



6660

ASTRO PITCH LIGHTING ANALYSIS

WYATTVILLE PARK BTR

Loughlinstown
Co. Dublin

Green Urban Living N11 Ltd

Project file no
DKP-M17-6660 | 1P
2021-05-26

Document control

DKP project no: M17
 DKP document no: 6660
 Project file no: DKP-M17-6660

Circular	Issue >	1#	1P
Clients	Green Urban Living N11 Ltd		
Architects	Wilson Architecture	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Planning consultants	KPMG Future Analytics	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Engineers	BMCE		
Landscape architects	TBSstudio		
Issue	1#	2021-02-09	For review
Issue	1P	2021-05-26	Final issue

Document issue status ID

Sketch/draft
 P Planning
 C Concept
 D Design
 G General information
 T Tender
 W Works/construction
 Z As-build/constructed

Issue	Prepared	Checked	Approved
1	214	201	201
2	202	202	201

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Contents

Section	Page
1 Introduction	4
2 Approach, methodology and calculation results	6
3 Calculation summary and conclusion	8
Appendix C "Astro pitch flood lighting" calculation data	Separately attached

1 Introduction

1.1 Report purpose

This report gives information on the proposed astro playing pitch lighting installation with particular focus on minimising the effects on any possible bat habitats and light spill into the back gardens of the existing residential units.

1.2 Instruction

DKPartnership (DKP) have been commissioned by Green Urban Living N11 Ltd to carry out the analysis and report for the proposed development on lands associated with St. Laurence College, Wyattville Park, Loughlinstown, Co. Dublin.

1.3 Development description

The development will principally consist of the demolition of the existing AstroTurf and hardcourt area and the construction of: 256 no. Build-to-Rent apartments (105 no. 1-bed, 145 no. 2-bed and 6 no. 3-bed) in 4 no. blocks ranging in height from 1 to 8 no. storeys above ground level including and connected by single storey podiums with internal communal amenities and facilities; a crèche with outdoor play area; a café; communal and public open space and play facilities; a permanent multimodal access off Wyattville Park Road; a pedestrian/cycle link from the N11 to Wyattville Park; a temporary construction access off the N11; car, motorcycle and bicycle parking; and a set down area. Furthermore, the school side development will consist of: the provision of a new AstroTurf pitch and associated floodlighting; a bin store/vehicle shed; and a new vehicular and pedestrian entrance off Wyattville Park Road. The development will also include all ancillary site services and works to facilitate the development.

2 Executive summary

2.1 Analysis conducted

In this report the pitch lighting was designed to provide a reasonable illumination level for night time sports activities whilst minimising the effect on possible bat areas and limiting light spill into neighbouring private dwelling gardens.

2.2 Design considerations

The pitch lighting design has been executed with the following design considerations:

A – Pitch lighting as per the guidelines set out in the CIBSE lighting guide LG4 for multi sports activities.

B – Light spill into possible bat foraging areas to be minimised as directed by the Altermar's ecological impact assessment report.

C – General minimising of light spill into neighbouring residential gardens as directed by the ILP Guidance Notes for the Reduction of Obtrusive Light GN01:2011.

2.3 Calculation data and targets

The playing pitch area was designed in line with the CIBSE lighting guide LG4 for sports activities with the target standard to be class II suitable for a multi purpose sports outdoor area for recreational purposes. The design also takes in account that there is limited available space for lighting columns away from the playing surface resulting in a pitch side lighting solution. Light spill into possible bat foraging areas have been minimised into the adjacent tree areas to lower potential effects on foraging/commuting bats by utilising asymmetric flat glass directional LED fittings. Using LED only light fittings which have no / little UV attract relatively less insects than broad spectrum types with high UV therefore, the no / little UV LED fittings have a relatively lower impact on bats by not attracting their insect prey base away from the nearby habitats where bats will be searching for prey. The use of directional lighting has also been applied to reduce the light spillage into the surrounding environment in relation to bats and into the neighbouring residential gardens and rear walls of the dwellings as directed by the "Guidance Notes for the Reduction of Obtrusive Light GN01:2011 of the ILP. (Institute of Lighting Professionals)

2.4 Conclusion

The pitch lighting design as per illumination report Appendix C and as noted in the above calculation results meets the criteria set out in CIBSE LG4 lighting guide for sports activities and in particular the outdoor multi sports playing area. We further note that although the ecological impact assessment report did not find any evidence of bats roosting on the site grounds the pitch lighting design has taken into account to the possibility of bat foraging areas in the trees adjacent to the astro pitch. Light spill levels into the tree areas are within 5 meters reduced to 5/10lx due to the use of accurate asymmetric flat glass plate light fittings. The use of the directional asymmetric light fittings also resulted in average horizontal light spill (obtrusive lighting) in the neighbouring gardens kept below the 0.94lx and the vertical light spill upon the back walls/windows of the adjacent dwellings kept below the 0.55Lx and well below the zone 3 (suburban) 10lx pre-curfew and 2 lx post curfew obtrusive lighting guidelines of the ILP Notes for the Reduction of Obtrusive Light GN01:2011. We, DKP, therefore conclude that the pitch lighting design is within the standards and recommendations of the CIBSE guides whilst the light spill into the possible bat foraging areas and neighbouring gardens/rear wall have been kept to an acceptable minimum.

2.5 Mitigation measures / actions

There are no mitigation measures anticipated.

3 Geographical overview

3.1 Project overview

Image 3.1, the (google maps) site map below shows the approximate location of the site with proposed development approximately outlined in the area site map.



Image 3.1 Approximate geographical location of proposed development site.

4 Approach and methodology

4.1 Analysis approach

The external lighting was designed with specific design considerations;

A – Pitch lighting as per the guidelines set out in the CIBSE lighting guide LG4 for multi sports activities.

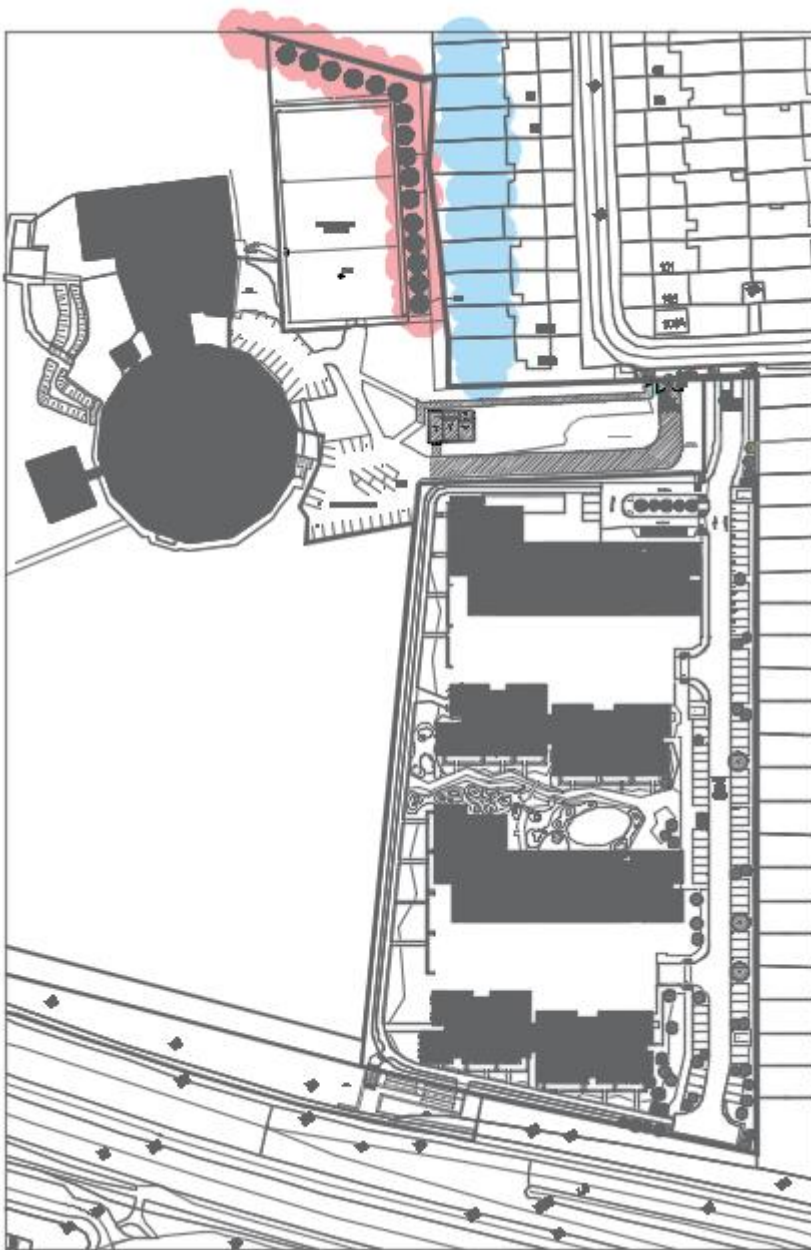
B – Light spill into possible bat foraging areas to be minimised as directed by the Altermar's ecological impact assessment report.

C – General minimising of light spill into neighbouring residential gardens.

4.2 Astro pitch location with tree (bat) area and neighbouring residential gardens

B – The approximate tree line (bat) area clouded in RED.

C – Neighbouring residential gardens area clouded in BLUE.



4.3 A – Pitch lighting standard and target

The playing pitch area was designed in line with the CIBSE lighting guide LG4 for sports activities with the target standard to be class II suitable for a multi purpose sports outdoor area for recreational purposes. The design also takes in account that there is limited available space for lighting columns away from the playing surface resulting in a pitch side lighting solution.

Target illumination data for pitch playing area.

ILLUMINATION CLASS	E avg (lx)	E target (lx)	E min (lx)	Uniformity
II Recreational / club	+/- 20%	200	100	0.8

4.4 B – Tree areas East and North-East of the playing pitch

The light spillage was to be minimised into the Eastern and North-Eastern tree areas as noted in the *enclosed Ecological Impact Assessment prepared by Altamar which stated;*

“No evidence of a bat roost was noted in any of the onsite structures, no mitigation measures regarding these animals are needed during the proposed works. There is also no requirement for a National Parks and Wildlife Service derogation licence application to allow the planned works. Light spill during construction and operation should be discussed with the project ecologist and measures put in place to compensate for the loss of foraging habitats for bats on site due to increased light spill along the treeline”.

Lighting types that emit a narrow spectrum with no / little UV attract relatively less insects than broad spectrum types with high UV therefore, the narrow spectrum types with no / little UV have a relatively lower impact on bats by not attracting their insect prey base away from the nearby habitats where bats will be searching for prey. The use of directional lighting and luminaire accessories (shield, louvre) are also very successful approaches to reducing light spillage nuisance into the surrounding environment in relation to bats. Where artificial lighting is managed and/or designed to avoid light spillage into the wider environment, potential effects on foraging/commuting bats would be considered neutral imperceptible. In this case, this would include avoiding light spillage onto the existing tree areas on the Eastern and North Eastern boundaries.

Taking the above into account we applied asymmetric beam floodlights, as opposed to symmetric ones, orientated so that the glass of the luminaries is positioned parallel to the ground as recommended. This will ensure that the light is cast in a downward direction and avoids horizontal spillage of the light. As per recommendations for lighting of Sport Playing Pitches: Lighting levels of 3 Lux or lower are achieved quite quickly adjacent to the pitch due to the accuracy of the beam projection allowing the levels to drop where not required minimising disruption to foraging routes. The use of LED lighting with no/low UV component due to the phosphors within an LED lamp converting UV to white light will also play a great part to keep disruption to a low level. Hours of Illumination will be low in comparison to streetlight as it will only be for sports activity, typically averaging 3 hours during winter season only. Height of the columns have been reduced from 15 to 10 metres to further reduce light spill or trespass.

4.5 C - Neighbouring residential gardens

There are no specific regulatory standards in relation to light spillage from light sources into neighbouring buildings / spaces however the Institute of Lighting professionals (UK) have published guidelines with regards to acceptable light spill (obtrusive lighting) from lighting installations. The ILP guide refers to specific targets in particular typical surroundings.

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty etc
E2	Rural	Low district brightness	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 night-time activity

ILP environmental zone table with the Wyattville project identified as zone E3; Suburban environment/

ILP E3; Suburban environment light intrusion levels to be Ev 10 lx pre-curfew and 2 lux post curfew. See table 2.

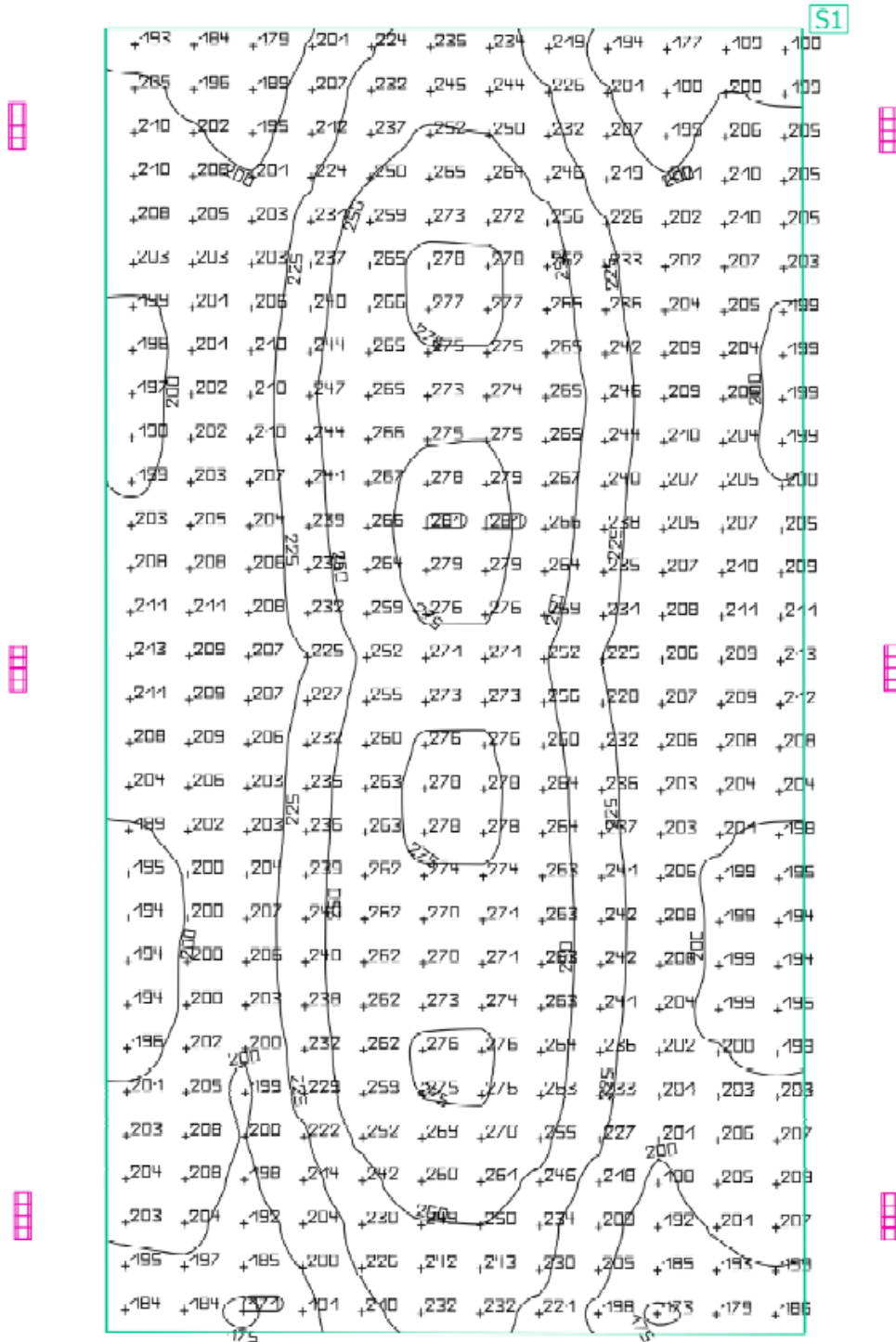
Environmental Zone	Sky Glow ULR [Max %] ⁽¹⁾	Light Intrusion (into Windows) E _v [lux] ⁽²⁾		Luminaire Intensity I [candelas] ⁽³⁾		Building Luminance Pre-curfew ⁽⁴⁾
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Average, L [cd/m ²]
E0	0	0	0	0	0	0
E1	0	2	0 (1*)	2,500	0	0
E2	2.5	5	1	7,500	500	5
E3	5.0	10	2	10,000	1,000	10
E4	15	25	5	25,000	2,500	25

5 Calculation data and conclusion

5.1 A - Pitch lighting

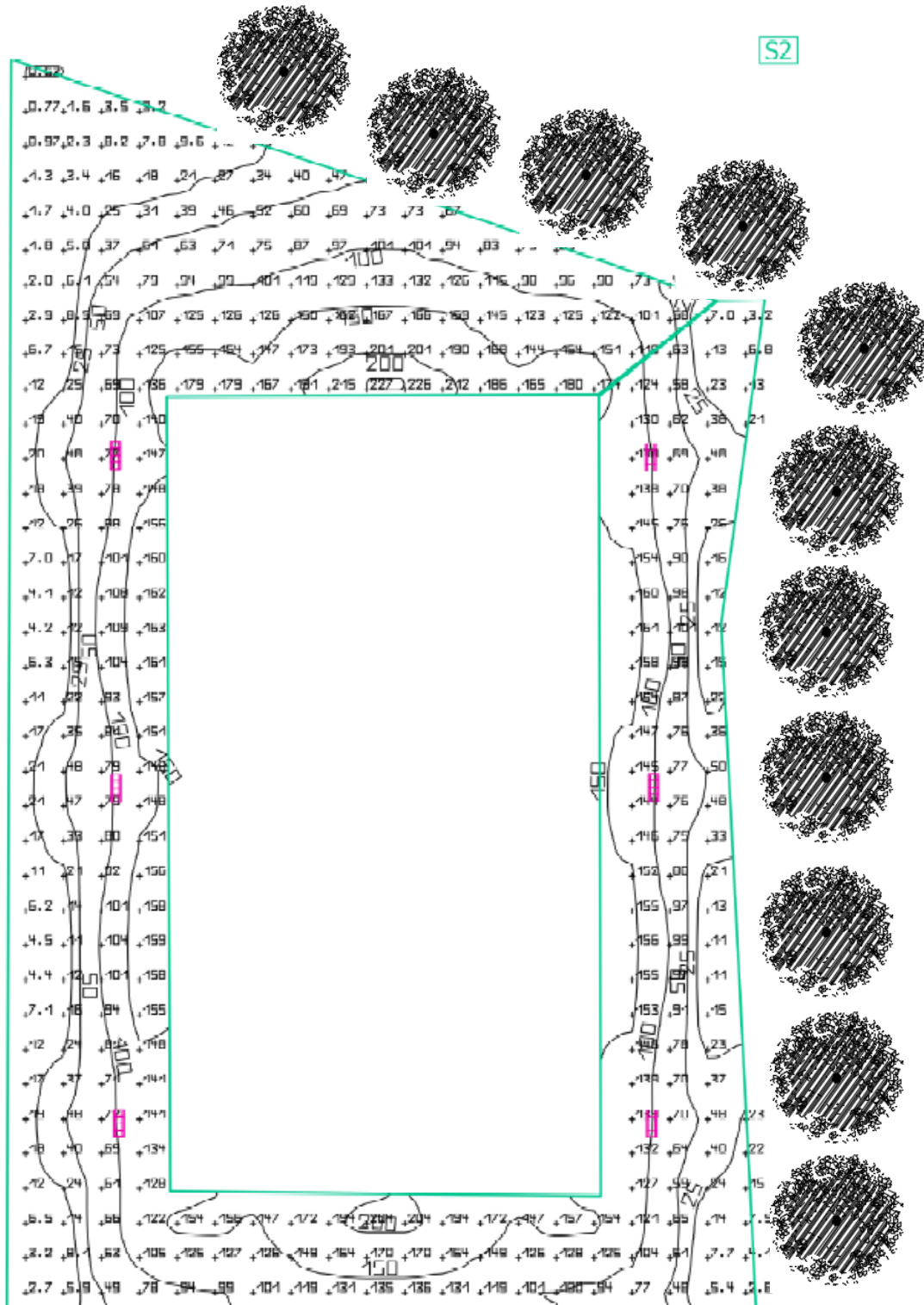
Using the CIBSE lighting guide LG4 for sports activities and target set in item 4.3 the illumination levels have been achieved using the Philips BVP651 T25 DX51 LED750/740 NO asymmetric fittings (to lower the spill) on a 10 meter pole. See Appendix C, "Astro pitch flood lighting" section S1 calculation data.

ITEM	E avg (lx)	E target (lx)	E min (lx)	Uniformity
TARGET	+/- 20%	200	100	0.8
ACHIEVED	226 (12%)	200	171	0.76



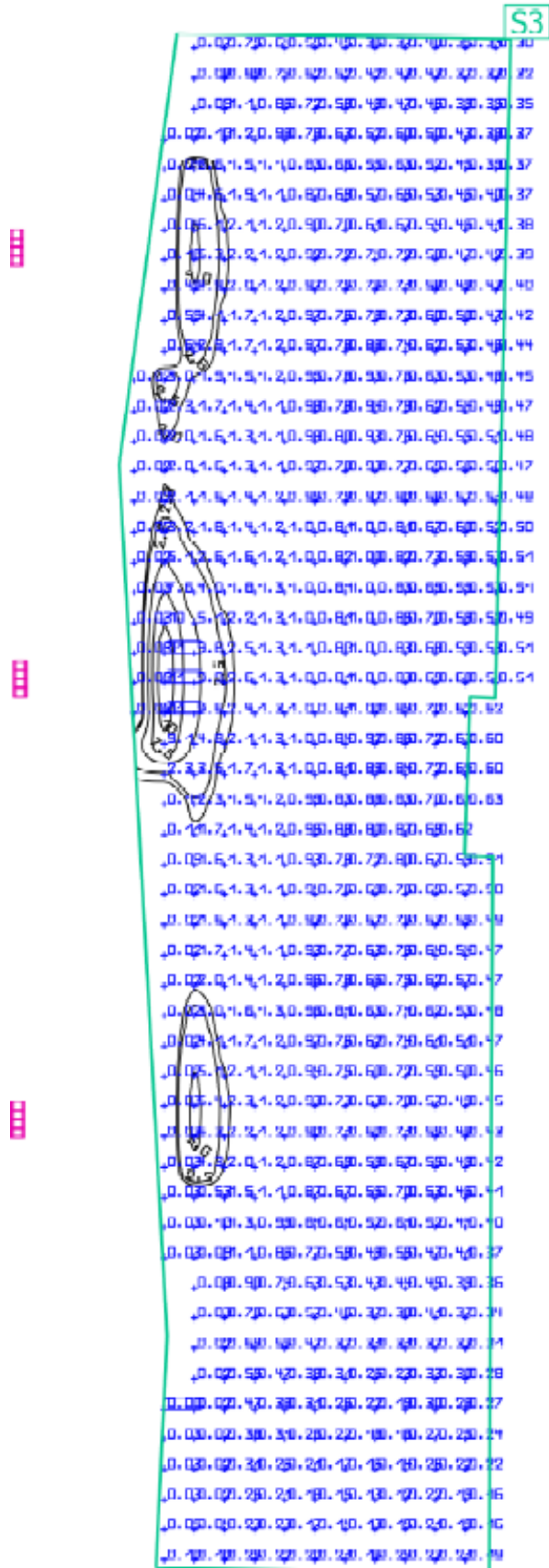
5.2 B – Possible bat area in Eastern and North-Eastern tree areas

Using the Philips BVP651 T25 DX51 LED750/740 NO asymmetric type light fittings as opposed to standard symmetric light fittings allows the light to be directional and casting it away from the pole on to the playing area. The glass of the luminaries is positioned parallel to the ground to ensure that the light is cast in a downward direction and avoids horizontal spillage of the light, i.e. into the tree area. Within 5 meters the light spill illumination level is brought down to between 5 and 10 lux which is deemed excellent considering the close range to the 10 meter high poles thus limiting the effects on possible foraging habitats for bats. The use of LED lighting with no/low UV component due to the phosphors within an LED lamp converting UV to white light will also play a great part to keep disruption to a low level. See Appendix C, “Astro pitch flood lighting” section S2 calculation data.



5.3 C - Neighbouring residential gardens

From items 5.1 and 5.2 we note the use of the Philips BVP651 T25 DX51 LED750/740 NO asymmetric type light fittings which also benefits the light spill into the neighbouring private gardens. The average horizontal light spill in the neighbouring gardens was kept below the 0.94lx and the vertical light spill upon the back walls/windows of the adjacent dwellings was kept below the 0.55Lx and well below the zone 3 (suburban) 10lx pre-curfew and 2 lx post curfew obtrusive lighting guidelines of the ILP Notes for the Reduction of Obtrusive Light GN01:2011. See Appendix C, "Astro pitch flood lighting" section S3 calculation data.



5.4 Conclusion

The pitch lighting design as per illumination report Appendix C and as noted in the above calculation results meets the criteria set out in CIBSE LG4 lighting guide for sports activities and in particular the outdoor multi sports playing area. We further note that although the ecology Impact assessment report did not find any evidence of bats roosting on the site grounds the pitch lighting design has taken into account to the possibility of bat foraging areas in the trees adjacent to the astro pitch. Light spill levels into the tree areas are within 5 meters reduced to 5/10lx due to the use of accurate asymmetric flat glass plate light fittings. Using these directional asymmetric fittings also resulted in keeping the obtrusive lighting or light spill into the neighbouring gardens and onto the neighbouring dwelling walls/windows below the recommended obtrusive lighting limitations as guided by the ILP's "Notes for the Reduction of Obtrusive Light GN01:2011". We, DKP, therefore conclude that the pitch lighting design is within the standards and recommendations of the CIBSE guides whilst the light spill into to possible bat foraging areas and neighbouring gardens/rear wall have been kept to an acceptable minimum.

5.5 Mitigation measures / actions

No further mitigation measures required.

5.6 Light fitting illustration

Philips BVP651 T25 DX51 LED750/740 NO.

4 no side by side fittings on a 10m pole.

