

LIGHTING CALCULATION REPORT

NETHERTOWN ROAD PODS

CA_NETHERTOWN_ROAD_PODS_00001

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Introduction

This calculation report demonstrates the proposed lighting model for Nethertown Road Pods. The client being Sunshine Properties West Coast LTD.

This calculation report included all external lighting for car parks, main roads (10mph-30mph), as well as all paved footpaths along the property. All calculations are in line with the relevant British Standards, BS EN12464-2 (Outdoor Lighting Requirements) Please see below for these standards and the specific requirements for each type of area.

For installation instructions please see Appendix.

EN 12464-2:2024 (E)

6.4 Lighting requirements for areas, tasks and activities

Table 7 — General requirements for traffic zones outside buildings and for cleaning at outdoor work places

Ref. no.	Type of area, task or activity	$\bar{E}_m$ lx		U_o	R_{GL}	R_a	Specific requirements
		required ^a	modified ^b				
7.1	Walkways exclusively for pedestrians	5	—	0,20	50	70	
7.2	Traffic areas for slowly moving vehicles (max. 10 km/h), e.g. bicycles, trucks and excavators	10	—	0,40	50	70	
7.3	Regular vehicle traffic (max. 40 km/h)	20	—	0,20	45	70	At shipyards and in docks, R_{GL} may be 50.
7.4	Mixed traffic areas, vehicle turning, stationary loading and unloading points	50	—	0,40	50	70	When the area is non-occupied $\bar{E}_m$ required may be reduced to 5 lx. Pay attention to the illuminance levels of the surrounding and adjacent areas.
7.5	Cleaning and servicing	50	—	0,25	50	70	At all relevant surfaces
7.6	Recycling centers - areas with rubbish bins and sorting of waste	30	—	0,25	50	70	
^a Required: minimum value.							
^b Modified: considers common context modifiers in 5.3.3.							

EN 12464-2:2024 (E)

Table 10 — Outdoor areas in educational facilities and kindergartens

Ref. no.	Type of area, task or activity	$\bar{E}_m$ lx		U_o	R_{GL}	R_a	Specific requirements
		required ^a	modified ^b				
10.1	Common play areas	7,5	10	0,20	50	70	Pay attention to the illuminance levels of the surrounding areas (5.3.4).
10.2	Play areas with play-equipment that requires lighting for safety reasons	10	15	0,20	50	80	Pay attention to the illuminance levels of the surrounding areas (5.3.4).
10.3	Schoolyards with a need of schoolyard guards during the hours with no daylight	30	—	0,25	50	80	Pay attention to the illuminance levels of the surrounding areas (5.3.4).
10.4	Play areas for ball playing and games to be used during the hours with no daylight	15	20	0,40	50	70	Pay attention to the illuminance levels of the surrounding areas (5.3.4).
^a Required: minimum value.							
^b Modified: considers common context modifiers in 5.3.3.							

Table 8 — Parking areas

Ref. no.	Type of area, task or activity	$\hat{E}_m$ lx		U_0	R_{GL}	R_a	Specific requirements
		required ^a	modified ^b				
8.1	Light traffic, e.g. parking areas of shops, terraced and apartment houses; cycle parks	5	—	0,25	55	70	
8.2	Medium traffic, e.g. parking areas of department stores, office buildings, plants, sports and multipurpose building complexes	10	—	0,25	50	70	
8.3	Car charging station points in lit areas	20	—	0,25	50	70	At the relevant area approx. up to 3 m from charging point. If the display is not self illuminated, a vertical illuminance of $\hat{E}_m = 50$ lx at the charging poles should be provided for the time of reading. Vertical illuminance on the car should be considered.
8.4	Car charging station points in unlit areas	10	—	0,25	50	70	If the display is not self illuminated, a vertical illuminance of $\hat{E}_m = 50$ lx at the charging poles should be provided for the time of reading.
8.5	Heavy traffic, e.g. parking areas of major shopping centres, major sports and multipurpose building complexes	20	—	0,25	50	70	
^a Required: minimum value.							
^b Modified: considers common context modifiers in 5.3.3.							

Lighting Results

Properties	E	E _{min}	E _{max}	U ₀ (g ₁)	g ₂	Index
Surface 2	22.9 lx	10.8 lx	32.7 lx	0.47	0.33	CG1
Surface 3	15.0 lx	4.37 lx	29.0 lx	0.29	0.15	CG2
Surface 4	22.0 lx	12.4 lx	28.5 lx	0.56	0.44	CG3
Surface 5	23.0 lx	6.16 lx	31.3 lx	0.27	0.20	CG4
Surface 6	15.2 lx	3.92 lx	31.2 lx	0.26	0.13	CG5
Surface 7	13.9 lx	3.61 lx	35.9 lx	0.26	0.10	CG6

Please refer to Appendix for Surface Locations and Figure 8 for site calculation overview.

Luminaire List

Pcs.	Manufacturer	Article No.	P	Φ	Luminous Efficacy
16	Thorn Lighting	96262145	14.0 W	583 lm	41.6 lm/W
27	Thorn Lighting	96632916	60.0 W	7240 lm	120.7 lm/W

Note – Use these luminaires or equivalent.

Φ Total = 204808 lm

P Total = 1844.0 W

Luminous Efficacy = 111.1 lm/W

Appendix

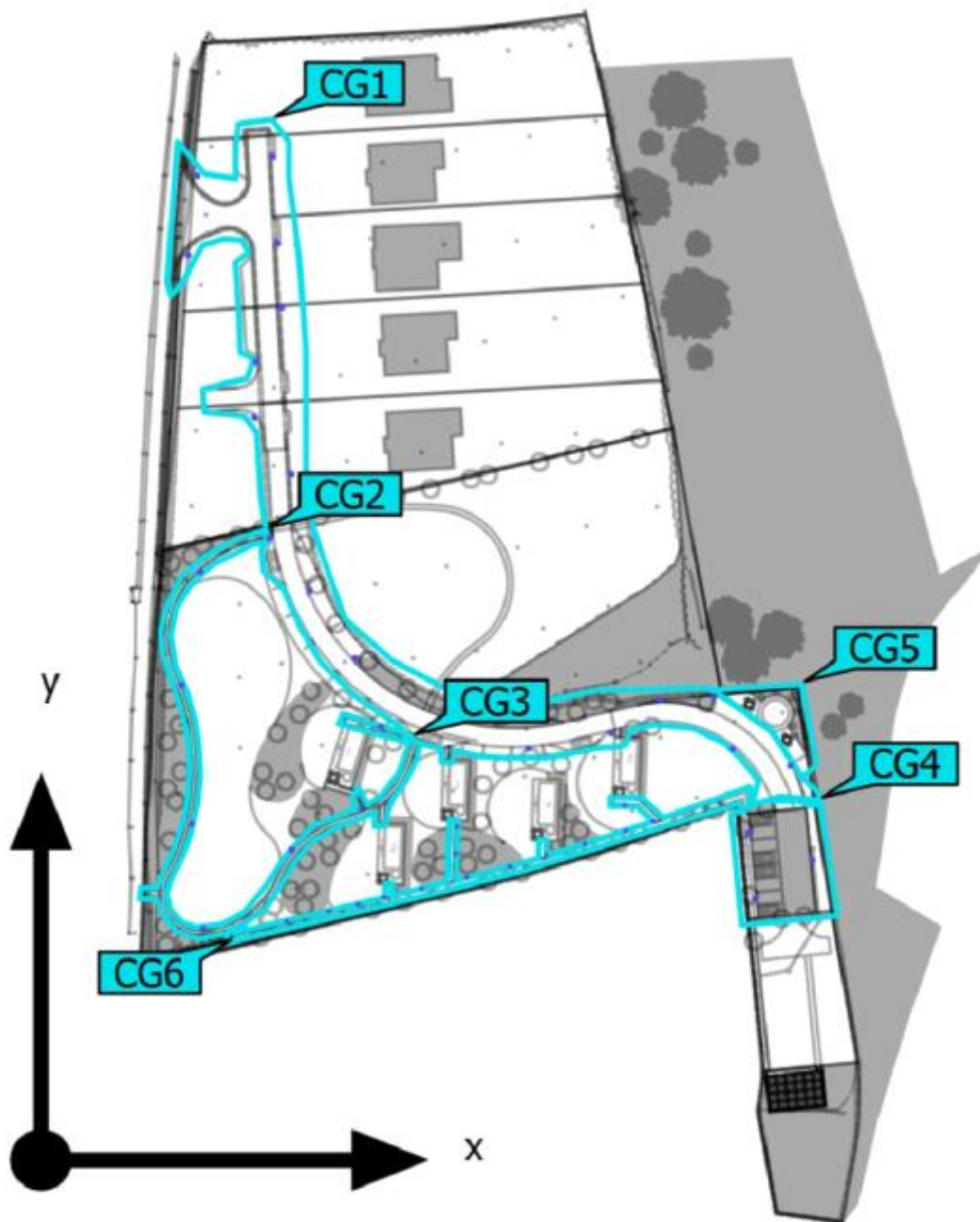
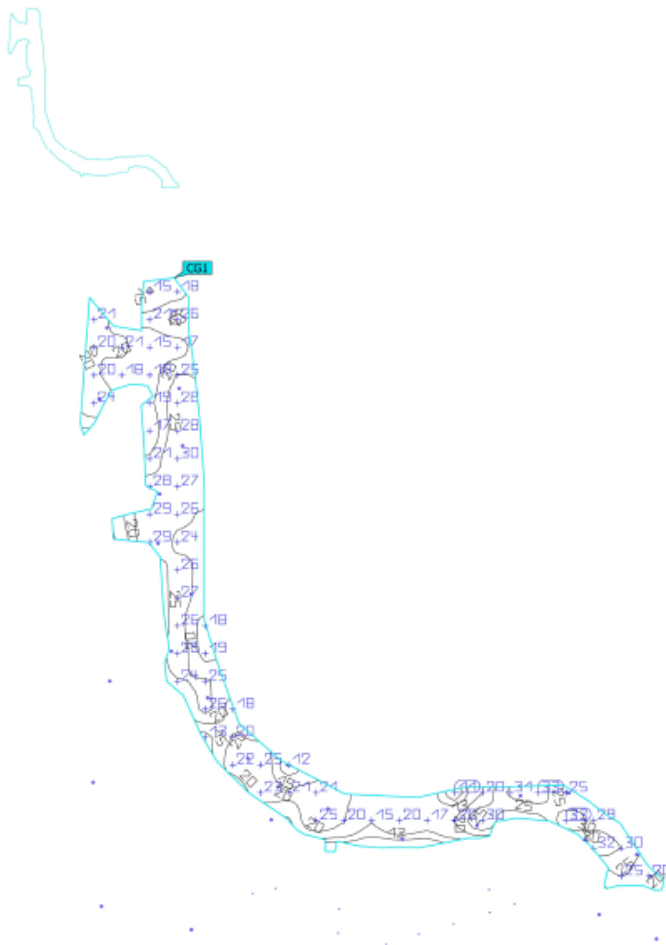


Figure 1-Site Map

Site 1 (Light scene 1)

Calculation surface 2



Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
Calculation surface 2 Perpendicular illuminance Height: 0.000 m	22.9 lx	10.8 lx	32.7 lx	0.47	0.33	CG1

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Figure 2-CG1 Layout

Site 1 (Light scene 1)
Calculation surface 3

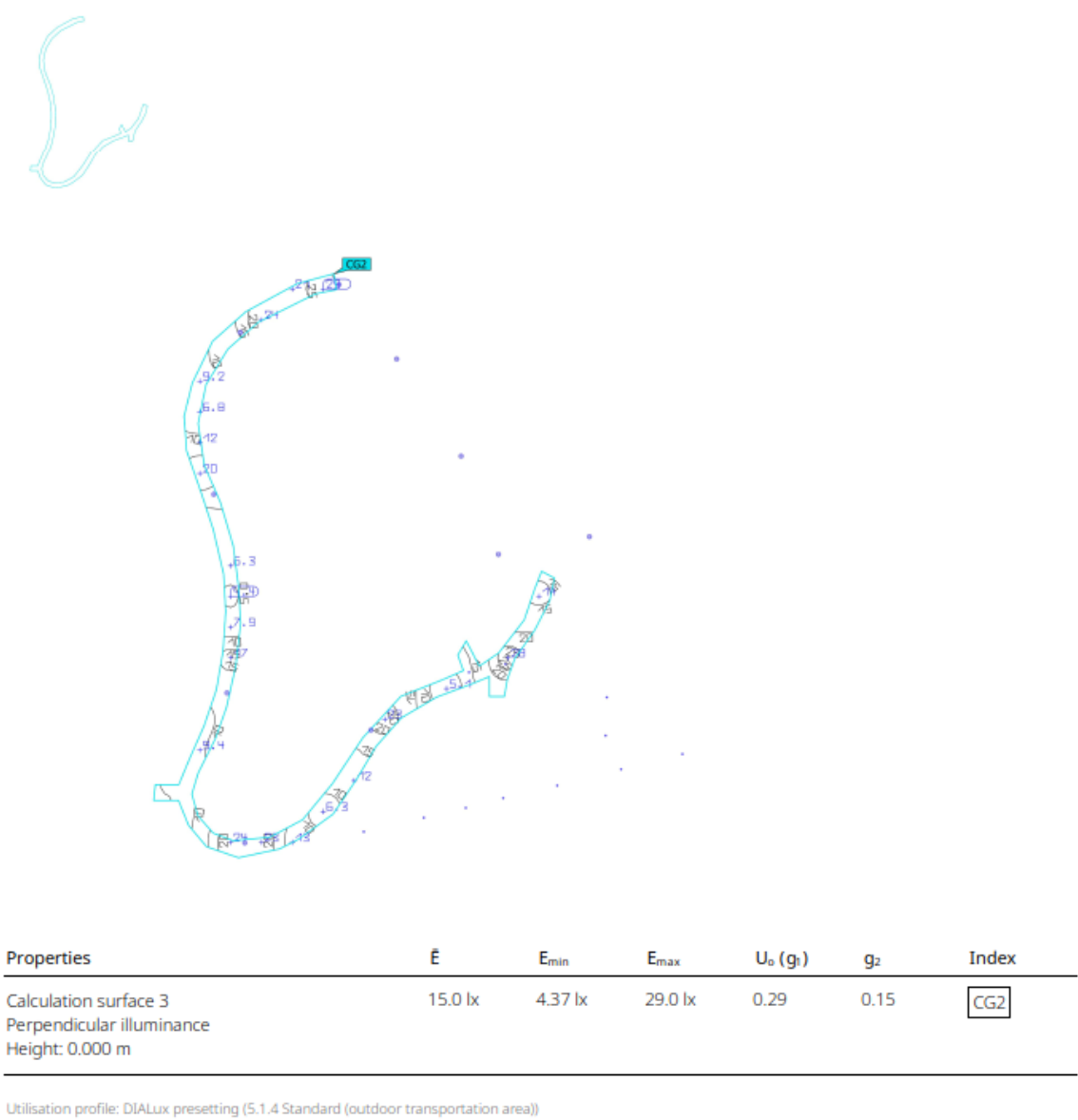
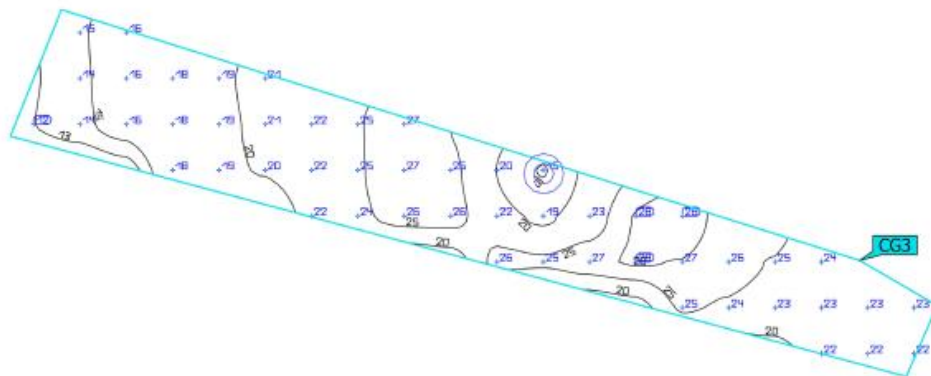


Figure 3-CG2 Layout

Site 1 (Light scene 1)

Calculation surface 4



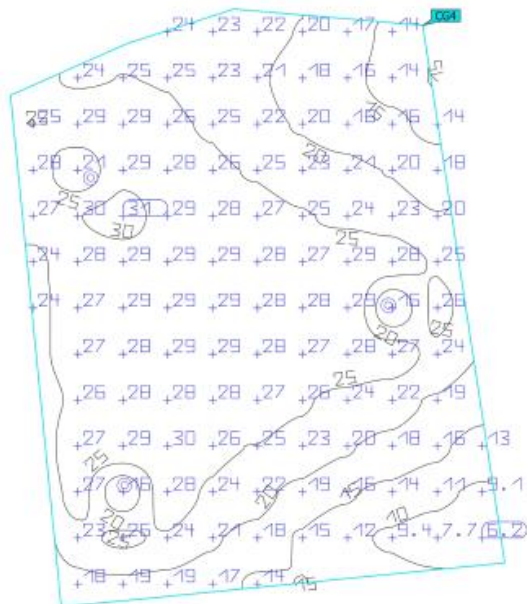
Properties	$\bar{E}$	E_{min}	E_{max}	$U_0 (g_1)$	g_2	Index
Calculation surface 4 Perpendicular illuminance Height: 0.000 m	22.0 lx	12.4 lx	28.5 lx	0.56	0.44	CG3

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Figure 4-CG3 Layout

Site 1 (Light scene 1)

Calculation surface 5



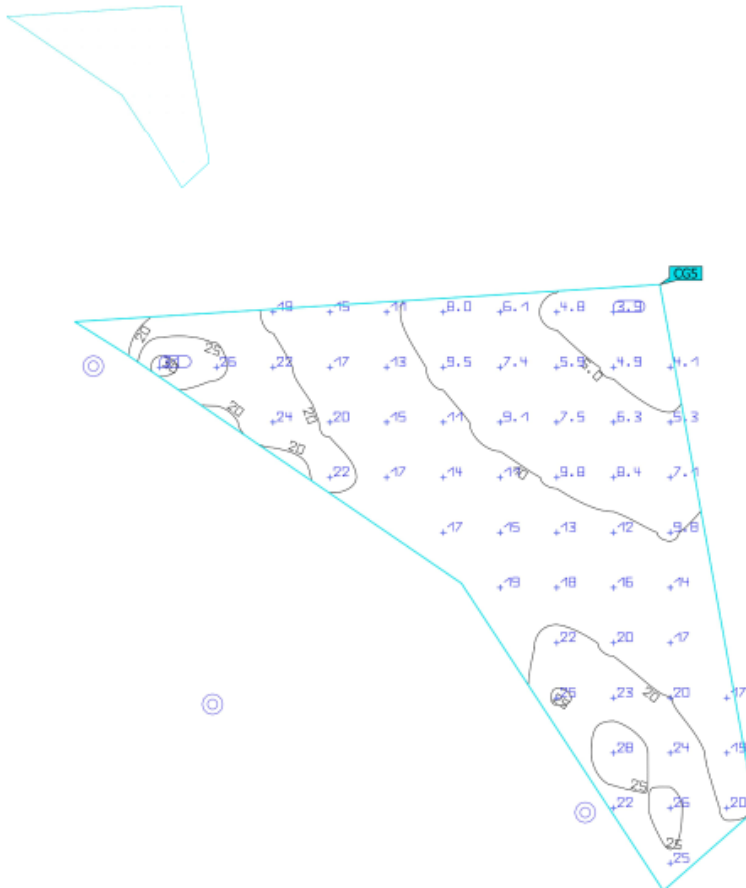
Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
Calculation surface 5 Perpendicular illuminance Height: 0.000 m	23.0 lx	6.16 lx	31.3 lx	0.27	0.20	CG4

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Figure 5-CG4 Layout

Site 1 (Light scene 1)

Calculation surface 6

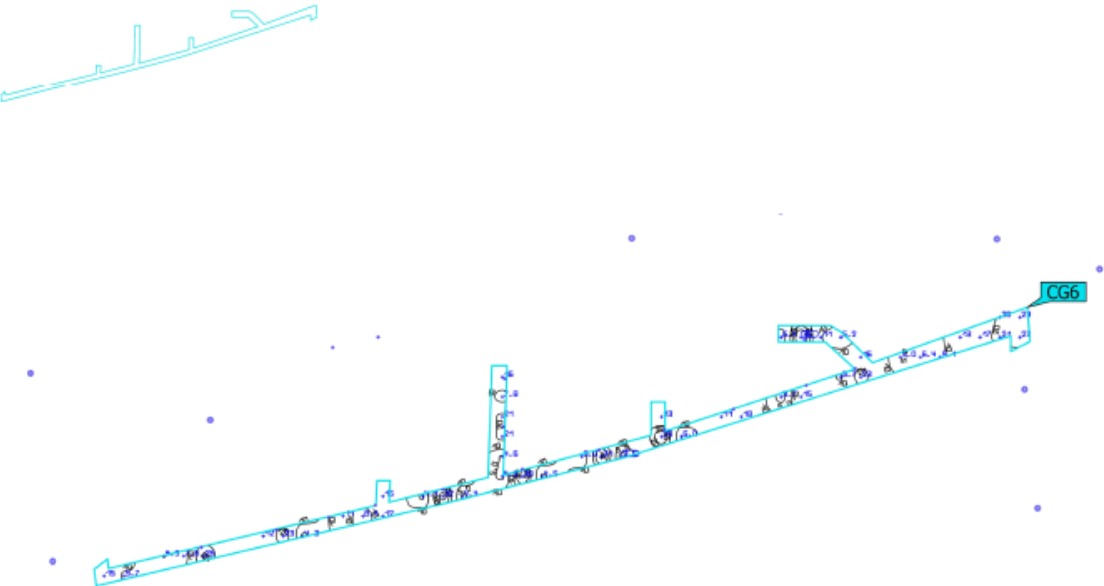


Properties	$\bar{E}$	E_{min}	E_{max}	$U_0 (g_1)$	g_2	Index
Calculation surface 6 Perpendicular illuminance Height: 0.000 m	15.2 lx	3.92 lx	31.2 lx	0.26	0.13	CG5

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Figure 6-CG5 Layout

Site 1 (Light scene 1)
Calculation surface 7



Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
Calculation surface 7 Perpendicular illuminance Height: 0.000 m	13.9 lx	3.61 lx	35.9 lx	0.26	0.10	CG6

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Figure 7-CG6 Layout

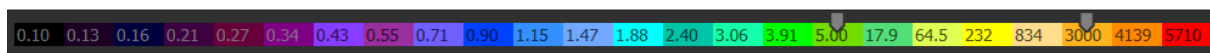
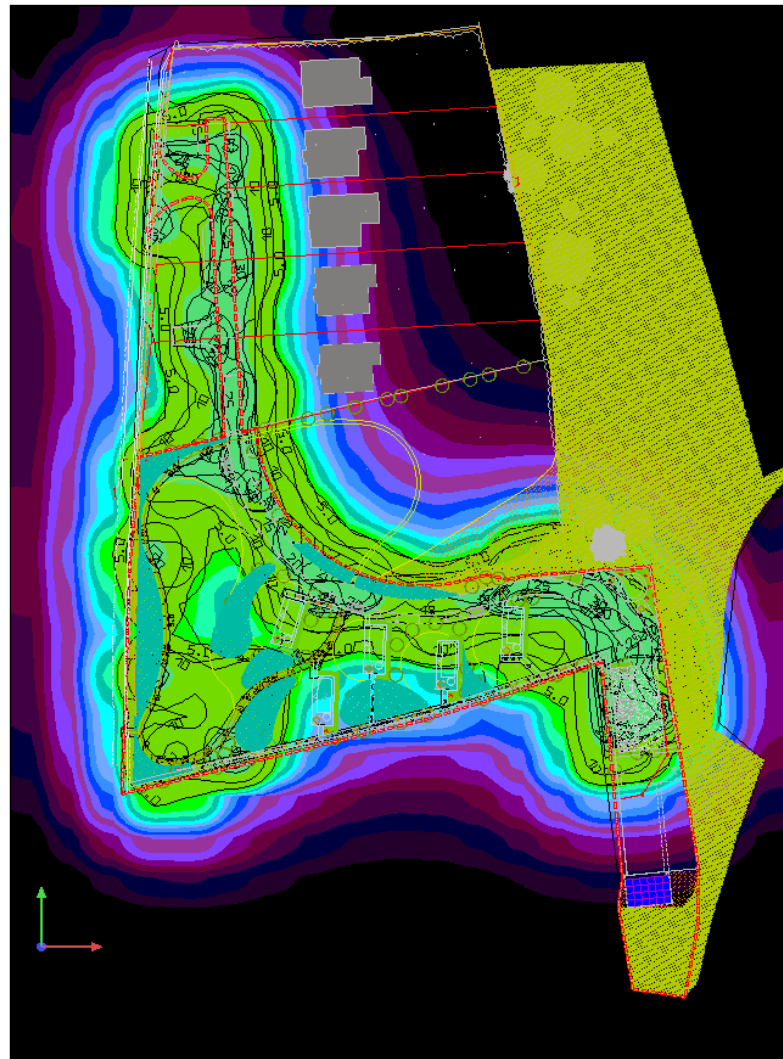


Figure 8-Lighting Calculation Overview

As shown above, the site is adequately lit using the specified lights. This conforms with BS 16424-2 as well as limiting light spill to public roads and other properties. The average light spill for 5m outside of the property lines is 0.3 lx, the average for 8m is 0 lx and the average for being under 5m outside of property lines is 0.9 lx on average. These figures are based purely off a flat simulation. Factors such as shrubbery, ground height and level, and walls will decrease the predicted figures of light spill. This is the maximum outcome with 0 shields on the lights and nothing obstructing the from flowing.

Installation instructions

- Lighting shields to be used on all lighting units (follow calculation map to see direction of light) to eliminate obtrusive artificial light pollution outside of site boundaries and decrease light spill. The lighting shields to direct the light to a low level to road and footpath areas and not spill outside the site and cause sky glow.
- Photocell controls are to be used on all lighting units to eliminate excess pollution during the day specifically during peak hours of natural light.
- All fittings are to have independent timer to reduce the any unnecessary time the lights are activated during light and dark periods.
- All installations are to be in accordance with BS EN 12464-1 & BS 7671.