

**D1846**  
**East Wall Road**  
**Residential Development**



**Site Lighting Report**

IN2 Project. No. D1846

9<sup>th</sup> January 2020

Rev03

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## ISSUE REGISTER

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## 1.0 INTRODUCTION

IN2 Engineering Design Partnership has been appointed by Arrow Asset Management to complete a Planning Stage Site Lighting Study for the proposed East Wall Road residential project to demonstrate that the proposed site lighting design will enhance the development and maintain safe levels of illumination to circulation areas while minimising light overspill to the residents or neighbouring properties.

## 2.0 EXECUTIVE SUMMARY

The following report contains the design layout and accompanying calculations for the proposed site lighting scheme for the new East Wall Road residential development on the East Wall Road, Dublin.

The external lighting for this development has been designed to achieve the performance requirements as set out in the following standards:

- Institution of Lighting Professionals - Guidance Notes for the Reduction of Obtrusive Light GN01:2011
- BS EN 13201-2:2015 - Road Lighting Part 2: Performance Requirements
- BS 5489-1:2013 Code of Practice for the Design of Road Lighting
- Chartered Institution of Building Services Engineers - Lighting Guide 6
- ETCI National Rules for Electrical Installations ET 101

For the purposes of this report, the development has been classed as an Environmental Zone E3 - Suburban with Medium District Brightness, in Accordance with ILP GN01:2011. The design criteria set out for this development, based on the lighting requirements for the stated environmental zone of E3 as outlined in BS 5489-1:2013, are as specified in the table below.

Area	Lighting Levels (Lux)	Uniformity ( $U_o$ )
Road (Main Traffic Routes)	7.5	0.2
Walkways	10	0.4
Stairs	100	0.4
Light Spill (Obtrusive Light)	10 (Maximum)	N/A

*Figure 2.1 - Minimum Lighting Requirements*

### 3.0 DEVELOPMENT OVERVIEW

The proposed development is to be situated on the corner of East Wall Road and Merchants Road, Dublin 3 within the site context as illustrated below in Figure 3.1.



*Figure 3.1 - Development Site*

The proposed development comprises of the demolition of the existing buildings on site (excluding Unit 11, 15 and 16) and the construction of 337 no. residential apartment units and a range of commercial uses, including café, retail and office at the IDA Business Park, East Wall Road, Dublin 3. The proposed development will range in height from 4 no. to 10 no. storeys (c. 35.2m) and will be laid out in 6 no. residential blocks and 2 no. existing commercial blocks. The proposed development will also include public open space, residential amenities, hard and soft landscaping, basement car and bicycle parking and all other ancillary works necessary to facilitate the development.

## 4.0 PROPOSED INSTALLATION

The proposed site lighting for the East Wall Road development has been designed to ensure that the lighting criteria set out in each of the relevant standards listed previously are met or exceeded and that sufficient illumination is provided to ensure that key requirements such as access/egress, enhanced site security and the safe use of paths, amenity spaces, pedestrian crossings and traffic routes is provided. The design has been assessed to establish minimal environmental impact through glare, sky glow and obtrusive light (light spill).

It is proposed to illuminate the main traffic route through the development using 6m galvanised steel lighting columns with Type 'X1' post-top mounted LED luminaires as per the luminaire schedule in Appendix A of this report. The luminaires shall be complete with narrow beam roadway optics to ensure minimal light spill to adjacent buildings and no upward light spill, minimising sky glow and glare. Each luminaire shall have individual photocell switching to reduce the energy consumption of the proposed lighting scheme via a 7-Pin Nema socket.

Lighting shall be provided on the pedestrian links to East Wall Road and Merchant's Road using Type 'X2' lighting bollards of 1,000mm in height to ensure compliance with Technical Guidance Document M of the Irish Building Regulations. It is proposed to illuminate the landscaped space to the north-west of the site located behind Block 4 using Type 'X3' decorative column LEDs 3 meters in height. These 3-meter columns shall also be used to illuminate the landscape plaza surrounding Block 2. Both the 1,000mm high lighting bollards as well as the luminaires on the 3-meter columns shall have a mechanical impact rating of IK10. All luminaires shall be Extra-Low Voltage LED luminaires to ensure protection against electric shock in the event that damage may occur.

It is proposed to illuminate the pedestrian access link to East Wall Road with a mixture of recessed lights on Block 5 and 1,000mm bollards.

The public pathway located to the rear of Block 1 parallel to Merchant's Road shall be illuminated using the Type 'X1' luminaire mounted on 6m columns. The integral LED driver has been programmed to ensure a Constant Lumen Output throughout the fitting's lifespan.

The technical data and photometric curves for each of the proposed luminaires has been provided in the luminaire schedule enclosed in Appendix A of this report.

The performance of the proposed lighting scheme has been analysed using Relux Pro 3D lighting simulation software package, the results of which have been displayed in Section 5.0 of this report.

## 5.0 DESIGN ANALYSIS AND CALCULATION RESULTS

### 5.1 Road (Main Traffic Route)

The lighting performance on the main traffic route has been assessed with fitting Type 'X1' (as per luminaire schedule) mounted on 6 metre columns. Columns have been placed at equal spacings of 20 meters centre to centre.

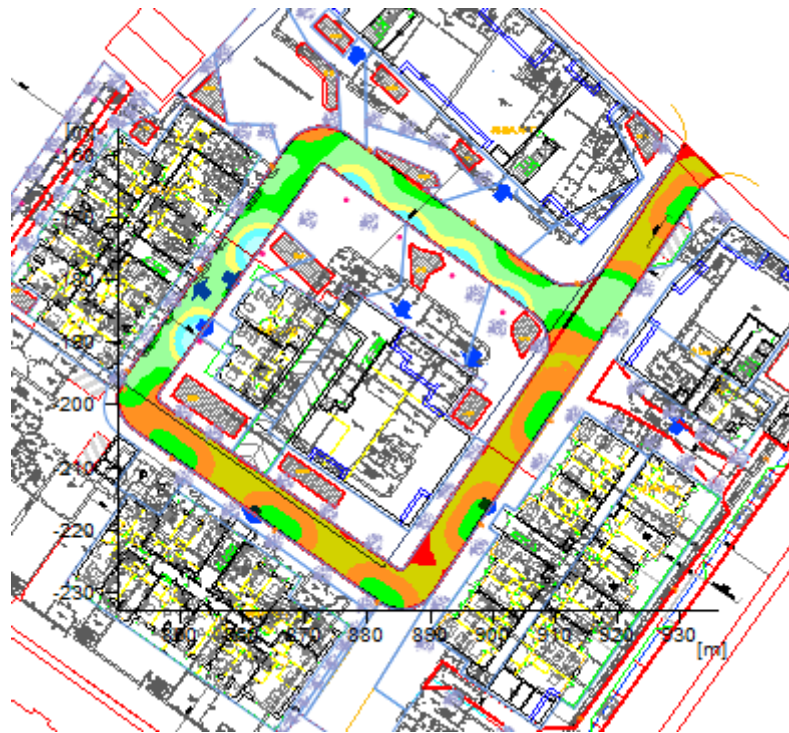
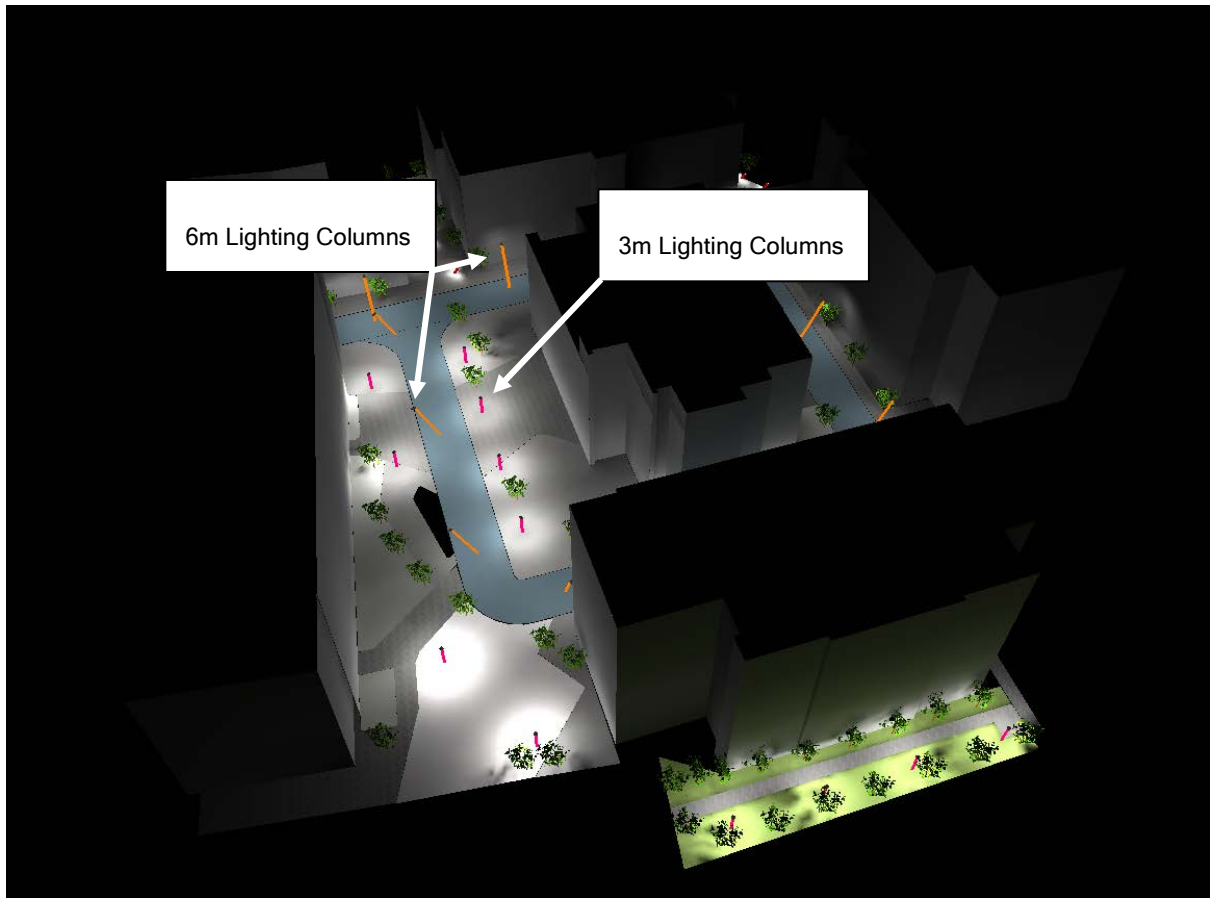


Figure 5.1.1 - Illumination Levels on Main Traffic Route

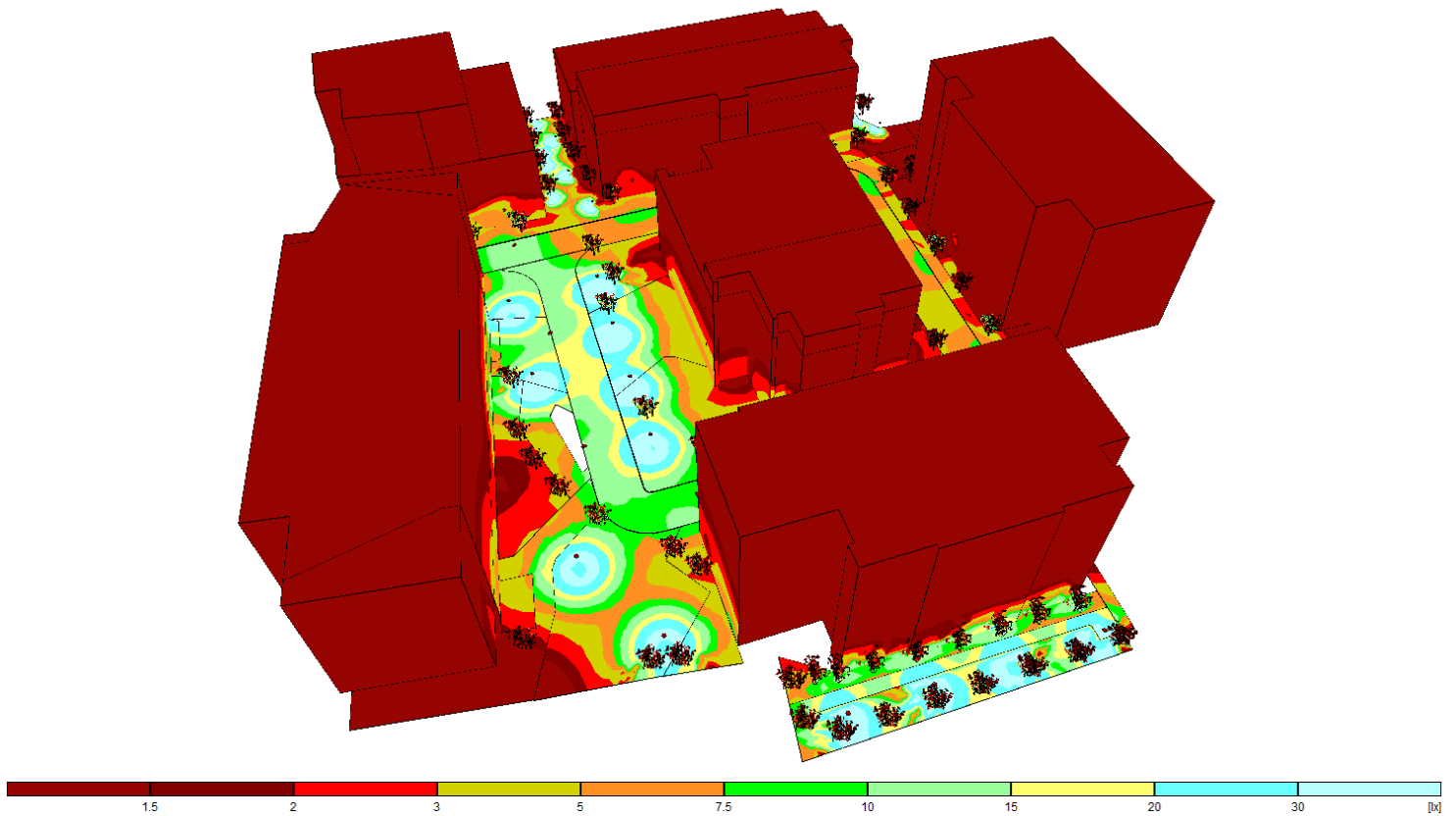
Evaluation	Target	Result	
$E_{\text{AVERAGE}}$ (maintained)	7.5 lux	8.83 lux	PASS
$E_{\text{MIN}}$	1.5 lux	1.78 lux	PASS
$U_0$ (Uniformity)	0.20	0.20	PASS

Figure 5.1.2 - Analysis Results





*Figure 5.1.3 - 3D Model indicating Luminaire Positioning*



*Figure 5.1.4 - 3D Model Lux Levels*

## 5.2 Merchant's Road Pedestrian Links

The lighting performance on the Pedestrian Link footpaths with Merchant's Road has been assessed with fitting Type 'X2' 1000mm (H) Part M compliant lighting bollards (as per luminaire schedule) spaced evenly at 5-meter intervals.

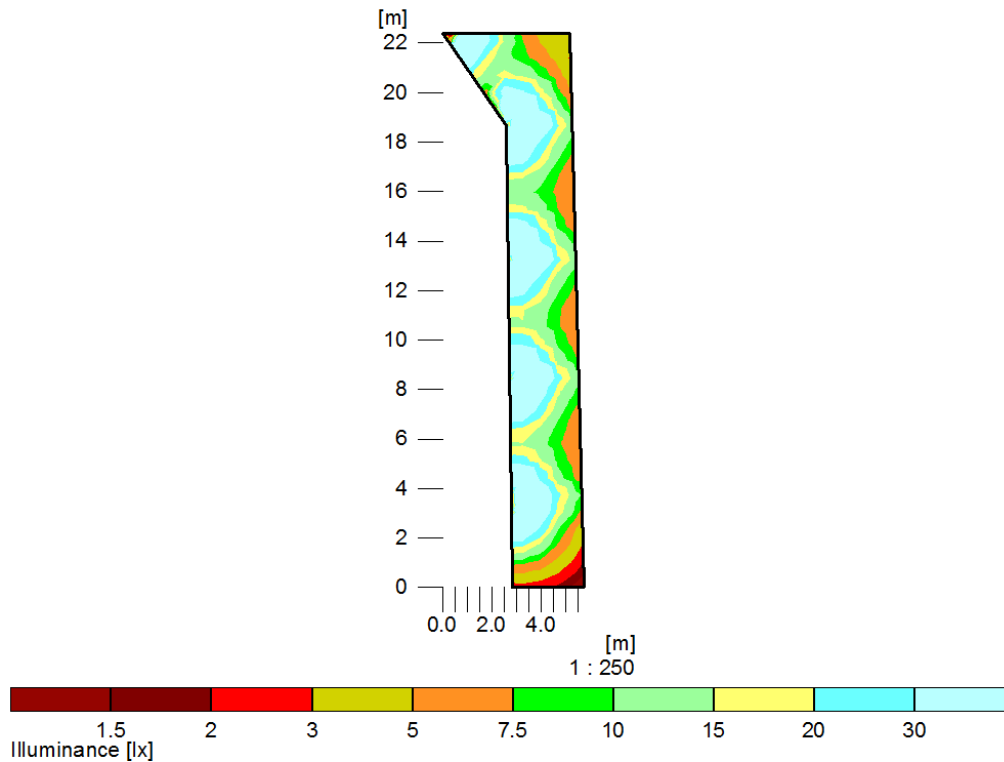


Figure 5.2.1 - Illumination Levels on Pedestrian Link

Evaluation	Target	Result	
$E_{\text{AVERAGE}}$ (maintained)	10 lux	14.3 lux	PASS
$E_{\text{MIN}}$	4 lux	5.7 lux	PASS
$U_{\text{O}}$ (Uniformity)	0.40	0.40	PASS

Figure 5.2.2 - Analysis Results

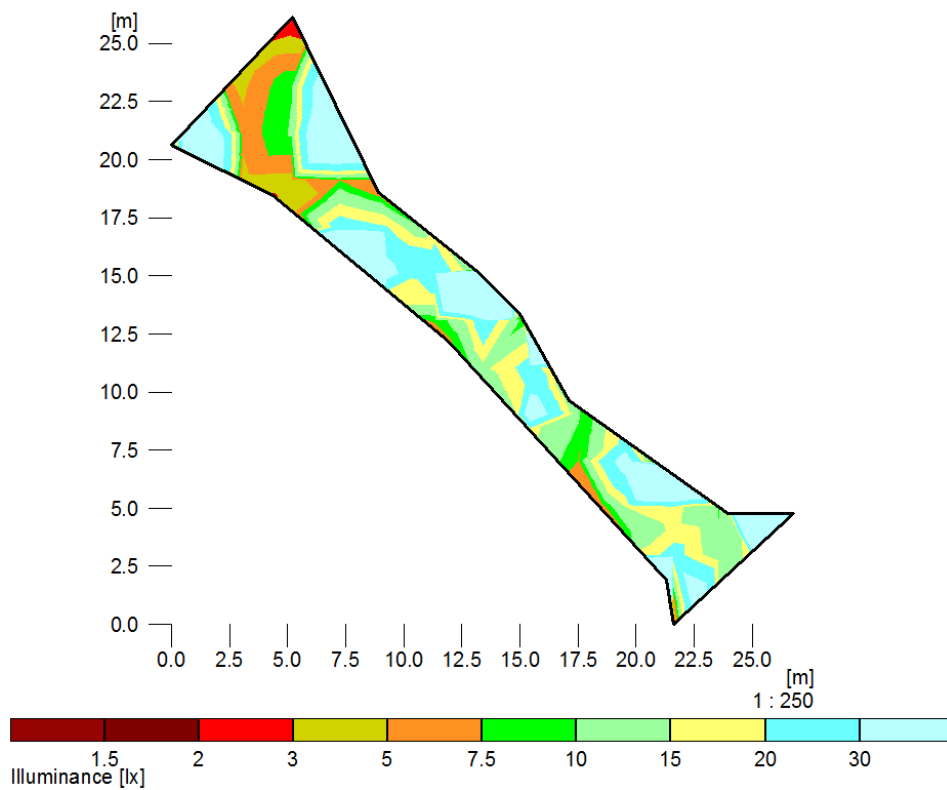


Figure 5.2.3 - Illumination Levels on Pedestrian Link

Evaluation	Target	Result	
$E_{\text{AVERAGE}}$ (maintained)	10 lux	17.4 lux	PASS
$E_{\text{MIN}}$	4 lux	7.3 lux	PASS
$U_{\text{O}}$ (Uniformity)	0.40	0.42	PASS

Figure 5.2.4 - Analysis Results



Figure 5.2.5 - 3D Model indicating Luminaire Positioning

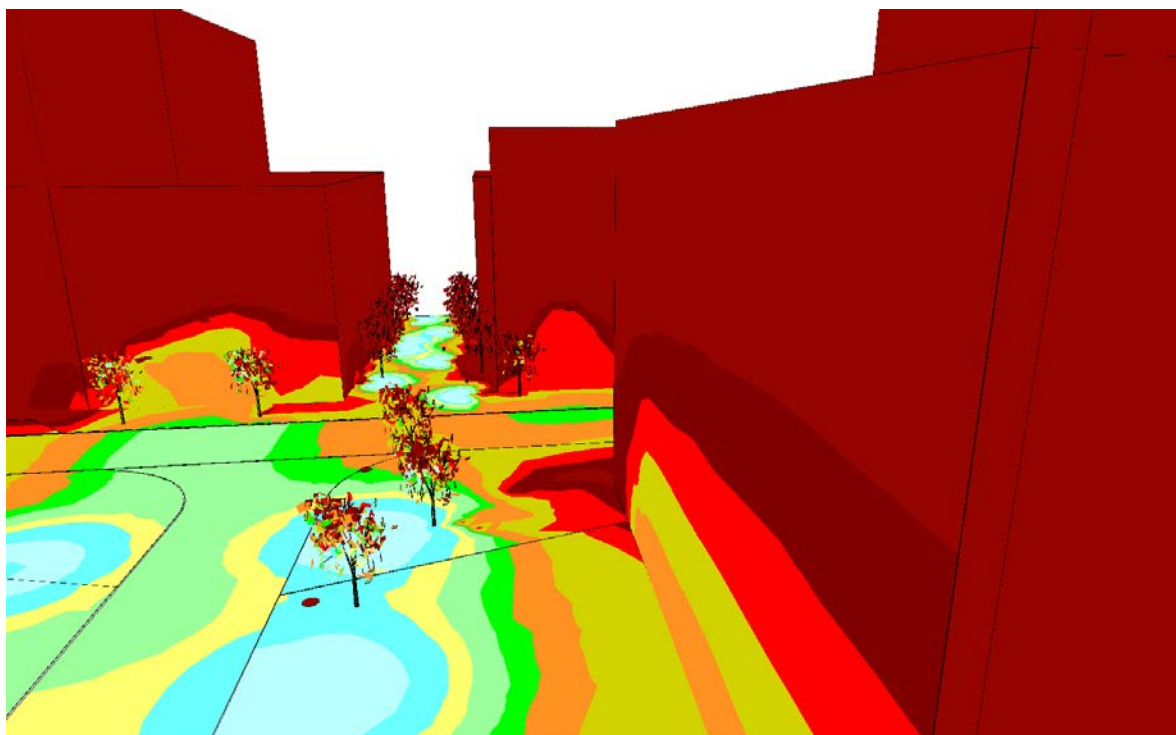


Figure 5.2.6 - 3D Model Lux Levels

### 5.3 Landscape Area

The lighting performance on the Landscape Area located at the back of Block 4 has been assessed with fitting Type 'X3' 3-meter (H) columns (as per luminaire schedule) spaced evenly at 10-meter intervals.

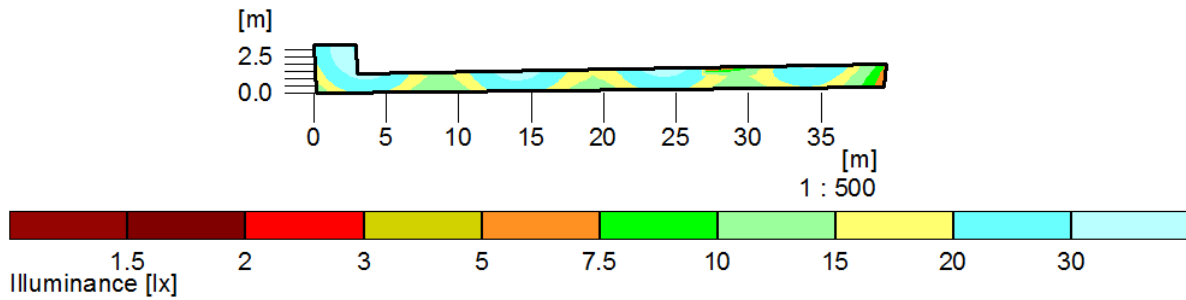
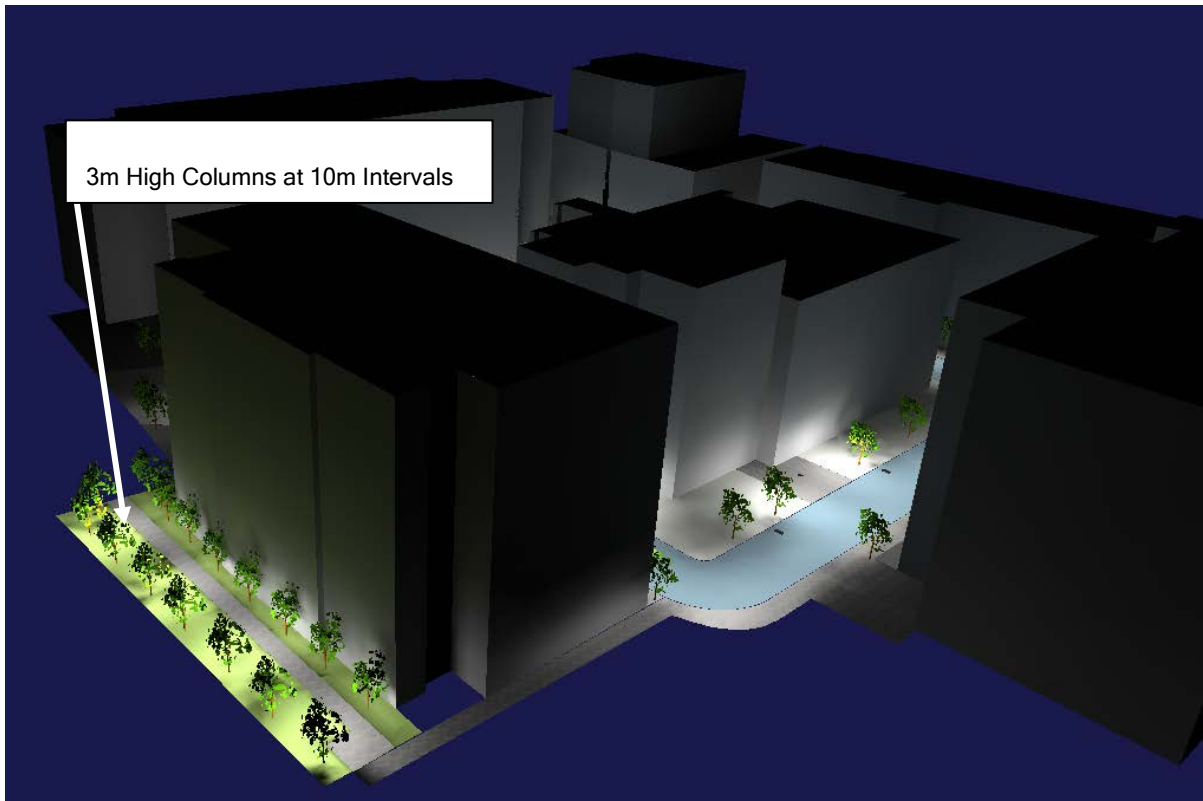


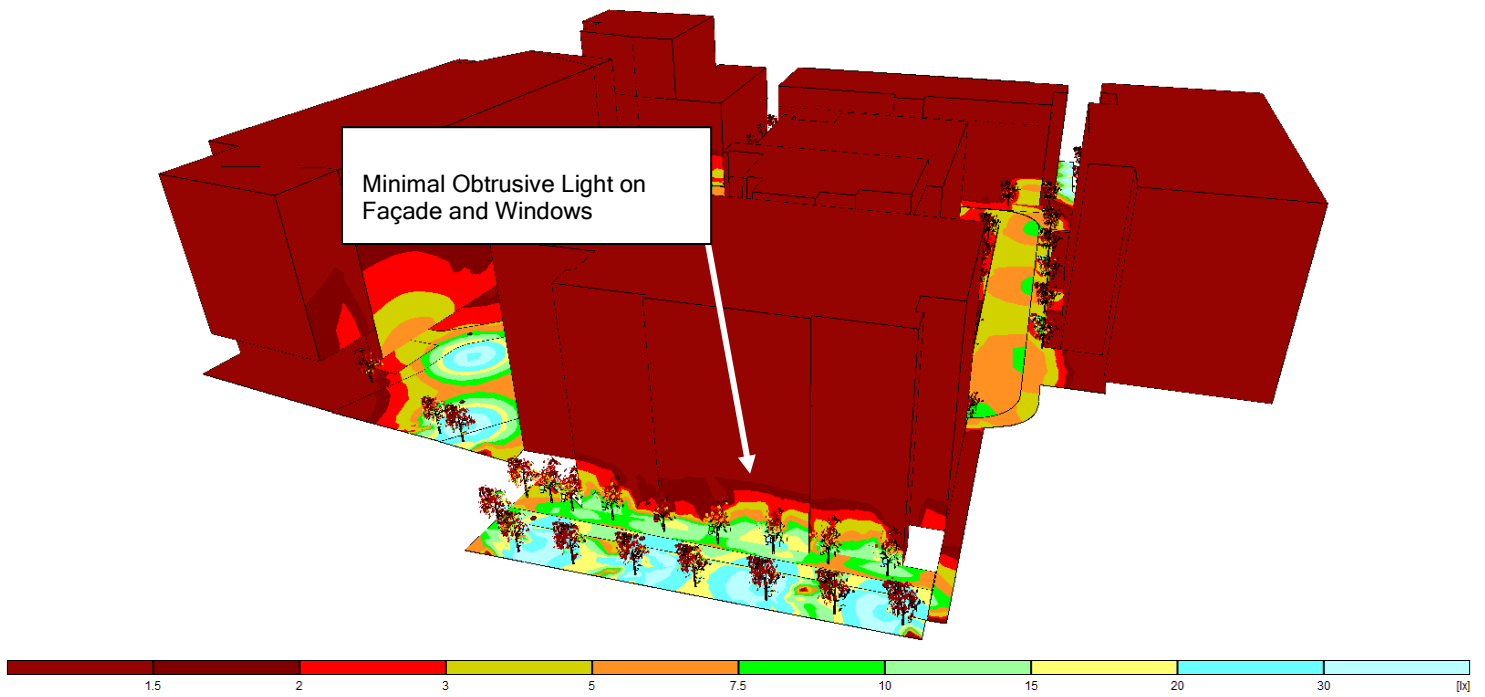
Figure 5.3.1 - Illumination Levels on Landscaped Area

Evaluation	Target	Result	
		Value	Status
$E_{\text{AVERAGE}}$ (maintained)	10 lux	16.4 lux	PASS
$E_{\text{MIN}}$	4 lux	6.6 lux	PASS
$U_{\text{O}}$ (Uniformity)	0.40	0.42	PASS

Figure 5.3.2 - Analysis Results



*Figure 5.3.3 - 3D Model indicating Luminaire Positioning*



*Figure 5.3.4 - 3D Model Lux Levels*

## 5.4 Merchant's Road Pedestrian Footpath/Parking

The lighting performance on the Pedestrian footpath and parking spaces along Merchant's Road have been assessed with fitting Type 'X1' luminaires mounted on 6m columns as per luminaire schedule) spaced evenly at 25-meter intervals. The proposed lighting layout has been designed to ensure that lighting levels and uniformity achieve a Class P4 as specified in BS 5489-1:2013 as required by Dublin City Council Public Lighting Service's General Specification.

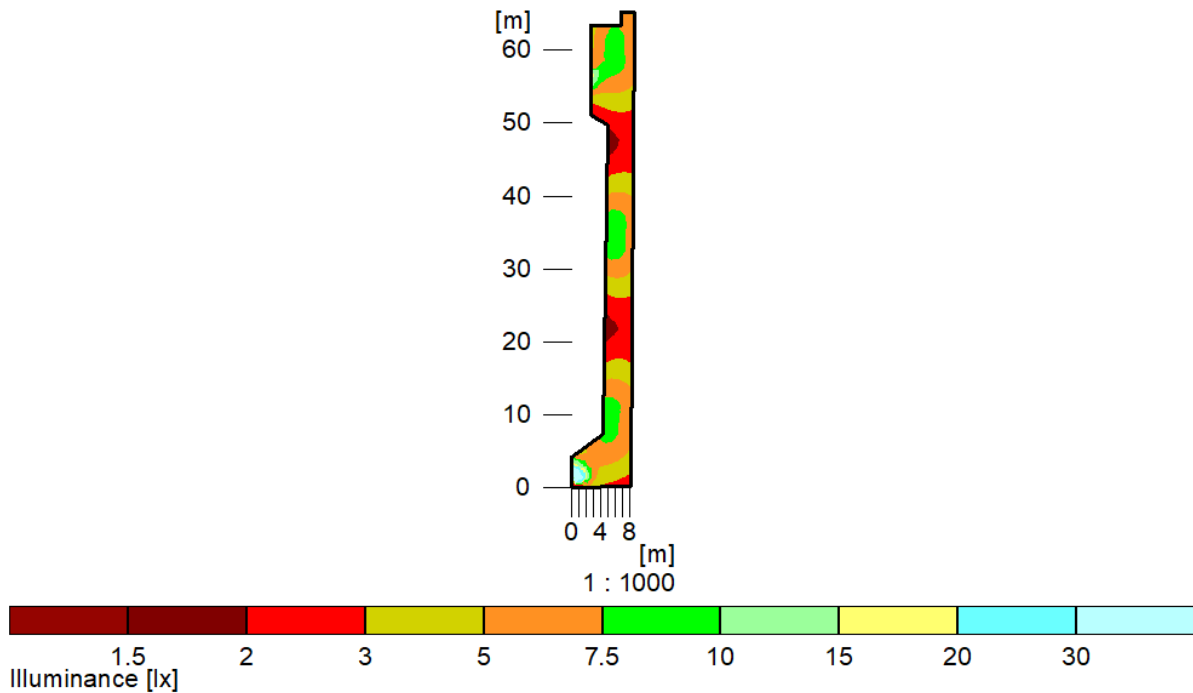
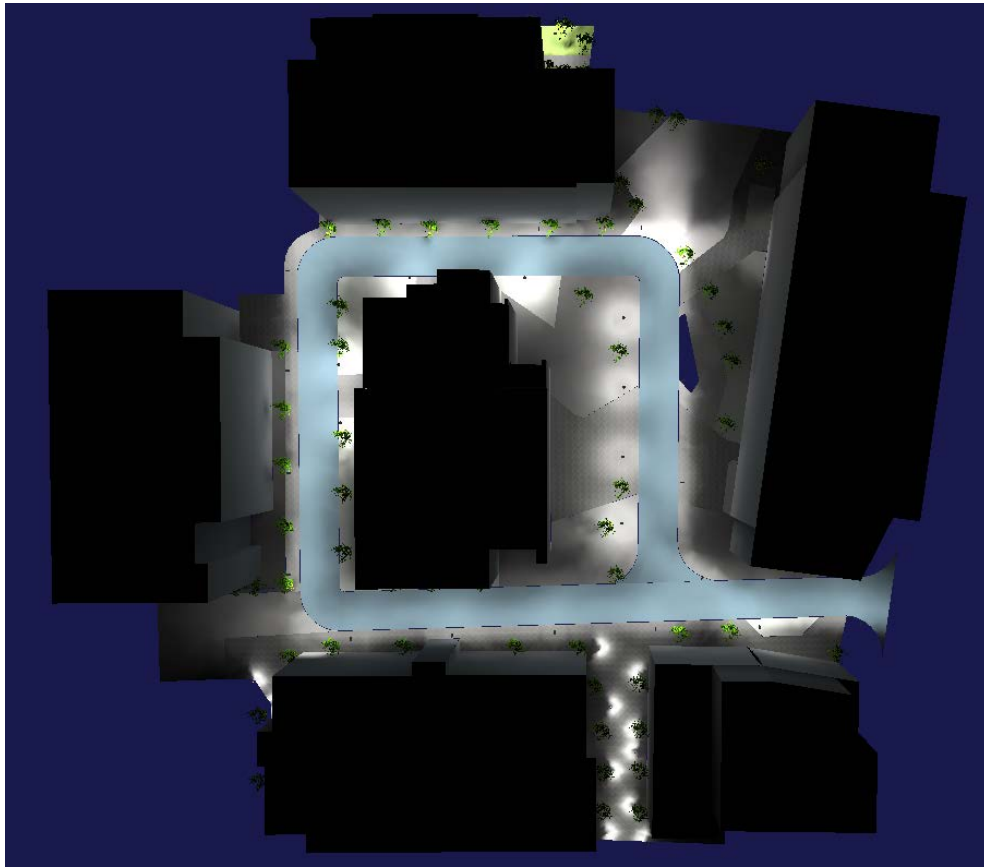


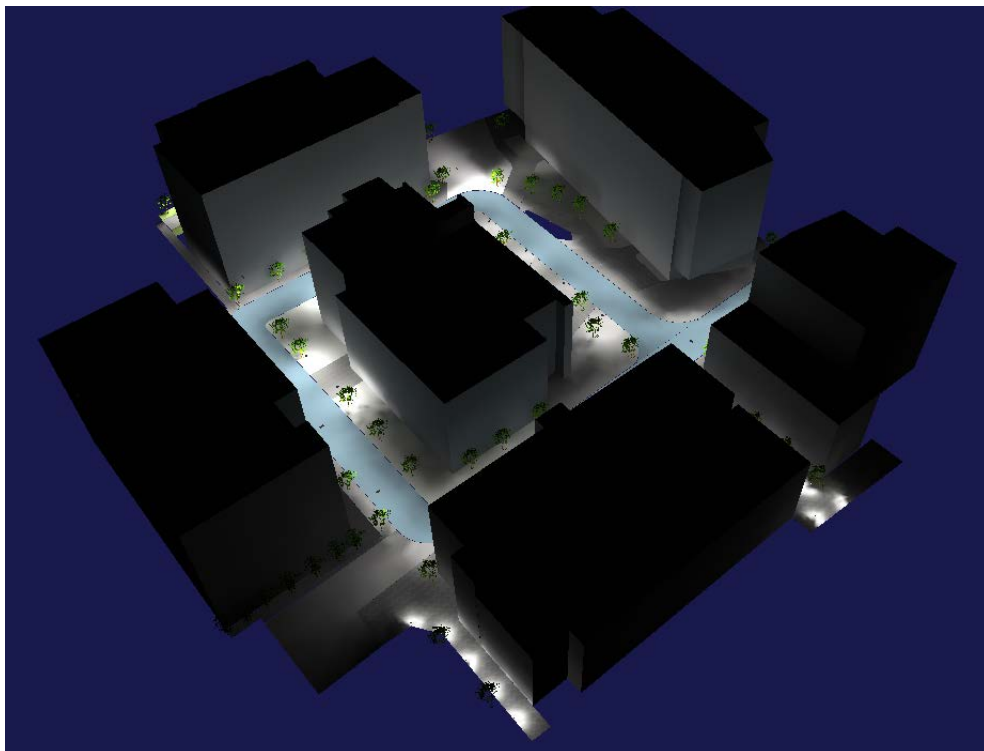
Figure 5.4.1 - Illumination Levels on Pedestrian Footpath/Parking

Evaluation	Target	Result	
$E_{\text{AVERAGE}}$ (maintained)	5 lux	5.6 lux	PASS
$E_{\text{MIN}}$	1 lux	1.8 lux	PASS
$U_{\text{O}}$ (Uniformity)	0.2	0.32	PASS

Figure 5.4.2 - Analysis Results



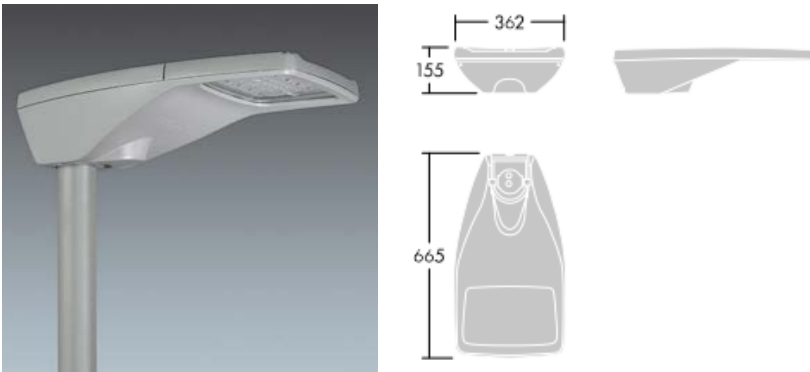
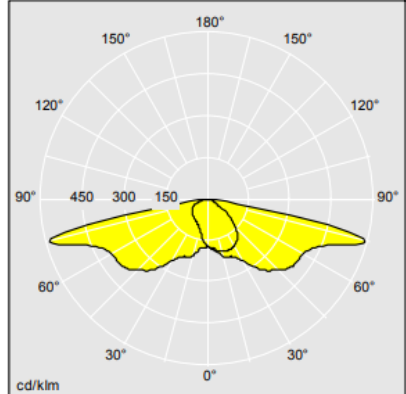
*Figure 5.4.3 - 3D Model Plan View*



*Figure 5.4.4 - 3D Model of Full Site*



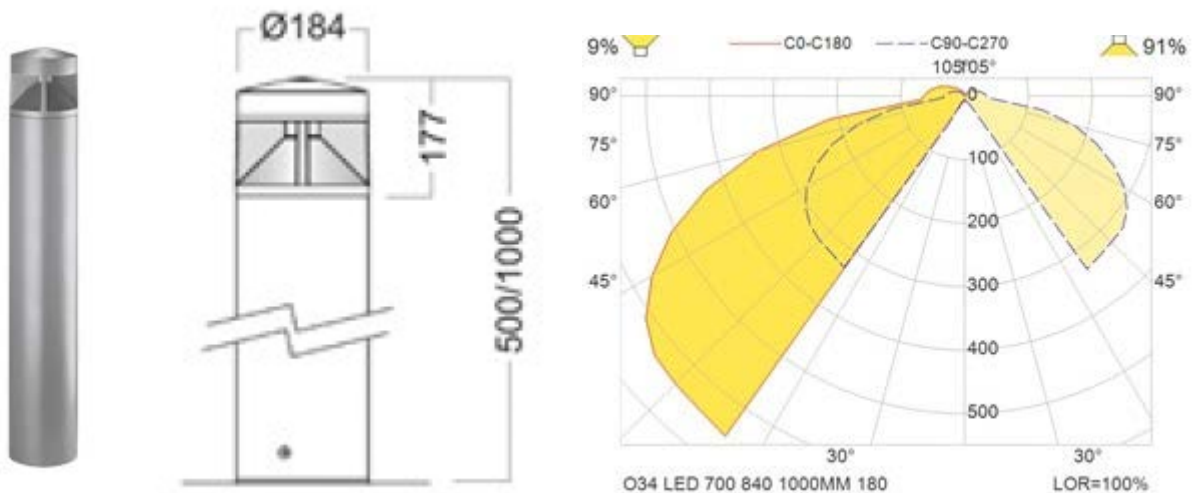
## 6.0 APPENDIX A - LUMINAIRE SCHEDULE

Luminaire Reference	X1	Manufacturer	Thorn/ R2L2 / Equal & Approved
Body Description	IP66, IK08, Die-Cast Aluminium	Recessed/Surface or Wall Mounted	Post Top on 6m Columns
Diffuser Type	Tempered Flat Glass	Lamps	15W LED Lamp
Reflector	-	Lumen Output	1875 lumens (125 lm/W)
Control Gear	230V, 50-60Hz AC c/w 350mA LED Driver	Colour of Lamps	4000K
Area of Application	Vehicular Access Roads, Public Pathway	Lamp Life	100,000 Hrs
Dimensions (mm)	665mm (L) x 362mm (W)x 155mm (H)	IEC Photometric Code	840/339
Initial Colour Variation	-	IESNA LM 80-80 tested	Yes
A small size LED road lighting lantern with 12 LEDs driven at 350mA. Luminaire is complete with Constant Lumen Output to ensure high-performance throughout lifetime and 7-Pin Nema socket to allow for individual photocell switching and future smart control to minimise energy consumption.			
Lumen Depreciation	N/A	Power Factor	0.95
Colour rendering Index	>70	LED luminaire tested	To be in accordance with IESNA LM-79-08
Manufacturing Standard	EN 60 598-1:2015, EN 60598-2-2:2012, IEC/TR 62778:2014	LED drivers shall conform to	To be in accordance with IEC 61347-2-13 & IEC 62384.
Warranty Length	Five-year on-site warranty to include failure of all luminaire components, inclusive of driver, electronics & LED modules. Contractor to include for all fixtures and fixings necessary for correct mounting and operation.		
 			
Contractor to ensure catalogue numbers are the latest and are correct prior to ordering.			


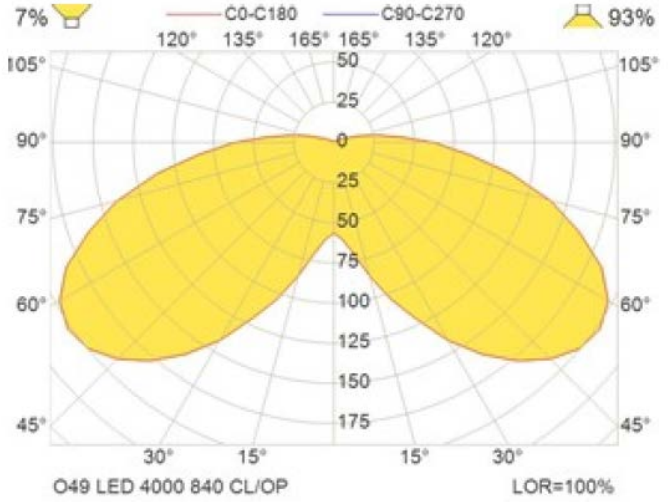
<b>Luminaire Reference</b>	<b>X2</b>	<b>Manufacturer</b>	<b>Glamox / O34 / Equal &amp; Approved</b>
Body Description	IP66 rated, Die-cast aluminium	Recessed/Surface or Wall Mounted	Floor mounted - Bollard
Diffuser Type	Tempered Glass	Lamps	12W LED
Reflector	N/A	Lumen Output	665 lumens
Control Gear	230V, 50-60Hz	Colour of Lamps	4000K
Area of Application	Site - External Walkways	Lamp Life	50,000hours
Dimensions (mm)	184mm (Dia) x 177mm (H)	IEC Photometric Code	840/339
Column Height	1000mm (H)	IESNA LM 80-80 tested	Yes

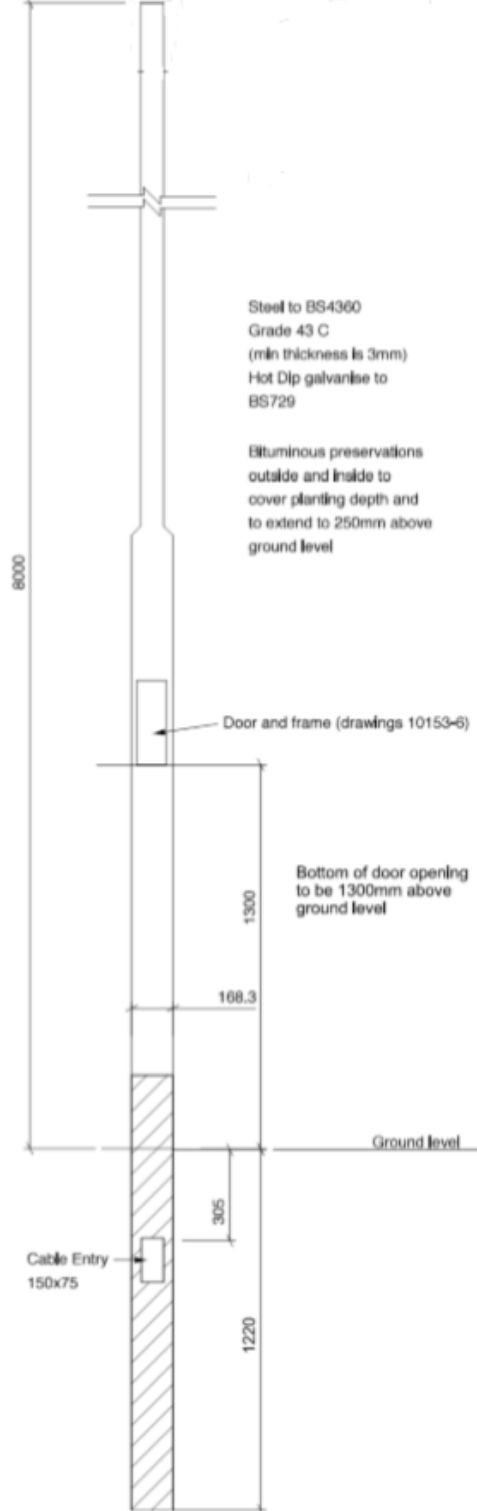
A robust and decorative LED bollard with luminaire housing in extruded and die-cast aluminium. Double layer polyester powder coated paint finish. Supplied with tempered glass diffuser. The bollard has silicone gasket and all screws are in stainless steel.

Lumen Depreciation	L80 B50	Power Factor	> 0.9
Colour rendering Index	>70	LED luminaire tested	To be in accordance with IESNA LM-79-08.
Manufacturing Standard	EN 60 598-1:2015, EN 60598-2-2:2012, IEC/TR 62778:2014	LED drivers shall conform to	To be in accordance with IEC 61347-2-13 & IEC 62384.
Warranty Length	Five-year on-site warranty to include failure of all luminaire components, inclusive of driver, electronics & LED modules. Contractor to include for all fixtures and fixings necessary for correct mounting and operation.		



Contractor to ensure catalogue numbers are the latest and are correct prior to ordering.

<b>Luminaire Reference</b>	<b>X3</b>	<b>Manufacturer</b>	<b>Glamox / O49 / Equal &amp; Approved</b>
Body Description	IP66 rated, Die-Cast Aluminium	Recessed/Surface or Wall Mounted	Floor mounted
Diffuser Type	Polycarbonate	Lamps	40W LED
Reflector	N/A	Lumen Output	3960 lumens
Control Gear	230V, 50-60Hz	Colour of Lamps	4000K
Area of Application	Site - Walkways	Lamp Life	60,000hours
Dimensions (mm)	492mm (Dia) x 640mm(H)	IEC Photometric Code	840/339
Column Height	3000mm (H)	IESNA LM 80-80 tested	Yes
A decorative LED luminaire. Suitable for parks, paths and amenity lighting. Manufactured with luminaire housing in die-cast aluminium. Double layer polyester powder coated paint finish. The luminaire is available with three types of optics.			
Lumen Depreciation	L80 B50	Power Factor	> 0.9
Colour rendering Index	>80	LED luminaire tested	To be in accordance with IESNA LM-79-08.
Manufacturing Standard	EN 60 598-1:2015, EN 60598-2-2:2012, IEC/TR 62778:2014	LED drivers shall conform to	To be in accordance with IEC 61347-2-13 & IEC 62384.
Warranty Length	Five-year on-site warranty to include failure of all luminaire components, inclusive of driver, electronics & LED modules. Contractor to include for all fixtures and fixings necessary for correct mounting and operation.		
 			
Contractor to ensure catalogue numbers are the latest and are correct prior to ordering.			

Light Post Reference	LP1	Manufacturer	Piltown Engineering / OC6X76 / Equal & Approved
Body Description	Hot Dip Galvanized Coated Finish	 <p>Steel to BS4360 Grade 43 C (min thickness is 3mm) Hot Dip galvanise to BS729</p> <p>Illuminous preservations outside and inside to cover planting depth and to extend to 250mm above ground level</p> <p>6000</p> <p>Door and frame (drawings 10153-6)</p> <p>1300</p> <p>Bottom of door opening to be 1300mm above ground level</p> <p>168.3</p> <p>Ground level</p> <p>305</p> <p>1220</p> <p>Cable Entry 150x75</p>	
Colour Description	TBC		
Door Ope Dimensions (mm)	115mm (W) x 600mm (H)		
Cable Slot Dimensions (mm)	75mm (W) x 150mm (H)		
Area of Application	Site Lighting		
Post Height (mm)	6000mm		
Post Diameter (mm) Bottom	184mm		
Post Diameter (mm) Top	60mm		
Manufacturing Standard	<p>B.S. 4360 Grade 43C S275JO Structural Steel &amp; Steel Plate</p> <p>B.S. 5649 EN40 Lighting columns. Specification for design loads</p> <ul style="list-style-type: none"> <li>• Minimum of 25years of Design Life</li> <li>• Minimum Terrain Category TC3</li> </ul> <p>Must be as per Public Lighting Services General Specification</p>		

Contractor to ensure catalogue numbers are the latest and are correct prior to ordering.