

Based on:	Rev
Architectural:	Rev
Structural:	Rev
Survey:	Rev
Other:	Rev
Other:	Rev

THIS DRAWING MAY INDICATE ELEMENTS RELATED TO FIRE SYSTEMS. THESE ARE INDICATIVE ONLY AND FINAL NUMBER, POSITIONING AND PERFORMANCE MUST BE ESTABLISHED AS PART OF THE CDW WORKS TO MAINTAIN THE INTENT OF THE DESIGN FIRE STRATEGY.

- NOTES:**
1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL AND ENGINEERING SERVICES DRAWINGS, SPECIFICATIONS, SCHEDULES AND PROJECT SPECIFIC DOCUMENTS.
 2. ALL PLANT AND EQUIPMENT IS TO BE INSTALLED TO MANUFACTURER'S RECOMMENDATIONS, ALLOWING FULL ACCESS FOR COMMISSIONING, MAINTENANCE AND REMOVAL/REPLACEMENT.
 3. ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED.
 4. DO NOT SCALE FROM THIS DRAWING.
 5. SET OUT ALL LUMINAIRES AS PER THE ARCHITECT'S AND LANDSCAPE ARCHITECT'S DETAILED DRAWINGS.

- CONTRACTOR**
6. CHECK THE LIGHTING INSTALLATION CO-ORDINATION AND POSITIONS WITH THE ARCHITECT'S DESIGN DETAILS. CHECK THE CO-ORDINATION OF ANY MEP SERVICES, SUCH AS FIRE ALARM, SECURITY DEVICES ETC. CHECK THE CO-ORDINATION WITH ANY CIVIL ENGINEERING SERVICES SUCH AS DUCTING ETC.
 7. REFER TO MANUFACTURERS INSTALLATION GUIDES TO ENSURE CORRECT INSTALLATION METHOD FOR EACH TYPE OF LUMINAIRE.
 8. ALL LUMINAIRES ARE TO BE LED.
 9. INCLUDE ALL ANCILLARY EQUIPMENT SUCH AS DRIVERS, FLOOR BOXES, MOUNTING BRACKETS, OUTER CASINGS, CONNECTORS, INSTALLATION CLIPS ETC.
 10. A PHOTOCELL LOCATION WILL BE FINALIZED DURING THE NEXT DESIGN STAGE. CARE MUST BE TAKEN TO ENSURE THAT THE SENSOR IS INSTALLED IN A LOCATION WHERE IT IS NOT OVERSHADOWED.
 11. ALL LUMINAIRES ARE TO BE LEFT IN A CLEAN CONDITION ON COMPLETION AND CARE SHALL BE TAKEN TO ENSURE ALL GLASS COVERS, FILTERS ETC ARE DUST FREE.

- LEGEND**
- A - FLOOD LIGHTS WITH COWL ACCESSORY, 25.000LM MOUNTED ONTO 7M POLE
 - B - LIGHTING COLUMNS - VCYP-FW70-4.3-15D, 1926 LM MOUNTED ONTO 5M POLE
 - C - LIGHTING COLUMNS - VCYP-AY70-4.3-15D, 1983 LM MOUNTED ONTO 4M POLE
 - D - BOLLARDS - 160LM, 0.8M HIGH, 180 DEGREE LIGHT GUIDANCE RING
 - G - HERITAGE STYLE COLUMN - DW WINDSOR WINDSOR AVENUE, 4118LM SYMMETRICAL BEAM, MOUNTED ON 4M POLE
 - H - WALL LIGHTS - 2.5W DOWN ONLY - BEGA 222803 - 176LM - MOUNTED AT 2M HIGH ON BUILDING FACADES
 - M - SPORTS PITCH LIGHTING - URBIS SHREDER BRITELINE - 694W; 92815LM - 3000K LED - 5449 55° ASYMMETRICAL OPTIC - SWITCHED ON/OFF VIA INTEGRATED PHOTOCELL SENSOR WITH OVERRIDE TIMECLOCK. PRODUCT CODE - E99291
 - 13M TUBULAR STEEL COLUMN

LUX LEVEL ISOLINE PLOT

INTRODUCTION

THE LIGHTING CALCULATION HAS BEEN BASED ON THE FOLLOWING DRAWINGS ISSUED BY ADP ARCHITECTURE: 001506-ADP-00-00-DR-A-1000-PROPOSED MASTERPLAN - OPTION 02. THE SPORTS PITCH LIGHTING IS IN ADDITION TO THE EXTERNAL LIGHTING DESIGN UNDER THE PREVIOUS PLANNING APPLICATION FOR THE LANDSCAPE AND ARCHITECTURAL DESIGN FOR THE KNELLER HALL MASTERPLAN.

THE PREVIOUS LIGHTING STRATEGY HAS BEEN INCLUDED WITHIN THE SPORTS PITCH ASSESSMENT TO PROVIDE AN OVERALL UNDERSTANDING OF THE SITE LIGHTING.

LIGHTING DESIGN NOTES

- THE EXTERNAL LIGHTING DESIGN HAS BEEN ASSESSED AGAINST ENVIRONMENTAL ZONE E3 WHICH IS DESCRIBED AS MEDIUM DISTRICT BRIGHTNESS AREAS I.E. SMALL TOWN CENTRES OR URBAN LOCATIONS. THIS INFORMATION IS INDICATED IN TABLE 2 DESIGN GUIDANCE IN THE ILP GUIDANCE NOTES FOR THE REDUCTION OF OBTRUSIVE LIGHT GND1:2021

THE LIGHTING INSTALLATION SHALL BE CAREFULLY CONSIDERED TO ENSURE PROVISION OF APPROPRIATE PHYSICAL AND SPECTRAL PROPERTIES AS FOLLOWS:

- WARM COLOUR TEMPERATURE $3000K$
- MINIMIZE THE SPREAD OF LIGHT ABOVE THE HORIZONTAL.
- USE NARROW SPECTRUM LIGHT SOURCES.
- LUMINAIRES ON THE SITE TO FACE INWARDS TO THE SITE TO REDUCE SPILL ONTO THE SURROUNDING AREA.
- BOLLARD HEIGHTS TO BE KEPT BELOW 0.8M
- UTILISE LED LIGHTING ONLY TO CONTROL LIGHT AND MINIMIZE UNWANTED LIGHT SPILL.
- PIR SENSORS ON LIGHTING OTHER THAN STREET LIGHTING, SHOULD REDUCE/TURN OFF AFTER A CURFEW TO BE AGREED. THEREFORE, ONLY PROVIDING LIGHT WHEN REQUIRED. ULTIMATELY REDUCING LIGHT POLLUTION AND VISUAL IMPACT.

LIGHTING CONTROLS

ALL EXTERNAL STREET LIGHTING WILL BE CONTROLLED VIA PHOTOCELL/TIMECLOCK. NOTE - THE ILP THE INSTITUTION OF LIGHTING ENGINEERS GUIDANCE NOTES FOR THE REDUCTION OF OBTRUSIVE LIGHT GND1:2021 SUGGESTED CURFEW TIME IS 2300hrs FOR EXTERNAL LIGHTING TO KNELLER HALL AND SURROUNDING PATHWAYS, 2100hrs FOR THE SPORTS PITCH WOULD BE RECOMMENDED, TAKING INTO ACCOUNT THE VISUAL BRIGHTNESS OF THE PITCH AND THE PROXIMITY TO SENSITIVE RECEPTORS.

LIGHTING STANDARDS

THE EXTERNAL LIGHTING DESIGN HAS BEEN DESIGNED IN LINE WITH THE FOLLOWING DESIGN STANDARDS:

- ILP THE INSTITUTION OF LIGHTING ENGINEERS GUIDANCE NOTES FOR THE REDUCTION OF OBTRUSIVE LIGHT GND1:2021
- SPORT ENGLAND DESIGN GUIDANCE NOTE - ARTIFICIAL SPORTS LIGHTING 2012
- THE FA GUIDE TO FLOODLIGHTING, BUILDING, PROTECTING AND ENHANCING SUSTAINABLE FOOTBALL FACILITIES
- BS EN 12464-2 LIGHTING OF WORKPLACES - OUTDOOR WORKPLACES PART 2
- ILP GUIDANCE NOTE GND8:2018; BATS AND ARTIFICIAL LIGHTING IN THE UK
- INSTITUTE OF LIGHTING PROFESSIONALS (ILP) FORMALLY THE IES), LIGHTING AGAINST CRIME, A GUIDE FOR CRIME REDUCTION PROFESSIONALS (JANUARY 2011)

DESIGN PARAMETERS

- THE SITE NOW INCLUDES SPORTS PITCH OPTION 2 LOCATED TO THE EAST OF THE SITE WITH A NORTH SOUTH ORIENTATION.
- THE SPORTS THAT HAVE BEEN CONFIRMED TO BE PLAYED ON THE SPORTS PITCH IS FOOTBALL AND RUGBY WHICH MUST BE DESIGNED TO COMMUNITY LEVEL PLAYING AS PER PLANNING INSTRUCTIONS.
- COMMUNITY LEVEL LIGHTING REQUIRES A MINIMUM LIGHTING LEVEL OF 75 LUX AND 0.5 UNIFORMITY. SPORTS ENGLAND ALSO REFERS TO THE FA GUIDE TO FLOODLIGHTING WHO RECOMMEND A MINIMUM OF 120 LUX FOR TRAINING. AS THE PITCH WILL BE AVAILABLE TO HIRE FOR LOCAL COMMUNITY CLUBS FOR TRAINING THE PITCH HAS BEEN LIT TO 120 LUX.
- THE SITE AS A WHOLE HAS BEEN DESIGNED TO BS EN 12464-2 STANDARDS.
- FOR THE GENERAL SITE, LIGHTING THE ECOLOGY CORRIDOR HAS BEEN AVOIDED. A FINCH POINT HAS BEEN IDENTIFIED AT THE ENTRANCE TO THE SITE. A LOW LEVEL LIGHTING STRATEGY USING 1M HIGH BOLLARDS HAS BEEN APPLIED HERE.
- SPORTS PITCH LUMINAIRES ARE REQUIRED TO BE TILTED BY 20° TOWARDS THE SPORTS PITCH TO IMPROVE THE UNIFORMITY LEVEL.
- THE CALCULATIONS DO NOT INCLUDE LIGHTING TO THE SURROUNDING ROADS HOWEVER DETAILS OF THESE CAN BE FOUND IN THE EXTERNAL LIGHTING STRATEGY REPORT KNH-CDL-XX-XX-RP-LG-63201

CRITERIA

THE SITE HAS BEEN CLASSED AS AN E3 ENVIRONMENTAL ZONE WITHIN THE ILP GUIDANCE NOTES OF THE REDUCTION OF OBTRUSIVE LIGHT. THEREFORE THE FOLLOWING STANDARDS MUST BE MET:

- UPWARDS LIGHT RATIO (ULR) - 5%
- ILLUMINANCE IN THE VERTICAL PLANE (LUX) - 10 (PRE-CURFEW), 2 (POST-CURFEW)
- MAXIMUM LUMINOUS INTENSITY EMITTED BY LUMINAIRES (CD) - 10,000 (PRE-CURFEW), 1,000 (POST-CURFEW)
- BUILDING LUMINANCE (CD/M²) - 10

KEY RECEPTORS

THE KEY RECEPTORS HAVE BEEN IDENTIFIED AS AREAS/ELEMENTS THAT COULD POTENTIALLY BE IMPACTED BY THE OPERATIONAL LIGHTING OF THE SITE AND WILL THEREFORE REQUIRE MITIGATION TO THE LIGHTING DESIGN STRATEGY.

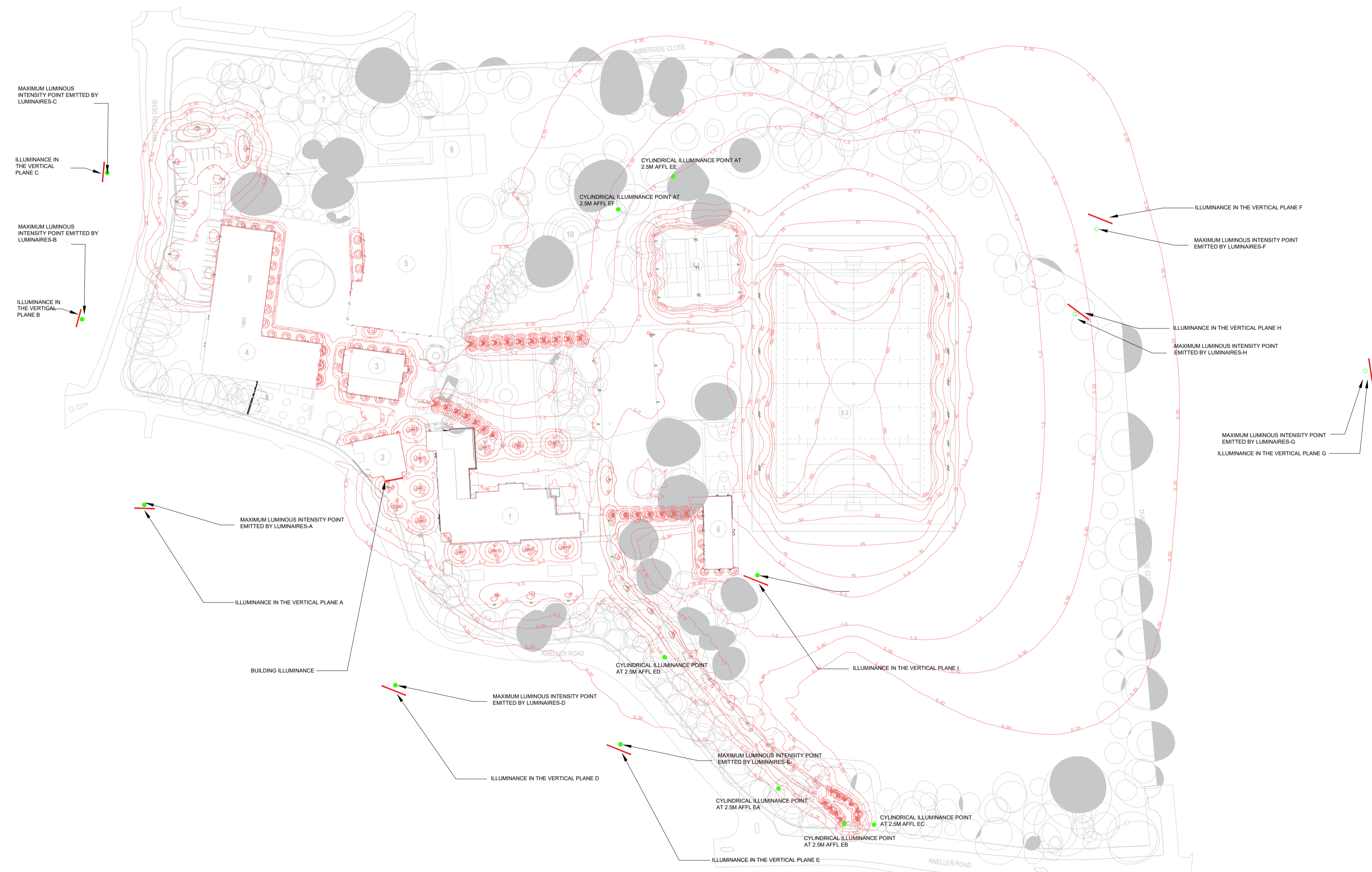
ADDITIONAL RECEPTORS HAVE BEEN INCLUDED WITHIN THE ASSESSMENT TO THE EAST OF THE SITE. A SERIES OF CYLINDRICAL ILLUMINATION POINTS HAVE BEEN PLACED IN THE WOODLAND AT 2.5M AFFL. THE MAINTENANCE FACTOR OF THE ISOLINES LUX PLOT HAS BEEN SET TO 1.0 AS PER THE DAY ONE INSTALLATION.

SUMMARY

FOR PRE-CURFEW THE DESIGN COMPLIES WITH THE ILP GUIDANCE NOTES ON THE REDUCTION OF OBTRUSIVE LIGHT. FOR POST-CURFEW THE SPORTS PITCH LIGHTING WILL BE TURNED OFF AND SO ALSO COMPLIES WITH THE ILP GUIDANCE NOTES ON THE REDUCTION OF OBTRUSIVE LIGHT.

MITIGATION MEASURES

- THE FOLLOWING MITIGATION MEASURES ARE RECOMMENDED:
- REAR SHIELDS FOR EACH SPORTS PITCH LUMINAIRE TO MINIMISE UNNECESSARY SPILL LIGHT TO THE BACK OF THE LIGHTING COLUMN. THE GLARE SHIELDS HAVE BEEN INCLUDED WITHIN THE LIGHTING CALCULATION.
 - AN AGREED CURFEW WITH THE CLIENT AND THE COUNCIL, THAT WILL TURN OFF THE SPORTS PITCH LIGHTING. THE CURRENT RECOMMENDATION IS TO TURN THE LIGHTING OFF AT 2100hrs.
 - THE PERIMETER TREE LINE AND FOLIAGE HAVE NOT BEEN INCLUDED WITHIN THE ASSESSMENT BUT WILL LUKELY ASSIST IN MITIGATING AGAINST THE VIEWS OF THE SPORTS PITCH LUMINAIRES. THE ILLUMINANCE IN THE VERTICAL PLANE AND THE MAXIMUM LUMINOUS INTENSITY - IT MAY HELP TO REDUCE THE SUBSEQUENT PERCEIVED VISUAL BRIGHTNESS ONTO THE SPORTS PITCH ITSELF.



ILP GUIDANCE NOTES ON THE REDUCTION OF OBTRUSIVE LIGHT

	UPWARDS LIGHT RATIO - ULR [MAX %]	ILLUMINANCE IN THE VERTICAL PLANE (LUX)		MAXIMUM LUMINOUS INTENSITY EMITTED BY LUMINAIRES (CD)		BUILDING LUMINANCE PRE CURFEW AVERAGE L [cd/m²]	PASS OR FAIL
		PRE CURFEW	POST CURFEW	PRE CURFEW	POST CURFEW		
BASED ON MAINTENANCE FACTOR OF 1							
ENVIRONMENTAL ZONE E3	5.00	10	2	10,000	1,000	10	TARGET
ULR	1.32						PASS
PLANE A		0.06	0.01				PASS
PLANE B		0.09	0.09				PASS
PLANE C		0.14	0.14				PASS
PLANE D		1.20	0.30				PASS
PLANE E		1.94	0.14				PASS
PLANE F		8.22	0.05				PASS
PLANE G		2.23	0.02				PASS
PLANE H		6.03	0.05				PASS
PLANE I		7.39	0.03				PASS
VIEW POINT A				29.64	29.64		PASS
VIEW POINT B				111.09	111.09		PASS
VIEW POINT C				64.98	64.98		PASS
VIEW POINT D				278.69	278.69		PASS
VIEW POINT E				287.60	0.00		PASS
VIEW POINT F				109.00	0.00		PASS
VIEW POINT G				120.00	0.00		PASS
VIEW POINT H				267.00	0.00		PASS
VIEW POINT I				143.00	0.00		PASS
BUILDING LUMINANCE						3.23	PASS

CALCULATION POINT 2.5M AFFL	CYLINDRICAL ILLUMINANCE (LUX)	CYLINDRICAL ILLUMINANCE CALCULATION POINTS
EA	1.24	CALCULATION POINTS HAVE BEEN PLACED AT KEY POSITIONS WITHIN THE WOODLAND CLOSE TO THE PROPOSED LIGHTING. THESE CALCULATION POINTS HAVE AT BEEN PLACED AT 2.5M ABOVE FLOOR LEVEL. THE RESULTS DEMONSTRATE THAT LIGHTING LEVELS IN THE VERTICAL PLANES ARE MORE THAN 10LUX. THE MITIGATION MEASURES THAT HAVE BEEN RECOMMENDED WILL REQUIRE INPUT FROM THE ECOLOGIST AS TO HOW THEY COULD BE EXPANDED.
EB	4.97	
EC	1.6	
ED	2.32	
EE	3.67	
EF	3.6	

PO2 26/03/24	FOR PLANNING	HH	ND	KR	
PO1 22/03/24	DRAFT FOR PLANNING	HH	LS	-	
Issue	Date	Description	By	Crtd	Verfd

Project: KNELLER HALL LIGHT POLLUTION ASSESSMENT

Client: RADNOR HOUSE SCHOOL

Title: LIGHT IMPACT ASSESSMENT SPORTS PITCH OPTION 2

Drawing Status: S4 - ISSUED FOR PLANNING

Project No: 1033713 Scale: 1:500

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Drawing No: KNH-CDL-ZZ-XX-DR-LG-63802