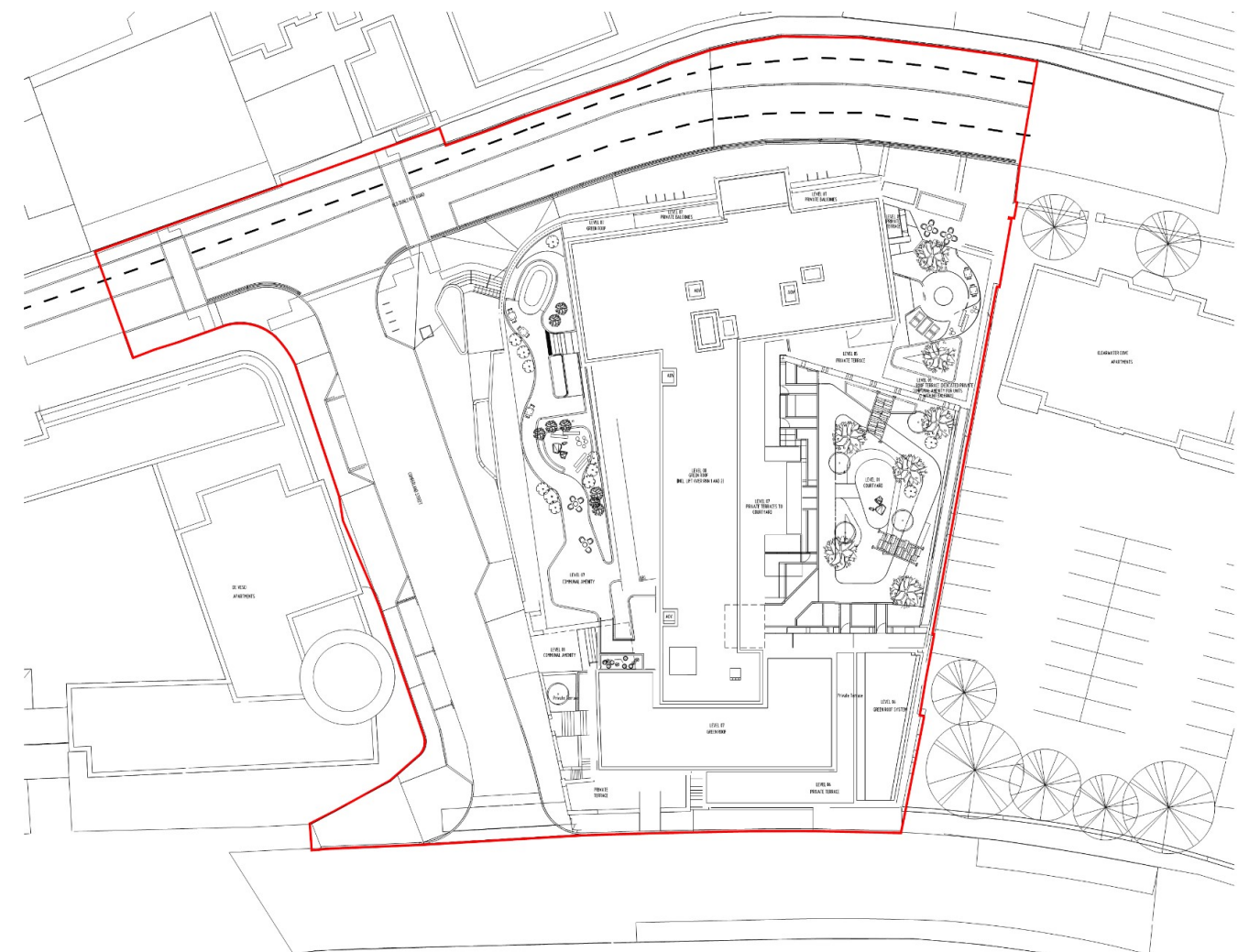


A591

Lands at Former Ted Castles Site and Dunleary House

LIGHTING ANALYSIS



Planning Stage
Rev. P08
November 2021

NOTICE

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DOCUMENT CONTROL & HISTORY

OCSC Job No.: A591		Project Code	Originator	Zone Volume	Level	File Type	Role Type	Number	Status / Suitability Code	Revision
		A591	OCSC	XX	XX	RP	E	0001	S4	P08
Rev.	Status	Authors		Checked		Authorised		Issue Date		
P08	For Planning	MC		PF		PF		17.11.21		
P07	For Planning	MC		PF		PF		17.09.21		
P06	For Planning	MC		PF		PF		18.08.21		
P05	For Comment	MC		PF		PF		22.06.21		
P04	For Comment	MC		PF		PF		19.01.21		
P03	For SHD Application to ABP	PL		PF		PF		24.06.20		
P02	For Comment	CA		PF		PF		26.03.20		
P01	For Comment	CA		PF		PF		27.02.20		

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1.0 EXECUTIVE SUMMARY

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1.0 EXECUTIVE SUMMARY

The report considers the lighting design as developed by O'Connor Sutton Cronin (OCSC) and outlines the design intent and considerations with regards to transport, cyclists, pedestrians whilst considering access for deliveries and collections at the Lands at Former Ted Castles site and Dunleary House (a Proposed Protected Structure). The lighting design complies with the regulations services such as IS10101 National Rules for Electrical Installations, Dún Laoghaire - Rathdown County Council Public Lighting Installations and British Standards Institution 5489-1:2013 Code of practice for the design of road lighting Part 1: Lighting of roads and public amenity areas lighting regarding Illumination levels.

The report has been developed with the following principal considerations:

- Provide adequate illumination to contribute towards the safe use of the roadways, footpaths and pedestrian walkways.
- Contain the lighting within the site.
- Minimise light pollution and visual glare for pedestrians and neighbouring areas.
- Enhance security.

The complete external lighting installation was designed to align with the regulations services such as IS10101 National Rules for Electrical Installations, Dún Laoghaire - Rathdown County Council (DLRCC) Public Lighting Installations and British Standards Institution 5489-1:2013 Code of practice for the design of road lighting Part 1: Lighting of roads and public amenity areas lighting regarding Illumination levels. The design criteria is outlined in Section 3.0.

The predicted performance of the external lighting installations has been assessed in detail using Lighting Simulation software. The Lighting Simulation software used was Lighting Reality; which includes isoline contour capabilities.

Our design intent comprising of column lighting for the roadways and footpaths are described in Section 4.0. An indicative example of the type of proposed luminaire (light fitting) and associated lamp specification have been included, with accompanying images, photometric and dimensional data.

Section 5.0 provides analysis of the predicted illumination results for the roadways, footpaths and pedestrian walkways.

2.0 INTRODUCTION

The proposed development at the former Ted Castles site and Dunleary House (a proposed Protected Structure), Old Dun Leary Road, Cumberland Street and Dun Leary Hill, Dún Laoghaire is within an urban area with low level traffic and public use is likely to be moderate with usage of amenities primarily by local residents. A lighting class of M3 for Old Dunleary Road (N31), P1 Cumberland Street and P3 for pathways is required within the development with results outlined in section 5 of this report.

The report will deal with compliance with the regulations such as IS10101 National Rules for Electrical Installations, Dún Laoghaire - Rathdown County Council Public Lighting Installations and British Standards Institution 5489-1:2013 Code of practice for the design of road lighting Part 1: Lighting of roads and public amenity areas lighting regarding Illumination levels.

Description of Development

The proposed development at the former Ted Castles site and Dun Leary House (a Proposed Protected Structure), Old Dun Leary Road, Cumberland Street and Dun Leary Hill, Dun Laoghaire will consist of:

- The provision of 146 no. apartment units (Build to Rent) and all associated ancillary facilities (including residential amenities) in a building with an overall height ranging from 6 storeys (with set backs from 4th & 5th storey) addressing Dun Leary Hill, to 5 and 8 storeys (with set back from 7th storey) addressing Old Dun Leary Road and 6-7 storeys (with set backs at 8th storey) addressing Cumberland Street. The proposal provides for private and communal open spaces in the form of balconies and terraces throughout.
- A retail unit (c.290m²) at ground floor level addressing Old Dun Leary Road and Cumberland Street
- The refurbishment, partial removal and adaptation of a 4-storey building on site known as “Dun Leary House” (a proposed Protected Structure), to provide co-working office suites (c.247m²) at Levels 01, 02 and 03. The works will include partial removal of original walls and floors, removal of non-original extensions to Dun Leary House, repointing and repair of brickwork and granite fabric, reinstatement of timber sash windows, removal of existing roof, removal; alteration and reinstatement of internal floor layouts, reinstatement of entrance point on Dun Leary Hill, removal of non-original level 00 and linking the existing building to the new development from level 00 to level 03 with the construction of 3 new floors of development (with set back at roof level) above the existing building. It is proposed to repair, reinstate and improve the existing boundary treatment to DunLeary House.
- Provision of 52 no. car parking spaces in total - 44 no. car parking spaces provided at level 00. At Cumberland Street 11 no. existing on-street car parking spaces will be removed and 8 no. on street car parking spaces provided. Provision of 277 bicycle parking spaces (94 no. cycle parking spaces accommodated in bicycle stands and 183 no. long term bicycle parking spaces within a secure storage area) and 4 no. motorbike parking spaces, all at Level 00. A new vehicular entrance/cycle path (off the Old Dun Leary Road), ancillary plant areas, ESB substation and storage areas.
- Extensive hard and soft landscaping throughout, green roof, public lighting, signage, boundary treatments and public realm improvements.

The demolition of the existing open fronted shed on site and all associated ancillary site services and site development works.

3.0 DESIGN CRITERIA

The design criteria applied to the proposed roadways, footpaths and pedestrian walkways lighting installation shall be in accordance with IS10101 National Rules for Electrical Installations as well as Dún Laoghaire - Rathdown County Council Public Lighting Installations.

The key items in focusing the design are as described below:

1. Compliance with lighting regulations for the roadways, footpaths and pedestrian walkways functionality
2. Mitigate light spill onto adjoining trees

To address these points the following measures were put in place:

1. Lighting positioned to limit negative spill and light pollution whilst also maintaining the required lux levels uniformly across the roadways, footpaths and pedestrian walkways.
2. Light levels at the Lands at former Ted Castles site were kept to a minimum to meet the conditions of classification M3 (15 Lux Average, 6 Lux Min), P1 (15 Lux Average, 3 Lux Min) and P3 (7.5 Lux Average, 1.5 Lux Min) at ground level as per Dún Laoghaire - Rathdown County Council (DLRCC) requirements.

3.1 GUIDELINES TO ROADWAYS AND FOOTPATHS LIGHTING DESIGN

The points below were used as guidelines where practical in the design of the external lighting.

1. Warm light (3000K) LED luminaire.
2. Minimum lux levels shall be used as required by DLRCC Public Lighting (Classification M3, P1 and P3)
3. Dún Laoghaire - Rathdown County Council public lighting guidance document for roadways and footpaths are to be designed to conform with required lux levels with an average target as set in Table 3.1.1.
 - Old Dunleary Road (N31) will be designed to classification M3. Cumberland Street will be designed to classification P1.
 - To comply with M3 lighting classification the following parameters must be adhered to:
 - a. Average Horizontal Illuminance (\bar{E}) must be an average of 15.0 lux.
 - b. Minimum Horizontal Illuminance (E_{min}) must be a minimum of 6.0 lux.

	\bar{E}	E_{min}
P1 or S1	15.0	3.0
P2 or S2	10.0	2.0
P3 or S3	7.5	1.5
P4 or S4	5.0	1.0
P5 or S5	3.0	0.6
P6 or S6	2.0	0.4

**Table 3.1.1 - P Classification BS
5489-1:2013**

- c. It is recommended that the actual overall uniformity of illuminance (U_o) be as high as reasonably practicable.
- To comply with P1 lighting classification the following parameters must be adhered to:
 - d. Average Horizontal Illuminance (\bar{E}) must be an average of 15.0 lux.
 - e. Minimum Horizontal Illuminance (E_{min}) must be a minimum of 3.0 lux.
 - f. It is recommended that the actual overall uniformity of illuminance (U_o) be as high as reasonably practicable.
- Footpaths surrounding the proposed development will be designed to classification P3.
- To comply with P3 lighting classification the following parameters must be adhered to;
 - g. Average Horizontal Illuminance (\bar{E}) must be an average of 7.5 lux.
 - h. Minimum Horizontal Illuminance (E_{min}) must be a minimum of 1.5 lux.
 - i. It is recommended that the actual overall uniformity of illuminance (U_o) be as high as reasonably practicable.

3.2 ILLUMINATION DESIGN TO MINIMISE THE EFFECTS ON BATS AND WILDLIFE

The following design measures have been introduced in order to reduce the impact on local wildlife and promote biodiversity throughout the site.

1. Only areas requiring illumination have been designed. - all areas demonstrating areas where bats commute have been avoided. Areas in close proximity to roadways and path ways have directional lighting with no up-light.
2. No mature trees will be illuminated as part of the design to ensure safe areas for the bats to nest.
3. All light levels have been kept to a minimum level for occupants. All species of bats have been considered when selecting lighting levels and positions and mounting heights of fittings. The type of light will be a warm light and achieve a 3000K value.
4. Reflectance's - all surfaces have been considered to reduce lighting reflectance. All roadways will be tarmac and pathways concrete finish. This will reduce lighting reflectance's throughout the site.
5. All luminaires have been selected on the basis of minimal up-lighting and night-time glow.
6. Type of Light - All lighting will be LED type. LED lighting has no UV light and therefore create a more comfortable type of light for wildlife.

7. Lighting Controls - The peak time for feeding for bats is dusk. This is when they exit the roost to go foraging. Lighting will be daylight dimmable and include power reducing measures to create comfortable conditions for wildlife.
8. The proposed lighting has been specified with a wavelength higher than 550nm.

4.0 PROPOSED INSTALLATIONS

The proposed residential development roadways, footpaths and pedestrian walkways will require illumination and shall for the purposes of this report comprise of the lighting installation of the Lands at former Ted Castles Site, Dún Laoghaire.

It is proposed that the development roadways will accommodate 6 metre high columns with a zero outreach. To ensure compliance with guidelines and standards Dún Laoghaire - Rathdown County Council (DLRCC) do not permit the use of bollard lighting. Two of the main reasons for this are:

- Inefficiency - using bollards is an inefficient way of lighting an area.
- Safety

4.1 COLUMN LIGHTING FOR DEVELOPMENT ROADWAYS

It is proposed to provide 6m high column type light fittings with a zero outreach required for the roadways. The light fittings will have a zero outreach required in order to achieve average lumination levels.

The proposed column light fittings are indicatively displayed in the accompanying images.

Proposed Light Fitting A & B as per Lighting Reality Report

Luminaires located in locations of existing street lights are labelled "B" in the Lighting Reality report. Luminaires located in additional positions are labelled "A" in the Lighting Reality report. A and B are the same luminaire type.

The indicative luminaires selected would be provided with 1 x 70 Watt LED lamp module, with a lamp output of 7850 lumens and colour temperature 3000K.

The photometric curve displayed indicates how all light output is directed downwards (0-90° angle); i.e. no risk of sky glow.



4.2 COLUMN LIGHTING FUNCTIONALITY

4.2.1 Pre-programming Ability / Dimmable Functionality & Telemetry

All lanterns shall be fitted with smart electronic ballasts suitable for use with the Dún Laoghaire - Rathdown County Council proposed method of lighting control with programmable DALI drivers. The drivers shall have dimming capability of 75% full light output between mid-night and 6am, have a 90% CLO (Constant Light Output) type, have a segment controller at street level for the onward forwarding of data and control signalling to / from a server.

The Public Lighting system of Dún Laoghaire - Rathdown County Council shall also incorporate a facility for remote monitoring and diagnostics.

The installation will be directly compatible with lighting control management software in use by Dún Laoghaire - Rathdown County Council.

4.2.2 Photocells

Switching control of the lighting columns will be achieved by means of miniature photocell control. Each individual lantern shall be capable of being switched "ON" from dusk to dawn, unless otherwise requested by Dún Laoghaire - Rathdown County Council.

An individual solid-state one-part Photo-Electric Control Unit (PECU) which will include a "fail safe" circuit that switches the lantern on in the event of photocell failure will control each lantern.

The PECU will incorporate a phototransistor complying with I.S.428: 1991 as the light sensor; e.g. SELC 84 by Solar Enterprises Ltd., or equivalent approved by the Council.

The PECU will be designed to fit the 7 pin NEMA socket provided on each lantern.

Each lantern will be fitted with a miniature photocell unless otherwise directed by the Engineer. The miniature photocell shall have a minimum IP65 rating.

The lanterns will have an integrated miniature photocell, switching at 35/18 lux levels. A control cable shall be installed from the miniature photocell to the column door to allow for future programming.



Fig 4.2.1.1
 Pre-programming Ability/ Dimmable
 Functionality & Telemetry



Fig 4.2.2.1
 Photocell

5.0 RESULTS

5.1 GROUND ILLUMINATION FOR DEVELOPMENT

Figures 5.1.1 & 5.1.2 indicate the results of the predicted illumination levels on Ground for the proposed installation.

The results indicate:

- These levels are based upon a 6 metre high pole with pole top lanterns (i.e.) zero outreach.
- The Average Horizontal Illuminance is 28.53 for Old Dunleary Road **M3 compliant**, 23.18 Lux for Cumberland Street **P1 compliant** and 13.75 Lux for the Path Ways **P3 compliant**.
- The Minimum Horizontal Illuminance is 7.11 Lux for Old Dunleary Road **M3 compliant**, 4.76 Lux for Cumberland Street **P1 compliant** and 1.54 Lux for the Pathways **P3 compliant**.
- The Overall Uniformity U_o of 0.21 is achieved for Roadways and 0.11 for Path Ways.

The results from the lighting simulation software, Lighting Reality produced a layout displaying the horizontal illuminance (lux).

Eav	28.53
Emin	7.11
E_{max}	69.72
Emin/E_{max}	0.10
Emin/Eav	0.25

Fig 5.1.1
M3 Illuminance Levels
for Old Dunleary Road

Eav	23.18
Emin	4.76
E_{max}	64.10
Emin/E_{max}	0.07
Emin/Eav	0.21

Fig 5.1.2
P1 Illuminance Levels
for Cumberland Street

Eav	13.75
Emin	1.54
E_{max}	64.12
Emin/E_{max}	0.02
Emin/Eav	0.11

Fig 5.1.3
P3 Illuminance Levels
for Pathways

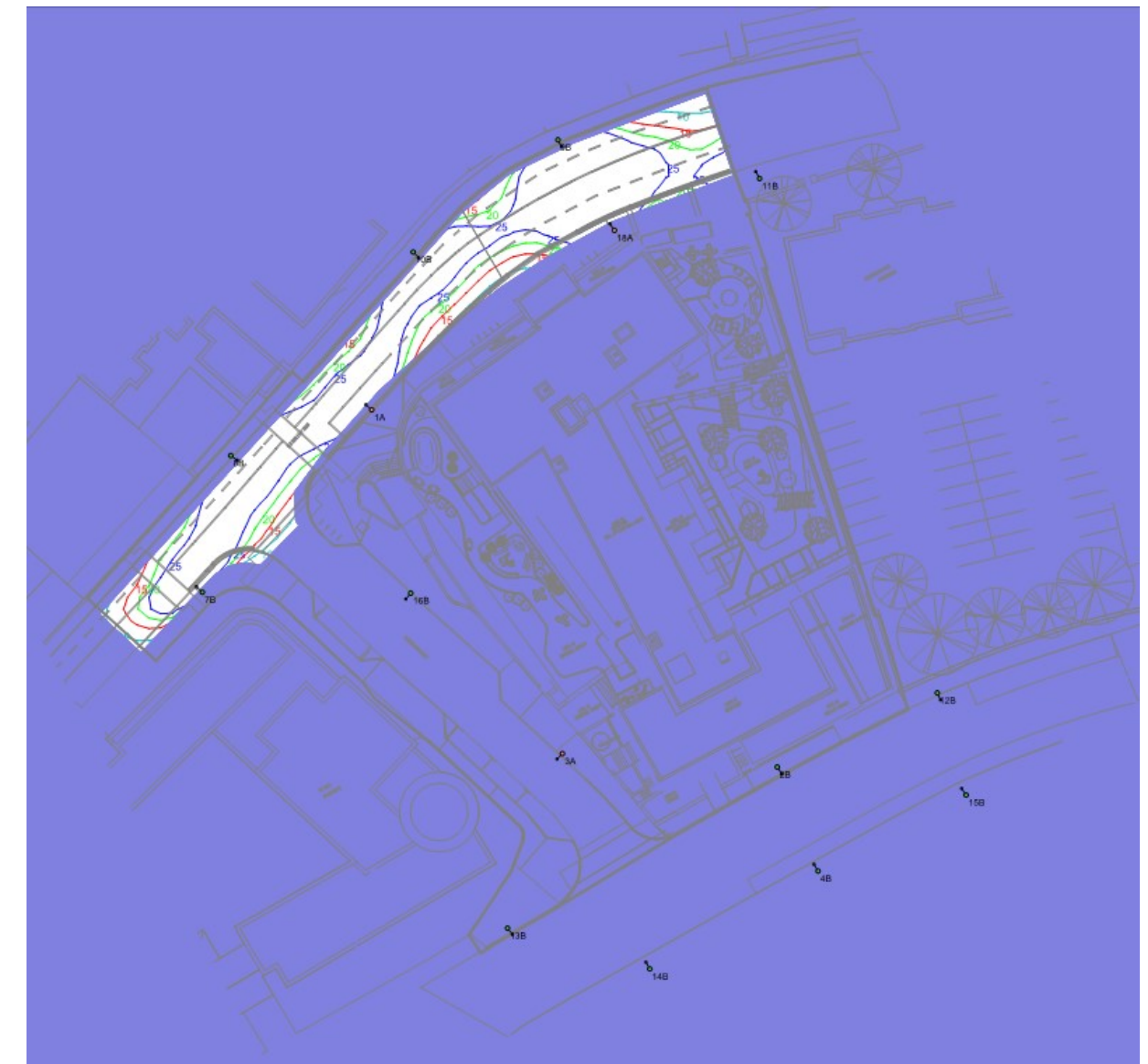


Fig 5.1.4
Horizontal Illuminance (lux) (M3)
Old Dunleary Road (N31)

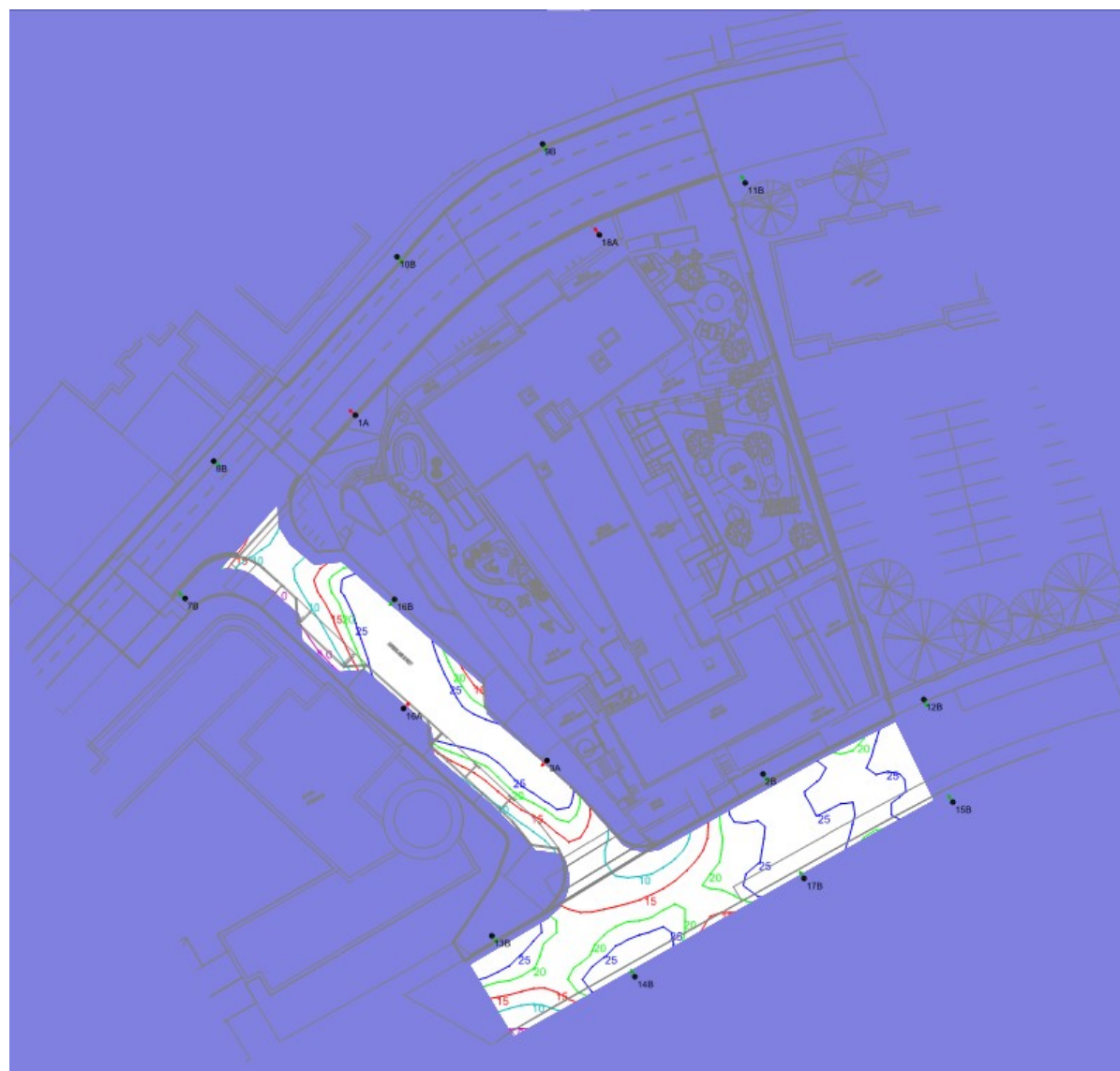


Fig 5.1.5
Horizontal Illuminance (lux) (P1)
Cumberland Street

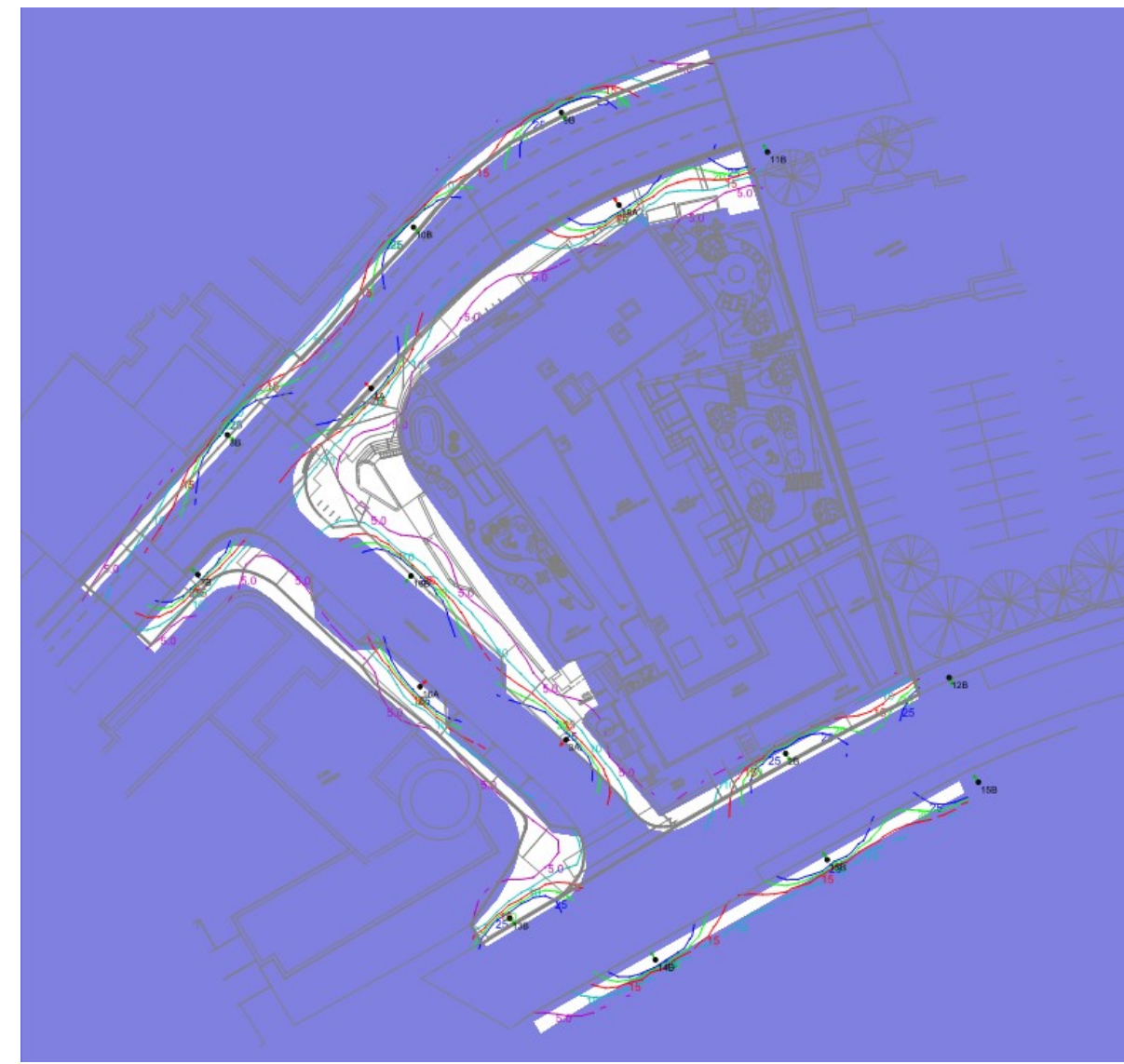


Fig 5.1.6
Horizontal Illuminance (lux) (P3)
Pathways

6.0 CONCLUSION

As shown in Figure 5.1.1, 5.1.2 and 5.1.3 the illumination throughout the Lands at Former Ted Castles Site development meets the lighting design requirements.

It should be noted that the results in Figure 5.1.1, 5.1.2 and 5.1.3, show the design intent only. Additional lamp standards may be required to ensure P1 and P3 Classification is adhered to ensuring lux level requirements are maintained throughout.

The proposed lighting design has utilised the Dún Laoghaire Rathdown compliant light fitting. On the basis of this light fitting being used we can confirm we have achieved M3, P1 and P3 lux level targets and more importantly confirm that the average uniformity has been achieved.

DATE: 20 January 2021

DESIGNER: Michael Casey

PROJECT No: A591

PROJECT NAME: Ted Castle Cumberland Street P1

**LIGHTING
REALITY**

Outdoor Lighting Report

Layout Report

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Roadways	723440.59	728742.95	141.73	135.04	1.49	1.48
2	Path ways	723441.01	728743.16	140.76	131.02	1.50	1.49

Luminaires

Luminaire A Data

Supplier	VEELITE
Type	5MER08LBA-R1
Lamp(s)	32LED 4K
Lamp Flux (klm)	7.85
File Name	5MER08LBA-R1 70W.ies
Maintenance Factor	0.79
Imax70,80,90(cd/klm)	679.1, 319.1, 0.0
No. in Project	4

Luminaire B Data

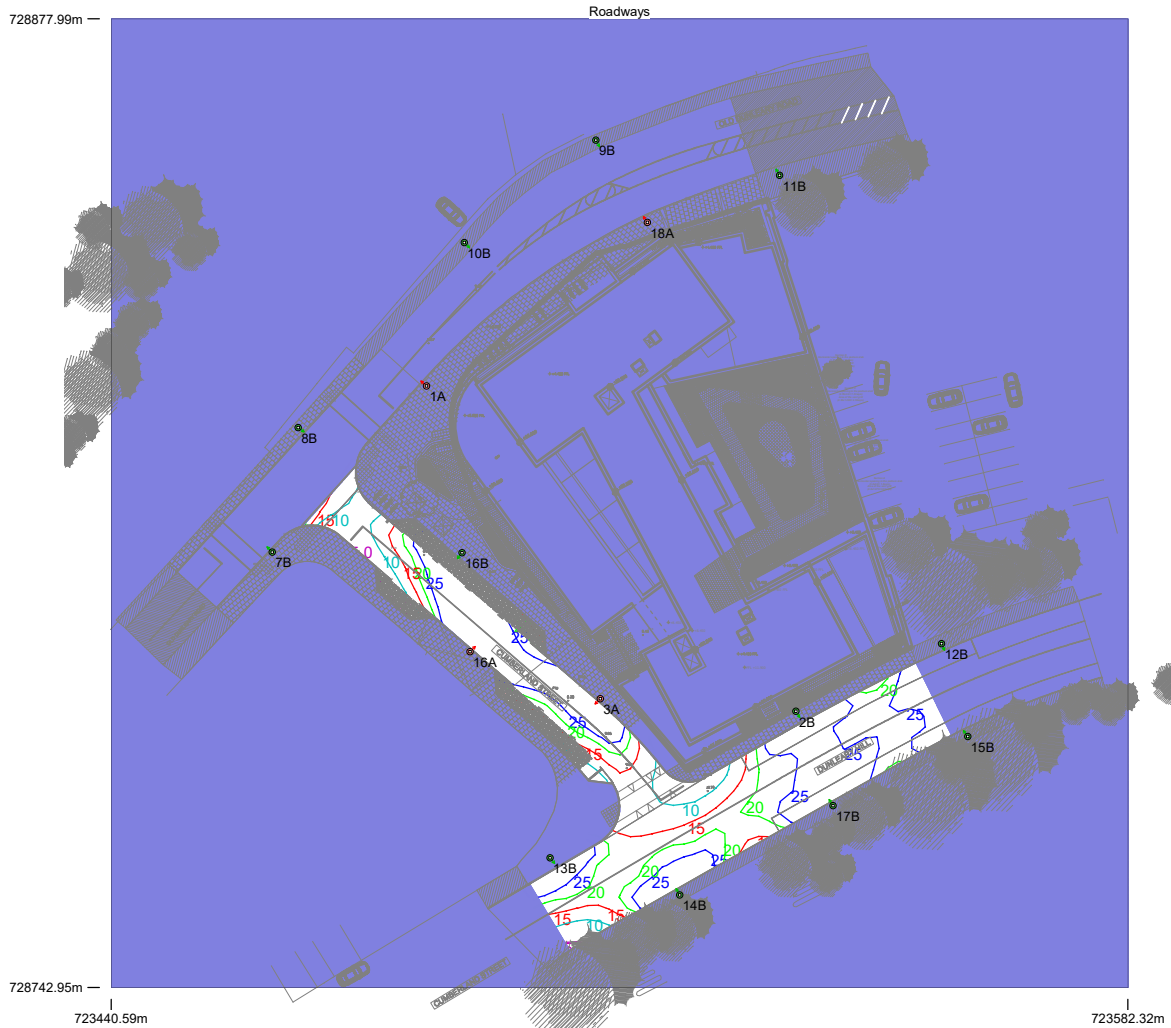
Supplier	VEELITE
Type	5MER08LBA-R1
Lamp(s)	32LED 4K
Lamp Flux (klm)	7.85
File Name	5MER08LBA-R1 70W.ies
Maintenance Factor	0.79
Imax70,80,90(cd/klm)	679.1, 319.1, 0.0
No. in Project	12

Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	A	723484.53	728826.82	6.00	138.00	0.00	0.00	0.00			
2	B	723536.00	728781.50	6.00	302.00	0.00	0.00	0.00			
3	A	723508.74	728783.23	6.00	225.00	0.00	0.00	0.00			
7	B	723463.04	728803.69	6.00	136.00	0.00	0.00	0.00			
8	B	723466.66	728821.04	6.00	322.00	0.00	0.00	0.00			
9	B	723508.15	728861.08	6.00	297.00	0.00	0.00	0.00			
10	B	723489.80	728846.83	6.00	314.00	0.00	0.00	0.00			
11	B	723533.75	728856.16	6.00	119.00	0.00	0.00	0.00			
12	B	723556.29	728790.92	6.00	295.00	0.00	0.00	0.00			
13	B	723501.76	728761.07	6.00	308.00	0.00	0.00	0.00			
14	B	723519.82	728755.89	6.00	120.00	0.00	0.00	0.00			
15	B	723559.95	728777.95	6.00	125.00	0.00	0.00	0.00			
16	B	723489.49	728803.56	6.00	230.00	0.00	0.00	0.00			
18	A	723515.32	728849.60	6.00	124.00	0.00	0.00	0.00			
17	B	723541.17	728768.32	6.00	121.00	0.00	0.00	0.00			
16	A	723490.61	728789.79	6.00	45.00	0.00	0.00	0.00			

Horizontal Illuminance (lux)

Roadways

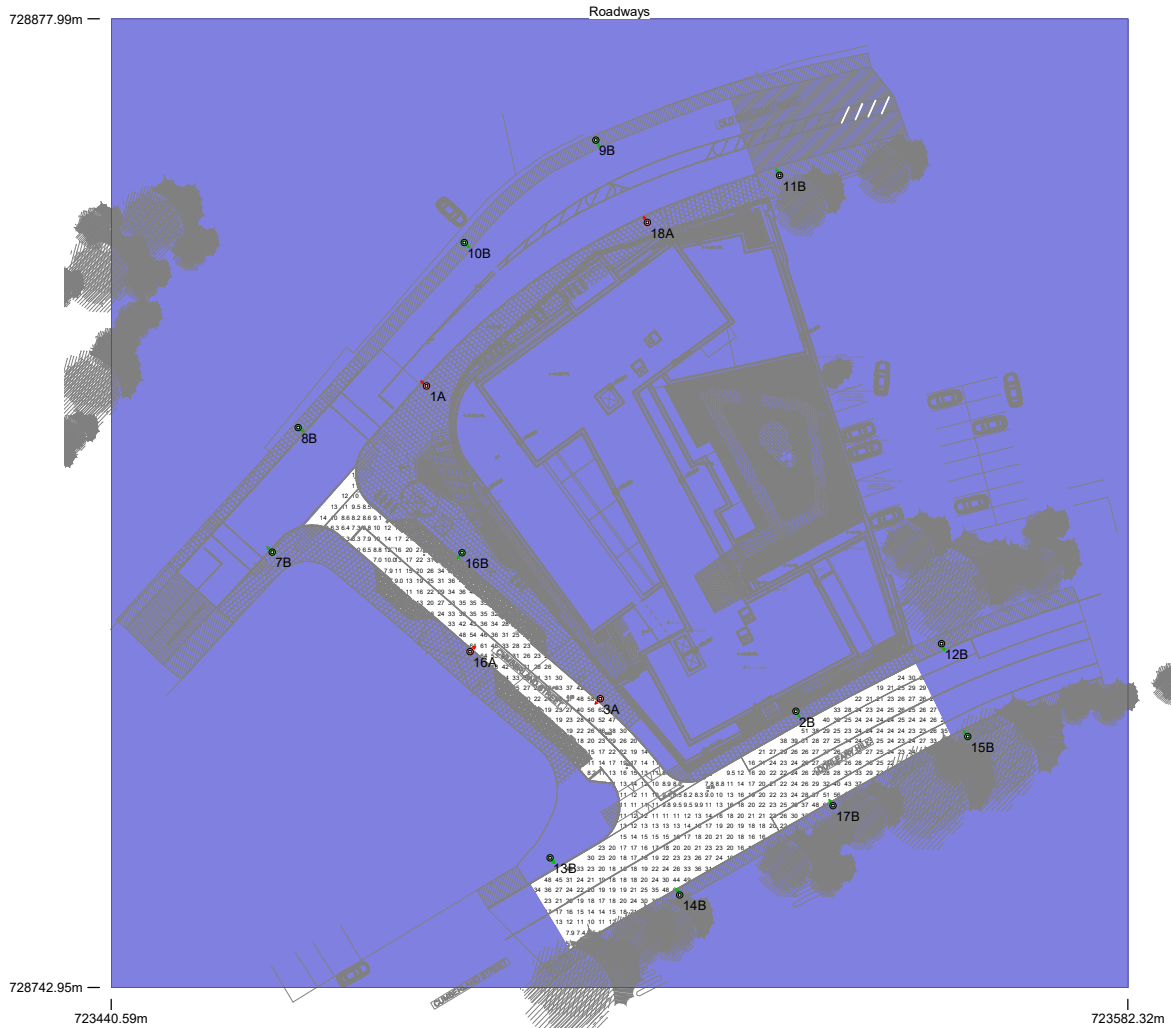


Results

Eav	23.18
Emin	4.76
Emax	64.10
Emin/Emax	0.07
Emin/Eav	0.21

Horizontal Illuminance (lux)

Roadways



Results

Eav	23.18
Emin	4.76
Emax	64.10
Emin/Emax	0.07
Emin/Eav	0.21

DATE: 20 January 2021
DESIGNER: Michael Casey
PROJECT No:
PROJECT NAME: Ted Castle Footpaths

**LIGHTING
REALITY**

Outdoor Lighting Report

Layout Report

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Roadways	723440.59	728742.95	141.73	135.04	1.49	1.48
2	Path ways	723441.01	728743.16	140.76	131.02	1.50	1.49

Luminaires

Luminaire A Data

Supplier	VEELITE
Type	5MER08LBA-R1
Lamp(s)	32LED 4K
Lamp Flux (klm)	7.85
File Name	5MER08LBA-R1 70W.ies
Maintenance Factor	0.79
Imax70,80,90(cd/klm)	679.1, 319.1, 0.0
No. in Project	4

Luminaire B Data

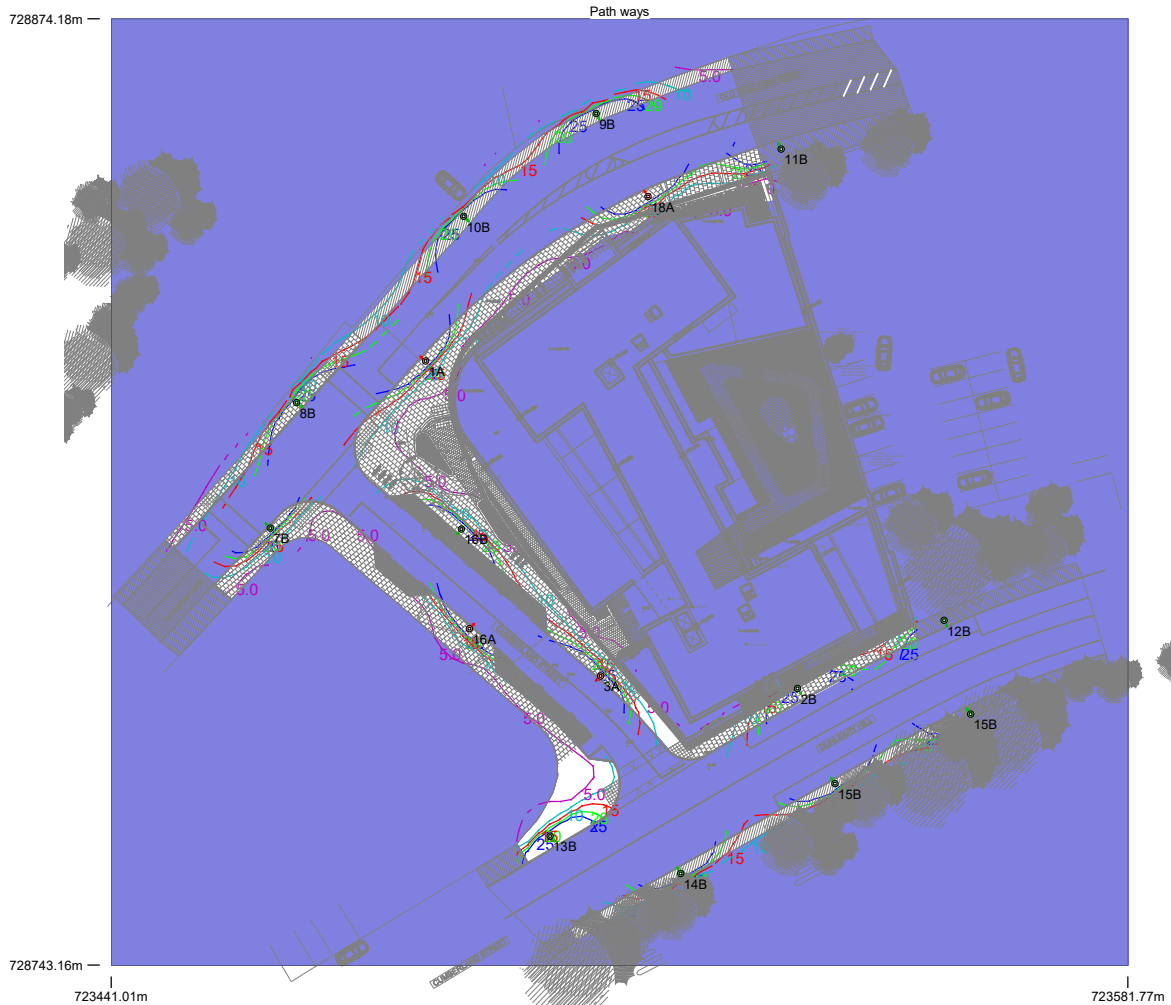
Supplier	VEELITE
Type	5MER08LBA-R1
Lamp(s)	32LED 4K
Lamp Flux (klm)	7.85
File Name	5MER08LBA-R1 70W.ies
Maintenance Factor	0.79
Imax70,80,90(cd/klm)	679.1, 319.1, 0.0
No. in Project	12

Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
1	A	723484.53	728826.82	6.00	138.00	0.00	0.00	0.00			
2	B	723536.00	728781.50	6.00	302.00	0.00	0.00	0.00			
3	A	723508.74	728783.23	6.00	225.00	0.00	0.00	0.00			
7	B	723463.04	728803.69	6.00	136.00	0.00	0.00	0.00			
8	B	723466.66	728821.04	6.00	322.00	0.00	0.00	0.00			
9	B	723508.15	728861.08	6.00	297.00	0.00	0.00	0.00			
10	B	723489.80	728846.83	6.00	314.00	0.00	0.00	0.00			
11	B	723533.75	728856.16	6.00	119.00	0.00	0.00	0.00			
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14	B	723519.82	728755.89	6.00	120.00	0.00	0.00	0.00			
15	B	723559.95	728777.95	6.00	125.00	0.00	0.00	0.00			
16	B	723489.49	728803.56	6.00	230.00	0.00	0.00	0.00			
18	A	723515.32	728849.60	6.00	124.00	0.00	0.00	0.00			
15	B	723541.17	728768.32	6.00	121.00	0.00	0.00	0.00			
16	A	723490.61	728789.79	6.00	45.00	0.00	0.00	0.00			

Horizontal Illuminance (lux)

Path ways

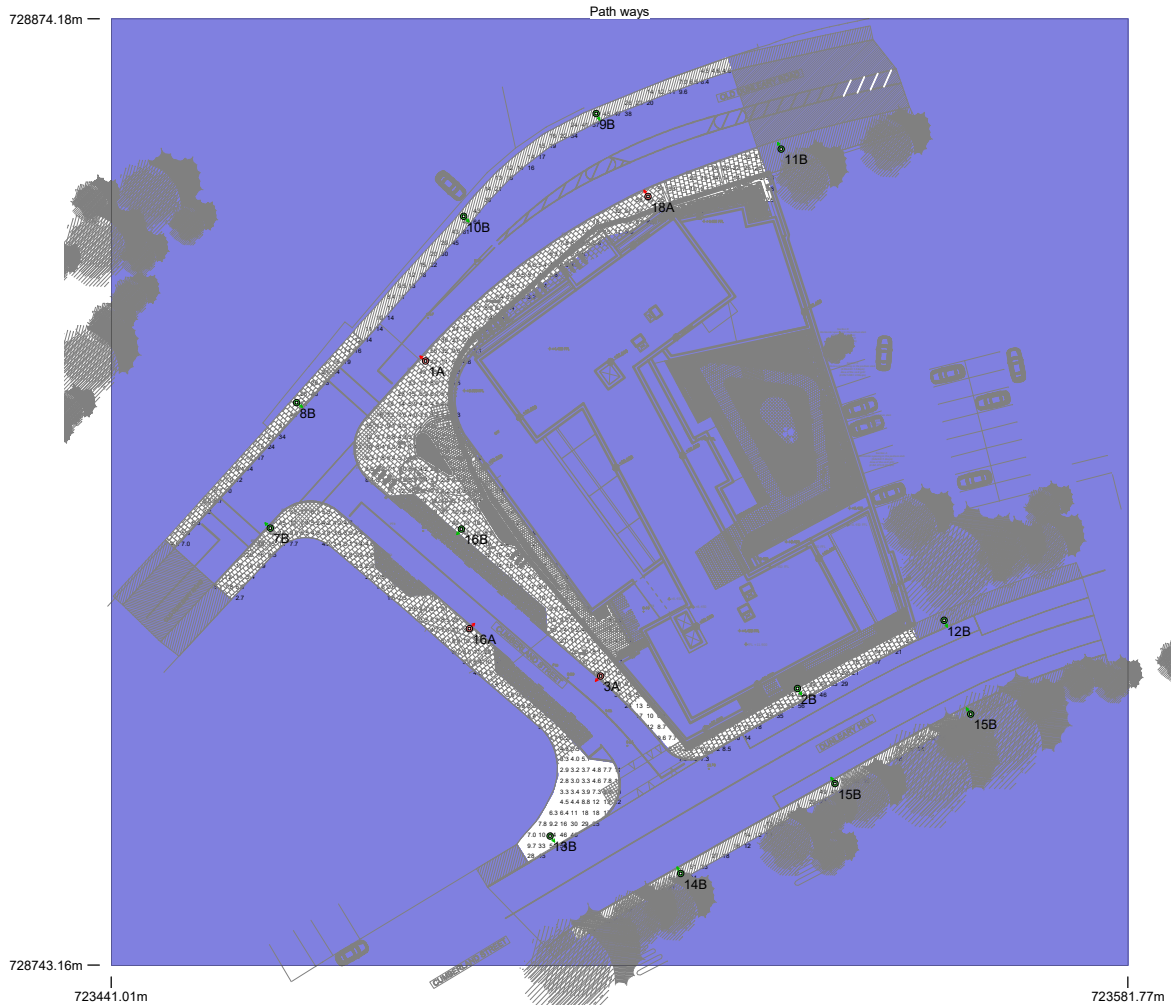


Results

Eav	13.75
Emin	1.54
Emax	64.12
Emin/Emax	0.02
Emin/Eav	0.11

Horizontal Illuminance (lux)

Path ways



Results

Eav	13.75
Emin	1.54
Emax	64.12
Emin/Emax	0.02
Emin/Eav	0.11

DATE: 18 January 2021
DESIGNER: Michael Casey
PROJECT No: A591
PROJECT NAME: Ted Castle Dunleary Road M3

**LIGHTING
REALITY**

Outdoor Lighting Report

Layout Report

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Roadways	723440.59	728742.95	141.73	135.04	1.49	1.48
2	Path ways	723441.01	728743.16	140.76	131.02	1.50	1.49

Luminaires

Luminaire A Data

Supplier	VEELITE
Type	5MER08LBA-R1
Lamp(s)	32LED 4K
Lamp Flux (klm)	7.85
File Name	5MER08LBA-R1 70W.ies
Maintenance Factor	0.79
Imax70,80,90(cd/klm)	679.1, 319.1, 0.0
No. in Project	3

Luminaire B Data

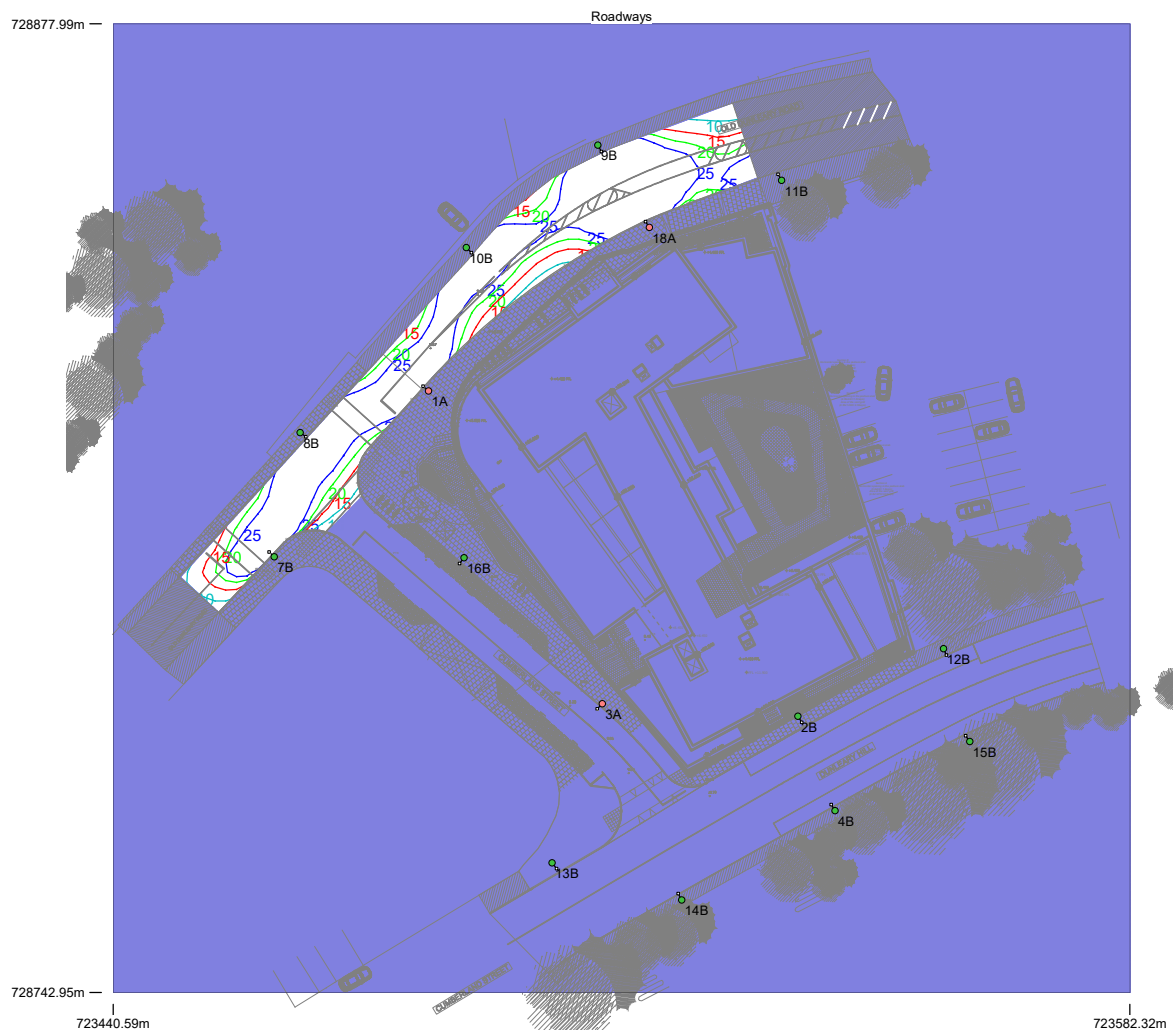
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Type	5MER08LBA-R1
Lamp(s)	32LED 4K
Lamp Flux (klm)	7.85
File Name	5MER08LBA-R1 70W.ies
Maintenance Factor	0.79
Imax70,80,90(cd/klm)	679.1, 319.1, 0.0
No. in Project	12

Layout

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3	A	723508.74	728783.23	6.00	225.00	0.00	0.00	1.00			
4	B	723541.17	728768.32	6.00	121.00	0.00	0.00	1.00			
7	B	723463.04	728803.69	6.00	136.00	0.00	0.00	1.00			
8	B	723466.66	728821.04	6.00	322.00	0.00	0.00	1.00			
9	B	723508.15	728861.08	6.00	297.00	0.00	0.00	1.00			
10	B	723489.80	728846.83	6.00	314.00	0.00	0.00	1.00			
11	B	723533.75	728856.16	6.00	119.00	0.00	0.00	1.00			
12	B	723556.29	728790.92	6.00	295.00	0.00	0.00	1.00			
13	B	723501.76	728761.07	6.00	308.00	0.00	0.00	1.00			
14	B	723519.82	728755.89	6.00	120.00	0.00	0.00	1.00			
15	B	723559.95	728777.95	6.00	125.00	0.00	0.00	1.00			
16	B	723489.49	728803.56	6.00	230.00	0.00	0.00	1.00			
18	A	723515.32	728849.60	6.00	124.00	0.00	0.00	1.00			

Horizontal Illuminance (lux)

Roadways

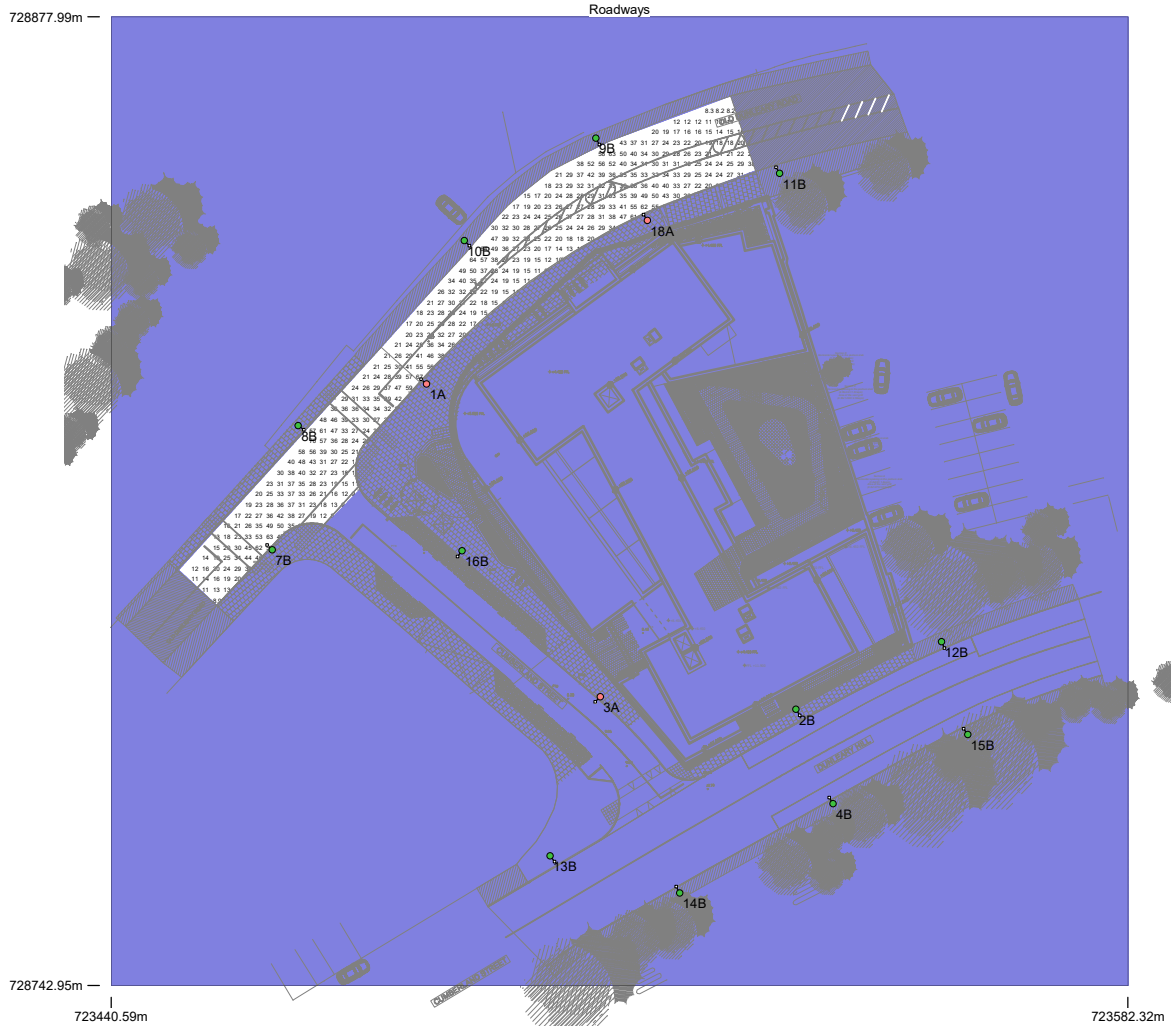


Results

Eav	28.53
Emin	7.11
Emax	69.72
Emin/Emax	0.10
Emin/Eav	0.25

Horizontal Illuminance (lux)

Roadways



Results

Eav	28.53
Emin	7.11
Emax	69.72
Emin/Emax	0.10
Emin/Eav	0.25