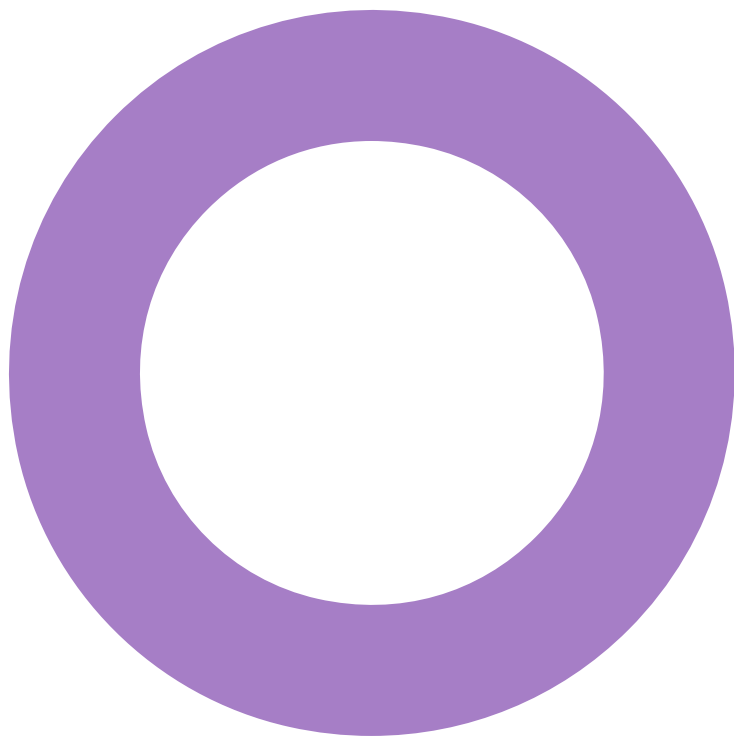


**MMU Public Realm.
Phase 1A.**
Manchester Metropolitan University.

LIGHTING DESIGN

DOC-1616617-241129-DLB-MMU PUBLIC REALM PHASE 1A LIGHTING VERIFICATION REPORT-02

02 DECEMBER 2024



Audit sheet.

Rev	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
01	02/12/2024	Lighting Verification Report	DLB	KF	DLB
02	02/12/2024	Text Correction	DLB	KF	DLB

This document has been prepared for Manchester Metropolitan University from our Appointment only and solely for the purposes expressly defined herein. We owe no duty of care to any third parties in respect of its content. Therefore, unless expressly agreed by us in signed writing, we hereby exclude all liability to third parties, including liability for negligence, save only for liabilities that cannot be so excluded by operation of applicable law. The consequences of climate change and the effects of future changes in climatic conditions cannot be accurately predicted. This report has been based solely on the specific design assumptions and criteria stated herein.

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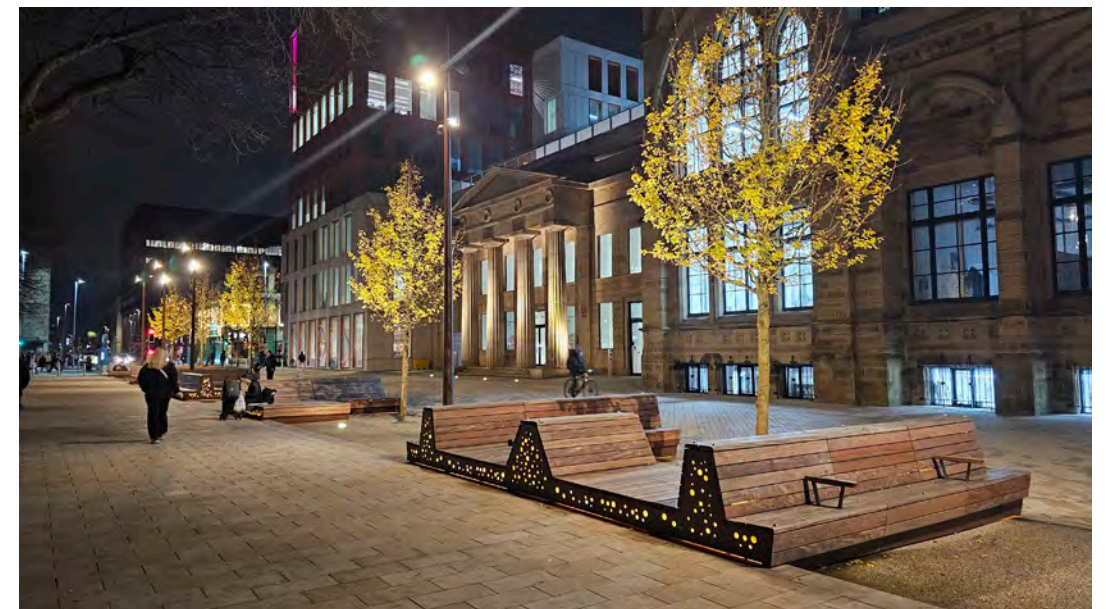
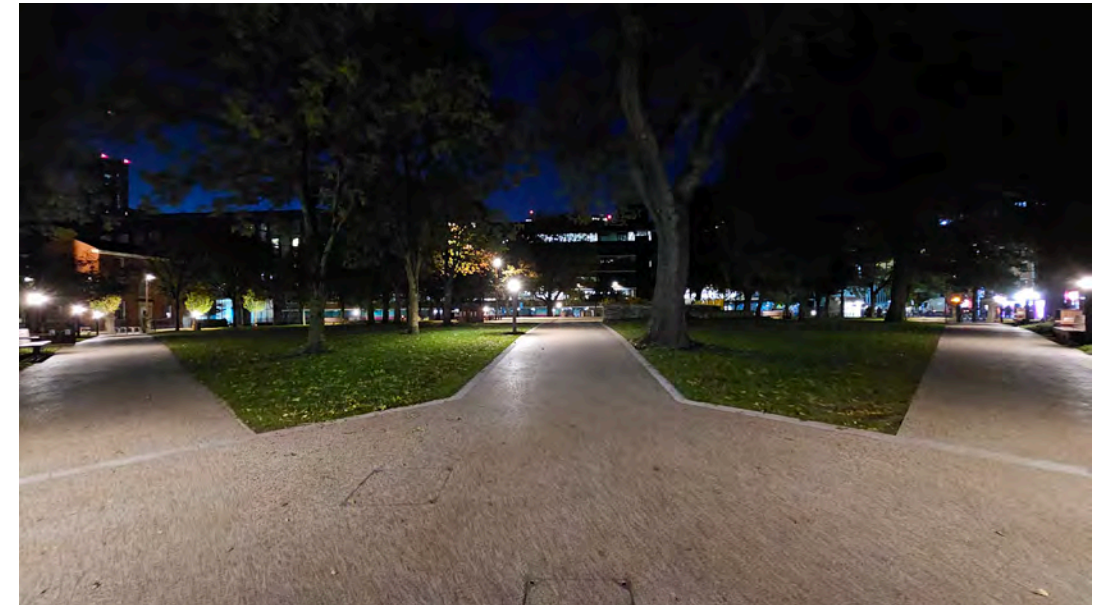
Introduction.

Within the Manchester City Council Planning Permission (ref: 128485/FO/2020 dated 3 November 2020) condition 16 states;

16) External lighting shall be designed and installed so as to control glare and overspill onto nearby residential properties.

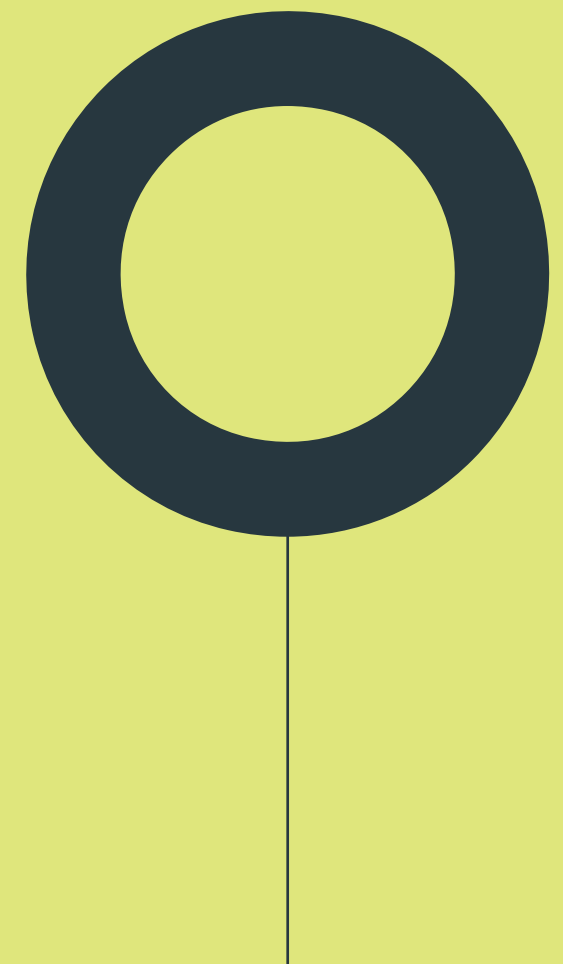
Upon completion of each Phase of the development (as specified in Condition 2b) a verification report in respect of the external lighting scheme will be required to validate that the work undertaken throughout that Phase of the development conforms to the recommendations and requirements in the approved light consultant's report. The report shall also undertake post completion testing to confirm that acceptable criteria has been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the criteria.

This document has been produced to compare the designed lighting to the installed lighting for Phase 1A of All Saints Park public realm project at MMU.



Completed project photos

Lighting Criteria.



Lighting Criteria.

Policy and Guidance

BS5489-1:2020 Design of road lighting. Lighting of roads and public amenity areas code of practice has been used to define the recommendations for lighting levels across the various spaces. In addition, BS EN 13201-2:2015 Road lighting part 2 performance requirements has been used to clarify the required lighting levels.

Environmental Zone Classification

To select the most appropriate lighting classifications for within the site it is important to have an understanding of the surrounding areas. This is to ensure illuminance levels do not drop suddenly between one zone and another, creating distinct contrast and the appearance of being dark.

The area has been classified within the E3 category for its environmental zone. This is due to the site being based within an Suburban, medium district brightness–small town centres or suburban location.

Lighting Requirements

It is important that the lighting applications provide both an aesthetic quality and also the appropriate levels of illumination required for the space they inhabit.

The adjacent tables, extracted from BS5489 and EN13201 give a guide to the target levels of illumination within similar spaces.

It is important to remember however that these are a guide and appropriate interpretation of the space and how these requirements align with its intended use should be taken into account.

The lighting requirements within the scope area fall into the following categories:

- Cyclist & Pedestrian Movement, Occasional Maintenance Vehicular Route
- Class P2 - 10 lux average, 2 lux minimum

Table A.6 - Lighting classes for city and town centres

Table extracted from 'BS5489-1:2020'

Type of traffic	Lighting class			
	Normal traffic flow		High traffic flow	
	E3 ^{a)}	E4 ^{a)}	E3 ^{a)}	E4 ^{a)}
Pedestrian thoroughfare	P2	P1	P2	P1
Pedestrian only	C4	C3	C3	C2
Mixed vehicle and pedestrian with separate footways	C3	C2	C2	C1
Mixed vehicle and pedestrian on same surface	C2	C1	C1	C1

Table 3 - P lighting classes

Table extracted from 'BS EN 13201-2:2015'

Class	Horizontal illuminance		Additional requirement if facial recognition is necessary	
	E_{av} ^{a)} [minimum maintained average]	E_{min} [minimum maintained]	E_v [minimum maintained]	E_{sc} [minimum maintained]
P1	15.0	3.0	5.0	5.0
P2	10.0	2.0	3.0	2.0
P3	7.5	1.5	2.5	1.5
P4	5.0	1.0	1.5	1.0
P5	3.0	0.6	1.0	0.6
P6	2.0	0.4	0.6	0.2
P7	Performance not determined	Performance not determined	-	-

Lighting Criteria.

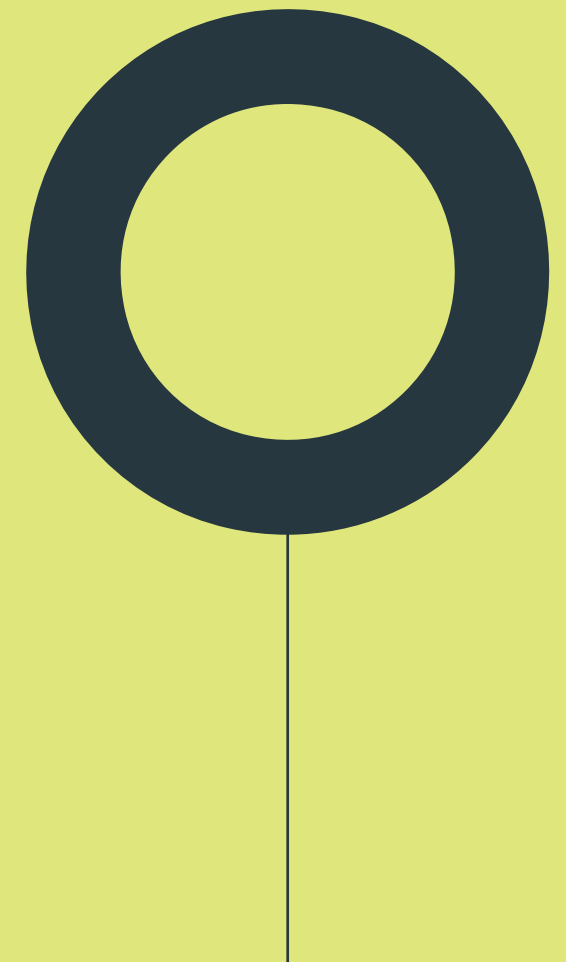
Lighting Levels

The below table and adjacent plan sets out the lighting class and lighting level requirements to all areas.

Area	Average Lux	Minimum Lux
Maintenance Vehicular Route, Cyclist & Pedestrian Movement	10	2



External Lighting Design.



Phase 1A - All Saints Park - Submitted Lighting Design.

Phase 1A

Type A - 2m Light Stack

Type B - 1m Bollard

Type C1/2 - 8m Multi-head Column with 3
area lighting spotlights

Type D - Tree uplight

Type F - 8m Multi-head Column with 2
area lighting spotlights and 2 tree lighting
spotlights

Type G - 8m Multi-head Column with 2 area
lighting spotlights

Type H - 8m Multi-head Column with 2 area
lighting spotlights and 2 gobo projectors

Type J - Memorial artwork linear strips

Type K1/2/3 - Bench lighting linear strips

Type L1/2 - Bench lighting linear strips



Phase 1A - All Saints Park - Developed Lighting Design.

During the construction phase, minor amendments we made to the landscape layout and the lighting design layout was coordinated with these changes.

There was no significant deviation from the original design, the changes consisted of moving the lighting as required. All lighting specifications (product types, heights, technical parameters etc) remained the same.

Phase 1A

Type A - 2m Light Stack

Type B - 1m Bollard

Type C1/2 - 8m Multi-head Column with 3 area lighting spotlights

Type D - Tree uplight

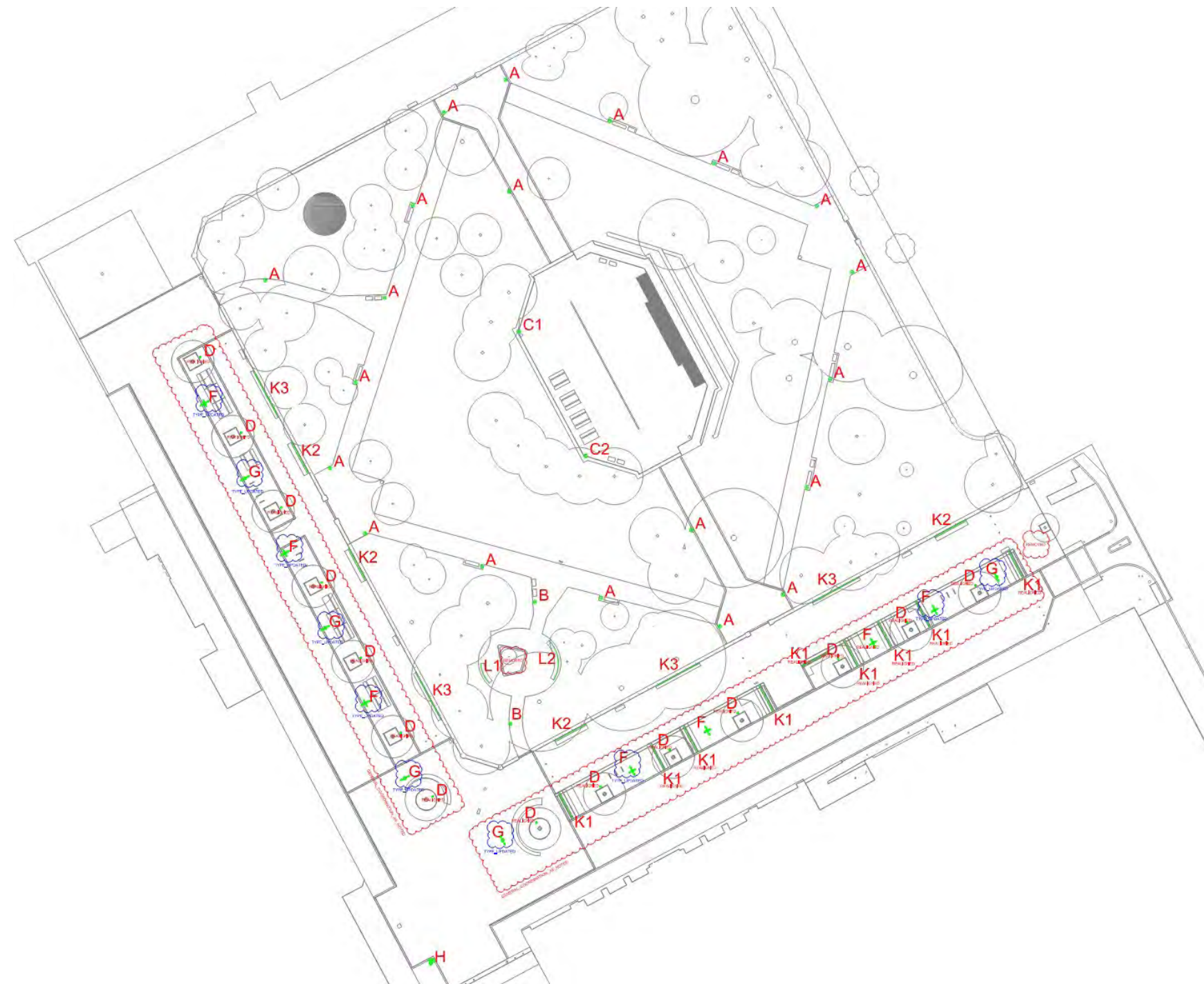
Type F - 8m Multi-head Column with 2 area lighting spotlights and 2 tree lighting spotlights

Type G - 8m Multi-head Column with 2 area lighting spotlights

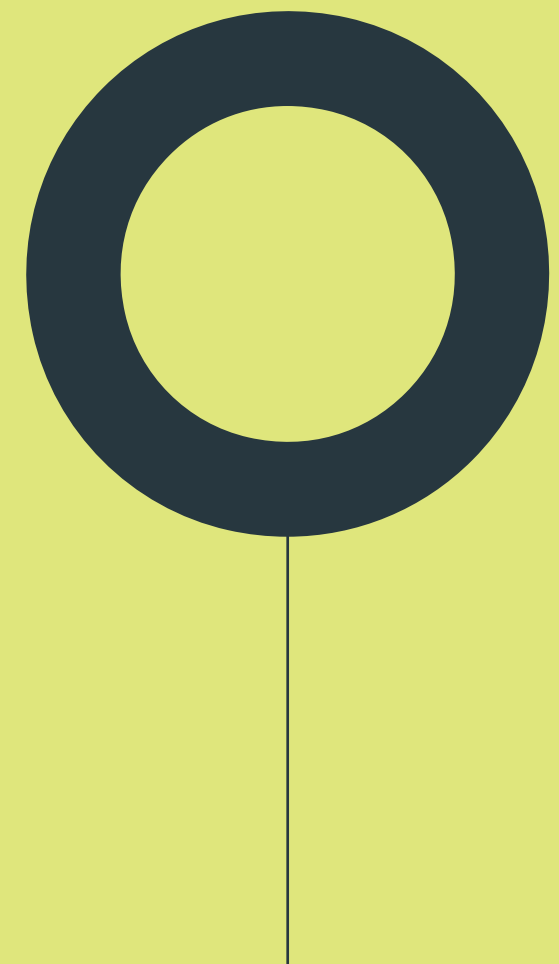
Type H - 8m Multi-head Column with 2 area lighting spotlights and 2 gobo projectors

Type K1/2/3 - Bench lighting linear strips

Type L1/2 - Bench lighting linear strips



Lighting Equipment and Installation Layout Verification.



Phase 1A - All Saints Park - General Lighting.

Light stacks

Type A

To provide the general illumination across All Saints Park, light stack luminaires of approximately 2m high are evenly spaced along the walkways of the park.

Using the same luminaire family as the bollards within the memorial garden, creates a consistent look across the park.

- Selux Elo Light Stack
- 2m height
- 3000K light source
- 14W
- 360° distribution
- 1500lm
- Futura Mars 2525 Sable YX355F finish
- IP66/IK10



Type A



Original Design Layout

Design Verification

The specification and installed layout of the Type A Light Stacks is as per the original design.



Phase 1A - All Saints Park - General Lighting.

Bollards

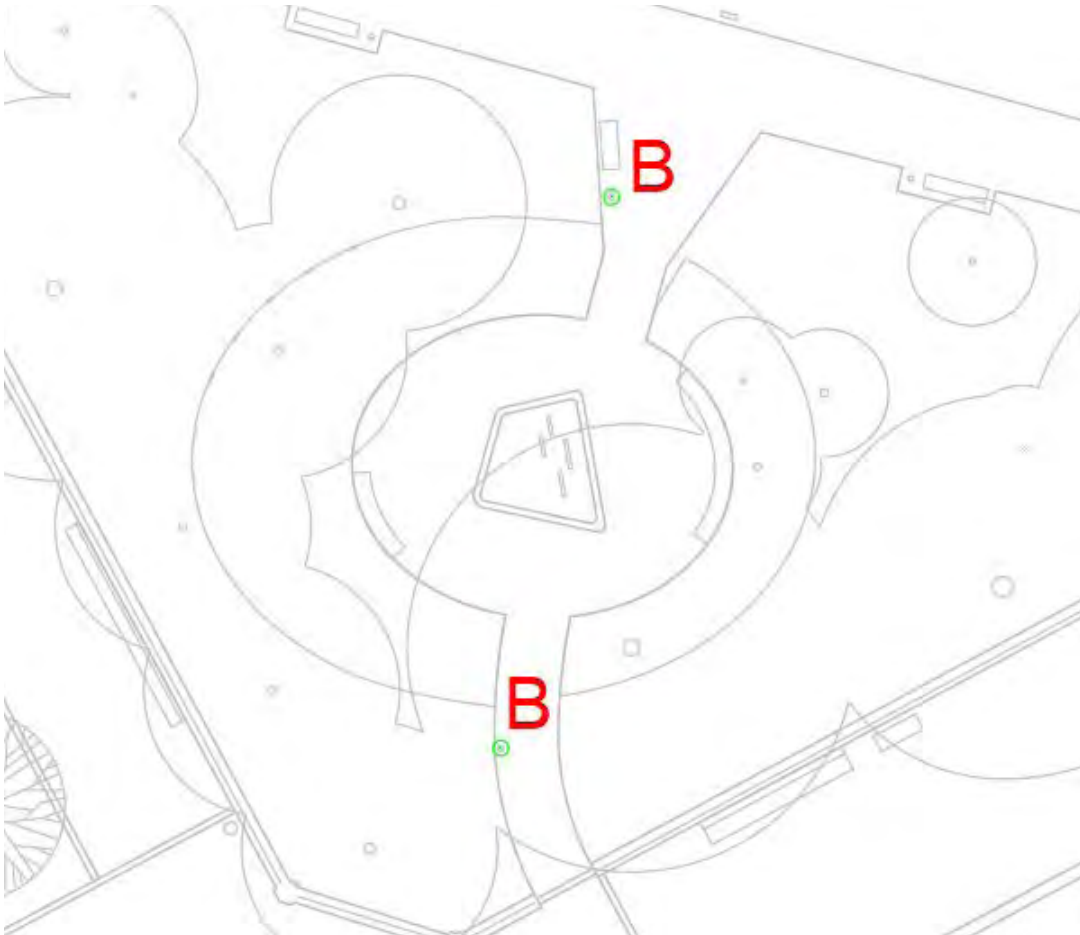
Type B

Low level bollards light the paths leading to the memorial garden providing a more intimate feel to the space, whilst enabling wayfinding.

- Selux Elo Bollard
- 1m height
- 3000K light source
- 14W
- 360° distribution
- 1500lm
- Futura Mars 2525 Sable YX355F finish
- IP66/IK10



Type B



Original Design Layout

Design Verification

The specification and installed layout of the Type B Bollards is as per the original design.



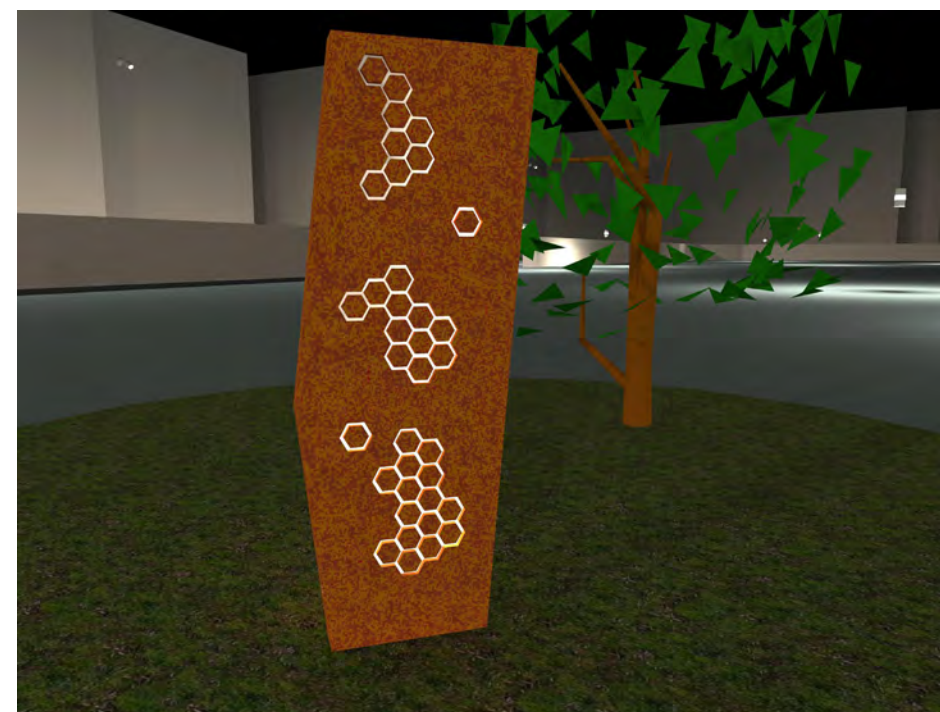
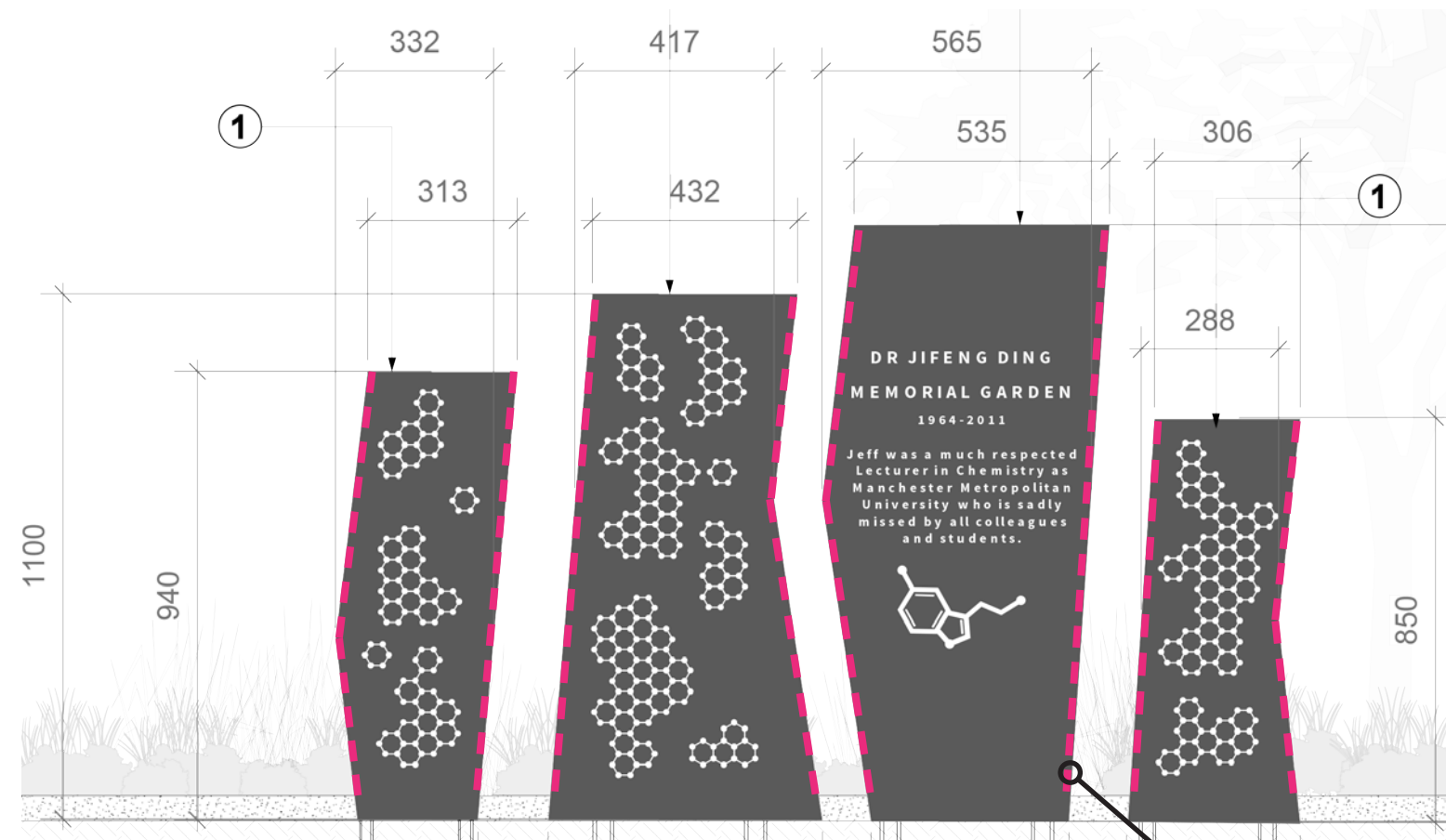
Phase 1A - All Saints Park - Feature Lighting.

Memorial lighting

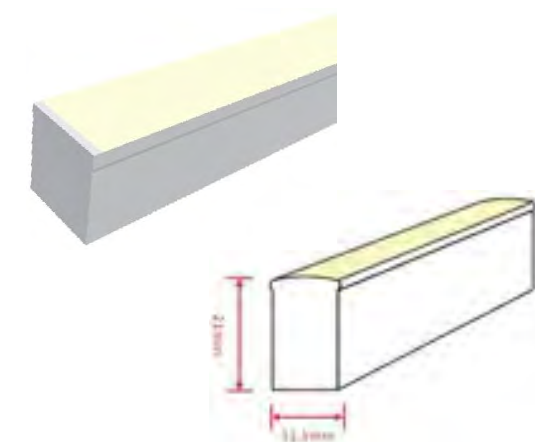
Type J

Design Verification

The artwork was not implemented. The lighting treatment was feature only the omission is not detrimental to light levels.



Example memorial artwork render

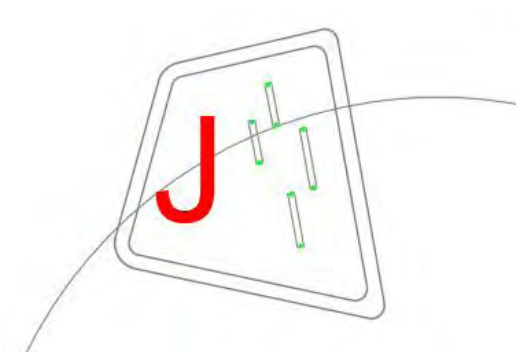


Type J

Lineo Line LED Strip

Light diffusing sheet

Corten Structure with laser cut pattern



Phase 1A - All Saints Park - Feature Lighting.

Under bench lighting

Type L1/2

2 benches are included around the memorial. These are on an open base form rather than the enclosed type outside the park.

Lighting is included to the benches, fixed to the underside to project down to the floor.

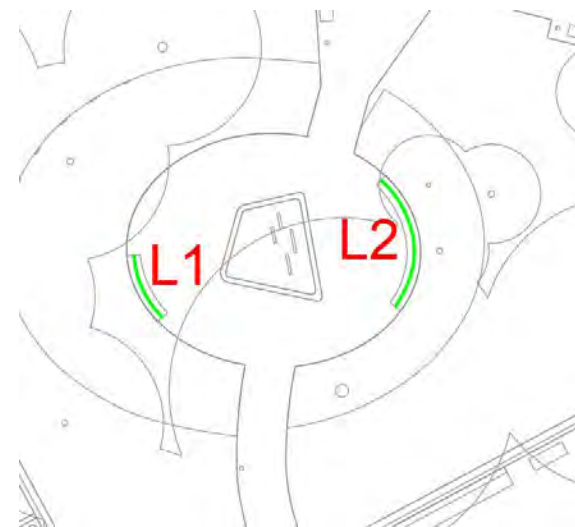
The product is required to be firmly fixed to the underside to prevent theft or vandalism as the product can be access due to the open nature of the benches.

The LED lighting strip is to be mounted within an extrusion with a remote IP rated driver incorporated local to the bench.

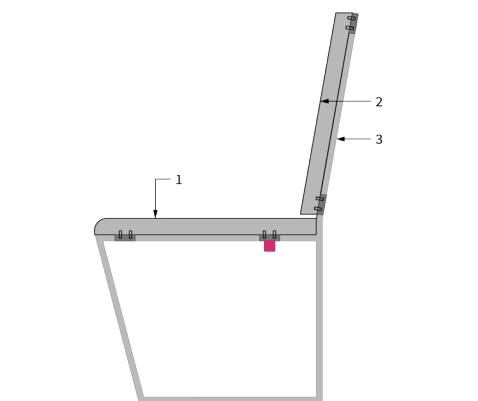
The lighting product and driver is to be invisible and tamperproof when mounted to the bench.

Nominal products lengths shown - exact lengths to be coordinated with bench design.

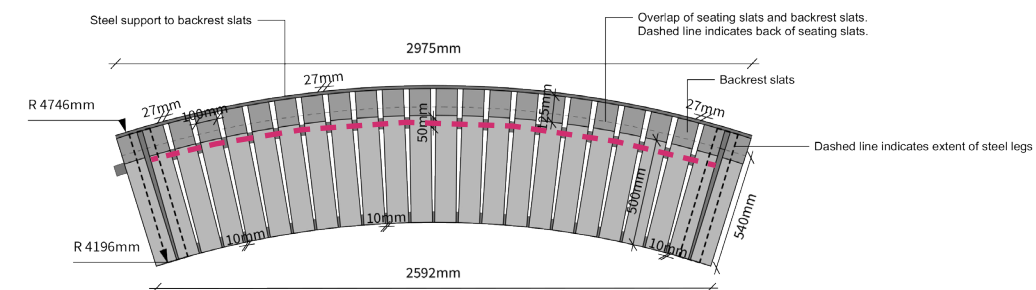
- Studiotech Lineo Line
- Lengths to suit
- 3000K light source
- 12W/m
- 160° distribution
- >320 lm/m
- IP67



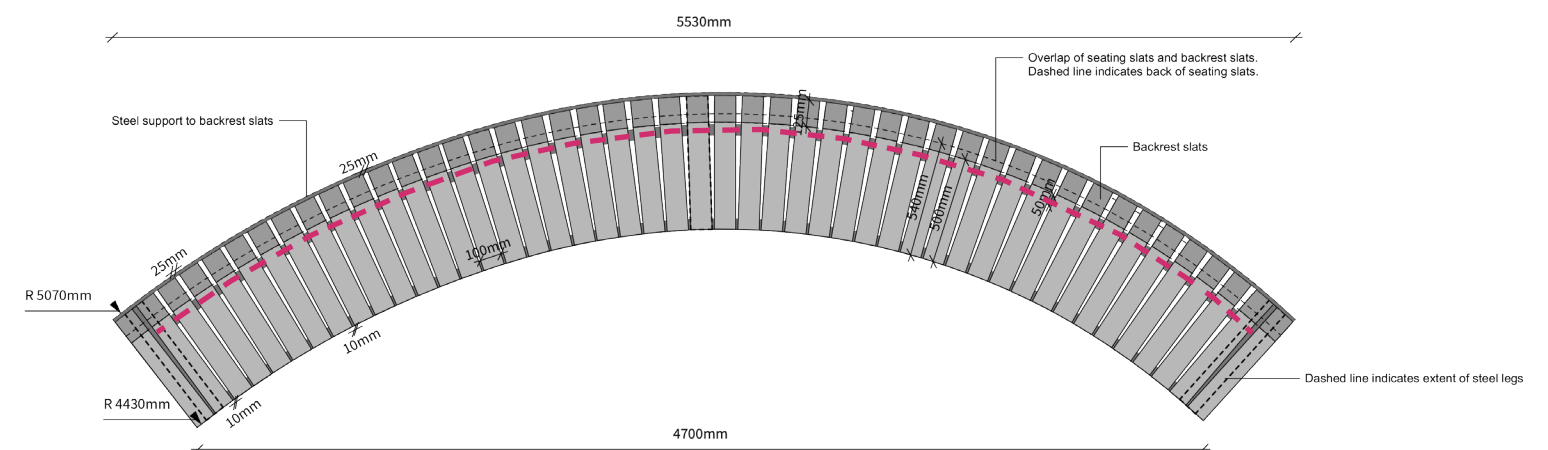
Original Design Layout



5 Typical Section B-B'
1:10



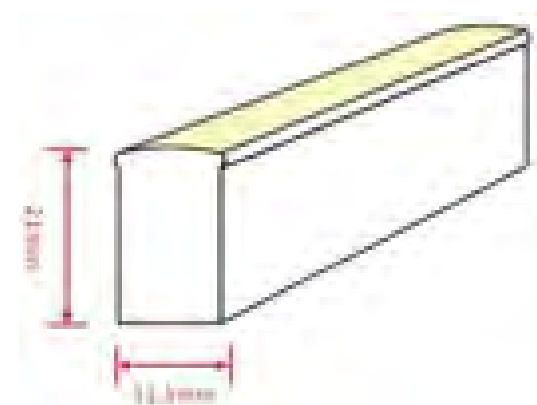
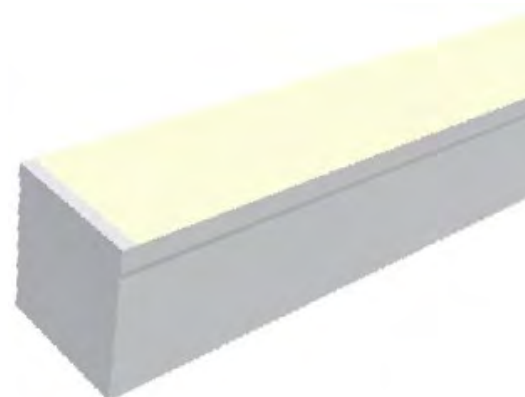
1 Memorial Bench A - Plan View
1:20



2 Memorial Bench B - Plan View
1:20

Design Verification

The specification was changed to amber to match the enclosed benches. The lighting treatment was feature only and this change is not detrimental to light levels.



Type L1/2

Phase 1A - All Saints Park - General Lighting.

Multi-head columns

Type C1/C2

Along the left hand perimeter, two 8m columns are positioned, each with 3 adjustable spotlights.

Type C1 and C2 are mirror images of each other. Each is fitted with two medium beam spotlights and one wide beam spotlight.

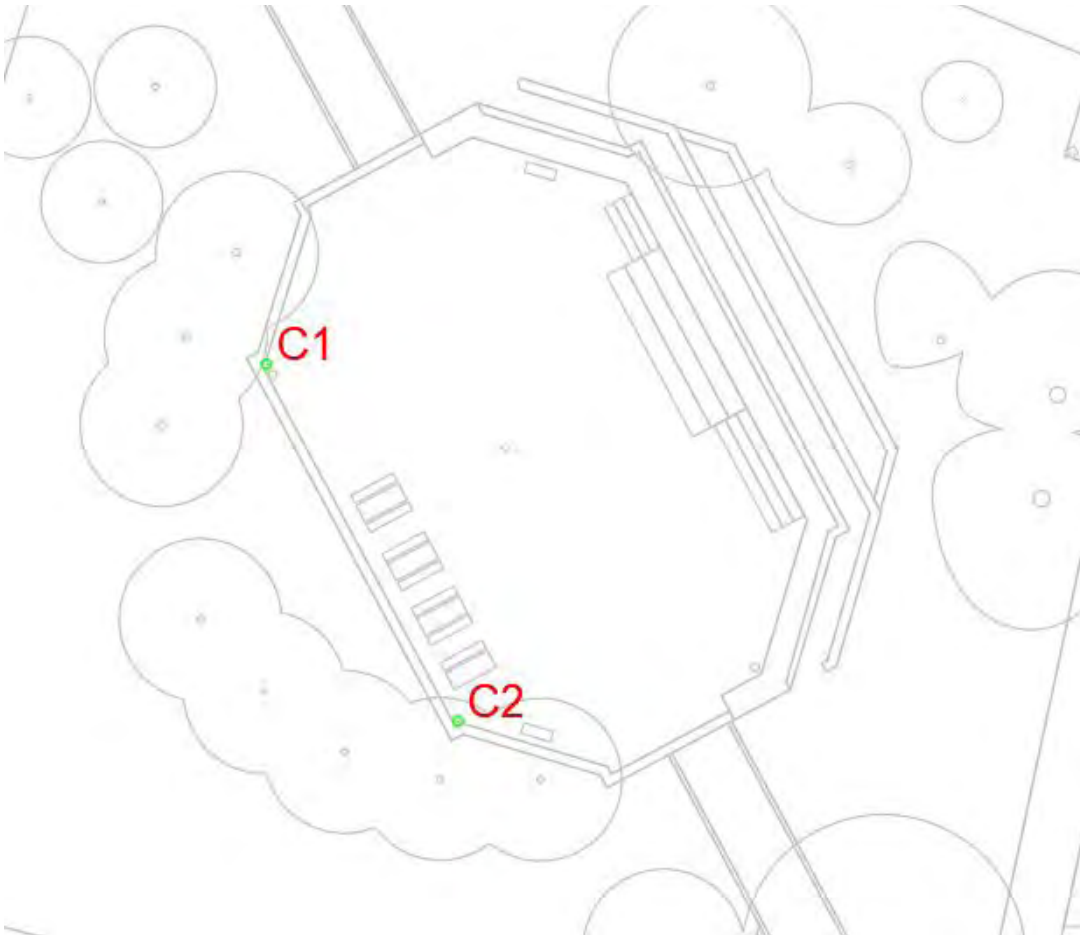
These spotlights are adjustable and are angled into several directions over the space to provide general illumination.

The lighting is to be switched from a photocell/timeclock.

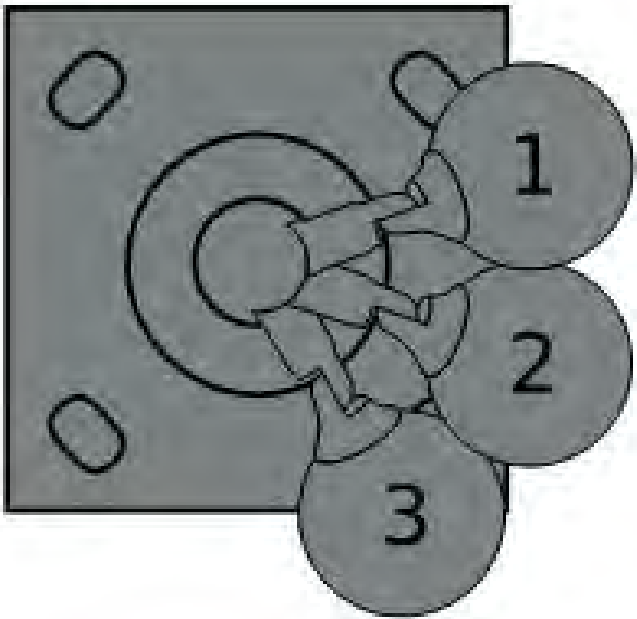
- Selux Olivio Sistema 3
- 8m height - tapered column
- 3000K light sources
- 2 x Olivio Medio
- 3 x 28W
- 2 x medium beam, 1 x wide beam distribution
- 3 x 3000lm
- Futura Mars 2525 Sable YX355F finish
- IP67/IK06



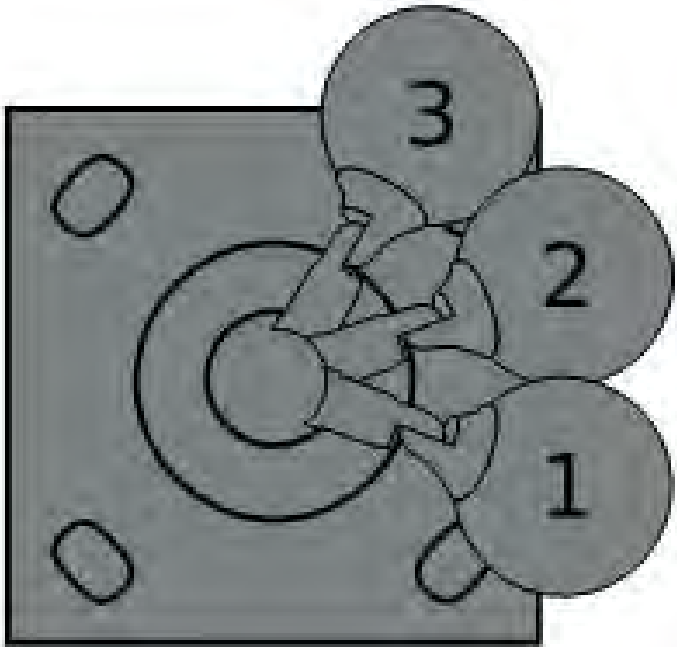
Selux Olivio



Original Design Layout



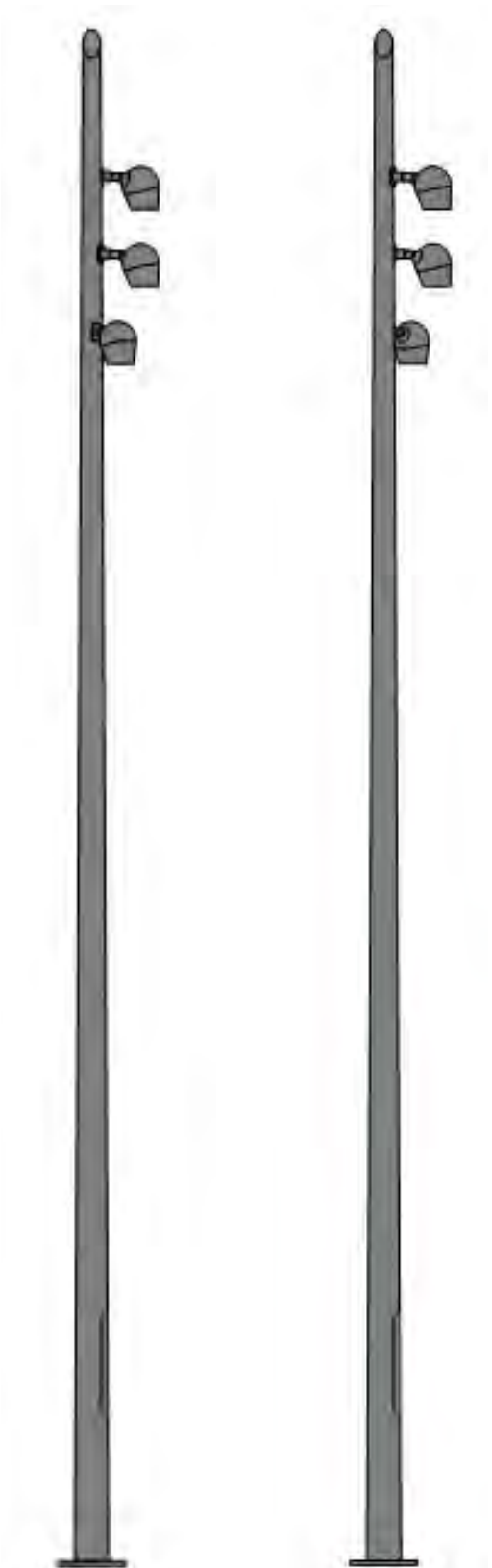
Type C1



Type C2

Design Verification

The specification and installed layout of the Type C1/C2 Columns is as per the original design.



Type C1

Type C2

Phase 1A - All Saints Park - Feature Lighting.

Tree lighting

Type D

There are two methods proposed for the tree lighting on Lower Ormond Street and Cavendish Street.

The first method is to have an in-ground uplighter, washing light up the trunk and into the foliage of the trees.

The second is to utilise the columns providing the general illumination within the space - see Type F.

Uplighter to be supplied with anti-slip coating to glass for safety.

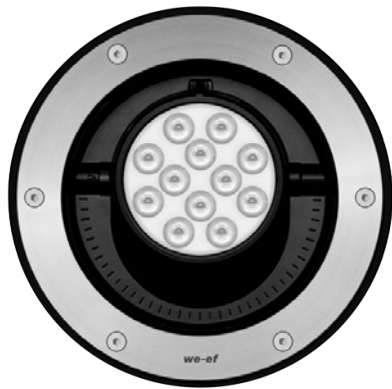
- We-ef ETC130 In-ground Uplighter
- 3000K light source
- 21W
- Medium beam distribution
- 1924lm
- Stainless steel finish
- IP67/IK10+



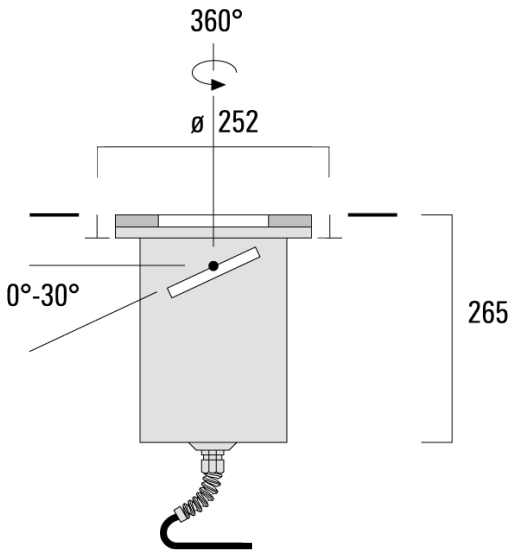
Original Design Layout

Design Verification

The specification of the Type D Uplighters is as per the original design. The installed layout was updated to coordinate with the landscape revisions to achieve the original design intent.



Type D



Phase 1A - All Saints Park - General Lighting.

Multi-head columns

Type F & G

To provide the general illumination over the surrounding streets, column mounted spotlights are located in-between the seating and the trees along each street.

This keeps the luminaires & columns tucked away, making them less obtrusive to the space. Furthermore using this location provides illumination to the circulation space either side of the trees, keeping the quantities of the columns to a minimum.

Every other column also incorporates spotlights aimed at the adjacent trees for feature illumination. This spreads light downwards within the tree providing a dappled effect.

The lighting is to be switched from a photocell/timeclock.

Design Verification

The specification of the Type F & G Columns is as per the original design. The installed layout was updated to coordinate with the landscape revisions to achieve the original design intent.



Original Design Layout

Phase 1A - All Saints Park - General Lighting.

Multi-head columns

Type F

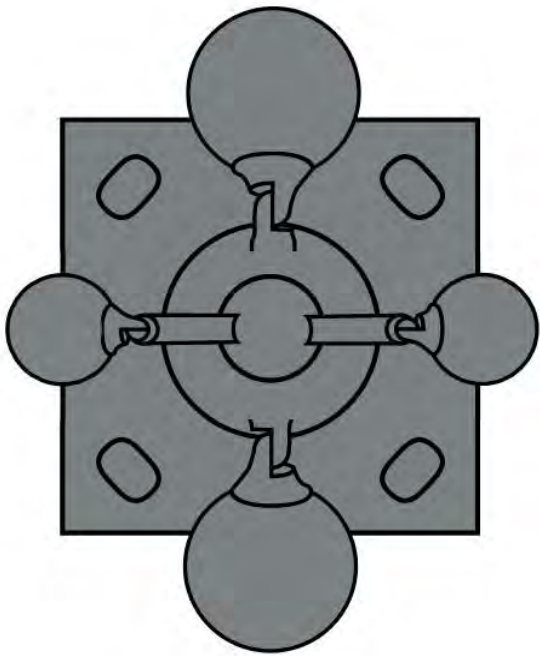
- Selux Olivio Sistema 3
- 8m height - tapered column
- 3000K light sources
- 2 x Olivio Medio (area lighting)
- 2 x Olivio Piccolo (tree lighting)
- 2 x 27W (area lighting)
- 2 x 21W (tree lighting)
- 2 x asymmetrical beam (area lighting)
- 2 x medium beam (tree lighting)
- 2 x 2400lm (area lighting)
- 2 x 1800lm (tree lighting)
- Futura Mars 2525 Sable YX355F finish
- IP67/IK06

Type G

- Selux Olivio Sistema 3
- 8m height - tapered column
- 3000K light sources
- 2 x Olivio Medio (area lighting)
- 2 x 27W (area lighting)
- 2 x asymmetrical beam (area lighting)
- 2 x 2400lm (area lighting)
- Futura Mars 2525 Sable YX355F finish
- IP67/IK06



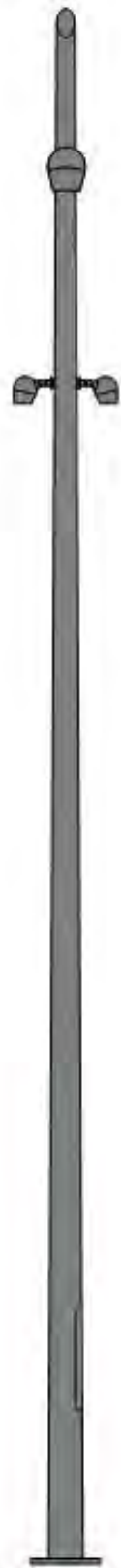
Selux Olivio



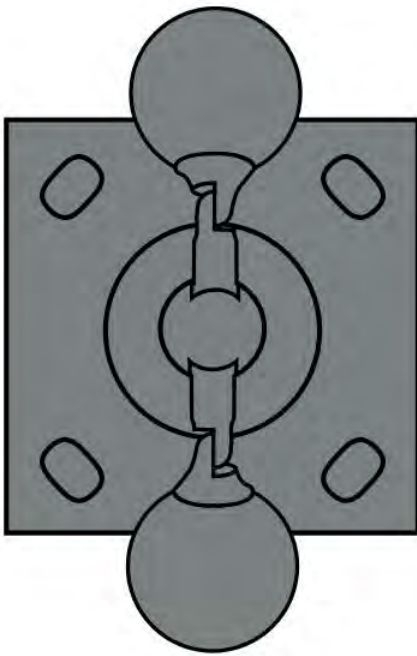
Type F

Design Verification

The specification of the Type F & G Columns is as per the original design. The installed layout was updated to coordinate with the landscape revisions to achieve the original design intent.



Type F



Type G



Type G

Phase 1A - All Saints Park - General and Feature Lighting.

Multi-head columns with gobo projectors

Type H

At the junction of Cavendish Street and Lower/Higher Ormond Street, a single column is positioned opposite the park.

The style is similar to the Type F/G columns with a revised orientation of spotlights to coordinate with the different location.

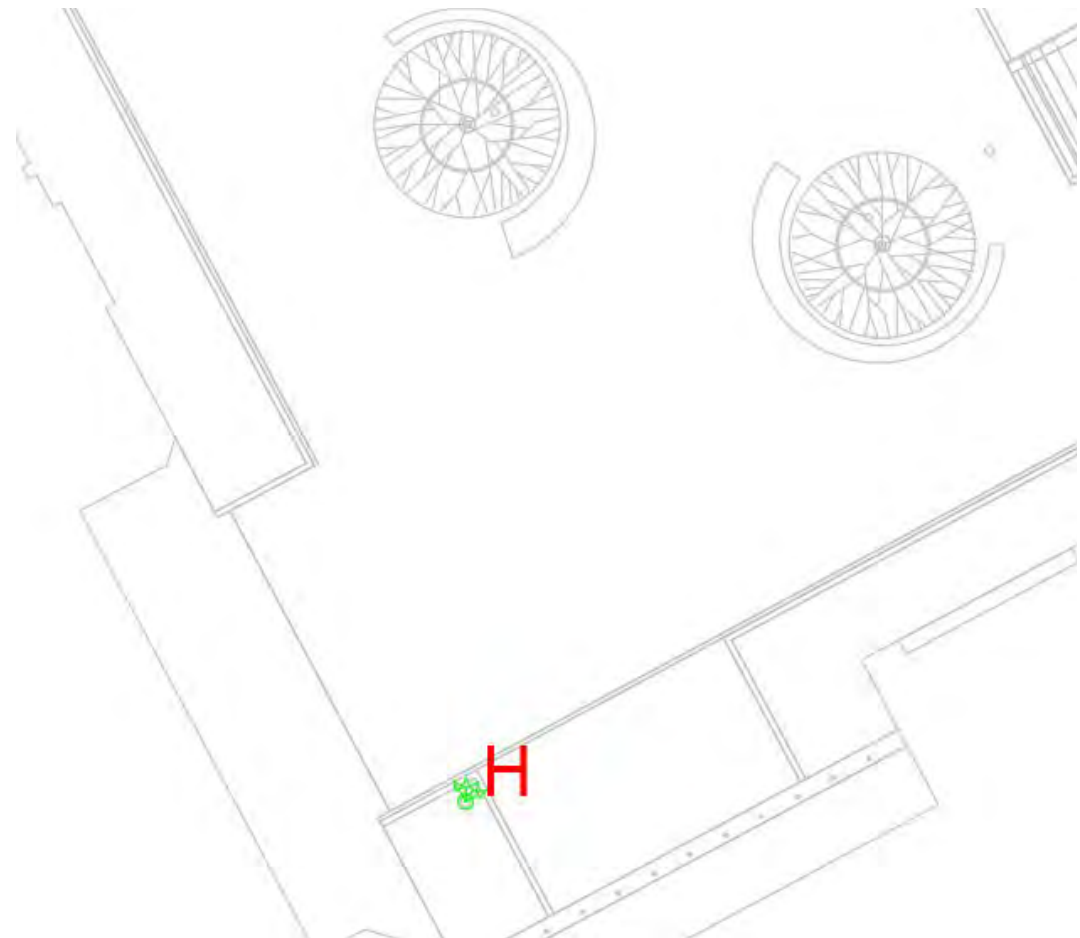
In addition, the column supports two gobo projectors to create a feature within this space. The Gobo projector can have a customised lens, for example the Manchester Metropolitan University logo. Alternatively there are many different designs which could be made and projected onto the ground.

The area lighting is to be switched from a photocell/timeclock. The gobo projector lighting is controlled via a wireless DMX system to a control system accessed by a web page.

- Selux Olivio Sistema 3
- 8m height
- 3000K light source (area lighting)
- 2 x Olivio Medio (area lighting)
- 2 x 28W (area lighting)
- 2 x medium beam (area lighting)
- 2 x 3000lm (area lighting)
- Futura Mars 2525 Sable YX355F finish
- IP67/IK06
- 2 x Griven GoboLED 500
- 2 x 450w (Gobo)

The gobo projector can house 7 different gobos which can be selected for projection. Design of gobos to be agreed with the University.

The gobo projector incorporates a variety of effects. The control system simplifies the selection by allowing the user to select the gobo and effect as shown in the controls section of this document.



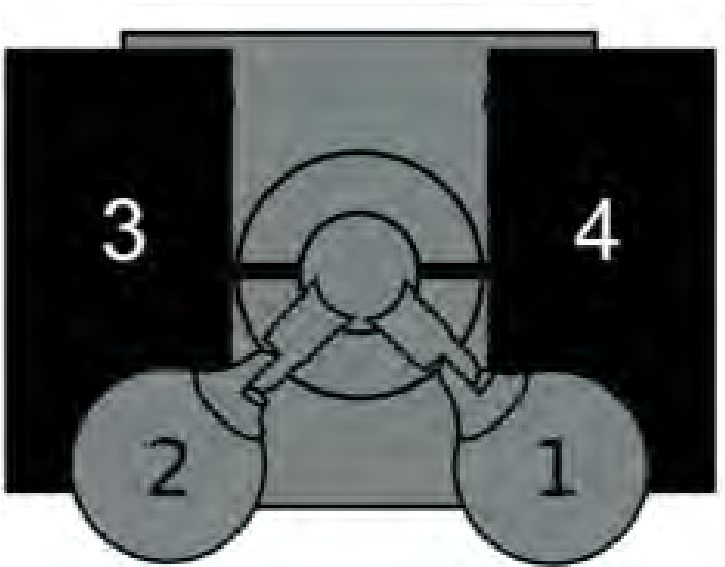
Original Design Layout



Selux Olivio



Griven GoboLED 500



Type H

Design Verification

The specification and installed layout of the Type H Column is as per the original design.



Type H

Phase 1A - All Saints Park - Feature Lighting.

Integrated bench lighting

Type K1/2/3

Along Lower Ormond Street and Cavendish Street are wall edge benches in low back and high back forms and tree surround benches.

To make these more prominent, lighting is incorporated within the structure of the seating.

A linear luminaire is located at the high point of each bench, projecting lighting into the cavity allowing it to protrude out of the slats, giving a glowing affect.

The LED lighting strip is to be mounted within an extrusion with a remote IP rated driver incorporated into the bench.

In order for the lighting to have a dramatic effect, the light colour is to be amber to contrast against the white ambient lighting.

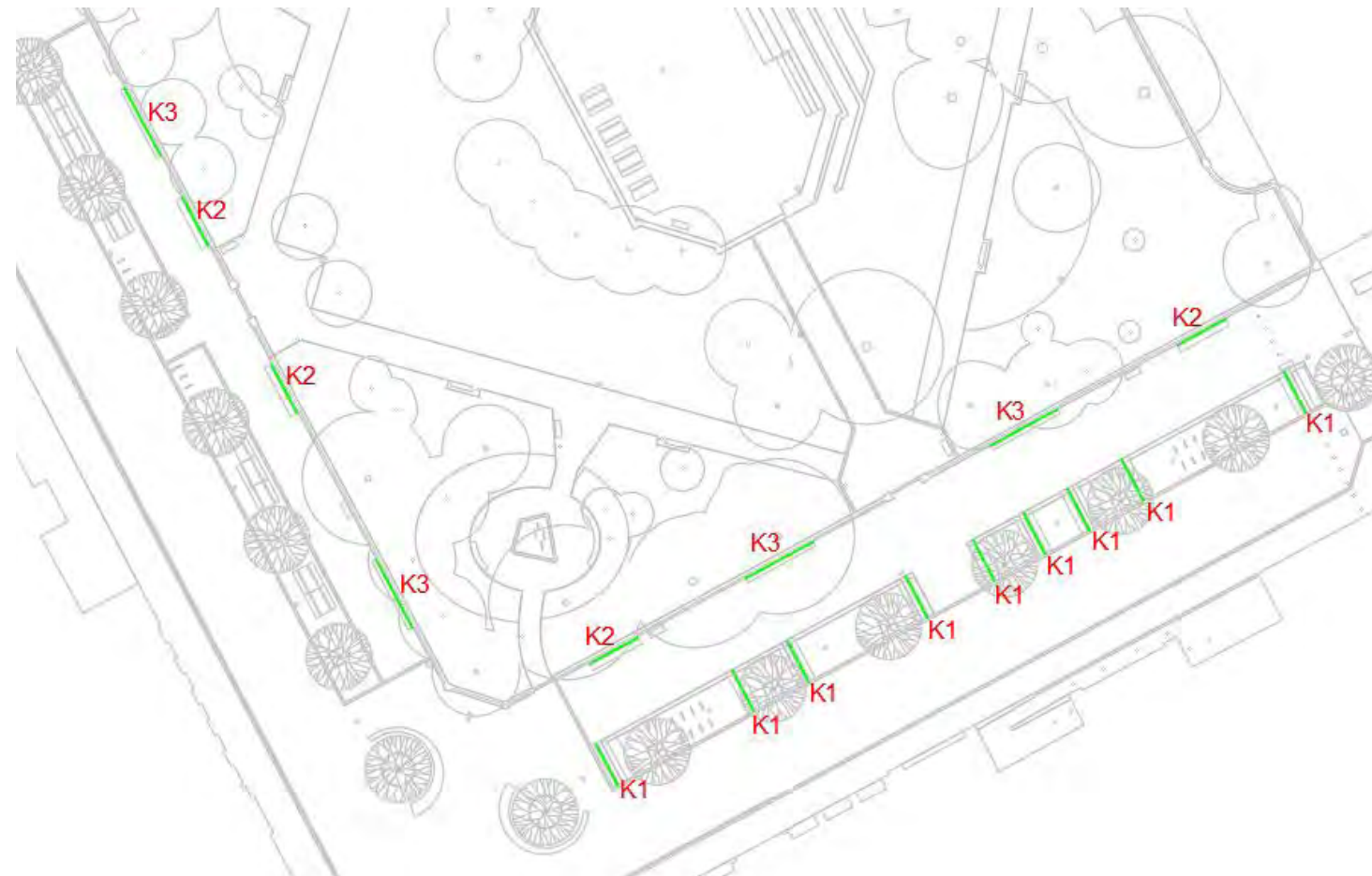
The lighting product and driver is to be invisible and tamper-proof when mounted inside the structure.

Nominal products lengths shown - exact lengths to be coordinated with bench structure design.

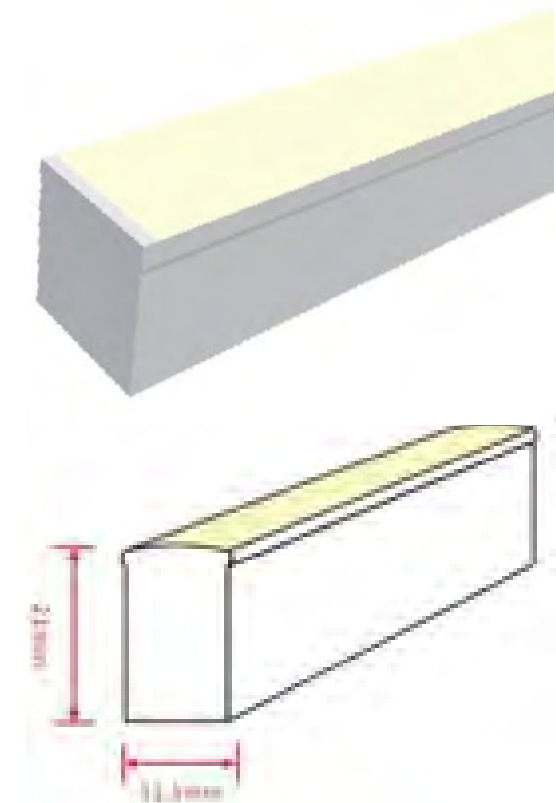
- Studiotech Lineo Line
- Lengths to suit structure
- Amber light source
- 7.2W/m
- 160° distribution
- 75lm/m
- IP68/IP67

Design Verification

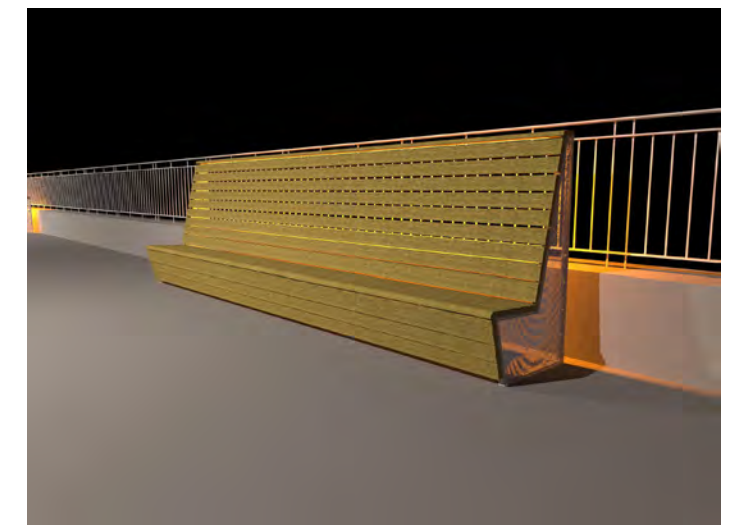
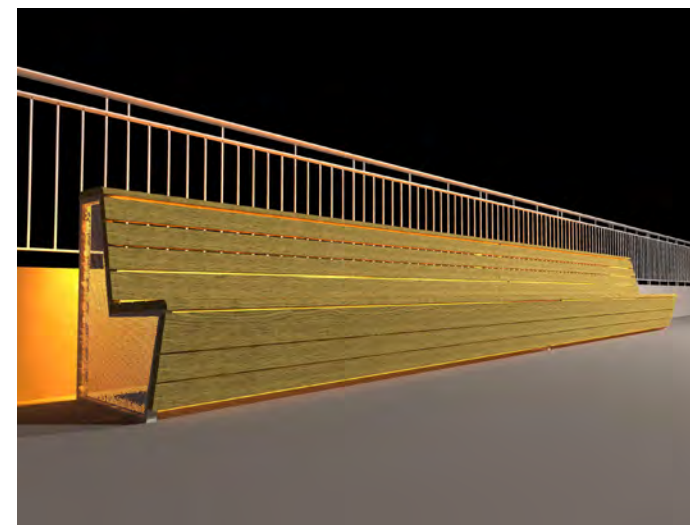
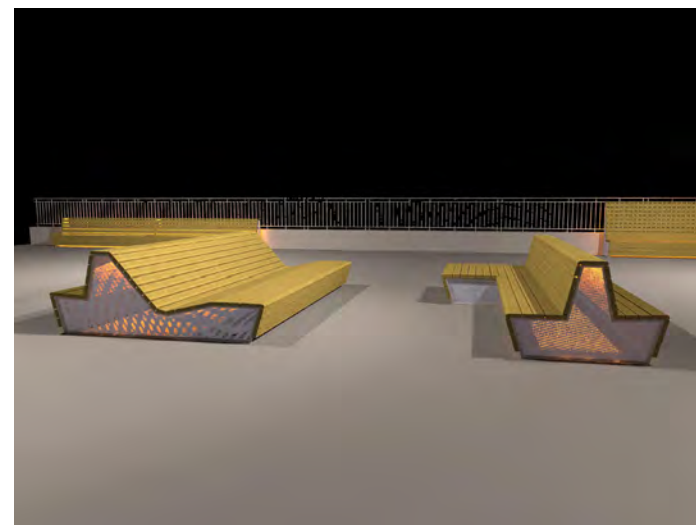
The specification of the Type K1/2/3 Bench Lighting is as per the original design. The lighting intent is as per the original design, the method of lighting placement within the bench was updated during the construction process to coordinate with the final bench manufacture design process.



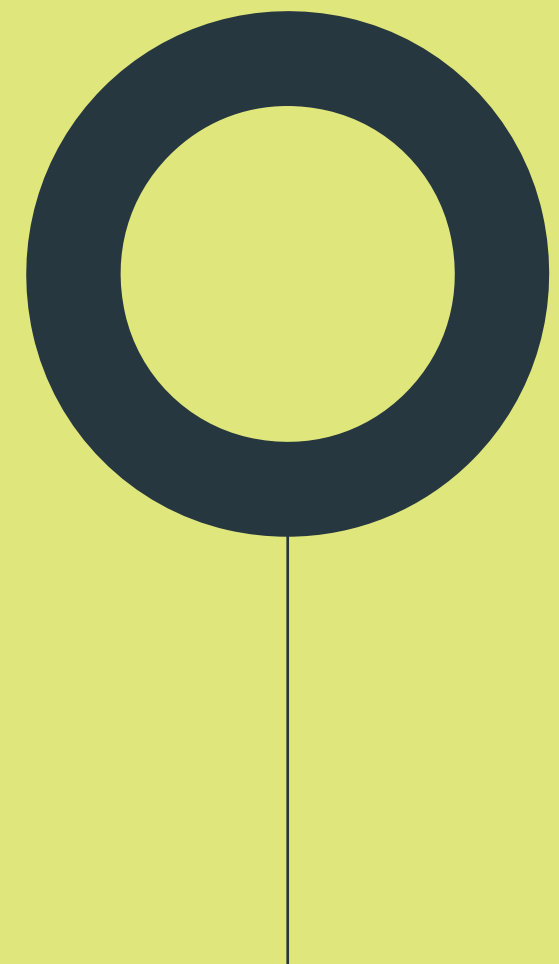
Original Design Layout



Type K



Light Level Verification.



Phase 1A - All Saints Park - Comparison of Lighting Design to Installed Lighting.

A survey of the light levels achieved by the installed lighting was undertaken on 27th November 2024 during the hours of darkness.

Light levels were taken with a handheld Minolta T10 light meter.



Variations are to be expected between calculated and measured values due to calculations parameters, photometry, site specific conditions and the measurement process.

Note, the calculated results do not include any lighting within the surrounding area.

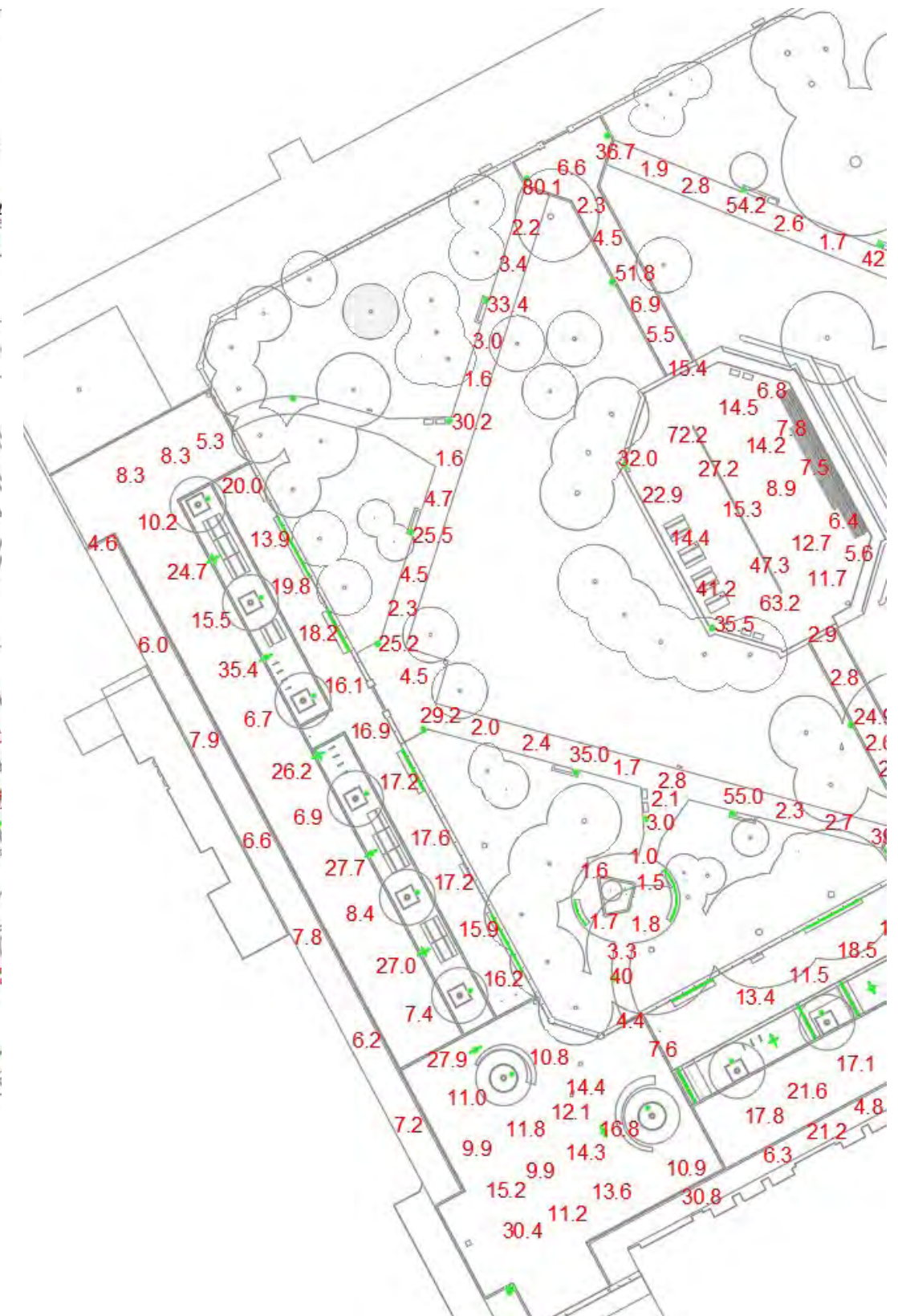
Design Verification

As detailed on these images and the following page, the calculated results from the proposed design are aligned with the measured results on site.

As such, the lighting is performing as anticipated and meets the performance requirements set out in the lighting design documentation produced prior to construction and referenced within Landscape Architects details forming part of the planning application.



Lighting Design Layout and Calculated Results (lux)



Measured Lighting Results (lux)

Phase 1A - All Saints Park - Comparison of Lighting Design to Installed Lighting.

Variations are to be expected between calculated and measured values due to calculations parameters, photometry, site specific conditions and the measurement process.

Note, the calculated results do not include any lighting within the surrounding area.

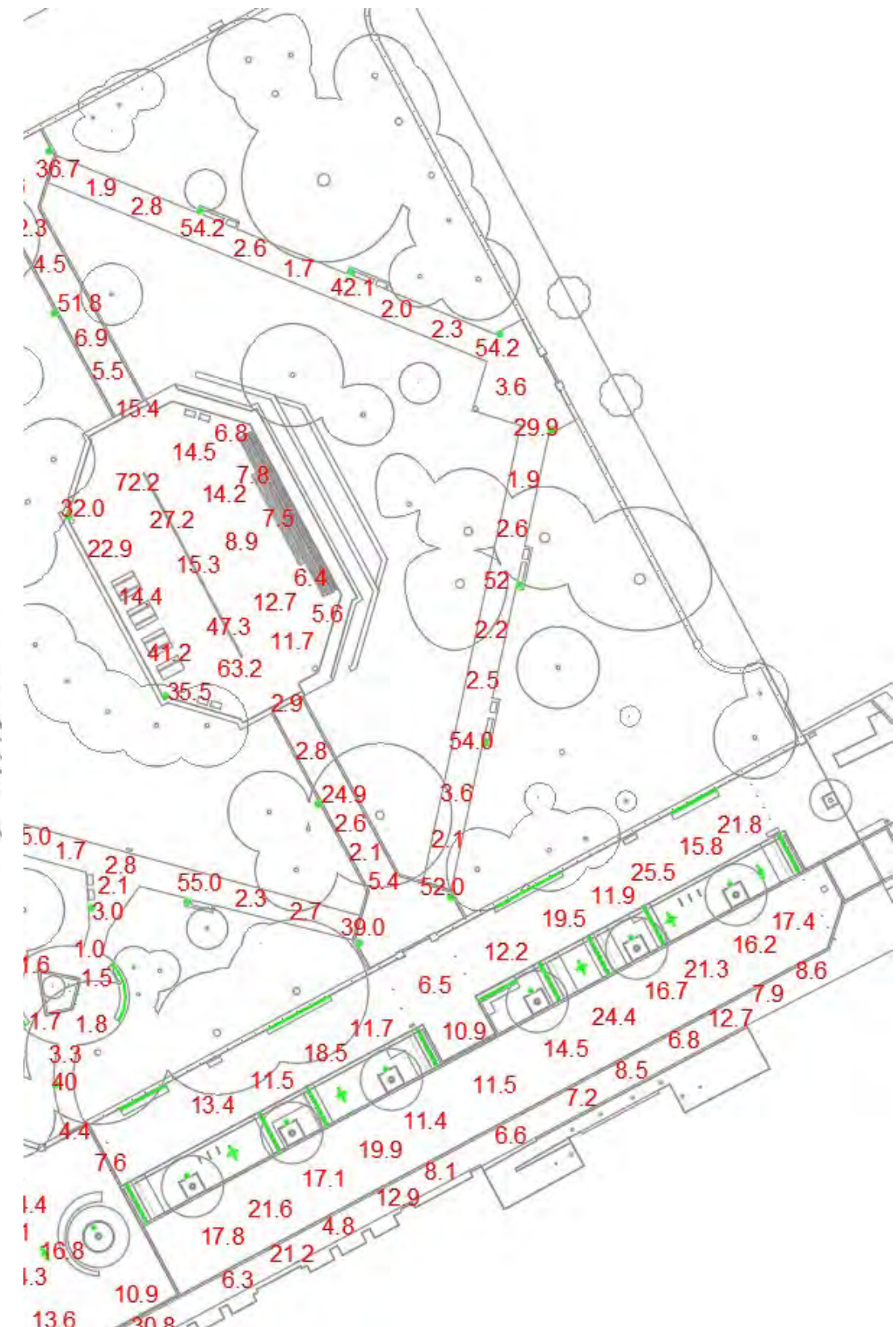
Design Verification

As detailed on these images and the previous page, the calculated results from the proposed design are aligned with the measured results on site.

As such, the lighting is performing as anticipated and meets the performance requirements set out in the lighting design documentation produced prior to construction and referenced within Landscape Architects details forming part of the planning application.



Lighting Design Layout and Calculated Results (lux)



Measured Lighting Results (lux)



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