Great Northern Warehouse, Manchester

PUBLIC REALM LIGHTING STRATEGY

NOVEMBER 2022
STATUS: FOR INFORMATION

Great Northern Warehouse

Public Realm Lighting Strategy

Issue Status: For Information

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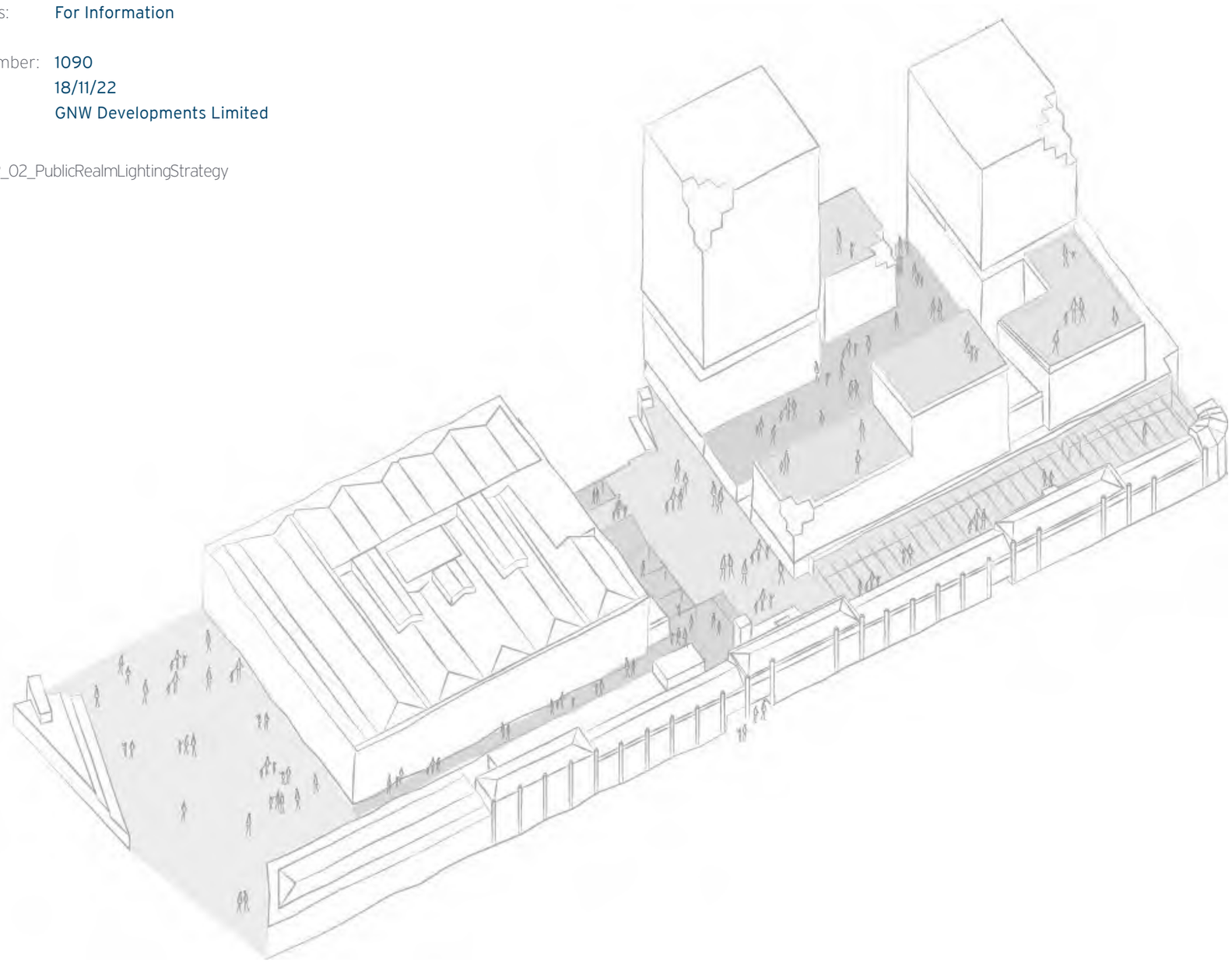


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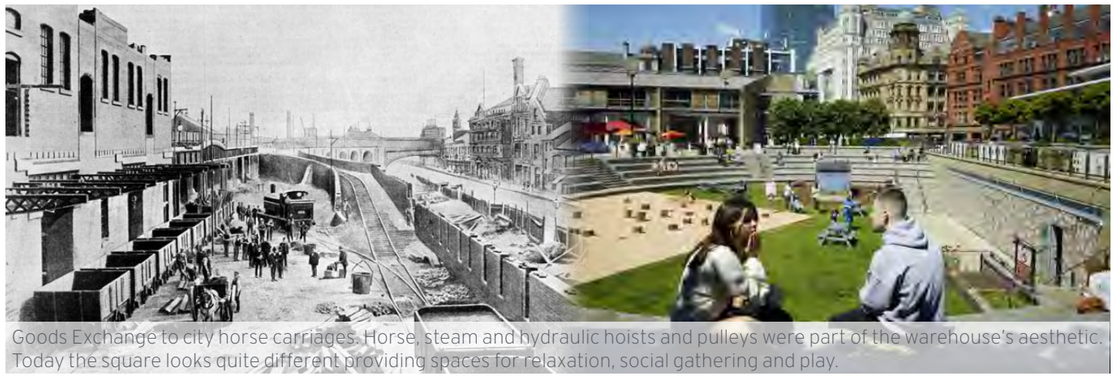
Manchester's largest railway warehouse, the Great Northern Warehouse was a unique three-way transport interchange of goods between local city carriages, trains coming direct from Central station and Manchester Salford Canal Tunnel.
It used to be the meeting point of the city, the rail and the canal.

Today the area is a busy intersection linked to the City's key services and facilities to the North and a number of Manchester's key established and emerging economic growth and regeneration areas to the South.

The Great Northern Warehouse development is intended to become a vibrant part of Manchester's city life.

Drawing inspiration from the legacy of the site the proposed lighting strategy offers the opportunity to incorporate key characteristics and elements from the original purpose of the development to create engaging and activating visual references.

These alongside a carefully planed and balanced lighting scheme would contribute to a unique attractive night time image of the development and its integration into the urban fabric of the city at night.



Goods Exchange to city horse carriages. Horse, steam and hydraulic hoists and pulleys were part of the warehouse's aesthetic. Today the square looks quite different providing spaces for relaxation, social gathering and play.

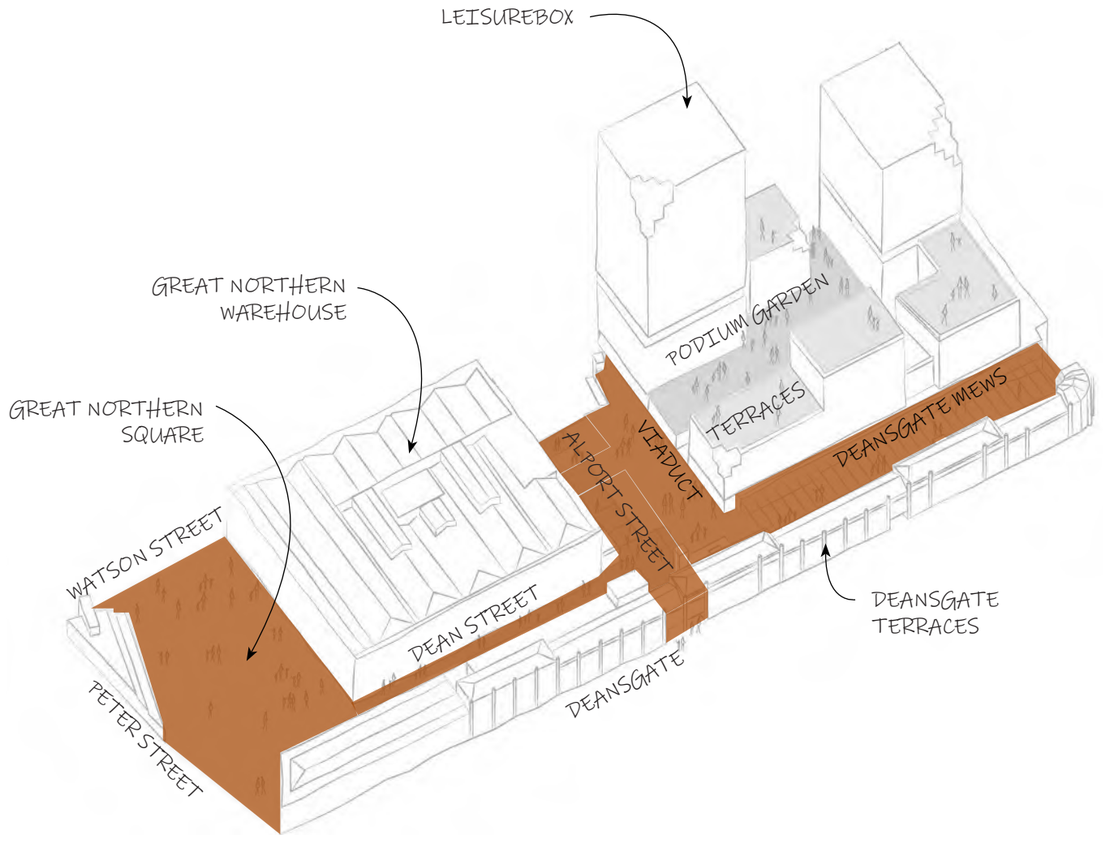


Railway access from the south. The aesthetic of the rail heritage, of iron rails and wood beams can be translated into the materiality of patinated metals, warm rusty colours, bright highlights and expressive contrast.



Although no longer in use the underground waterway can be introduced through impactful immersive interventions that refer to the various impressions of water.

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Scope

This document outlines Light Bureau's public realm lighting strategy for the planned Great Northern warehouse development in the centre of Manchester. The presented site-wide strategy aims to optimise the development's prime central location and future amenities, as well as add further value to the development by drawing visitors and creating a thriving space for businesses and an enjoyable, vibrant location for its new residents.
The project encompasses Great Northern Square, the two new passage ways - Dean and Alport Street, Deansgate Mews and the Viaduct open air space.
The design for these areas is described in further detail on the following pages.

A night time lighting strategy for the Warehouse facades and Deansgate Terraces Victorian facade is developed in detail in a separate report: LB_1090_LR_01_Facade Lighting Strategy.

Design Principles

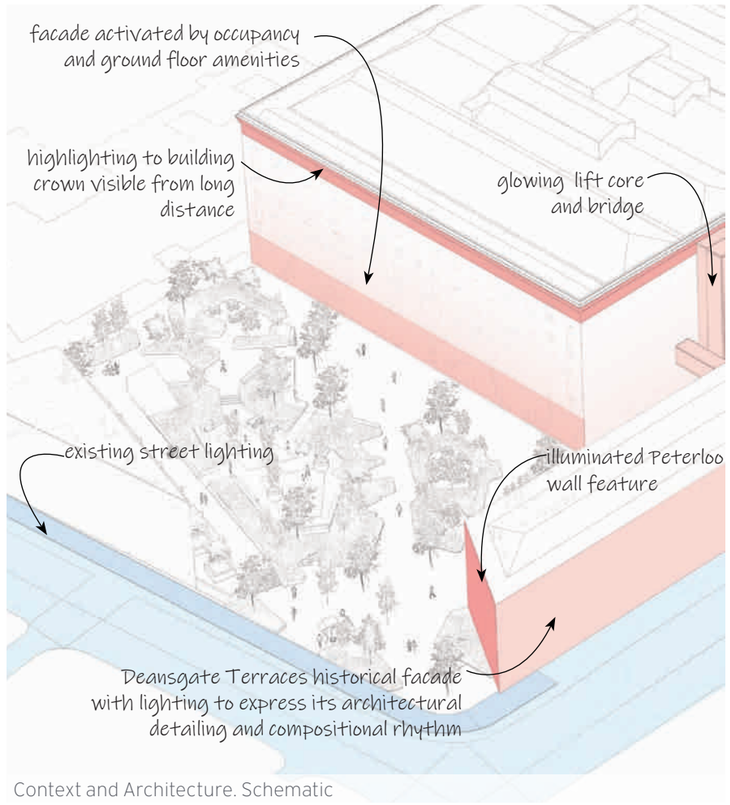
The overall lighting approach is guided by the following fundamental principles:

- Artificial lighting is implemented following clear hierarchy depending on area type and function guiding light levels and luminaire scale, type;
- Lighting equipment is to be implemented in manner that is least visually obtrusive allowing direct views through site and of any notable elements/elevations;
- Strict lighting control strategy is to be implemented to minimize light pollution, trespass, and over-illumination, as well as ensuring privacy for development's residents;
- Well shielded, warm-white colour temperature light sources that do not emit ultra violet (UV) wave-lengths are proposed for all amenity and safety lighting to prevent negative ecological impact;
- Lighting equipment selection to form a visually consistent palette fostering sense of connected community and unifying areas of different types;
- Soft accent is placed upon key trees and natural landmarks emphasizing the green qualities of development;
- Human-scale and integrated low level lighting is to be utilised in seating and relaxing areas to create comfortable environment encouraging visitors to linger and enjoy the offered amenities;
- Lighting of development's key elevations and features to create a local significance landmark and draw long distance views.
- Key characteristics of the site's heritage will be incorporated in the design solutions to support the image and identity of the spaces.

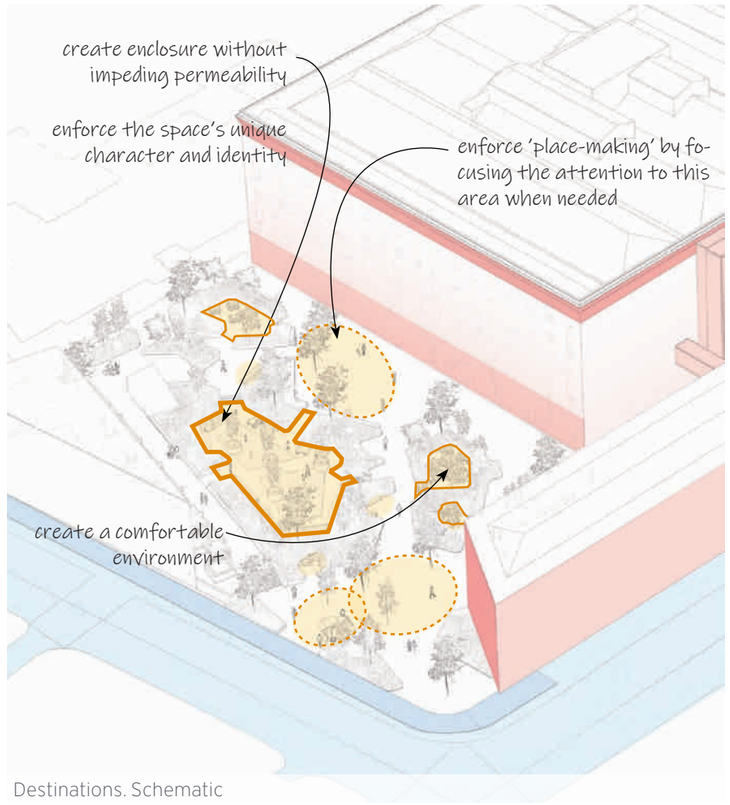
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1. Great Northern Square

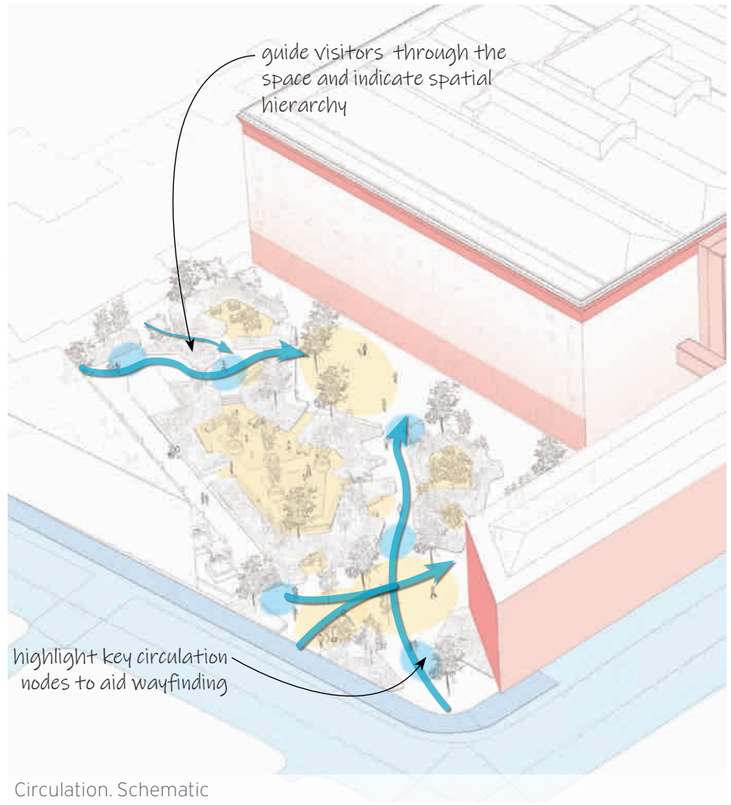
1.1 Analysis



Context and Architecture. Schematic



Destinations. Schematic



Circulation. Schematic

Observations

Great Northern Square is a complex space with a multitude of elements, zones and uses. The following lighting design strategy is based on the analysis of the square context, spaces to dwell - referred to as 'destinations' and circulation routes.

Each of these areas comes with its specific visual characteristics, however we've identified the above key considerations.

The illuminated architectural context creates key landmark elevations that dominate the close and long distance views towards the square.

The landscape design introduces areas for play and relaxation framed with planters and trees. Identifying these spaces and their intended use allows us to enhance and support the experience after dark.

Interlinked by pathways and circulation nodes the scheme calls for a visual lighting hierarchy to aid orientation and to create a balanced look avoiding over illumination and negative impact on visitors and wildlife.

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Gobo lighting used as a feature also contributes to the overall perceived ambience in the space. A pattern chosen well can activate the space and enforce play and exploration.



Illuminated building ground floor activating the square and animating the pedestrian experience.



Creating a boundary through low level bench integrated lighting and tree canopy uplighting.



High level post mounted lighting to circulation paths and nodes.



The contrast between the tall general lighting posts and short bollards would contribute to an unusual and joyful atmosphere.

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Illustrative Axonometry Render

General lighting to the pathways along the building perimeter provided by canopy integrated downlights.

General lighting to circulation pathways and nodes provided by post mounted adjustable spotlights with the applicable optical distribution to illuminate the horizontal surfaces.

General and accent lighting to destinations provided by additional post-mounted spotlights. Potential to include colour-changing or gobo - projection to selected locations could be used for events and festivities.

Low level accent lighting incorporated in the benches and seating areas helps bring the scale down and create an attractive inviting environment.

Feature bollards scattered in selected locations in the planters would help create vertical brightness and a sense of enclosure to the spill-out areas and active space.

Canopy uplighting to selected trees to support the vertical brightness in the seating areas.

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1. Great Northern Warehouse

1.4 Illustrative Lighting Layout and Product Palette



Illustrative Lighting Layout

1



Adjustable LED spotlights mounted to a 12m tall lighting post

3000K CCT, min CRI90
4800lm; 58W, dimmable
Supplied with glare reducing and beam shaping accessories

2



Low glare downlights integrated into canopy design

3000K CCT, min CRI90
800lm; 13W, dimmable

3



Feature LED bollard with shielded top and soft diffuse light distribution

2700K CCT, min CRI90
180lm; 2W, dimmable

4



Discrete adjustable LED spotlights installed in planters

2700K CCT, min CRI90
500lm; 7W, dimmable
Supplied with glare reducing and beam shaping accessories

5



Linear LED luminaire to be integrated in lighting details

2700K CCT, min CRI90
300lm/m; 10W/m, dimmable

6

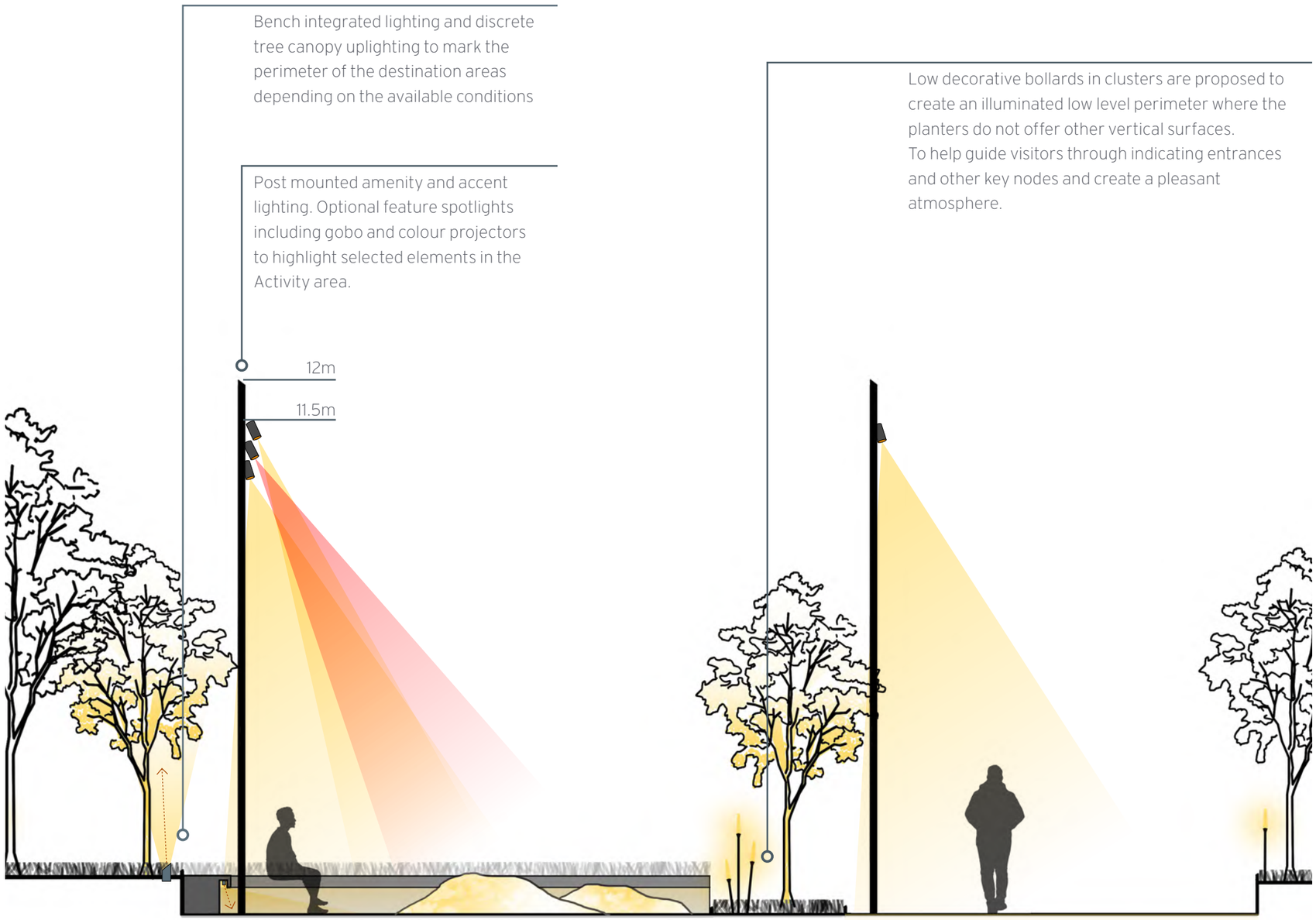


Miniature LED spots for integration into handrails

3000K CCT, min CRI80
160lm; 1.5W, dimmable

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Illustrative Section

Key Principles

The proposed strategy for circulation lighting involves taller but fewer lighting posts located in strategic places across the square. These posts would be supplied with good optic downlighters for general amenity lighting to the pathways. They could also incorporate accent lighting spotlights for additional seating groups or landscape features as well as event lighting luminaires.

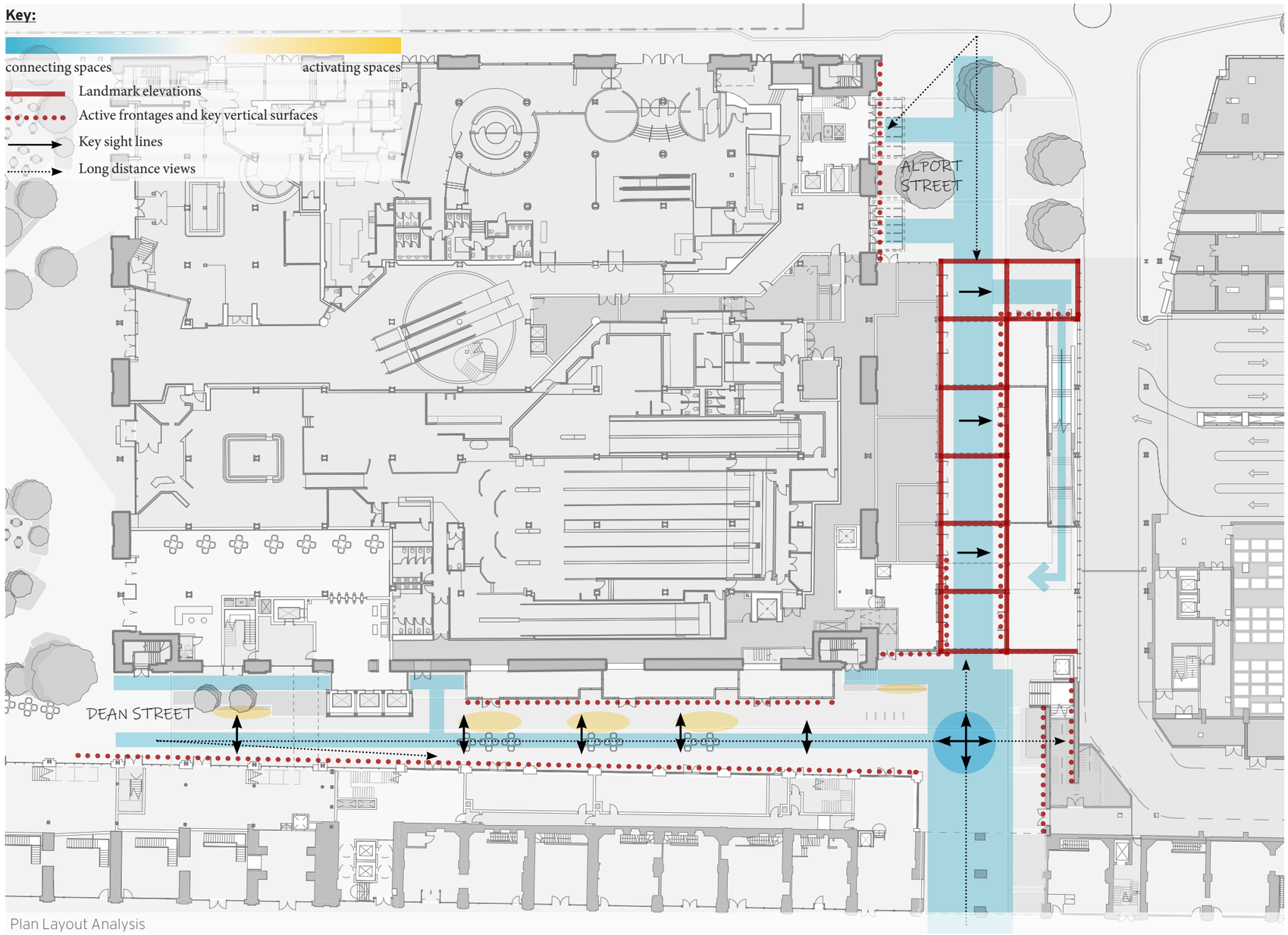
Another advantage of using lighting posts is the ability to incorporate sockets, speakers, Wifi hotspots, charging stations and various other equipment and sensors in a discrete way.

The proposed lighting strategy for the destination areas aims to create a sense of privacy and enclosure without obstructing views through. This is achieved through accent horizontal lighting to key surfaces and through an illuminated perimeter.

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2. Dean and Alport Street

2.1 Analysis and Key Objectives



Plan Layout Analysis

Observations

Alport Street is the new connection through the development that allows pedestrians to cross the site. Due to its particular location it becomes an important node with links to all other publicly accessible character areas.

The space is defined by the retained viaduct structures which create a pergola-like cover over the passageway.

The lighting design will aim to address the need for activation of this space and express the feature qualities of the viaduct framework.

Dean street is a transitional space between the Great Northern Square and Alport Street with active retail frontages alongside. As such it is important to make sure views through attract visitors in both directions.

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2.2 Inspiration



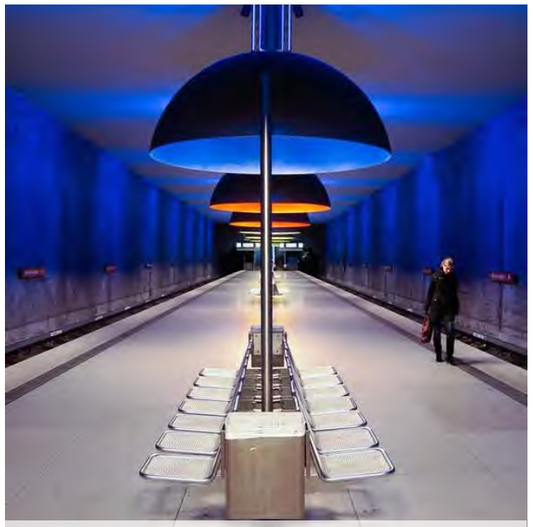
Activating retail frontages. Occupancy lighting from the retail frontages together with the tree uplighting create the ambience in the spill out areas.



Illuminated connecting bridge reads as a key visual element of the night time image of the building elevations.



Vertical facade lighting guiding the eye in



Potential to include colour changing amenity lighting for the Viaduct underside to create a feature experience and tie into the site history and water canal way located underground.

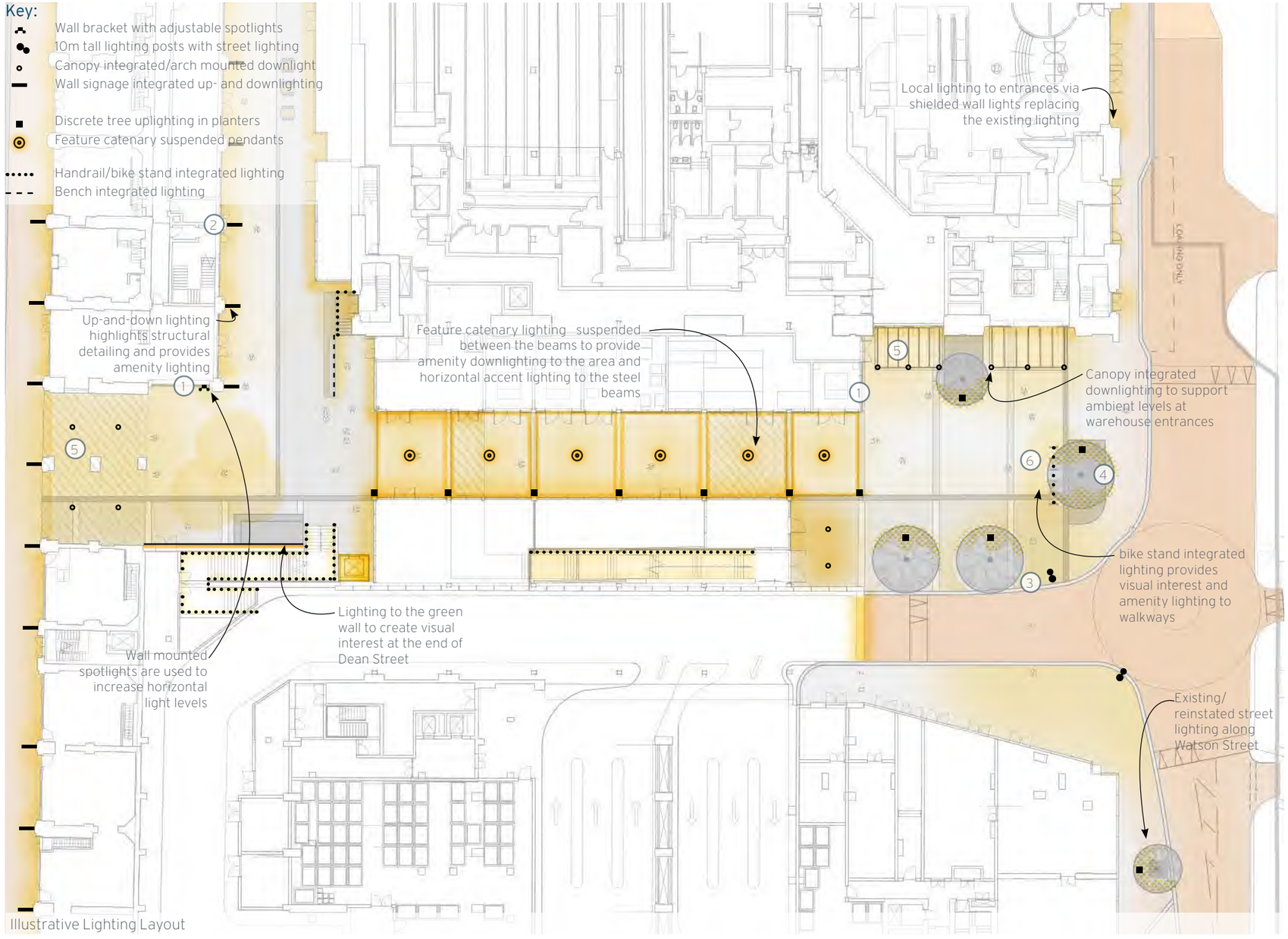


Warm white highlights picked up by the viaduct structure will create contrast and frame the space.

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2. Dean and Alport Street

2.3 Illustrative Lighting Layout and Product Palette

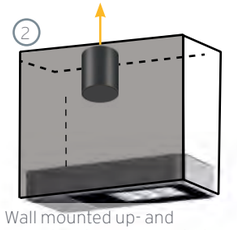


Illustrative Lighting Layout



Adjustable LED spotlights mounted to a wall bracket

3000K CCT, min CRI90
4800lm; 58W, dimmable
Supplied with glare reducing and beam shaping accessories



Wall mounted up- and downlight integrated within signage

Down - 3000K CCT, min CRI90
800lm; 13W, dimmable
Up - 3000K CCT, min CRI85
500lm; 7W, dimmable



10m street lighting column matching the look of the existing street lighting on site

3000K CCT, min CRI80
Optics and output TBC.
dimmable
Supplied with optional light shield



Ground recessed LED uplight.

2700K CCT, min CRI90
500lm; 7W, dimmable
Supplied with glare reducing and beam shaping accessories



Low glare discreet downlights

3000K CCT, min CRI90
800lm; 12W, dimmable



Miniature LED spots for integration into bike racks

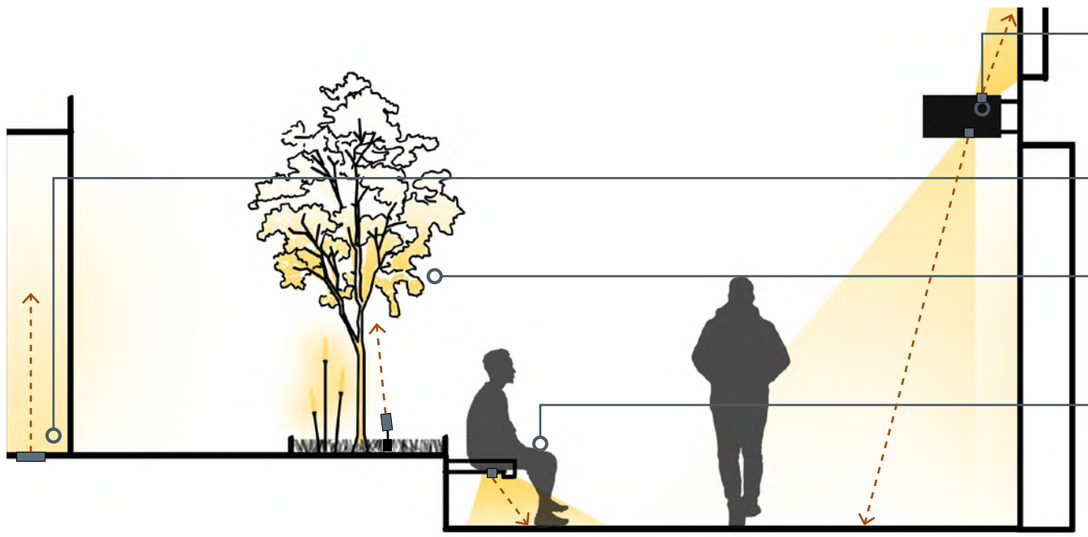
3000K CCT, min CRI80
160lm; 1.5W, dimmable

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2. Dean and Alport Street

2.4 Key Elevations and Details



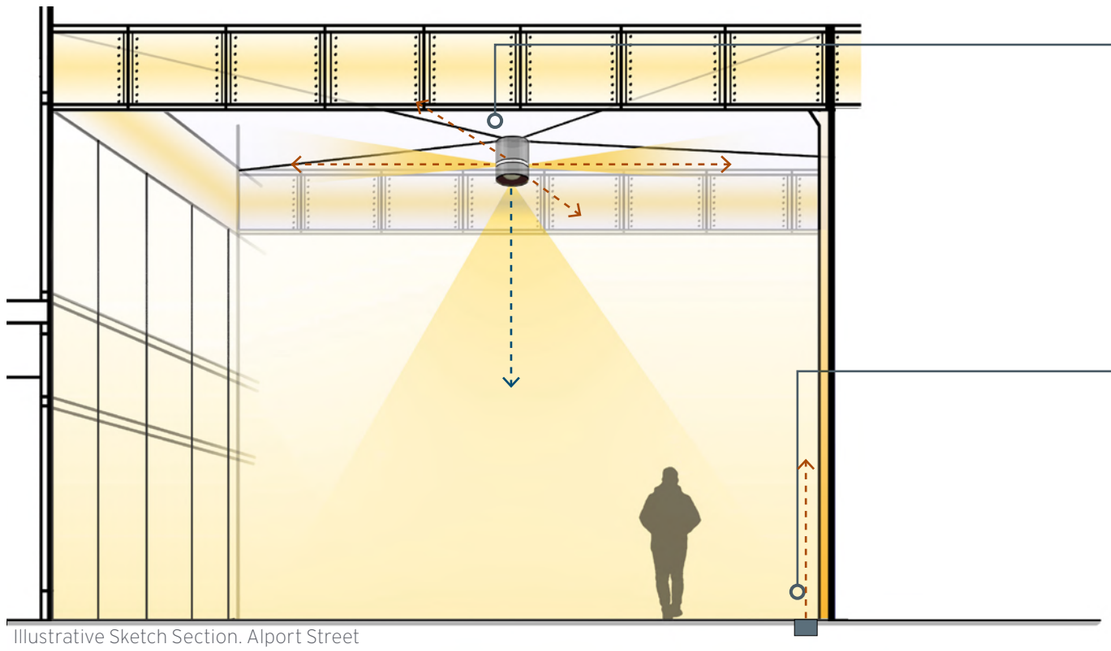
Downlighting to street level and uplighting to the terraces facade via wall mounted luminaires or incorporated into the store front signage.

In-ground reveal uplighting to warehouse entrances

Proposed planter lighting consistent with the square strategy : Tree uplights and feature bollards.

Discreet low level lighting concealed within the bench details.

Illustrative Sketch Section. Dean Street



Feature lanterns to provide ambient and accent lighting to the viaduct underside.

A diffuse soft downlighting component aimed at the floor. Potential to add colour changing lighting or gobo projections to create an unusual experience.

Feature sideways emission in warm white light colour illuminates the inner vertical perimeter of the riveted beams.

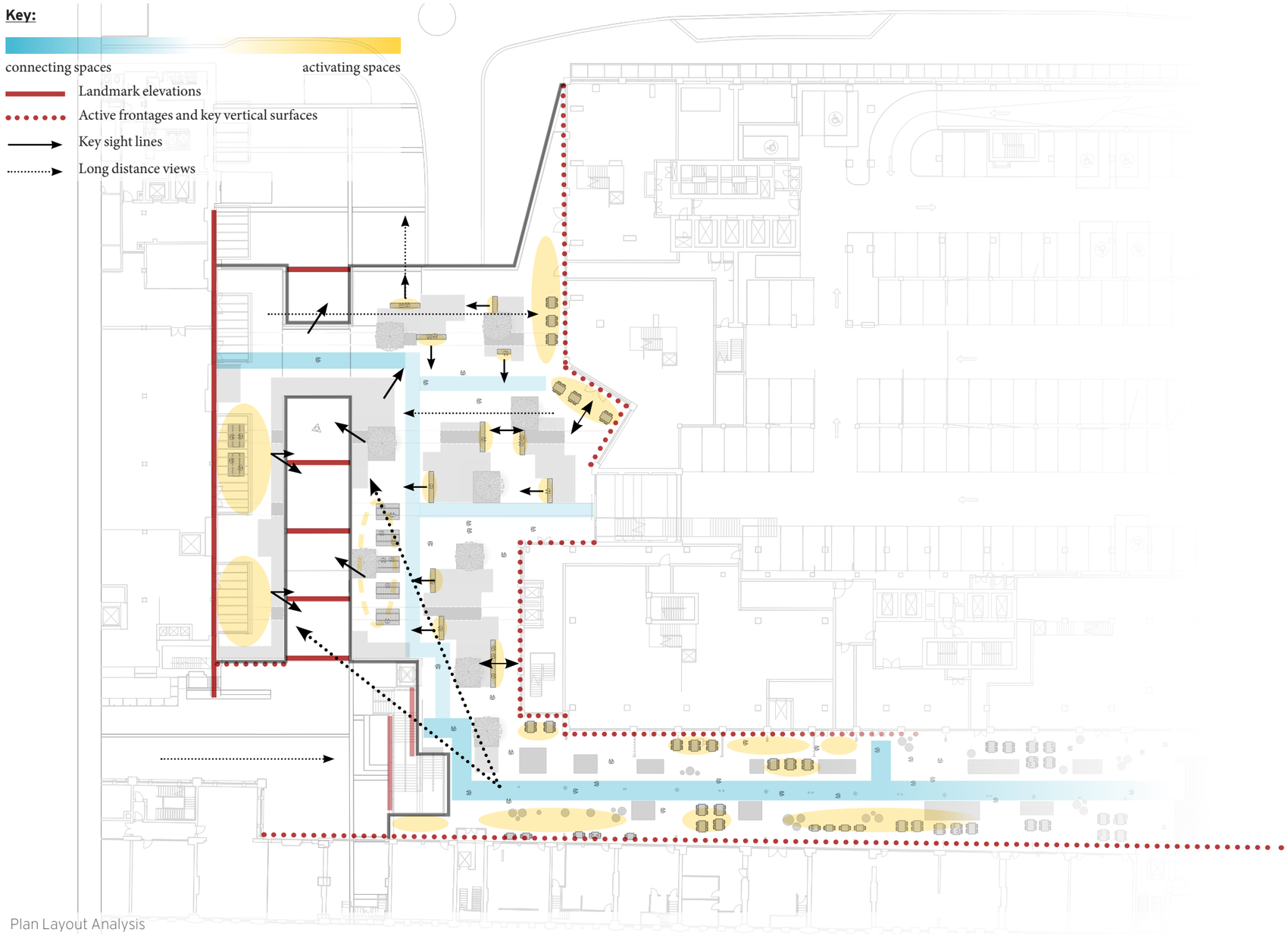
Ground recessed uplights to highlight the viaduct columns is warm white light tone

Illustrative Sketch Section. Alport Street

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3. Viaduct

3.1 Analysis and Key Objectives



Plan Layout Analysis

Observations

The viaduct terraces are large open air spaces that offer unobstructed views towards the sky, the heritage warehouse building and the streets on lower level.

Their connection with the surroundings is their most defining characteristic.

The F&B units benefit from generous spill out areas that contribute to the liveliness of the space. The rest of the exterior furniture consists of low benches and planters accommodating a calm contemplative experience of the open space.

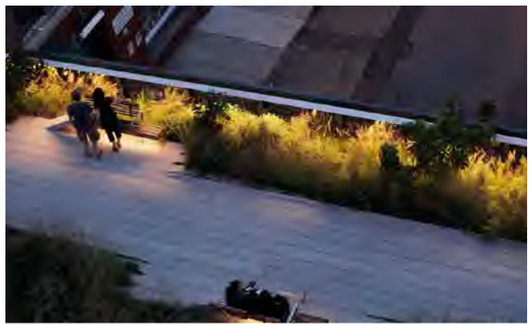
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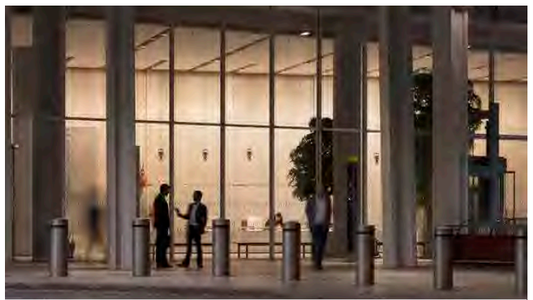
Connecting the levels through illuminated elements



Keeping all lighting at low level to ensure unobstructed views out



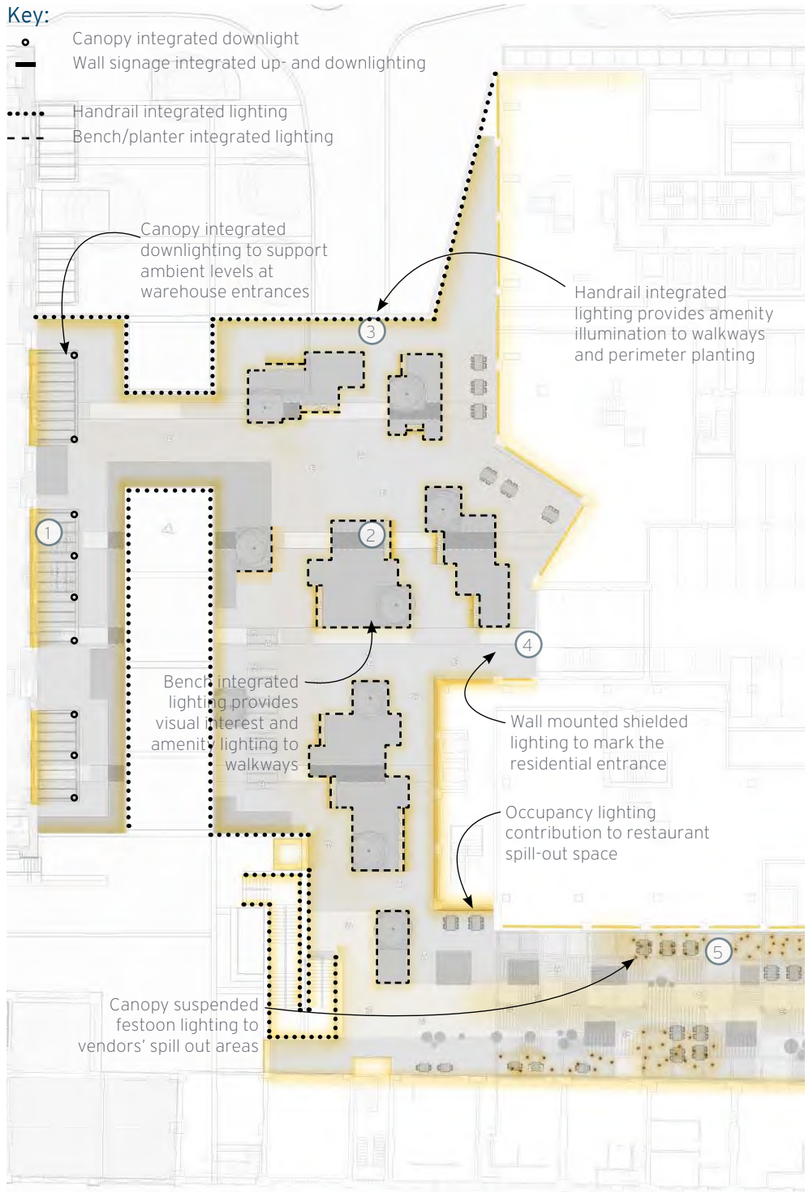
Gentle lighting to the perimeter and benches to guide visitors



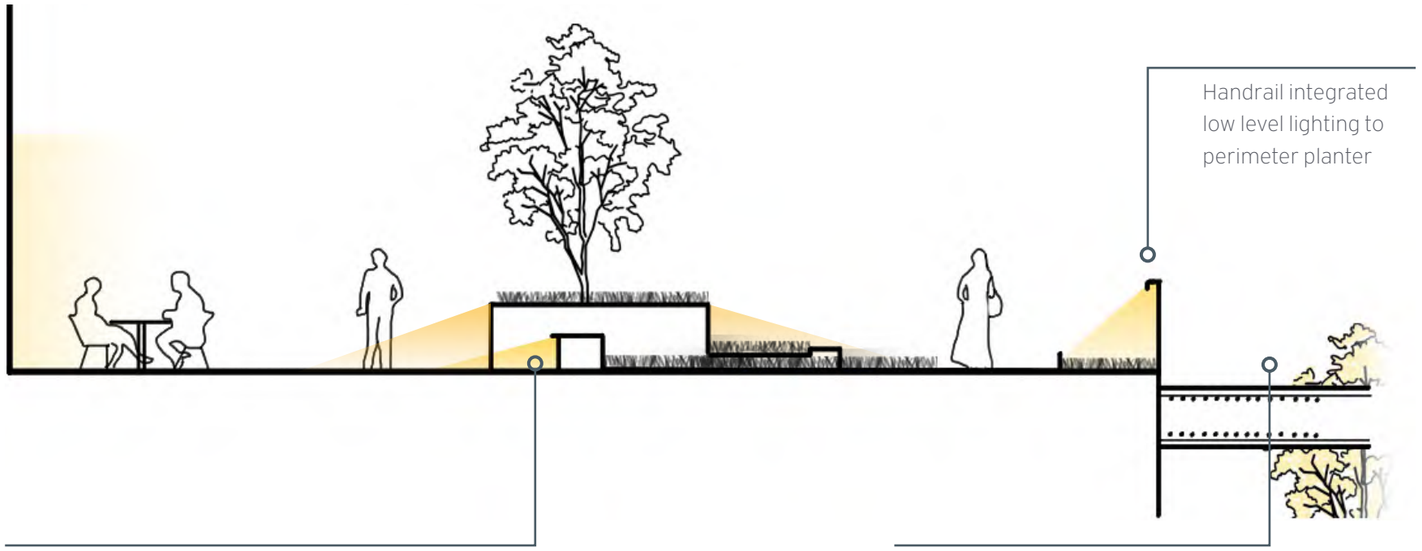
Active food and beverage elevations serve as bright backdrop and contribute to the overall light ambience in the spaces.

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3.3 Illustrative Lighting Layout and Product Palette



Illustrative Lighting Layout



Bench integrated lighting and low planter lighting illuminate the horizontal ground plane. Trees are kept unlit to allow the illuminated warehouse facade to stand out.

Spill light from Alport Street can be seen as a feature through the viaduct framework. It would aid orientation and help bind the spaces together

Illustrative Section

1



Low glare downlights integrated into canopy design

2700K CCT, min CRI90
800lm; 13W, dimmable

2



Linear LED luminaire to be integrated in lighting details

2700K CCT, min CRI90
300lm/m; 10W/m, dimmable

3



Miniature LED spots for integration into handrails

2700K CCT, min CRI80
160lm; 1.5W, dimmable

4



Shielded wall light used to mark residential entrances

2700K CCT, min CRI80
250lm; 3W, dimmable

5

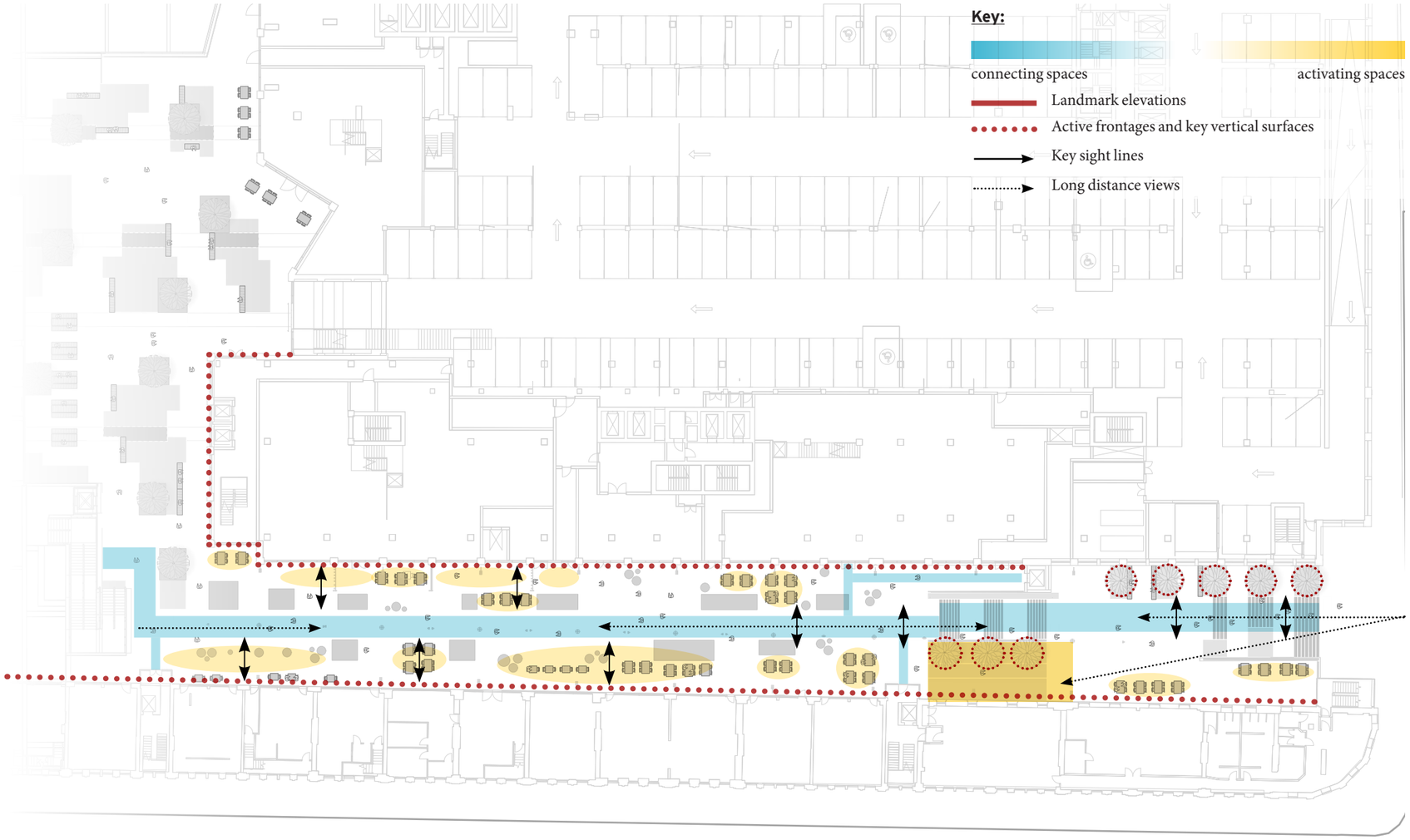


Canopy suspended festoon lighting over vendors' spill out areas

2700K CCT, min CRI80
120lm; 1.5W per globe

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4.1 Analysis and Key Objectives



Plan Layout Analysis

Observations

Deansgate Mews are enclosed between the terraces and new built Leisurebox facades on a level higher than street level. Stairs on both ends connect the mews with the rest of the site.

The stairs on the south side create a feature space framed at the top by a new canopy. This strong expression needs to be supported by a statement lighting design that takes into account the large vertical volumes and the important function this space serves as a key entrance to the development.

Sight lines are drawn in by the long unobstructed views through while the active shop fronts along the mews attract the eye on a micro scale.

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4.2 Inspiration



Festoon lighting creating an illuminated canopy that frames the views, provides a good level of soft ambient lighting and contributes to a cosy casual and warm atmosphere.



Festoons wrapped around the trees at the South entrance would provide vertical ambient illumination and will draw visitors in.



Large feature luminous element suspended in the double height space to create a sculptural installation, fill the volume and provide additional interest.



Feature pendants design inspired by the industrial legacy of the development

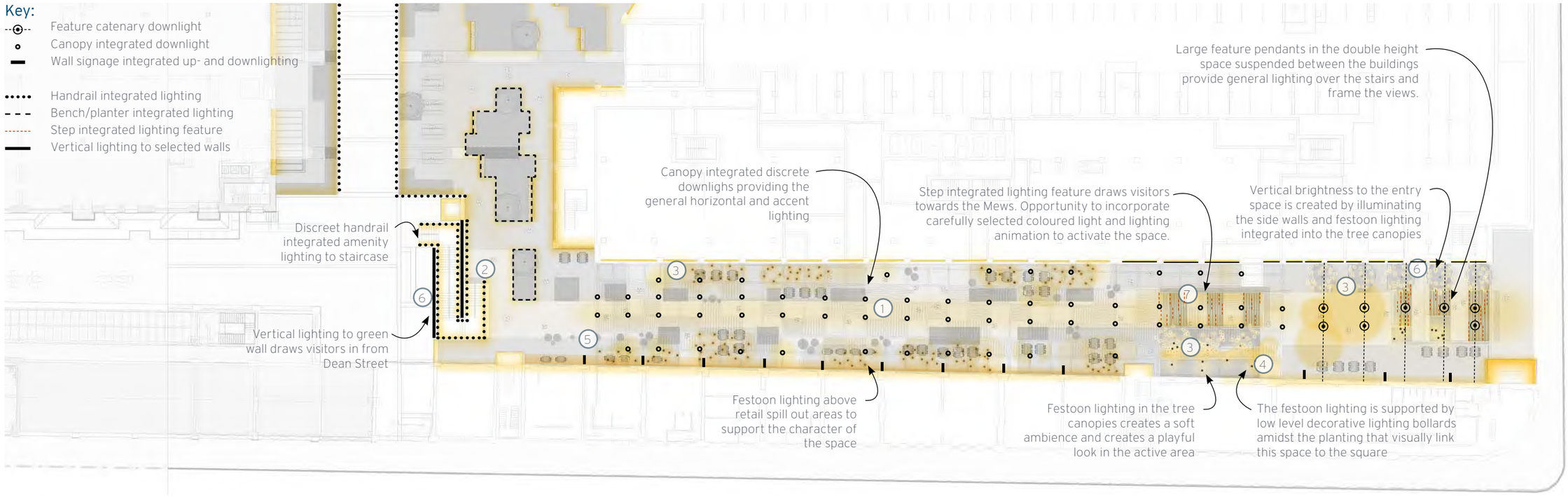


Discretely activating the street entrance through colour and light animation

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4. Deansgate Mews

4.3 Illustrative Lighting Layout and Product Palette



Illustrative Lighting Layout



Low glare downlights integrated into canopy design

2700K CCT, min CRI90
800lm; 13W, dimmable



Miniature LED spots for integration into handrails

2700K CCT, min CRI80
160lm; 1.5W, dimmable



Canopy suspended festoon over vendors' spill out areas

2700K CCT, min CRI80
120lm; 1.5W per globe



Feature LED bollard with shielded top and soft diffuse light distribution

2700K CCT, min CRI90
180lm; 2W, dimmable



Wall mounted downlight integrated within signage

3000K CCT, min CRI90
800lm; 13W, dimmable



Linear LED graze light with precise optics and glare reducing accessories

3000K CCT, min CRI90

1800lm/m; 32W/m, dimmable

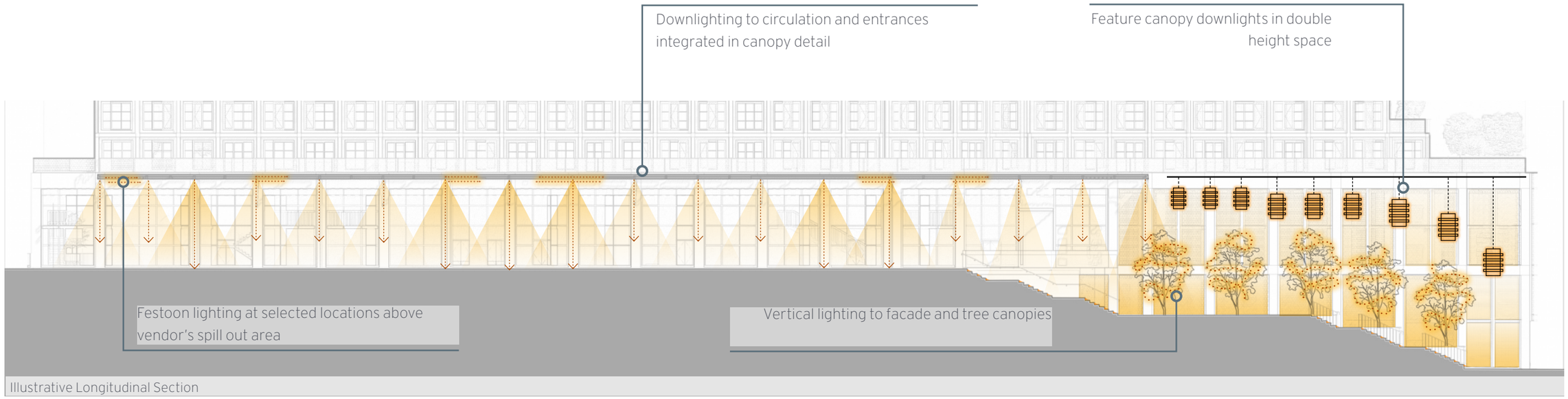


Colour changing linear LED luminaire to be integrated in step detail
RGBW, pixel controllable

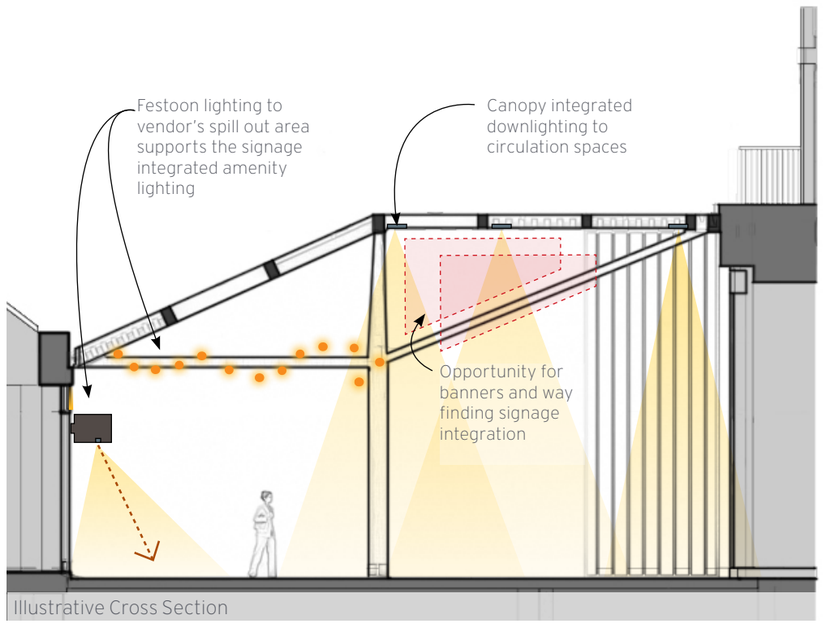
350lm/m; 15W/m, dimmable

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4.4 Key Elevations and Details

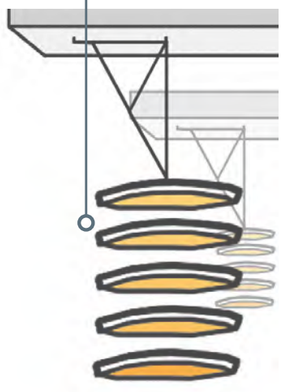


Illustrative Longitudinal Section



Illustrative Cross Section

Large scale feature pendants. Suspension mechanism and lantern design can be inspired by the industrial aesthetic of the warehouse.



Illustrative Sketch. Large Feature Pendant

Discrete downlighting recessed into canopy for a concealed look. Precise optics and glare reflectors to make the luminaires comfortable to look at and seamlessly integrated into the architectural details.



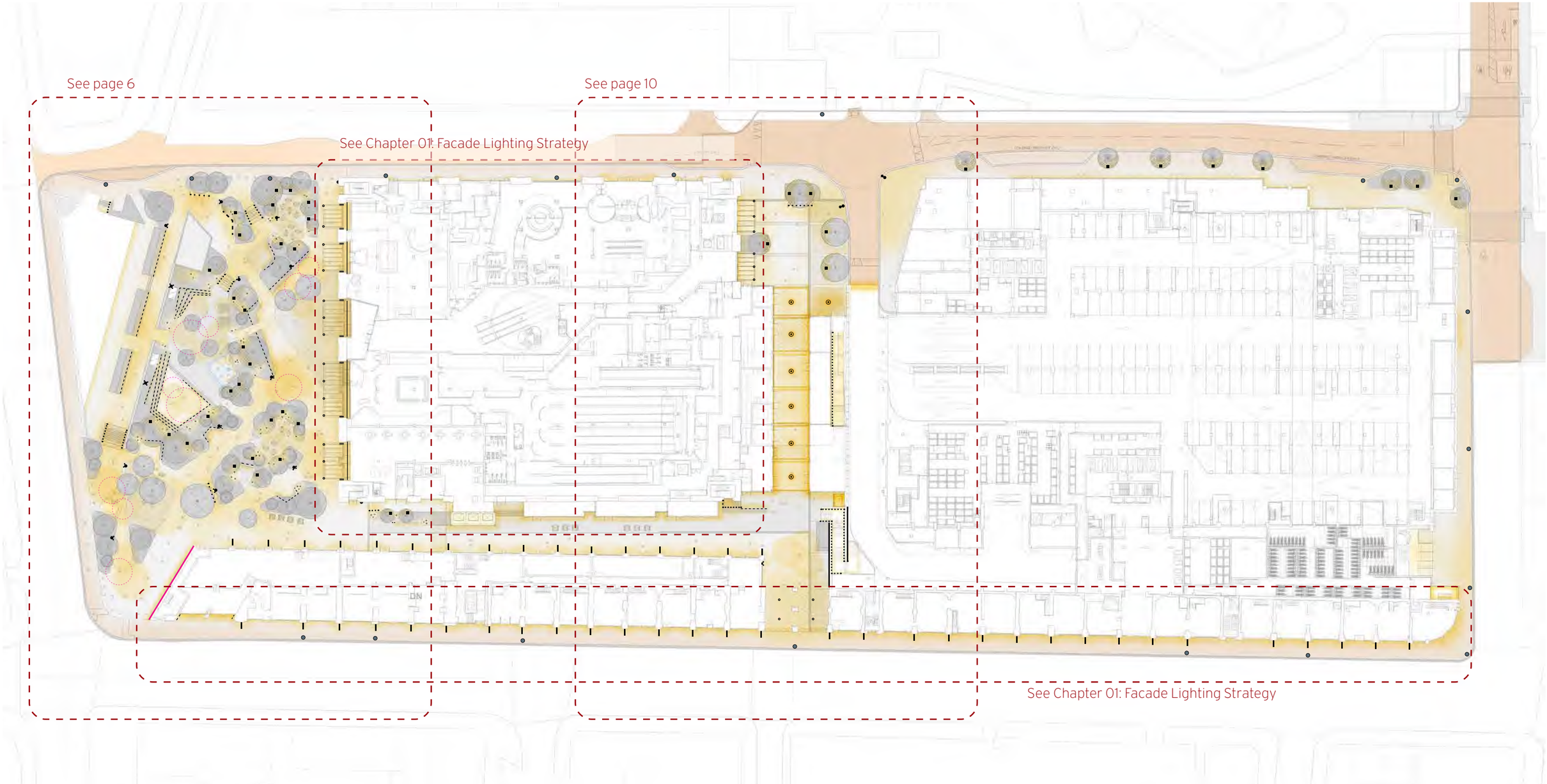
Festoon lighting provides the opportunity for various customisation through the addition of plates, shields and hats to make the design uniquely customised to the place and vendor.

Illustrative Sketch. Festoon Variations

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5. Indicative Lighting Layouts

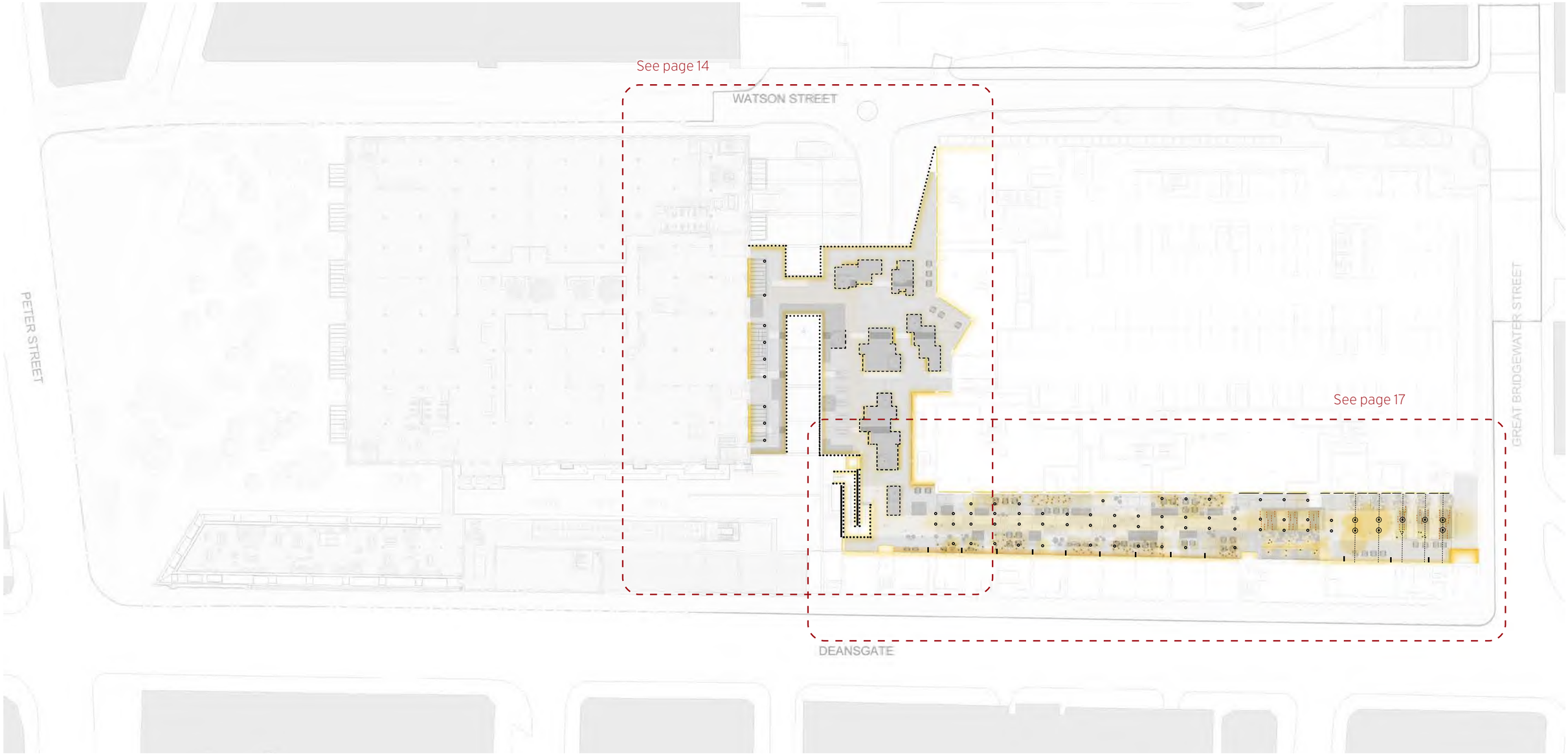
5.1 Ground Floor



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5. Indicative Lighting Layouts

5.2 First Floor



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Environmental Zone and Light Restrictions

Following "GN01:2020 Lighting Professionals Guidance Notes for the Reduction of Obstructive Light" we've considered the area of the development as E4 zone with the following limitations applied.

- Minimal light trespass into windows kept with the right control strategy below 25 lux pre-curfew. Post-curfew (23.00hrs) we recommend to reduce the luminaire output to achieve vertical illuminance of <5 lux.
- Minimal Upward Light Ratio of the overall installation. All columns have shielded sources and accessories in order to reduce direct upward light. Wall mounted luminaires have shielded sources, directing their light flux down.
  The lighting strategy includes some feature tree uplights, low decorative bollards and facade uplighting which will be controlled separately and will be switched off or significantly dimmed down after curfew.
  With developed and coordinated lighting layouts upward light ratio will be monitored and kept within 15% of the total scheme output.
- The specified light fittings will be equipped with dimmable sources that can be adjusted to match the local authorities requirements.

Additionally, all specified luminaires will employ high quality LED light sources and optical systems with an average luminous efficacy above 60lm/W.

TABLE 1 _ ENVIRONMENTAL ZONES		
Environmental Zone	Lighting Environment	Examples
E0_Protected	Dark (SQM 20.5+)	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1_Natural	Intrinsically dark (SQM 20 to 20.5)	National Parks, Areas of Outstanding Natural Beauty, etc
E2_Rural	Low district brightness (SQM ~15 to 20)	Village or relatively dark outer suburban locations
E3_Suburban	Medium district brightness	Small town centres or suburban locations
E4_Urban	High district brightness	Town/city centres with high levels of nigh time activity

Table 2 – Environmental Zones - ILP Guidance Notes for the Reduction of Obtrusive Light GN01:2020

TABLE 2 _ OBTRUSIVE LIGHT LIMITATIONS FOR EXTERIOR LIGHTING INSTALLATIONS						
Environmental Zone	Building Facade Luminance [Max cd/m²] (1)	Sky Glow ULR [Max %] (2)	Light Intrusion (into windows) Ev (lux) (3)		Luminaire Intensity I (candelas) (4)	
			Pre-curfew	Post-curfew	Pre-curfew	Post-curfew
E0_Protected	<0.1	0	0	0	0	0
E1_Natural	<0.1	0	2	0 (1*)	2,500	0
E2_Rural	5	2.5	5	1	7,500	500
E3_Suburban	10	5	10	2	10,000	1,000
E4_Urban	25	15	25	5	25,000	2,500

Based on Tables 3,4,6 and 8 – Obtrusive Light Limitations for Exterior Lighting Installations ILP Guidance Notes for the Reduction of Obtrusive Light GN01:2020

SQM = Sky Quality Measurements referenced by the International Dark-Sky Association (IDA), the criteria for E01 being revised in mid 2019 but not retrospective
ULR = Upward Light Ratio of the Installation is the maximum permitted percentage of luminaire flux that goes directly into the sky.
Ev = Vertical Illuminance in Lux - measured flat on the glazing at the centre of the window.
I = Light Intensity in Candelas (cd)
L = Luminance in Candelas per Square Metre (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.
***** = Permitted only from Public Road Lighting Installations
(1) Maximum permitted building facade luminance – Taken as the product of the design average luminance and reflectance divided by n.
(2) 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 aplication of suitably directional luminaires and light controlling attachments.
(3) Light Intrusion (into Windows) – These values are suggested maxima and need to take account of existing light intrusion 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 intrusion into the window down to the post curfew value by fitting a shield, replacing the luminaire, or by varying the lighting level.
(4) Luminaire Intensity – This applies to each luminaire 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.

Bats and Birds Consideration

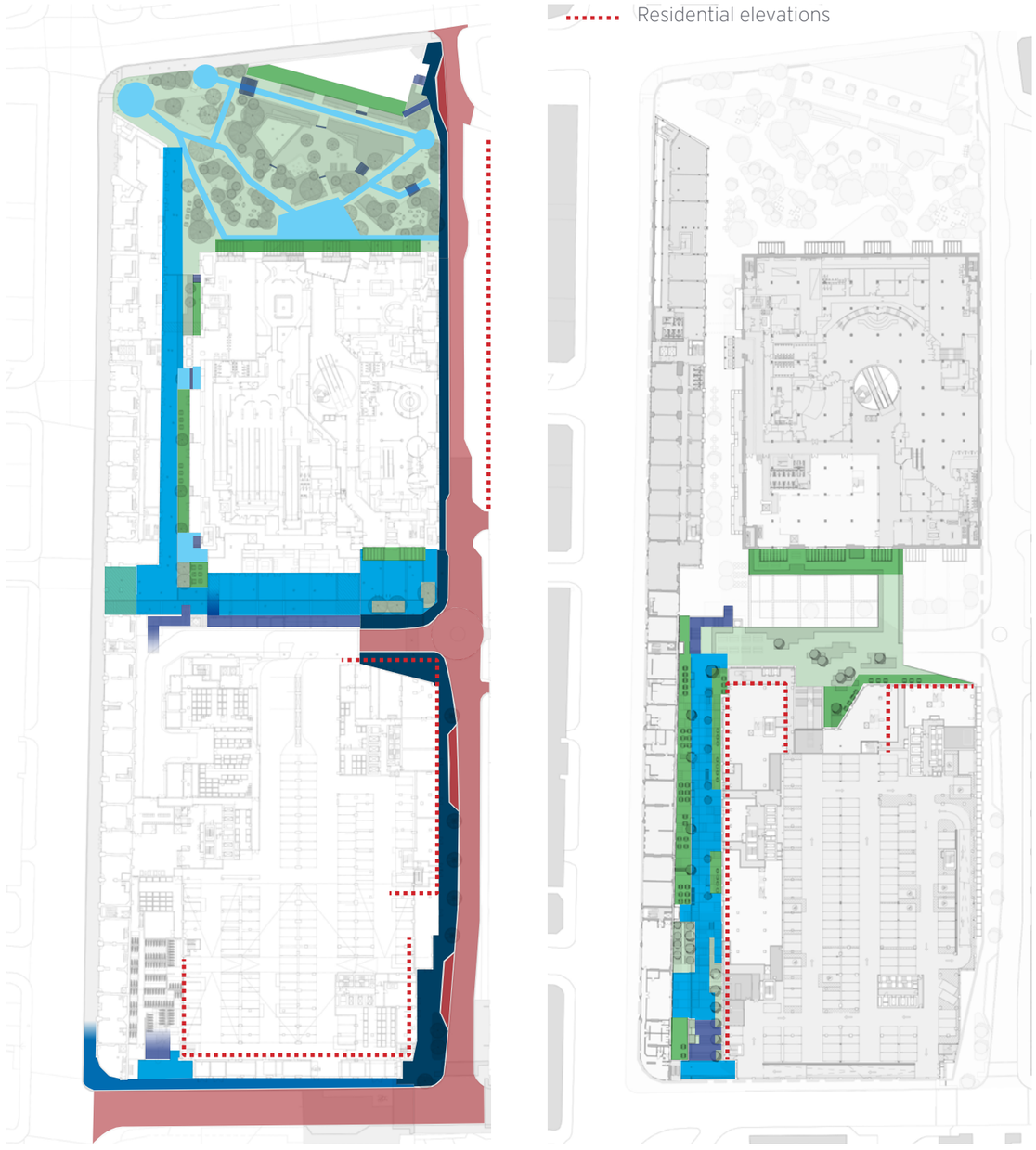
As per the ecological survey of the area although no signs of bat activity or occupation were found during inspection and suitability for roosting bat species is considered negligible, the new development will aim to create opportunities to provide bat roosting provision. This would include bat and bird boxes located in convenient and suitable places - attached to the buildings and/or existing trees.

To minimise potential adverse effects on existing and future wildlife the following principles will be incorporated in the design for the site and Great Northern square in particular:

- All decorative and feature lighting including upward pointing light fixtures will be switched off or significantly dimmed down after curfew;
- The selected luminaires would employ warm colour temperature (3000 Kelvin) light sources that do not emit ultra violet (UV) light. This avoids potential ecological impact by ultra violet light as it is known to attract flying insects and moths;
- Light post mounted lighting would utilize shielded light sources with good optical control aimed away from trees selected to host bat and bird boxes.

After curfew the lighting scheme targets the minimum prescribed values for safety and security.

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Spill-out areas in front of F&B and retail units
Occupancy spill lighting would largely contribute to the illumination of these areas. The particular character and brightness of these areas will be driven by the intent of the particular vendor. After working hours we expect these areas to not be occupied.

Park and landscaped areas
The lighting to these areas is designed to create an atmosphere enhancing the architectural and landscape qualities of the spaces. Lighting is used for visual guidance only.

Pedestrian thoroughfare in city and town centres
As per BS EN 13201-1 and 2 these areas fall into P1 lighting class with Ea=15lux and Emin=3lux maintained.

Pedestrian footways in city and town centres with expected high pedestrian only traffic
Those are areas falling into C2 lighting class with Ea>20lux and Uo>0.4.

Pedestrian footways in city and town centres with expected normal pedestrian only traffic
Those are areas falling into C3 lighting class with Ea>15lux and Uo>0.4.

Open stairs, ramps and footbridges
Ea=20lux and Emin=10lux at night time.

Enclosed arcade
Ea=250lux and Emin=150lux at day time;
Ea=150lux and Emin=75lux at night time.

Outdoor parking in medium traffic areas
Ea=10lux and Uo=0.25

Single carriageway route for low to moderate traffic
Identified as M4 lighting class with Lmin=0.75cd/m2 and Uo=0.4.

Light Level Considerations

While creating a comfortable and attractive night time experience for the occupants and visitors of the development the proposed lighting strategy aims to enforce a safe and balanced environment.
We've observed the prescriptions of *BS 5489-1:2013 Lighting of roads and public amenity areas* and *BS EN 12464-2:2014 Light and lighting - Lighting of work places - Part 2: Outdoor work places* to define areas of specific use and purpose with their corresponding lighting classes and lighting prescriptions.
These are listed on the side and coded in colour on the schematic plans.

Resident and pedestrian safety and crime reduction have been considered and design measures taken to ensure that sufficient facial recognition is achieved in publicly accessible areas. Additionally, luminaire types and positions are chosen in manner in which they clearly reveal paths along the site and introduce vertical brightness.

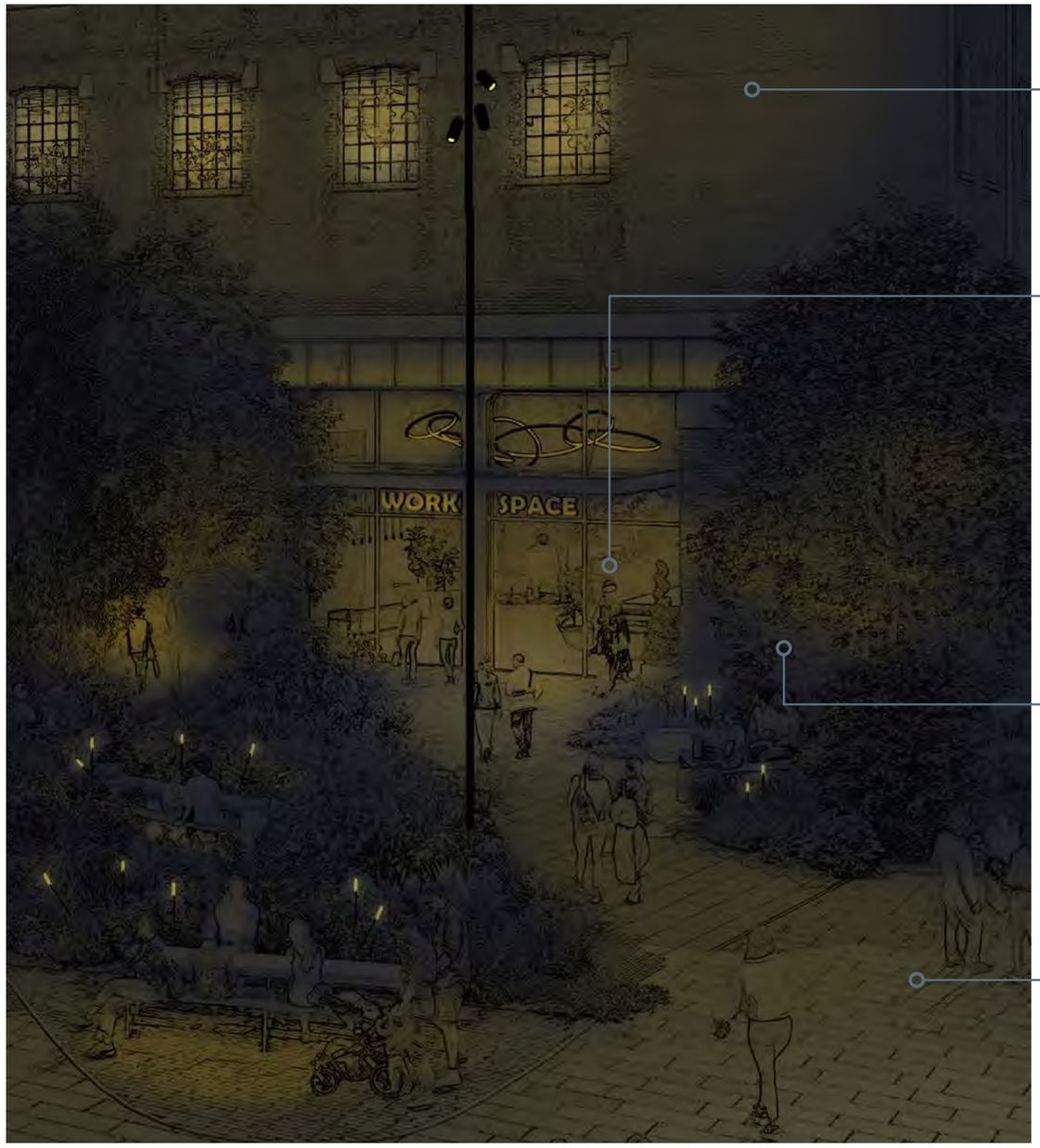
Please note that the existing lighting along Watson Street and Great Bridgewater Street will be retained and reinstated referring to the identified lighting class for that area.
Additional luminaires matching the look of the existing street lighting and utilizing suitable optics will be introduced for the carriageway leading towards the development's carpark.
The pavement along Deansgate and Peter Street is not part of the scope of this design report.

Where the prescriptions of *BS 5489-1* and *BS EN 12464-2* overlap we've selected the higher class' prescription.

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7. Lighting Control Strategy

7.1 Light Balance and Curfew Based Lighting Operation



Light Layers:

Facade lighting creates a bright back drop and highlights the warehouse facade as an important landmark.

Brightly illuminated interiors of the retail and hospitality units at ground floor along with the proposed entrance lighting activate the ground floor.

Feature and accent lighting frames the boundary of the spill-out and dwell areas.

Clusters of bollards create visual interest and guide visitors through the planted areas.

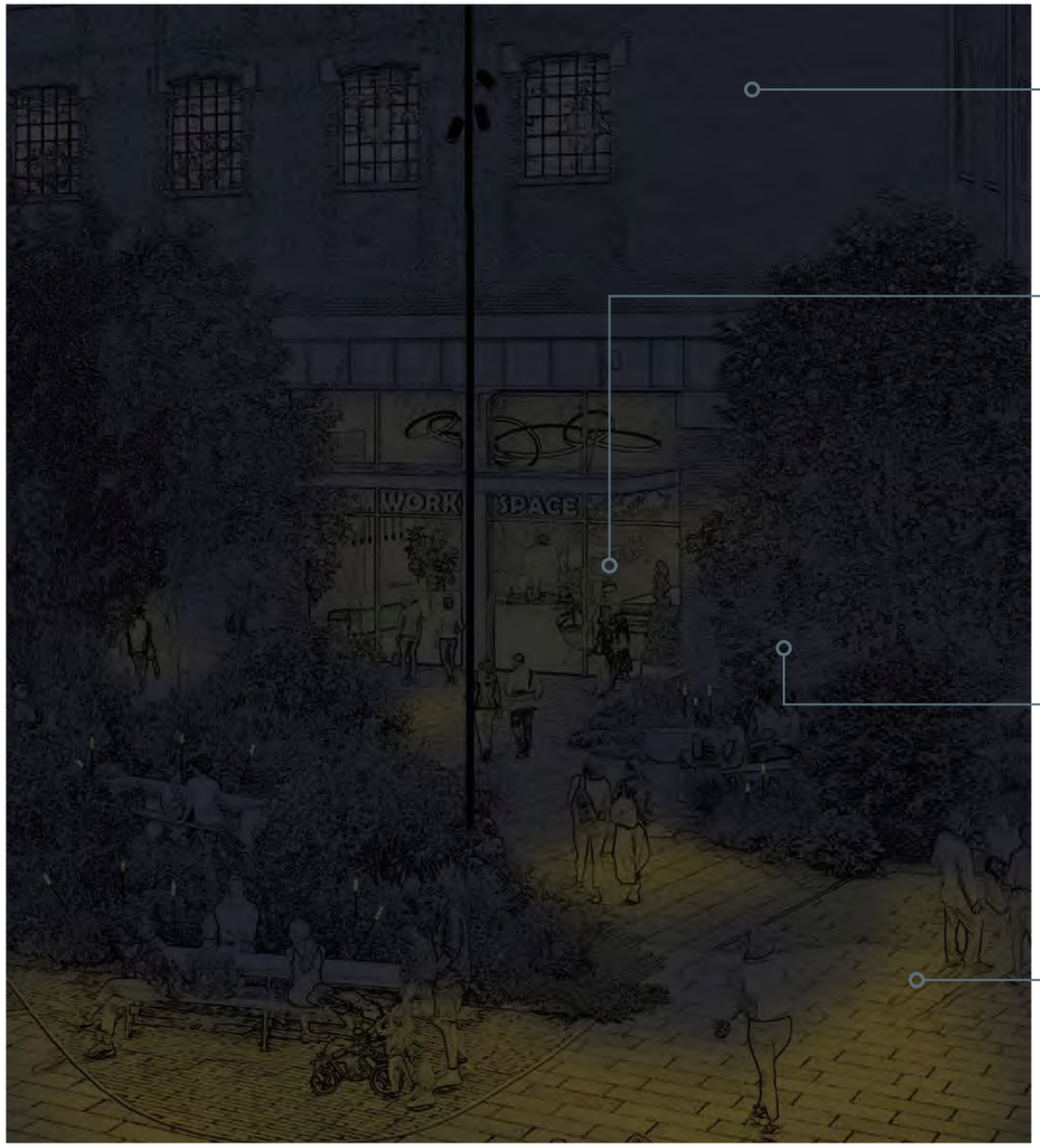
Horizontal amenity lighting aids navigation and orientation and enables the use of the square after dark.

Light Balance

Centralised exterior lighting controls system is proposed for the entire public realm scheme, allowing to establish balanced visual hierarchy between the various areas on site to draw views and encourage visitor interaction.
To achieve this stronger emphasis is placed on the arrival experience with well defined paths and entry points to the square and stair access to the mews.
Central role for the development play the key landmark elevations of the warehouse, Peterloo wall and selected features across site that draw attention to the vertical plane.
In order to avoid over illumination and to allow these features to stand out a careful balance of light intensities should be performed during commissioning creating a hierarchy of key illuminated surfaces and calmer subordinate areas.

The lighting control system should allow for the automated control and dimming of all luminaires either in groups per function and area or individually for general lighting luminaires such as column mounted spotlights and high level downlights which are likely to cover large and diverse areas.
A precise lighting control strategy based on scenes for pre- and post curfew operation will be developed in the later stages of the project in coordination with the existing street lighting scheme and Manchester City Council's requirements.

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Light Layers:

Facade lighting is dimmed down to reduce upward light spill

Retail lighting is reduced after working hours. Retaining low light levels to key surfaces inside is recommended to maintain vertical brightness and enforce the perception of a safety and security.

Feature and accent lighting is switched off after curfew hour to reduce the scheme's impact on wildlife and reduce energy consumption.

Horizontal amenity lighting is retained at reduced output to enable the necessary circulation while ensuring safety and security in accordance with the minimum required light levels as per the applicable British standards and best practices.

Post-Curfew Lighting

In order to reduce the scheme's environmental and ecological impact as well as prevent any negative impact towards wellbeing and privacy of residents living in the development, lighting curfew is proposed affecting all public amenity and feature lighting across site.

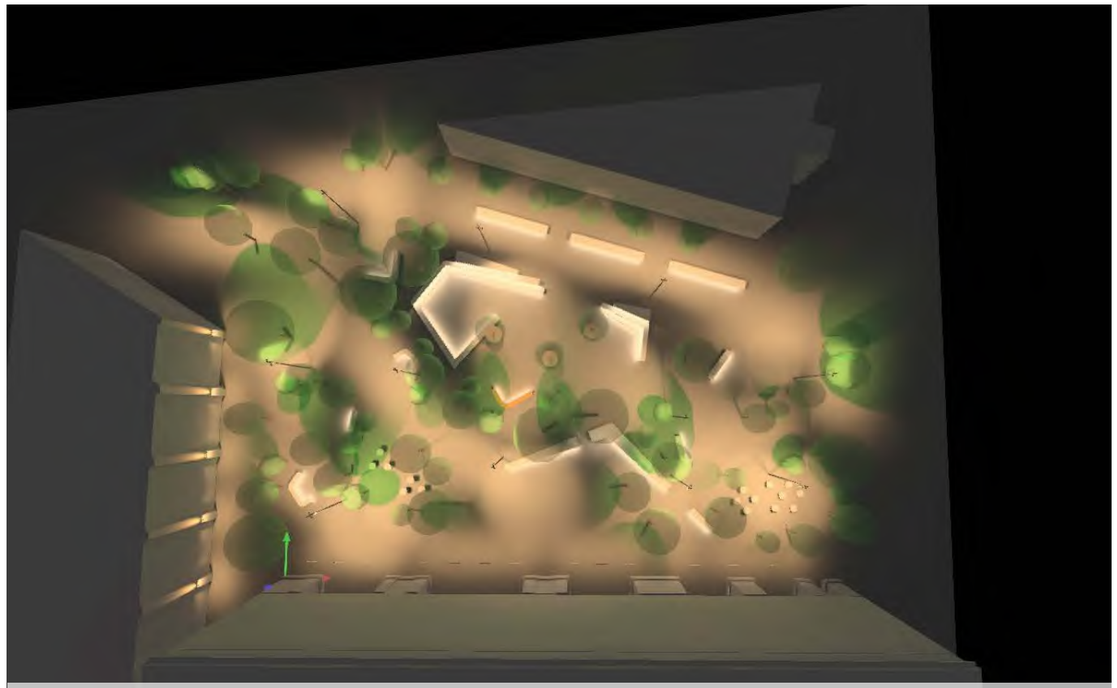
As part of this, all external ambient and feature lighting would be controlled separately from amenity street and pathway lighting, thus allowing to reduce overall site brightness during nighttime while still maintaining high level of safety and ease of navigation.

Presence detection (PIR) control is recommended for local common entrances only to dim light fittings when these spaces are not in use.

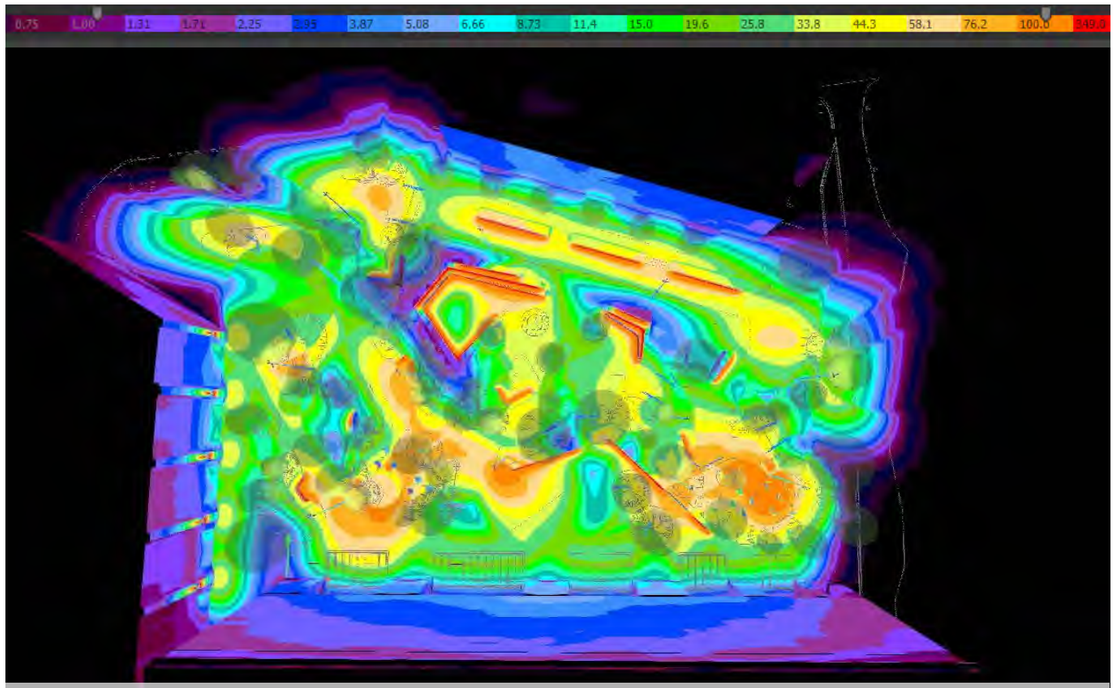
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8. Lighting Calculation Results

8.1 Great Northern Square



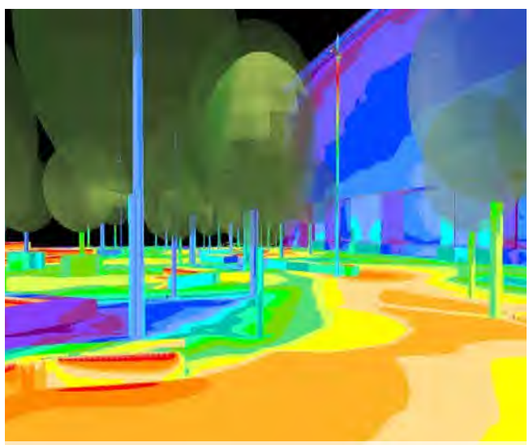
Great Northern Square Lighting Calculation Simulation



Great Northern Square Lighting Calculation Simulation. False Colours Render.



View A



View A. False Colours Render.

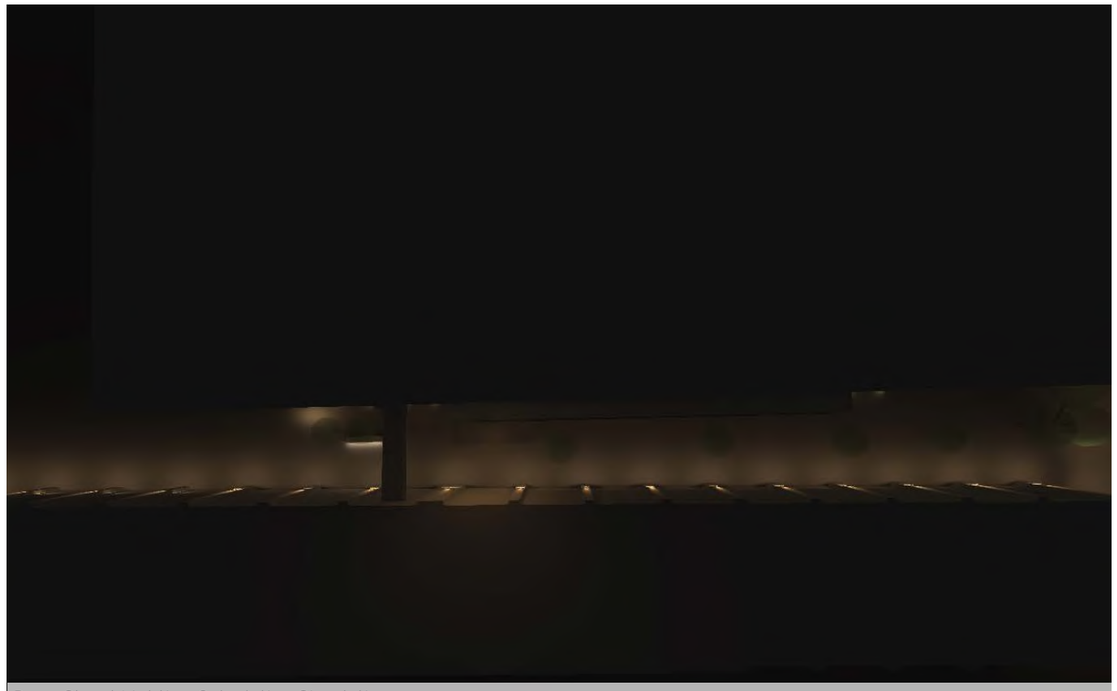
The above preliminary lighting calculation demonstrates pre-curfew horizontal light levels for Great Northern Square with the following characteristics and minimum requirements.

The key objective of the pre-curfew lighting scheme will be to create a pleasant and attractive atmosphere for visitors and enable the use of the different areas, amenities and activities. It will be balanced against the existing street lighting and ambience of the area.
After curfew lighting will be dimmed to satisfy the minimum lighting targets for the applicable lighting classes. These have been identified on page 24 as pedestrian thoroughfare in city and town centres (P1)
Minimum Lighting Targets:
Average maintained illuminance Ea=15lux
Minimum illuminance level Emin=3lux

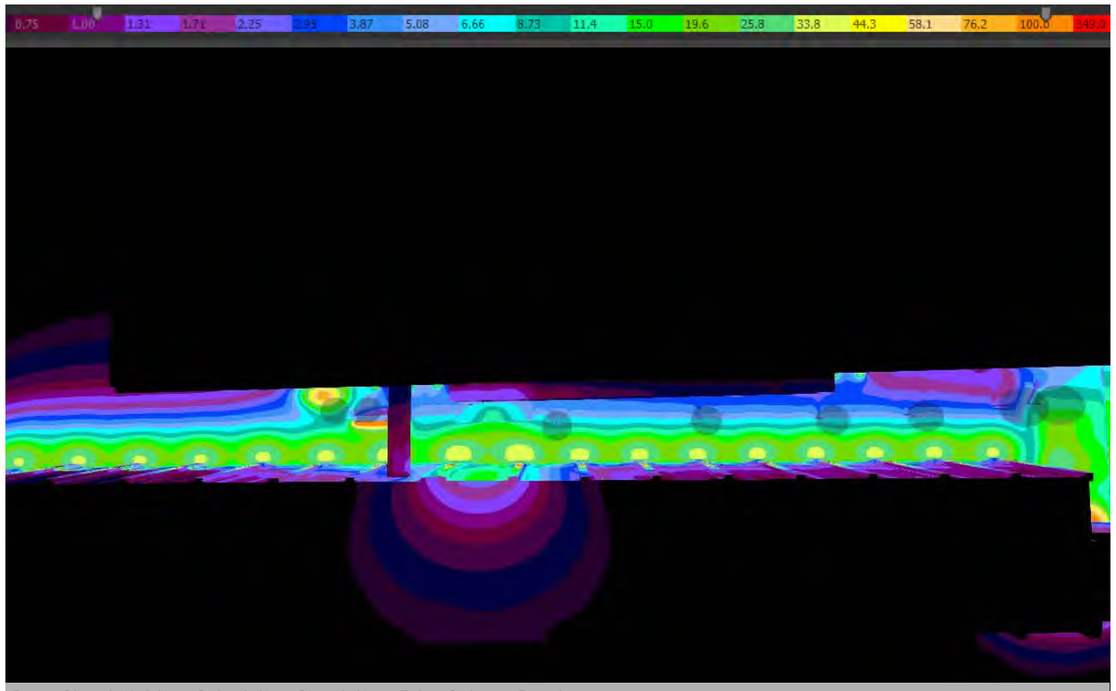
During regular pre-curfew operation average illuminance levels will be higher 30-35lux with selected key nodes and destinations up to 50lux.

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8.2 Dean Street



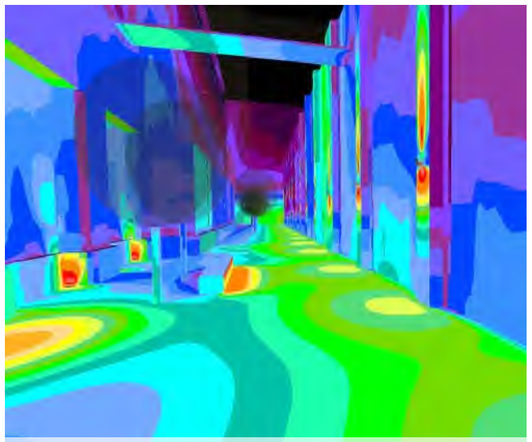
Dean Street Lighting Calculation Simulation



Dean Street Lighting Calculation Simulation. False Colours Render.



View B



View B. False Colours Render.

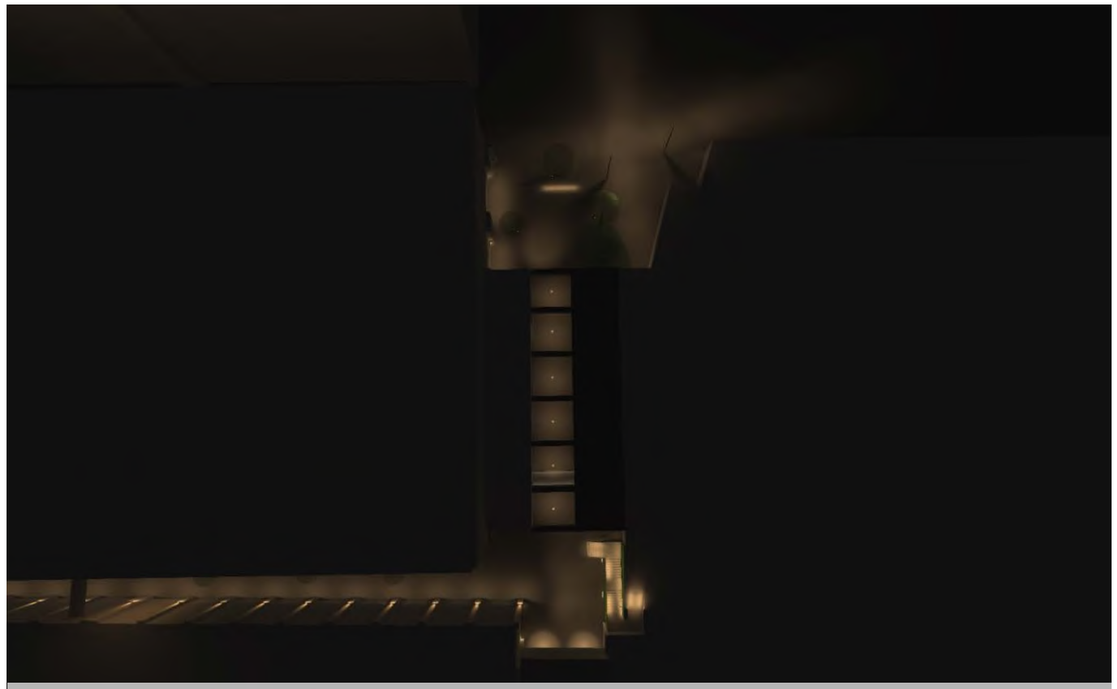
Along Dean Street lighting will help connect Great Northern Square with Alport Street and the Mews on Level 1. Pre-curfew light levels are intended to support the units spill-out without shifting attention away from the square.

After curfew the lighting will be dimmed to satisfy the minimum lighting targets for the applicable lighting class along the path identified as Pedestrian footways in city and town centres with expected high pedestrian only traffic (C2):
Average maintained illuminance Ea>20lux
Uniformity Uo>0.4

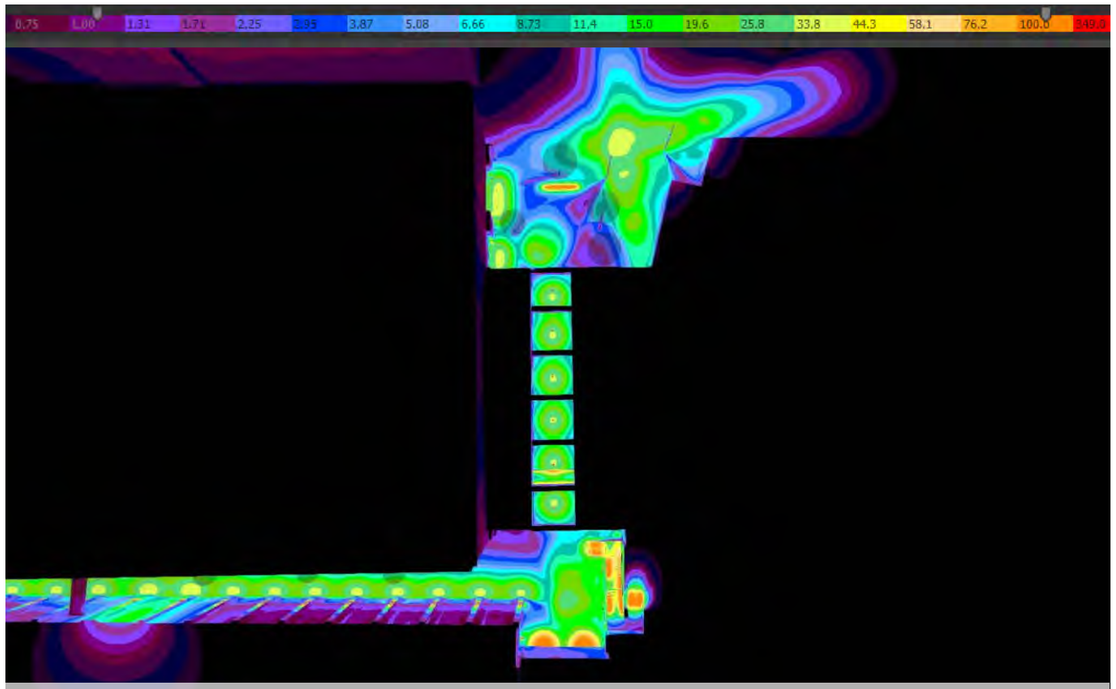
During regular pre curfew operation average illuminance levels will be 20-25lux.

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8.3 Alport Street



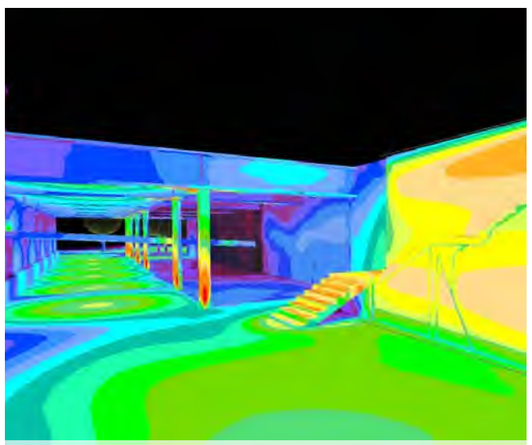
Alport Street Lighting Calculation Simulation



Alport Street Lighting Calculation Simulation. False Colours Render.



View C



View C. False Colours Render.

The lighting along Alport Street is intended to activate the space and improve the perception of safety and security in the area. Pre-curfew light levels will be adjusted to provide a seamless transition coming from Dean Street or the Mews. Higher illuminance to the entry nodes is intended to create an arrival experience for visitors coming from Deansgate and Watson Street.
After curfew the lighting will be dimmed to satisfy the minimum lighting targets for pedestrian footways in city and town centres with expected high pedestrian only traffic (C3):
Average maintained illuminance Ea>20lux
Uniformity Uo>0.4

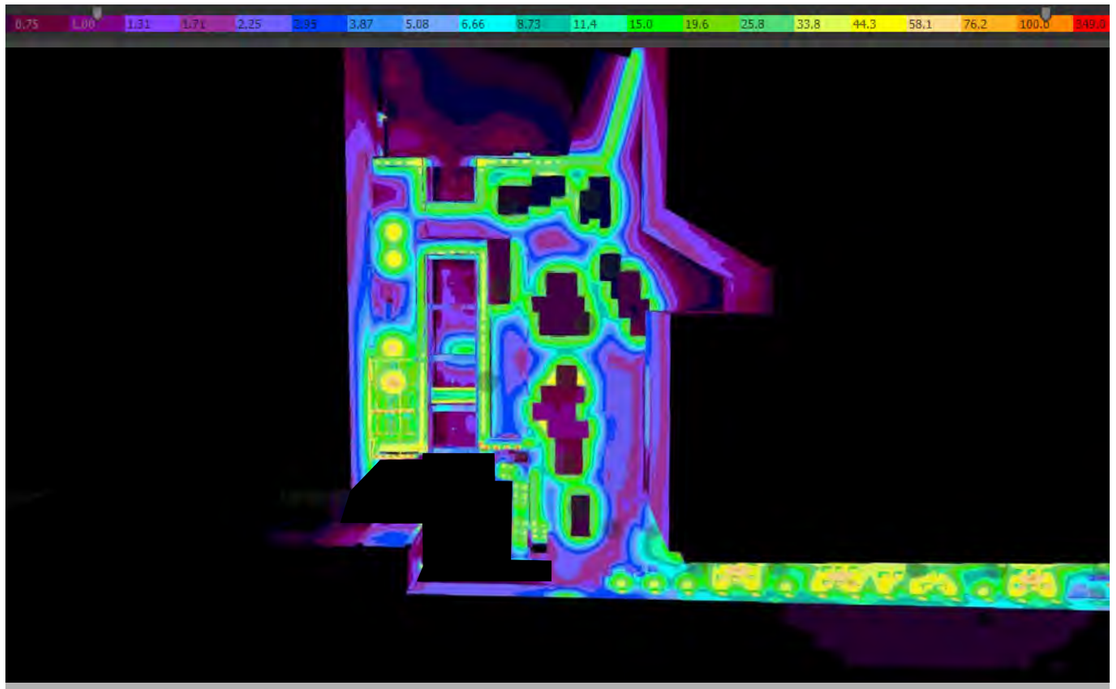
Additional vertical lighting introduced to key elevations and the viaduct structure would aid face recognition.

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8.4 Viaduct



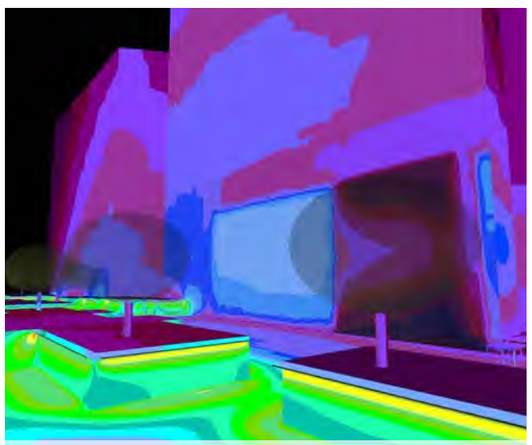
Viaduct Lighting Calculation Simulation



Viaduct Lighting Calculation Simulation. False Colours Render.



View D

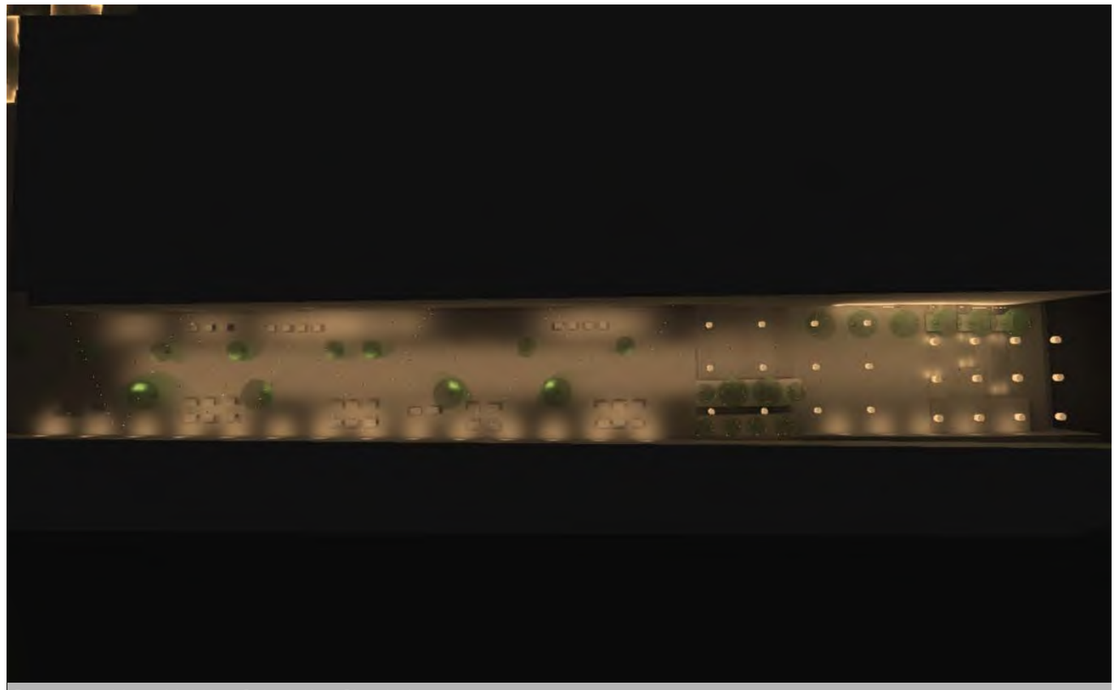


View D. False Colours Render.

The viaduct open spaces would benefit from excellent views towards the Great Northern Warehouse illuminated facade and the surrounding F&B elevations which will create the impression of a bight perimeter.
Active use of the terrace after dark would be concentrated around the restaurant elevations.
To keep the views free from obstructions low level lighting is used for visual guidance only.
Circulation will be supported by higher light levels following the pathways along the terrace balustrade and tall planters.

To support a comfortable transition between the Mews and the Viaduct terrace lighting in the threshold area will be gradually dimmed down.

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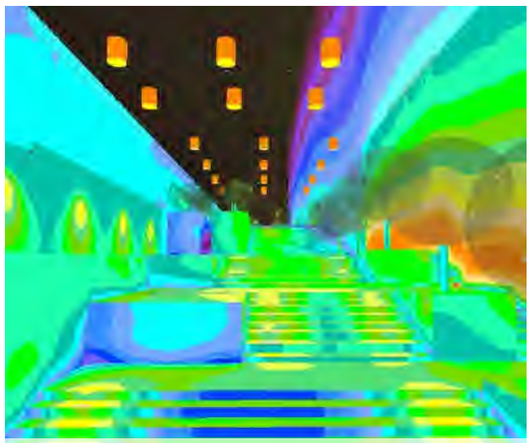
Deansgate Mews Lighting Calculation Simulation



Deansgate Mews Lighting Calculation Simulation. False Colours Render.



View E



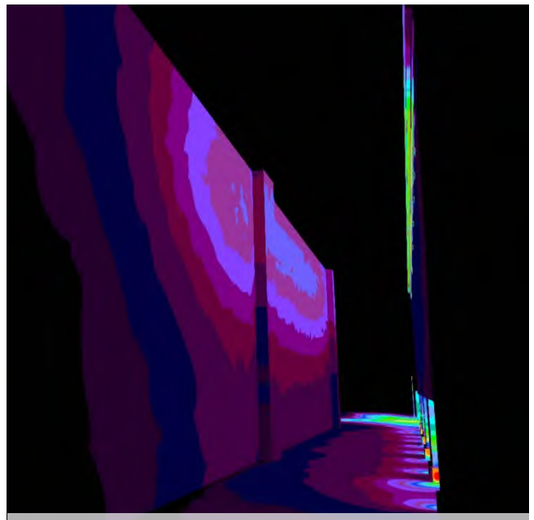
View E. False Colours Render.

Deansgate Mews will be a vibrant busy area and the main entrance to the development from the south.
Illuminance during working hours of the shops, restaurants and cafes will be maintained at higher levels to create an active environment. Where the Mews connect with Great Bridgewater Street and the Viaduct light levels will be adjusted accordingly to create a comfortable threshold transition.
After curfew the minimum lighting targets for the identified C2 lighting class will be meet the applicable requirements for:
Average maintained illuminance Ea>20lux
Uniformityl Uo>0.4

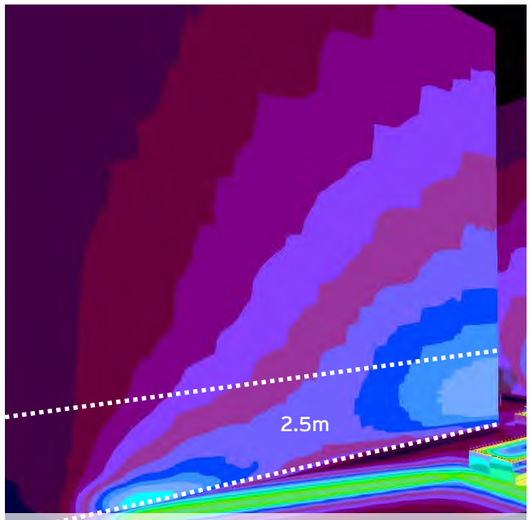
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8. Lighting Calculation Results

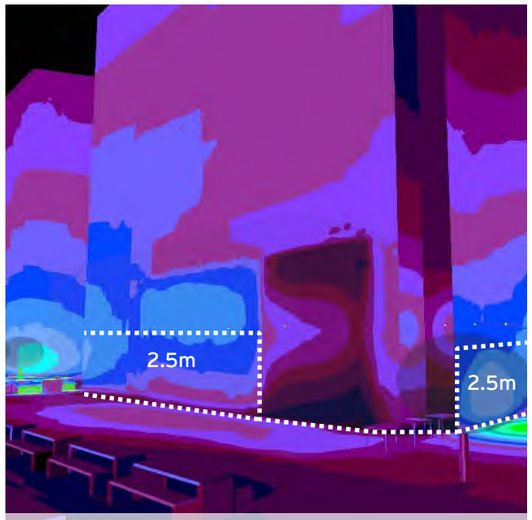
8.6 Vertical Light Spill onto Residential Elevations



View F. Pre-curfew. 3 lux maximum light intrusion to nearby residential windows.



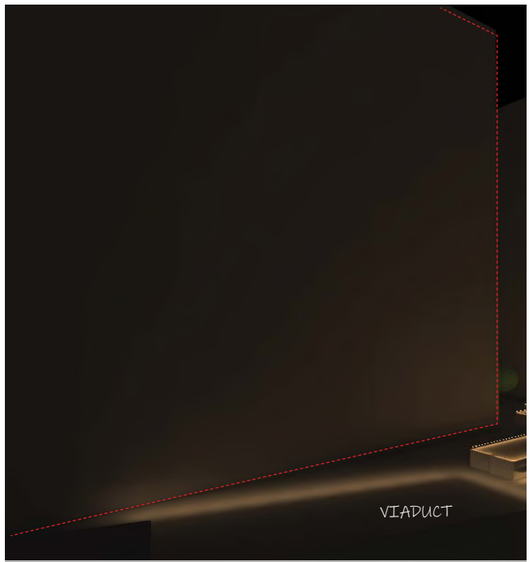
View G. Pre-curfew. All light intrusion above line is <5lux. Residential windows are located above the marked 2.5m zone.



View H. Pre-curfew. All light intrusion above line is <5lux. Residential windows are located above the marked 2.5m zone.



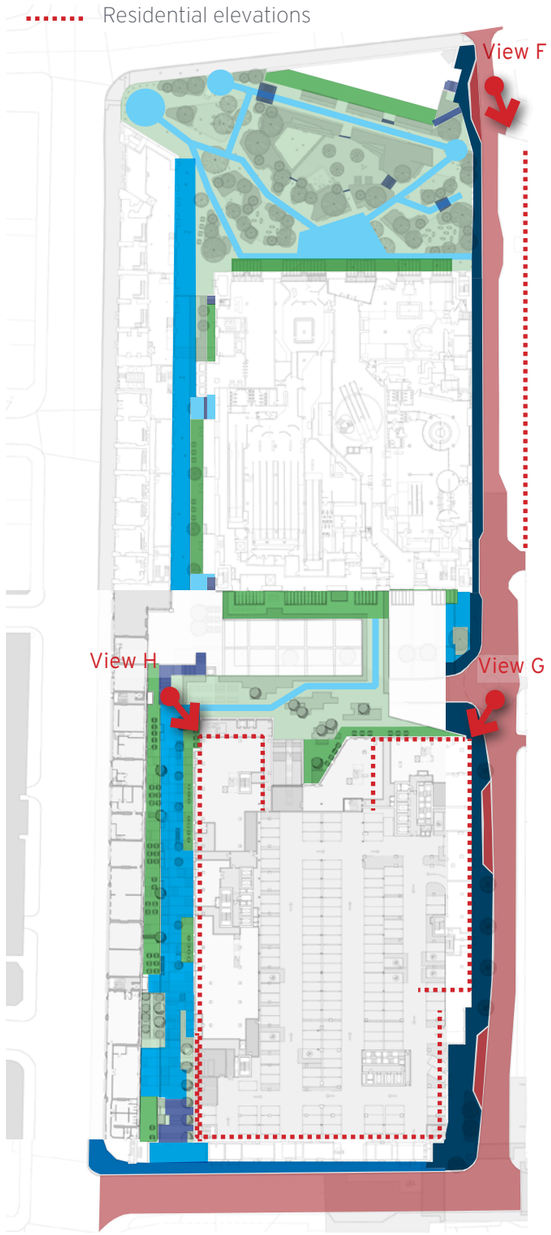
View F on Ground Level. Simulation



View G on Level 1. Simulation



View H on Level 1. Simulation



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