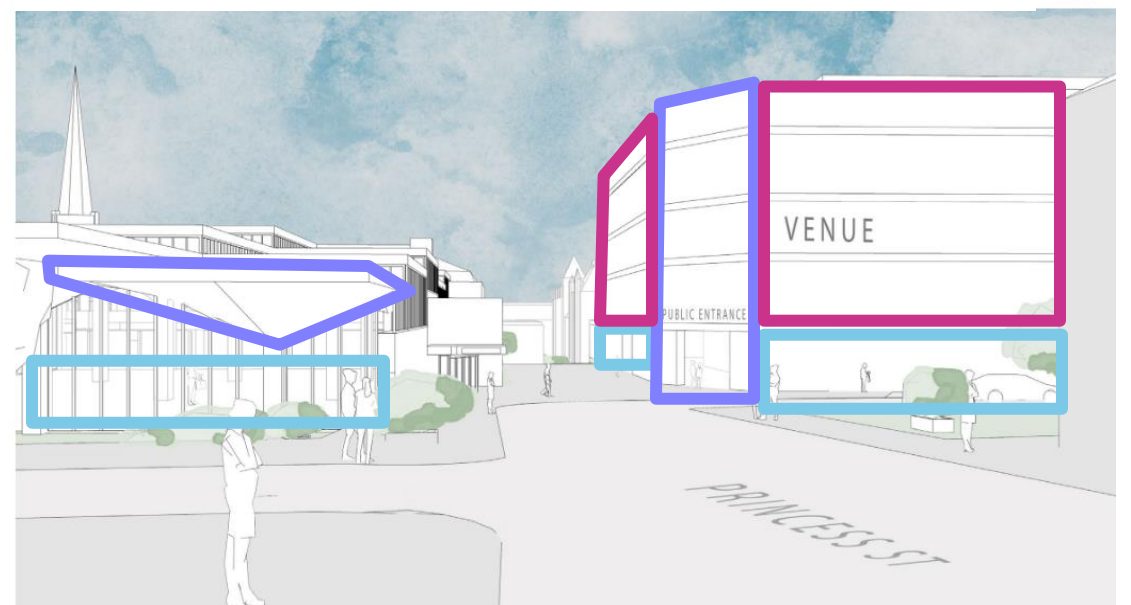
Within this section, the key façade views have been separated into three categories:

- **Active frontages:** The lower sections of the buildings will act as active frontages where there will be spill light into the streets encouraging foot flow.
- **Prominent façades:** These are the sections of the façades that will be seen from key viewpoints and encourage people to approach the area
- **Dynamic Facades:** These will have a colour overlay that can be tailored to specific events

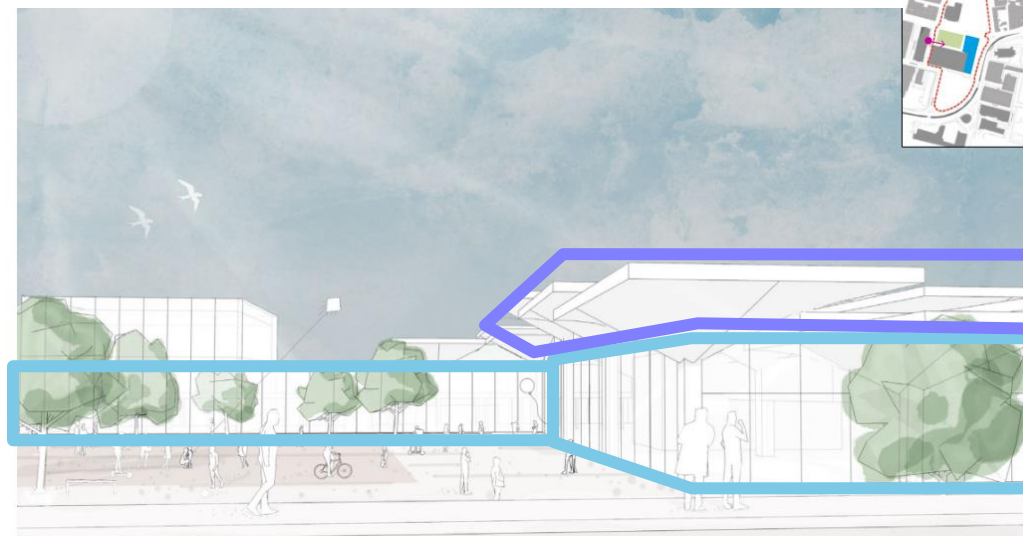
Indicative Gallery View



Indicative Venue and Food Hall



Indicative New Library and Food Hall



Indicative New Museum



- Active Frontages
- Prominent façades
- Dynamic façades

HERITAGE LIBRARY FAÇADE

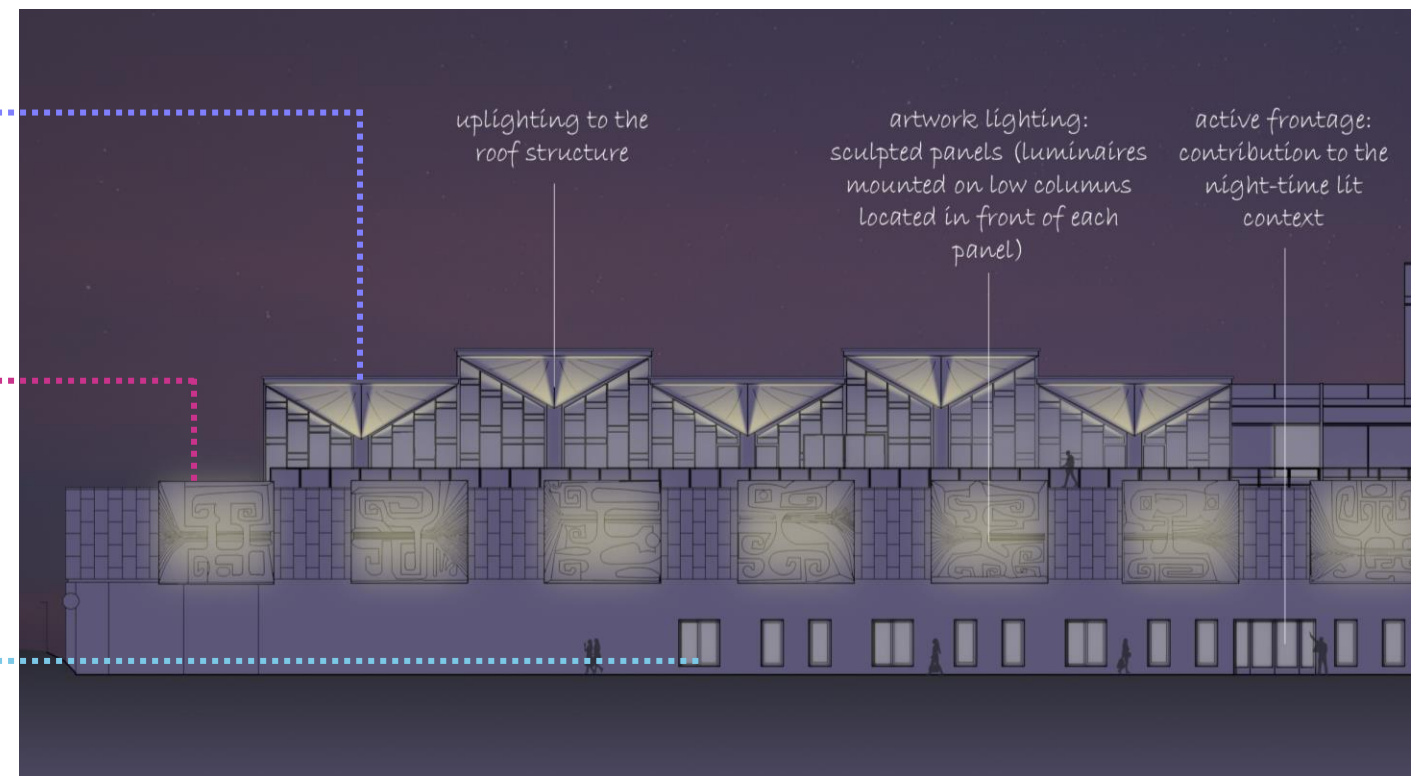
The library façade is Grade II listed. The friezes are heritage elements on the library façade, these are highlighted as prominent features.

At lower level the glazing acts as an active frontage to encourage movement outside the building and attract people in.

Uplight to roof structure to the Food Hall creates a soft glow and provides an interesting addition to the library facades. The lighting to the roof structure also provides a base lighting level to the Food Hall. This will also have a colour element to cater for events.



Library Façade Elevation



Library Façade Elevation

- Active Frontages
- Prominent facades
- Dynamic facades



Typical Product Images



Sketch of Friezes highlighted



Sketch of Mushrooms uplit

HERITAGE MUSEUM FAÇADE

The heritage façades of the Museum will have subtle lighting in keeping with heritage architecture. The South façade is more prominent onto the Event Square than the side façades, therefore we have defined the Museum's Primary and Secondary façades as shown.

The primary façade has key features highlighted via projectors that use precise gobo inserts to outline reveals and cornices, remotely mounted upon lighting columns in the event square.

This lighting strategy removes the requirement for luminaires mounted directly to the fabric of the Museum Façade, therefore is unintrusive.

The secondary façade will also have features picked out from projectors or floodlights mounted remotely on columns.

Additionally, the museum is located in a prominent position within the event square which creates an opportunity for temporary projection mapping and festive lighting interventions.



Museum Façade image



Museum Façade South Elevation

- Primary Façade
- Secondary Façade



Typical Product Images



Precise Gobo Projection (Example by We-Ef)



Precedent images of heritage facades



Section 6

Lighting Criteria

APPLICABLE CODES AND GUIDANCE

The following codes and guidelines have been considered in the development of the lighting design, in addition to the requirements provided by the client:

- BS 5489-1:2021 - Code of practice for the design of road lighting - Lighting roads and public amenity areas;
- BS EN 13201-2:2015 - Road lighting performance requirements;
- BS EN 12464-2:2014 - Lighting of workplaces - Outdoor workplaces;
- ILP GN01:2021 - Guidance notes for the reduction of obtrusive light;
- BS 8300-1:2018 - Design of an accessible and inclusive built environment. External environment;
- CIBSE Lighting Guide 6 - Lighting for the outdoor environment;
- Kirklees Council requirements

In addition to horizontal illuminance and uniformity targets, we are also proposing the use of additional ES (semi-cylindrical) illuminance criteria to ensure good ambient levels which will enhance the sense of safety and security for visitors.

ENVIRONMENTAL ZONE

To support development of the lighting design in a sustainable manner to avoid inappropriate over lighting but ensure the space is in keeping with the city centre context, the lighting strategy proposes that the project site is defined in terms of the environmental zones (as per ILP GN01, Table 2).

Environmental Zones are categorised in the ILP document as follows:

- E0: Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places.
- E1: Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
- E2: Sparsely inhabited rural areas, village or relatively dark outer suburban locations.
- E3: Well inhabited rural and urban settlements, small town centres of suburban locations.
- E4: Town/city centres with high levels of night-time activity

The lighting of the Kirklees Cultural Heart will conform to the requirements of an E4 zone.

SUPPORTING ECOLOGY

Obtrusive light will be minimised, and where appropriate, care will be taken to ensure that the proposed lighting installation does not adversely affect neighbouring ecology in accordance with ILP GN08 and avoid illuminating potential bat corridors.

LED technology is proposed to be the light source of choice for applications across the KCH development, with colour temperatures of 2700K to 3000K.

LED sources can be susceptible to high frequency flicker and sensitivity varies between humans and different species of ecological receptors. Visible blinking, flickering or strobing will not be acceptable at full lumen output, nor at any dimming level where dimming is specified.

Illuminance Levels

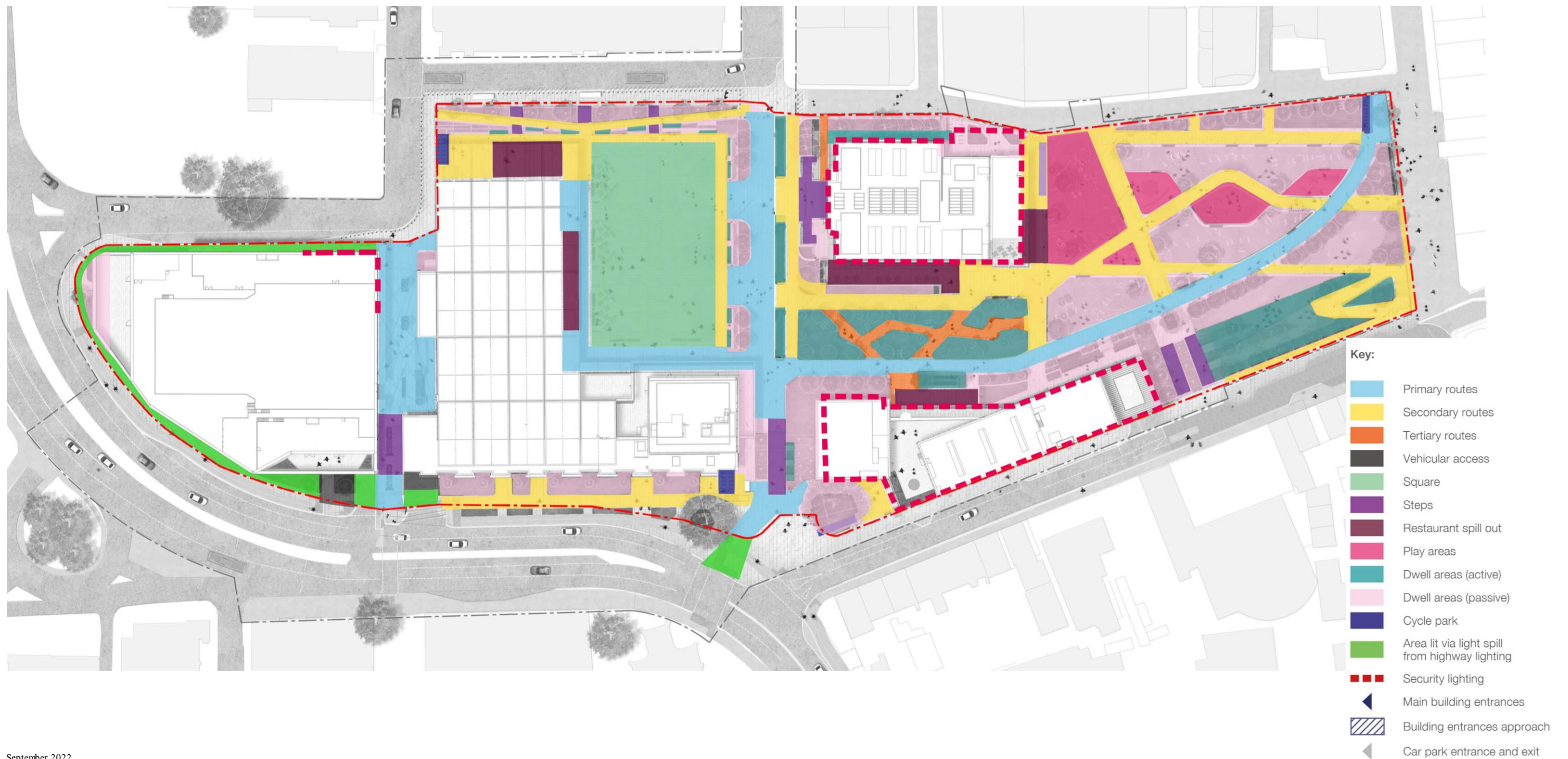
The adjacent table outlines the illuminance levels proposed for each external area. It is the intention that the lighting strategy avoids the traditional ‘blanket’ lighting approach typically used in busy urban areas which often creates an over-lit, bland atmosphere in the space.

Variable lighting classifications are provided in the notes column as an indication of where the lighting control system could be used to change lighting levels during events.

The classifications provided are indicative; the use of variable lighting, the achieved lighting levels and time-scales for reduced levels must be agreed with KC.

Glare has been defined within the table. The Glare rating is for outdoor areas and is based on a single viewer position surveying a visual. The glare rating goes up to 90, where <90 is unbearable, <50 is just admissible and <10 is unnoticeable. For typical outdoor spaces where there are pedestrians only the lighting design will aim to always be <50.

Key	Lighting class	Lighting criteria - Event Mode (Maintained horizontal illuminance)			Lighting criteria - Non Event Mode (Maintained horizontal illuminance)			Additional criteria (Semi-cylindrical illuminance)		Glare Glare Rating (GR)	Variable lighting classification	Notes
		Average (Lux)	Minimum (Lux)	Uniformity	Average (Lux)	Minimum (Lux)	Uniformity	Minimum (Lux)				
Primary route	C2/C3	20	-	0.4	15	-	0.4	5	<45	During events this might be raised to a C1 classification. To be discussed with Kirklees Council	As per BS 5489-1, Table A.8 Pedestrian only movement, high traffic flow.	
Secondary route	P1/P2	15	3	-	10	2	-	1	<45	-	As per BS 5489-1, Table A8 Pedestrian thoroughfare, high traffic flow.	
Tertiary route	P3/P4	7.5	1.5	-	5	1	-	1	<45	-	As per BS 13201 Selected to reflect lower pedestrian movement.	
Vehicular access	M2/C2	20	-	0.4	20	-	0.4	-	<50	-	Road lighting to provide spill to vehicular access, building to provide enhanced levels at entry points to allow for good transition.	
Square	P1/P4	15	3	-	5	1	-	1	<50	During events this might be raised to a P1 classification or dimmed completely off.	As per BS 13201 Reflects pedestrian movement during event and non-event mode.	
Steps	-	20	10	-	20	10	-	-	<40	-	As per BS 5489-1, Table 3 Open stairs and ramps.	
Restaurant spill out areas	-	15	3	-	15	3	-	5	N/A	-	Area illuminated by spill light from adjacent areas or active frontages.	
Play areas	-	15	-	0.25	5	-	0.25	-	<50	-	-	
Active dwell areas	-	-	-	-	-	-	-	-	<45	-	Not lit to a criteria, area illuminated by focused lighting to soft and hard landscape.	
Passive dwell areas	-	-	-	-	-	-	-	-	<45	-	Not lit to a criteria, area illuminated by spill light from adjacent areas.	
Cycle park	-	10	-	0.25	10	-	0.25	-	<45	-	As per BS 5489-1, Table 4 Medium traffic.	
Building entrance approach	-	50	-	-	50	-	-	-	<45	-	-	
Building entrance	-	100	-	-	100	-	-	-	<45	-	As per BS 8300-1, Table 5	



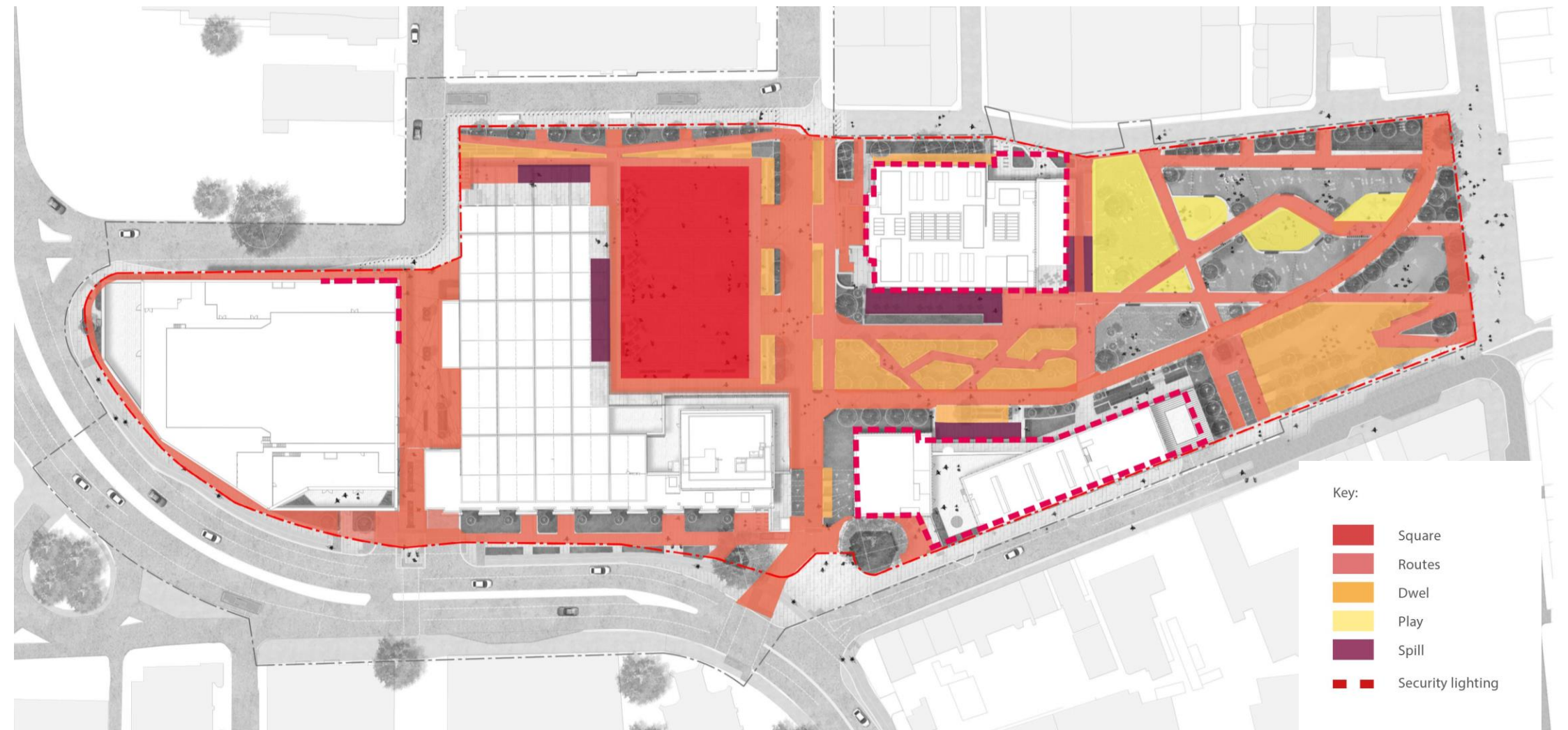
LIGHTING CONTROL STRATEGY

All proposed lighting is to be maintained by Kirklees Council. The controls treatment for routes and areas within the KCH will be zoned to allow for part night dimming. Special events that occur in the square and venues will be designated and commissioned to extend use of the public realm into the evening.

To promote sustainability and reduce energy usage, a control schedule will be employed. This will allow lighting to be switched on and off when required to best support the design aspirations, to follow guidance on obtrusive light and to limit sky glow. Time scheduling will have input from a photocell to switch lighting on when daylight levels have dropped below a predetermined level.

For example;

- Routes around the development will be on all night, providing safe levels of light but may dim to a lower level after an agreed time when expected pedestrian traffic reduces.
- Security lighting will be controlled through the buildings.
- Façade lighting will be controlled with the public realm lighting
- Lighting to soft landscaping, features will switch off at a curfew time, to be agreed.
- Lighting within the play areas will switch off, or change to white light, at a curfew time, to discourage negative use later in the evening
- The square lighting will be controllable for events and large gatherings.



Control Strategy Overview

SUSTAINABILITY & ECOLOGY

The exterior lighting will be strategically designed in accordance with the ILP GN01, to avoid excessive upward light and light trespass to neighbouring properties and sensitive areas of ecology. The lighting design will incorporate the following in response to the sustainability requirements:

- Controlling of all exterior luminaires to ensure all lighting will be directed downwards and falls on the surfaces being illuminated only. This will limit the potential impact on local ecology and minimise the scheme's contribution to light pollution.
- Minimising carbon consumption through the lighting control system including the use of part-night dimming. Utilising constant light output controls to avoid over lighting while maintaining minimum design levels.
- Selecting and specifying light sources for their long life, high efficacy characteristics as well as their ability to be dimmed.
- Materials will be chosen for longevity and robustness, appropriate for the installed location.
- Luminaire manufacturer credentials will be reviewed with reference to circular lighting principles set out in CIBSE TM66. Principles include modularity and of-the-shelf solutions to ease future maintenance.

LIGHT QUALITY

Generally all white-light light sources will have a colour rendering index Ra greater than 80 in accordance with the international colour code. This is of particular importance in areas with higher levels of illumination, where improved visual quality and accurate rendition of skin tones and signage, etc. can facilitate tasks and interactions and help to improve a user journey and sense of safety.

MAINTENANCE

All luminaires will be specified and installed at accessible locations for ease of maintenance, meeting the following criteria:

- Luminaires specified will be robust to minimise potential vandalism and will be suitable for use in external environment with the appropriate IP rating;
- Long life LED light sources will be used which exceed 50,000 hours.

REDUCTION OF OBTRUSIVE LIGHT

Light pollution can be simply defined as light directed into areas where is not needed or wanted, and can be separated into basic parts:

- Sky Glow – the brightening of the night sky diminishing of the beauty of a star-filled sky by either direct upward light or upward reflected light from surfaces;
- Glare – the excessive brightness of a luminaire between itself and viewed background;
- Light intrusion – the spill of light beyond the boundary of the area intended to be lit and also light intrusion in to adjacent properties.

The majority of light pollution is caused through poor design, either through the choice of lighting equipment that is unsuitable for the application, poor optical design and/or through improper orientation of fittings.

The impact of light pollution will be reduced through considered design and using the following methods:

Luminaires and installation

All column mounted luminaires shall be flat glass design with 0 degree upward tilt. Projectors on multi-head columns shall have an upward tilt of no more than 70 degrees.

Luminaires shall utilise louvres, cowls and snoots etc to prevent light spill outside of the task area and minimise direct view of the light source.

The luminance intensity of all luminaires shall comply with the recommended limits presented in ILP GN 01 Table 4.

Ground recessed and low level lighting to trees, planting, sculptures etc, shall be adjustable to allow light to be focused toward the surface or item being illuminated.

The upward light ratio of luminaires and upward flux ratio of the lighting scheme shall comply with the maximum values set on in ILP GN 01 tables 6 and table 7 respectively.

Luminance and illuminance criteria

Illuminance levels for horizontal surfaces, as defined in this section have been selected in accordance with relevant British Standards to ensure appropriate illumination of routes for the specific location, environment and anticipated traffic flow.

Vertical illumination is an important element of the lighting design to enhance facial recognition and instil a sense of safety and security for users. However, vertical illuminance must be carefully controlled to minimise intrusive light spill into adjacent properties, particularly residential and hotel accommodation. The lighting scheme shall be designed so as not to surpass the maximum values of vertical illuminance on properties as detailed in ILP GN 01 table 3.

The illumination of vertical surfaces is a fundamental part of the Kirklees Cultural Heart lighting strategy in order to create attractive and welcoming vistas within and through the development.

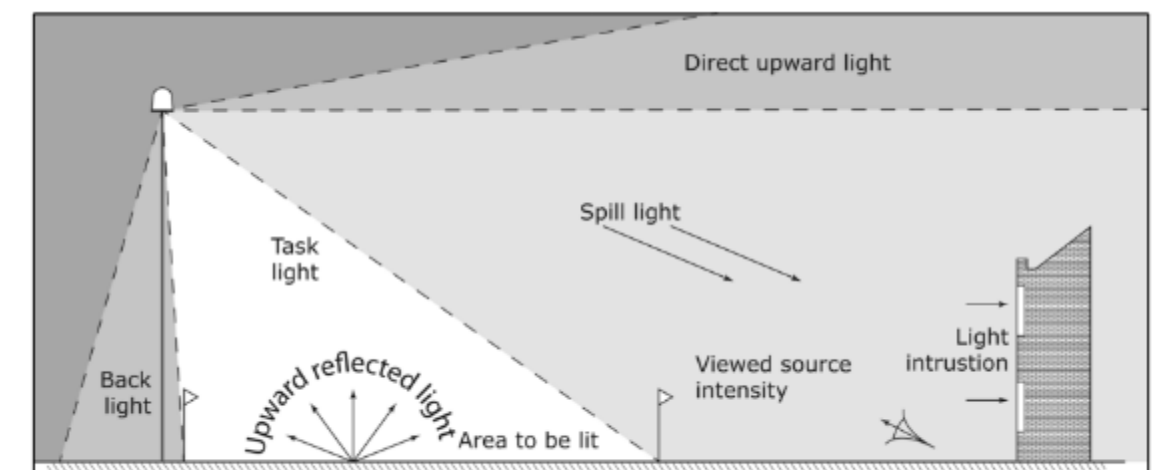


Figure 1: Types of obtrusive light

Extract from ILP GN01 Guidance Note 1, The reduction of obtrusive light

