HODKINSON

Light Pollution Report

Quantum Group

Former ICL

Final

Author: **Zeta Watkins**
BSc (hons), MSc, PIEMA
August 2017

DOCUMENT CONTROL RECORD
REPORT STATUS: FINAL

Version	Date	Reason for issue	Author	Checked by	Approved for Issue by Project Manager
v.1	14.07.2017	Draft	ZW	CS	CS
v.2	14.08.2017	Final	ZW	CS	CS
v.3	21.08.2017	Final	ZW	CS	CS

ABOUT HODKINSON CONSULTANCY

Our team of technical specialists offer advanced levels of expertise and experience to our clients. We have a wide experience of the construction and development industry and tailor teams to suit each individual project.

We are able to advise at all stages of projects from planning applications to handover.

Our emphasis is to provide innovative and cost effective solutions that respond to increasing demands for quality and construction efficiency.

Executive Summary

This Light Pollution Report has been prepared by Hodkinson Consultancy for the Former ICL Ground at Udney Park Road, appointed by Quantum Group.

A detailed flood lighting design has been provided by Abacus and has been detailed throughout the report. The site has been classified as Zone E3 (sub-urban area), this zoning allows for up 10 lux of light, measured vertically at the windows surrounding the proposed development. The proposed design confirms that the values for light trespass are not to exceed 10 lux; a maximum lux of 5 is expected at any one time with the lights on. The upward light output ratio requirement for Environmental Zone 3 is that luminaire flux above the horizontal shall not exceed 5% to minimise sky glow. The Challenger 1 lamps proposed do not exceed <0% at a 60° peak beam elevation which meets this requirement set by the Institute of Lighting Practitioners.

Hours of operation of the flood lights will ensure they are not operated after 22:00 in winter, and not lit at all in summer months. This is similar to current usage patterns of the existing, portable diesel generated flood lights which are currently used around the site. The new flood lighting proposals will be more energy efficient, quieter and less polluting than the current portable flood lights. The masts are also deemed to be of an appropriate height (12.5 m and 15 m) and are to be set back from the perimeter fence to ensure minimal disturbance on the neighbouring amenity areas.

The flood lighting designed is in compliance with relevant British Standards, guidance from the Institute of Lighting Professionals and from the Chartered Institute of Building Services Engineers (CIBSE), Society for Light and Lighting (SLL). A full list of the documents consulted and as a result a relevant outline lighting scheme can be found in this report.

The local environment and surrounding neighbours are unlikely to be impacted because of the proposed flood lighting scheme. This is because the impacts of light spill, glare and light trespass are considered to be negligible when compared against the existing portable diesel generated flood lights.

In respect of the above, the addition of flood lighting to the two new pitches is not expected to have a negative impact on the local environment, in line with the ILP, *GN01* (2011) guidance for the reduction of light pollution.

CONTENTS

1. INTRODUCTION

1.1 This light pollution report has been prepared by Hodkinson Consultancy, a specialist energy and environmental consultancy for planning and development for the Former ICL Ground at Udney Park Road, appointed by Quantum Group.

1.2 The formulation of this report has taken into account several important objectives, including:

> To address the issues surrounding floodlighting;

> To provide specific details of a flood lit pitch that complies with all necessary requirements;

> To minimise the negative impact of the addition of floodlights on the local environment;

> To incorporate mitigation measures to reduce the impact the local environment and amenity space;

> To provide statement of fact regarding floodlighting and their usage patterns.

Site Location

1.3 The proposed development is located in Teddington, between Udney Park Road to the west and Kingston Lane to the east. It is a short walk from Teddington High Street (A313).

1.4 The site is currently private open ground and is not accessible to the wider community. The existing sports pavilion is located to the west of the site, and is proposed for refurbishment.

1.5 The development location can be seen in Figure 1 below:

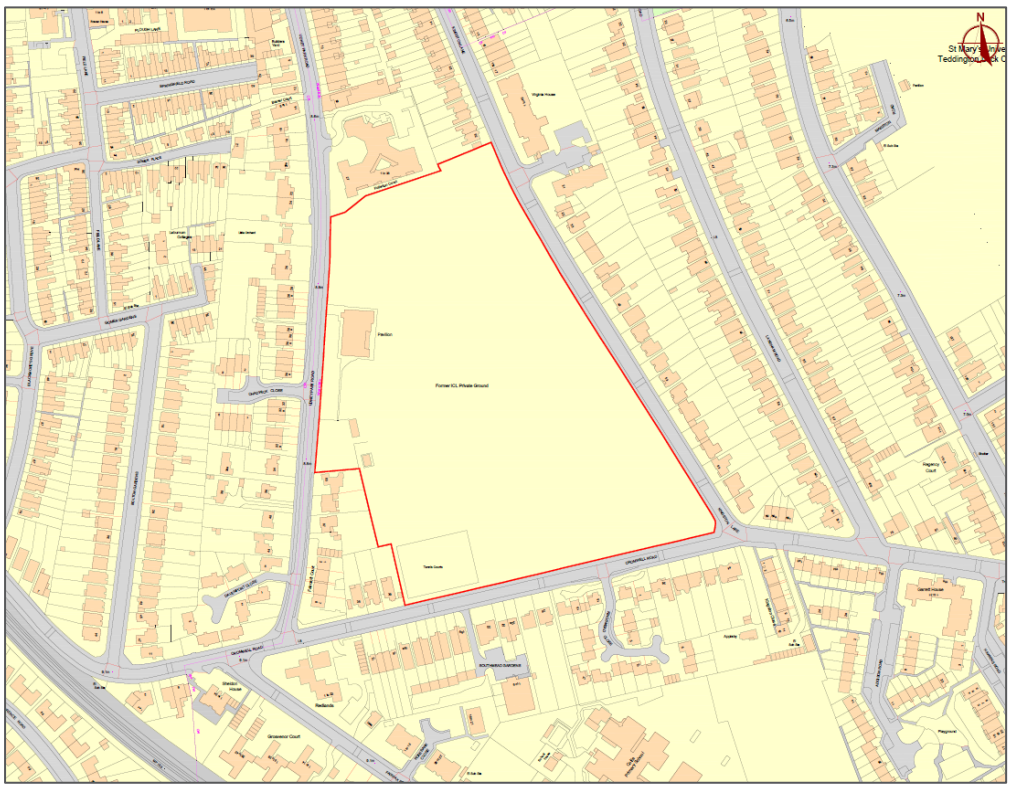


Figure 1: The Development Site (Quantum Group Location Plan – Ref.900-SK01)

Development Description

1.6 The proposed scheme will see the former Imperial College London Private Ground on Udney Park Road, Teddington, London, TW11 9BB, regenerated for a mixed-use development that will deliver high-quality sports and community facilities, alongside new public open space and affordable, care led accommodation for Older People and a new GP surgery. This triple approach secures a sustainable, inclusive future for the site, the benefits of which underpin national and local planning policy.

1.7 With the creation of the Teddington Community Sports Ground Community Interest Company, three areas will be established:

> Assisted living, extra care community with new GP surgery;

> Open parkland with community Orchard and outdoor gym;

> Community sports facilities.

1.8 The proposed community sports facilities will comprise of the following: -

> A full-size Third Generation artificial grass pitch (3G AGP)

> Natural grass playing pitch provision

> Tennis Courts / Multi Use Games Area (MUGA)

> Community pavilion containing changing rooms, kitchen, bar and server, flexible-use community rooms and crèche

1.9 The FA approved sports pitch in the Southern part of the site will include a 3G pitch, a MUGA and a turf pitch.

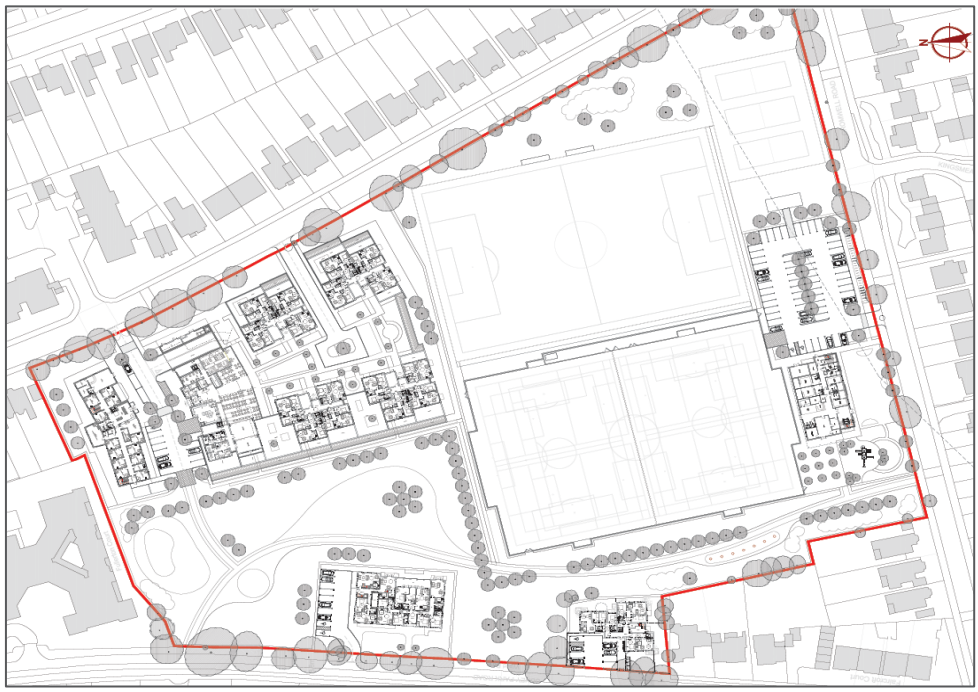


Figure 2: The Proposed Development Site Plan (Quantum Group Proposed Site Plan – Red.900-SK02)

Light Pollution

1.10 Light pollution is defined as any light emitting from artificial sources into spaces where it is unwanted, such as spillage of light from office or commercial buildings onto streets, or, into residential accommodation, such as bedrooms where this would cause nuisance to the occupants.

1.11 Light pollution is not always perceived as a bad thing, particularly in areas of high crime where good street lighting is seen as a positive attribute. The only adverse effects caused as a result of artificial lighting is the intrusion of light into sensitive locations including adjacent residential accommodation; areas of special night-time interest; or needless spillage into the night sky.

1.12 The ILP Guidance Notes for the Reduction of Obtrusive Light GN01:2011 includes a definition for Obtrusive Light / Light Pollution:

- **Sky glow** as *'the brightening of the night sky'*;
- **Glare** as *'the uncomfortable brightness of a light source when against a darker background'*; and
- **Light intrusion** ("trespass") as *'the spilling of light beyond the boundary of the property or area being lit'.*

Environmental Zones

1.13 The Institute of Lighting Professionals (ILP) Guidance Notes identifies numerical guidance criteria values for light pollution. It categorises the environment into four zones ranging from national parks to city centres, they are as follows:

- **E0: Protected** – Dark protected areas;
- **E1: Natural –** Areas with intrinsically dark landscapes;
- **E2: Rural –** Areas of low district brightness. Generally where roads are lit to a residential road standard;
- **E3: Sub-urban –** Areas of middle district brightness. Generally where roads are lit to a traffic route standard;
- **E4: Urban –** Areas of high district brightness. Generally having mixed residential and commercial uses with high night time activity.

1.14 The ILP document also includes an 'after curfew' value of 2 lux for developments within these zones. This 'after curfew' refers to a night time dark period, typically between midnight and 6 am and is applied to residential areas where there is an expectation of darkness during this period.

1.15 Table 3.2 of the ILP document outlines the limits of obtrusive light for exterior lighting installations in specific environmental zones, to minimise problems for people, flora and fauna. This can be seen below:

Table 1: Obtrusive Light Limitations for Exterior Lighting Installations (ILP, 2011)[1]

Environmental Zone	Light on Properties		Luminaire Intensity		Upward Light	Luminance	
	E_v		I		ULR	L_b	L_s
	lx		cd		%	$cd \cdot m^{-2}$	$cd \cdot m^{-2}$
	Pre Curfew[2]	Post Curfew	Pre Curfew	Post Curfew		Building	Signs
E1	2	0[3]	2,500	0	0	0	50
E2	5	1	7,500	500	0.05	5	400
E3	10	2	10,000	1,000	0.15	10	800
E4	25	5	25,000	2,500	0.25	25	1000

1.16 For the purpose of this report it is considered that the Former ICL Ground has been classified to be situated within environmental zone **E3**; i.e. a sub-urban area.

1.17 This classification of zoning allows for up 10 lux of light, measured vertically at the windows surrounding the proposed development.

ULR, Upward Light Ratio of Installation(%): is the proportion of luminaire flux, emitted above the horizontal going directly into the sky;

Ev, Vertical Illuminance (Lux): is the maximum vertical illuminance value on properties measured flat on the glazing at the centre of the window;

Iv, Light Intensity (cd): is the light intensity of each lighting source in the potentially obtrusive direction;

L, Luminance (cd.m-2): is the maximum average luminance of the building, and refers to buildings directly illuminated.

2, If no curfew regulations are available, the higher values shall not be exceeded and the lower values should be taken as preferable limits. If not otherwise stated 23:00hrs is suggested by the ILP (2011) document.

3, If the luminaire is for public (road) lighting, then this value may be up to 1 lx.

2. REQUIRED STANDARDS AND GUIDANCE

Legislation

2.1 Light pollution mitigation came into force as a form of statutory nuisance under Section 102 of the **Clean Neighbourhoods and Environment Act (2005)**. The amendment to Section 79 of the Environmental Protection Act 1990 to include statutory nuisance from artificial light:

'(fb) artificial light emitted from premises so as to be prejudicial to health or a nuisance,'

2.2 The following British Standards on lighting are relevant to the scheme:

> **BS 5489-1:2013** - Code of practice for the design of road lighting. Lighting of roads and public amenity areas;

> **BS EN 13201-2:2015** - Road lighting. Performance requirements, which includes appropriate lighting classes and photometric recommendations for different road uses and environments.

> **BS EN 12193:2007** - Sports Lighting. Performance requirements, which ensures good visual conditions for players, athletes, referees, spectators and CTV transmission.

2.3 Bat Conservation Trust, ILE (2009) ***'Bats and Lighting in the UK, Bats and the Built Environment Series'***;

> The lighting design shall comply with the requirements of the Bat and Lighting in the UK document. Lighting shall be positioned to avoid unnecessary spill, glare and the upward loss of light towards in any environmentally sensitive areas, such as areas known to have roosting bats or the potential to be a roost.

National and Regional Planning Policy Context

2.4 The following planning policy requirements apply for the scheme:

> The **National Planning Policy Framework** (NPFF) **Paragraph 125** states that:

*'By encouraging good design decisions should limit the impact of **light pollution** from artificial light on local amenity, intrinsically dark landscapes and nature conservation'.*

> The **Local Development Management Plan (2011)** for London Borough of Richmond upon Thames. Policy DM OS 9 states that:

'Floodlighting of sports pitches, courts and historic and other architectural features will be permitted unless there is demonstrable harm to character, biodiversity or residential amenity'

2.5 The policy states that favourable consideration will be given to the replacement or improvement of existing lighting to minimise impacts.

Technical Good Practice Guidance

2.6 Guidance on the assessment of lighting for external amenity areas can also be found on the following documents:

> Building Research Establishment (BRE) Guidelines 'Site Layout Planning for Daylight & Sunlight. A Guide to Good Practice', 1991

> CIBSE/SLL 'Code for Lighting', 2012;

> CIBSE/SLL 'Lighting Handbook', 2009;

> CIBSE/SLL 'LG06 : 'The outdoor environment', 2016;

> CIE '150 Guide on the Limitations of the Effects of Obtrusive Light from Outdoor Lighting Installations', 2003;

> ILP 'GN01 Guidance Notes for the Reduction of Obtrusive Light', 2011.

Football Association

2.7 As the 3G AGP is to be Football Association (FA) complaint, it will need to ensure that the lighting installed addresses their regulations in addition to those set by policy and good practice.

2.8 The footprint of the pitch is proposed to be 112 m x 76 m. The main playing area of the pitch will be 100 m x 64 m. A plan of the pitch has been provided in **Appendix A.**

3. EXISTING BASELINE CONDITIONS

3.1 Existing illumination levels were measured and recorded. The site visit took place at 21:30 on 11th May 2017 with a sunset time of 20:45. The weather was cloudy with a large downpour of rain between 22:00 – 22:30 with no wind detected.

3.2 Vertical and horizontal illuminance were measured for a qualitative evaluation of the existing lighting levels showing expectedly low readings in most areas of the site as existing lighting only comes from street road lighting and neighbouring dwelling lighting.

3.3 The centre of the site had both vertical and horizontal illuminance of 0.00 lux and 0.01 lux. The perimeter of the site (North of the proposed 3G AGP) was recorded to be 0.01 lux – 0.03 lux.

3.4 There were limited sources of light in the vicinity of the proposed site and further afield, as confirmed by the very low lux readings noted above. Portable flood lights were seen across the site but none of these were in operation during the site visit.

3.5 The photographs provided below highlight the extent of the darkness onsite with the existing flood lights not in operation.

Figure 3: Photographs taken during the night time light survey

Existing Flood Lights

3.6 It was identified that there were six portable flood lights on the site at the time of the external light survey. These lights were diesel generated and have wide dispersion lamps, as shown in Figure 4 below.

3.7 It has been acknowledged that the current portable flood lights are generally not used between May and August but are used consistently from 17:00 – 21:00 each weekday during October to March.

3.8 The current flood lights are only used for training purposes; they are not used during matches. Typically only three or four would be used at one time; it is not typical to have all six on for one pitch at one time. However if numerous activities were taking place all of the portable flood lights would expected to be in operation.

Figure 4: Portable Flood Lights Used on Site

3.9 The flood lights were:

> RAM Rugby (VT1) - 1000W metal halide lamps;

> Eurolight (Milo) – 1000W high pressure tubular lamps.

3.10 Due to the diesel generators these flood lights are noisy when in operation and they also have a very poor light spill due to an absence of deflectors.

4. PROPOSED LIGHTING DESIGN

4.1 The floodlight system installed is being designed to meet the desired weekly usage levels on a 3G AGP.

4.2 For a full size pitch specified for football use it is required to meet FIFA's Class II, which for 11 a side football is a minimum maintained average illuminance of **200 lux**. For training and cross play use, **120 lux** is the minimum requirement.

4.3 Abacus Lighting has produced a lighting design for both the 3G AGP and MUGA; this can be found in **Appendix B.**

4.4 Twelve 2kW Challenger 1 (AL6000 series) double asymmetric flood lights have been specified to be distributed across six 15 m masts across the 3G FTP. Four 2kW Challenger 1 (AL6000 series) double asymmetric flood lights have been specified to be distributed across four x 12.5 m masts across the MUGA.

4.5 These are high performance lights that provide control for outdoor sports grounds where obtrusive light control is essential. A data sheet for these lights has been provided in **Appendix C**.

Arrangements

4.6 The proposed flood lights are to be erected onto 12.5 m and 15 m masts that are to be positioned at least 1 m back from the perimeter fence line. Although slightly taller than the 9 m portable flood lights in situ currently these lights are more efficient and will generate no noise and minimal light spill with modern deflector design. Higher mounting heights also allows for lower main beam angles, which can also assist in reducing glare.

4.7 As the flood lights to be specified in the proposed design are double asymmetric they will reduce light overspill, glare and effective light distribution as the lamp holder can be adjusted to support two peak beam elevation, as shown in Figure 5 below:

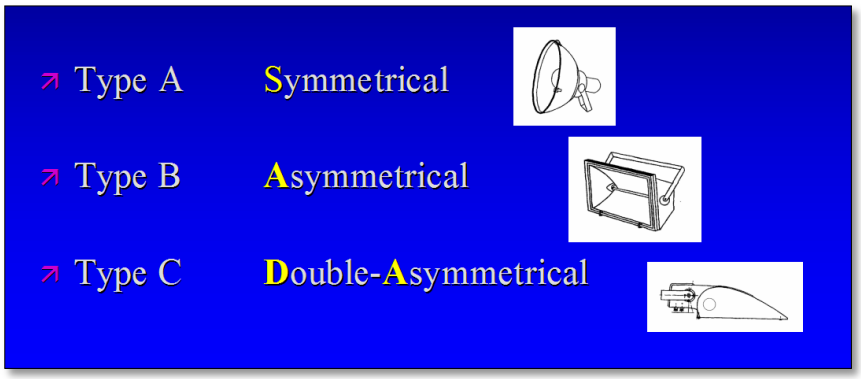


Figure 5: Variable Aim Luminaires (ILP, 2011)

4.8 The proposed light fittings will also ensure that their positioning minimises glare, light trespass and sky glow so their presence does not create a nuisance for the local environment.

4.9 BS 5489-1:2013 states that control of direct **glare** from luminaires in subsidiary roads and associated areas, footpaths and cycle tracks needs to be addressed. To control the glare on the proposed flood lights the main beam angle of light fittings directed at any potential observer shall not exceed 70° as illustrated in Figure 5 from the ILP (2011).

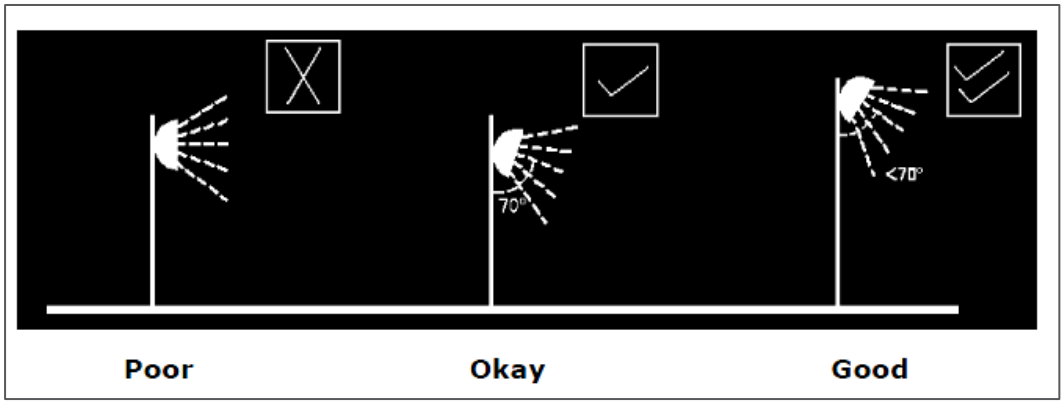


Figure 6: Luminaire Aiming Angles to Control Glare (ILP, 2011)

4.10 The double asymmetric reflector is designed to better concentrate and focus the light produced by each lamp. The lamps at the proposed development will be set to 65º from the normal to the front glass. This will result in a flat appearance, making less of the reflector visible to spectators as well minimising glare.

4.11 ILP (2011) limiting values for **light trespass** beyond the site and onto nearby properties suggest that lighting levels shall not exceed 10 lux for pre-curfew hours and 2 lux post-curfew (after 23:00) for sites in **Environmental Zone 3**.

> **Proposed Design:** Unlikely to exceed 5 lux at the neighbouring properties any one time (pre-curfew) with the lights on due to the distance of the dwellings from the proposed location of the floodlights. The light spill into gardens is expected to be no more than moonlight. It is also important note that the flood lights are not expected to be in operation after 22:00 so the post-curfew value is not applicable in this case.

4.12 The **Upward light output ratio** requirement for Environmental Zone 3 is that luminaire flux above the horizontal shall not exceed 5% to minimise **sky glow**. The Challenger 1 lamps proposed do not exceed <0% at a 60º peak beam elevation which meets the requirements.

Aesthetics

4.13 Slimline masts and floodlights in a light grey colour will be used to ensure that they do not stand out against the skyline.

Natural Screening

4.14 The eastern boundary of the site is significantly populated with trees and vegetation (abundant beech, green alkanet, ivy and oak) as displayed in the photographs below which offer natural screening in summer months to the surrounding buildings and the wider area.

Figure 7: Photographs demonstrating the natural screening of the site

4.15 It has been confirmed that these areas of natural screening will remain in situ and it has also been acknowledged that trees and vegetation on the site are not necessarily permanent features due to seasonal changes and the potential for disease and necessary removal throughout the course of their life.

4.16 The lighting design by Abacus when reviewing **light trespass** does not take this screening into consideration.

Hours of Use

4.17 The flood lights on both the 3G AGP and the MUGA are scheduled to be in use every day from 17:00 – 22:00 during October to March with an earlier finish on weekends (21:00 on Fridays and 20:00 on Saturday and Sundays). The flood lights will not be used from May to August and during school holidays (as per the current situation).

4.18 The flood lights will be switched off when not needed, using a timeclock and photocell sensors set in line with the determined curfew hours (part-night lighting). This will also help to reduce any night-time light pollution that may occur.

Maintenance

4.19 Typically flood light masts are designed for longevity; 25 years at the very least, providing all the recommended checks and follow-up maintenance are carried out as and when necessary.

4.20 Routine maintenance will include the cleaning of lamp glass, realignment and lamp replacement in accordance with manufacturer guidelines. The proposed Challenger 1 lamps to be installed have two rear doors with no requirements for tools so access for maintenance is straight forward.

4.21 Bi -annual maintenance should include electrical testing, illumination testing and certification and should be undertaken by a third party.

4.22 The lighting level provided by an installation will decrease throughout its life, mainly as a result of depreciation of lamps and luminaires. **A maintenance factor** is specified to compensate for ageing and soiling of the light sources, reflectors and front glasses. In the absence of relevant information, it is recommended to use a maintenance factor of 0.8. Both the 3G AGP and the MUGA have been given a maintenance factor 0.8, which meets the requirements.

Replacement of Original Flood Lights

4.23 Policy DM OS9 in the Local Development Framework (2011) states that:

"Favourable consideration will be given to the replacement or improvement of existing lighting to minimise impacts".

4.24 In this instance it not recommended to replace the original portable flood lights as they are noisy and the light spill on them is poor.

5. LOCAL ENVIRONMENT

Benefits

5.1 Outdoor sports lighting provides an important way of extending the use and the overall value of outdoor sports facilities.

5.2 Sports clubs, local schools, and local users across a wide range of sports including evening training facilities are expected to use the facilities on a weekly basis.

5.3 In the summer period long hours of daylight give individuals the opportunity to take part in sports and leisure activities during the long summer evenings. In contrast, the winter daylight can be as short as 7 hours a day and can restrict opportunities for outdoor sports to short periods during the weekends so the provision of flood lights will enable this to continue.

5.4 In numerical terms, outdoor sports lighting can extend the playing hours by some **1000 -1500 additional hours per annum** and this can allow people to train or play evening matches 7 days a week, all year round.

Impacts

Statutory Sites

5.5 There are a number of statutory sites designated for nature conservation located within 5 km of the site and non-statutory sites within 2 km.

5.6 The proposed development is located a sufficient distance from the statutory designated sites. As such there is no anticipated impact from the installation of the flood lighting to these sites.

Bats

5.7 All bat species and their roosts are legally protected, by both domestic and international legislation, it is therefore an offence to disturb or damage a bat roost.

5.8 Bats are nocturnal animals and are adapted to low-light conditions. This means that most bat species can find artificial lighting to be very disturbing.

5.9 The bat activity survey undertaken by Peach Ecology *(Report 0080 - Phase 2 Bat and Reptile Survey Report – July 2017)* recorded at least 8 different species of bats within the site boundaries or high above. The boundary trees and hedgerows are important for foraging and commuting bats providing key linear features for flight routes and wildlife corridors.

5.10 The numbers of bat passes per hour were significantly higher in the summer than in spring or autumn. As the flood lights are not going to be in operation during summer this should not pose a significant risk to the bats' summer activity.

5.11 Bat Conservation Trust, ILE (2009) requires that the glass of the lights is orientated to ensure that the light is cast in a downward position to minimise disturbance to bats. The double asymmetric beam floodlights (as opposed to symmetric) proposed for this developed are orientated so that the glass is parallel to the ground which will ensure that the light is cast in a downward direction and avoids horizontal spill.

Local Character

5.12 The site is deemed to have negligible significance in heritage terms, as confirmed by Asset Heritage Consulting in their report dated May 2016. It is even omitted from the local list of 'Buildings of Townscape Merit' is as it should be which the heritage specialist also agrees with.

5.13 The sites contribution to the character and appearance of the area (which is not a conservation area) is limited as it only has only one small building within its space.

5.14 It is therefore unlikely that the proposed development and the addition of floodlighting will have any impact on local character as it is void of any heritage significance.

Residential Amenity & Wider Public

5.15 The site is currently private open ground and is not accessible to the wider community. The creation of the 3G AGP and the addition of flood lights will allow a large number of groups to use the sports facilities on a weekly basis.

5.16 The lighting design proposed by Abacus lighting has confirmed that the neighbouring are unlikely to be affected by the addition of flood lighting to the site as the light trespass beyond the site and onto nearby properties is only expected to be 5 lux (maximum).

5.17 The ILP (2011) requirements note that these values should not exceed 10 lux for pre-curfew hours and 2 lux post-curfew with the lights on. The new flood lights are not likely to exceed 5 lux (pre-curfew) with the lights on due to the distance of the dwellings from the proposed location of the floodlights. The flood lights will not be in operation post curfew (23:00).

Energy Efficiency

5.18 It has been recognised that new external lighting products offer significant improvements in efficiency and substantial energy savings. This is why the replacement of the current flood lights has not been proposed.

5.19 The lighting system design by Abacus is able to increase the energy savings on site through:

> Installation of new efficient technologies (save up to 15% energy compared to previously designed floodlights);

> Optimised scheme design;

> Correct installation, operation and maintenance.

5.20 Daylight controls (timeclock or sensors) will also be installed to prevent the operation of the lighting during daylight hours or hours when they are not required.

Noise and Air Quality

5.21 The portable flood lights have been reported to be noisy and are diesel generated (with a run time of approximately 60 hours).

5.22 The proposed flood lights will emit no emissions and will be virtually silent when in operation.

6. CONCLUSION

6.1 A detailed flood lighting design has been provided by Abacus and has been detailed throughout the report. The site has been classified as Zone E3 (sub-urban area), this zoning allows for up 10 lux of light, measured vertically at the windows surrounding the proposed development. The proposed design confirms that the values for light trespass are not to exceed 10 lux; a maximum lux of 5 is expected at any one time with the lights on.

6.2 The upward light output ratio requirement for Environmental Zone 3 is that luminaire flux above the horizontal shall not exceed 5% to minimise sky glow. The Challenger 1 lamps proposed do not exceed <0% at a 60º peak beam elevation which meets this requirement set by the Institute of Lighting Practitioners.

6.3 The proposed flood light system would be suitable for installing in an environmental zone E3, meeting the most stringent of light control parameters whilst maintaining the specified illuminance levels for the sports pitch.

6.4 Hours of operation of the flood lights will ensure they are not operated after 22:00 in winter, and not lit at all in summer months. This is similar to current usage patterns of the existing, portable diesel generated flood lights which are currently used around the site. The new flood lighting proposals will be more energy efficient, quieter and less polluting than the current portable flood lights.

6.5 The masts are deemed to be of an appropriate height (12.5 m and 15 m) and are to be set back from the perimeter fence to ensure minimal disturbance on the neighbouring amenity areas.

6.6 The local environment and surrounding neighbours are unlikely to be impacted because of the proposed flood lighting scheme. This is because the impacts of light spill, glare and light trespass are considered to be negligible when compared against the existing portable diesel generated flood lights.

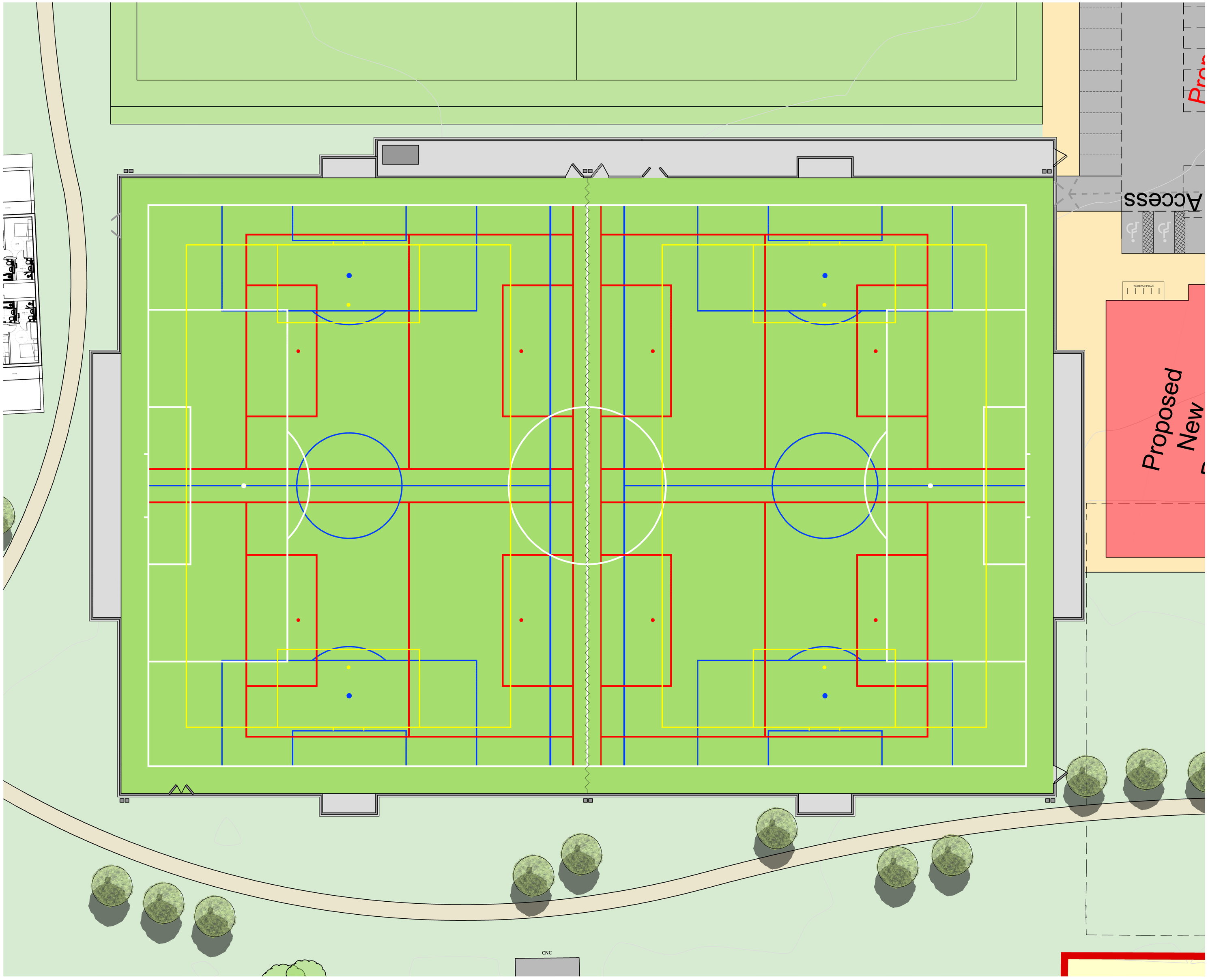
6.7 In respect of the above, the addition of flood lighting to the two new pitches is not expected to have a negative impact on the local environment, in line with the ILP, *GN01* (2011) guidance for the reduction of light pollution.

APPENDICES

Appendix A
Pitch Design

Appendix B
Abacus Lighting Design

Appendix C
Challenger 1 AL6000 Series



NOTES

1. No dimensions are to be scaled from this drawing.
2. All dimensions are to be checked on site prior to construction.

N

0m 5m 10m 15m 20m

0mm 10mm 20mm 40mm 60mm 80mm 100mm

SCALE 1 : 200

---	DD.MM.YYYY	---------
Revision	Date Issued	Details

PLANNING

LK2

Studio 2, Deepcale Enterprise Park,
Deepdale Lane,
Nettleham, Lincoln
LN2 2LL

Tel. 01522 750777
Fax. 01522 754061
E-mail info@lk2.co.uk
Web www.lk2.co.uk

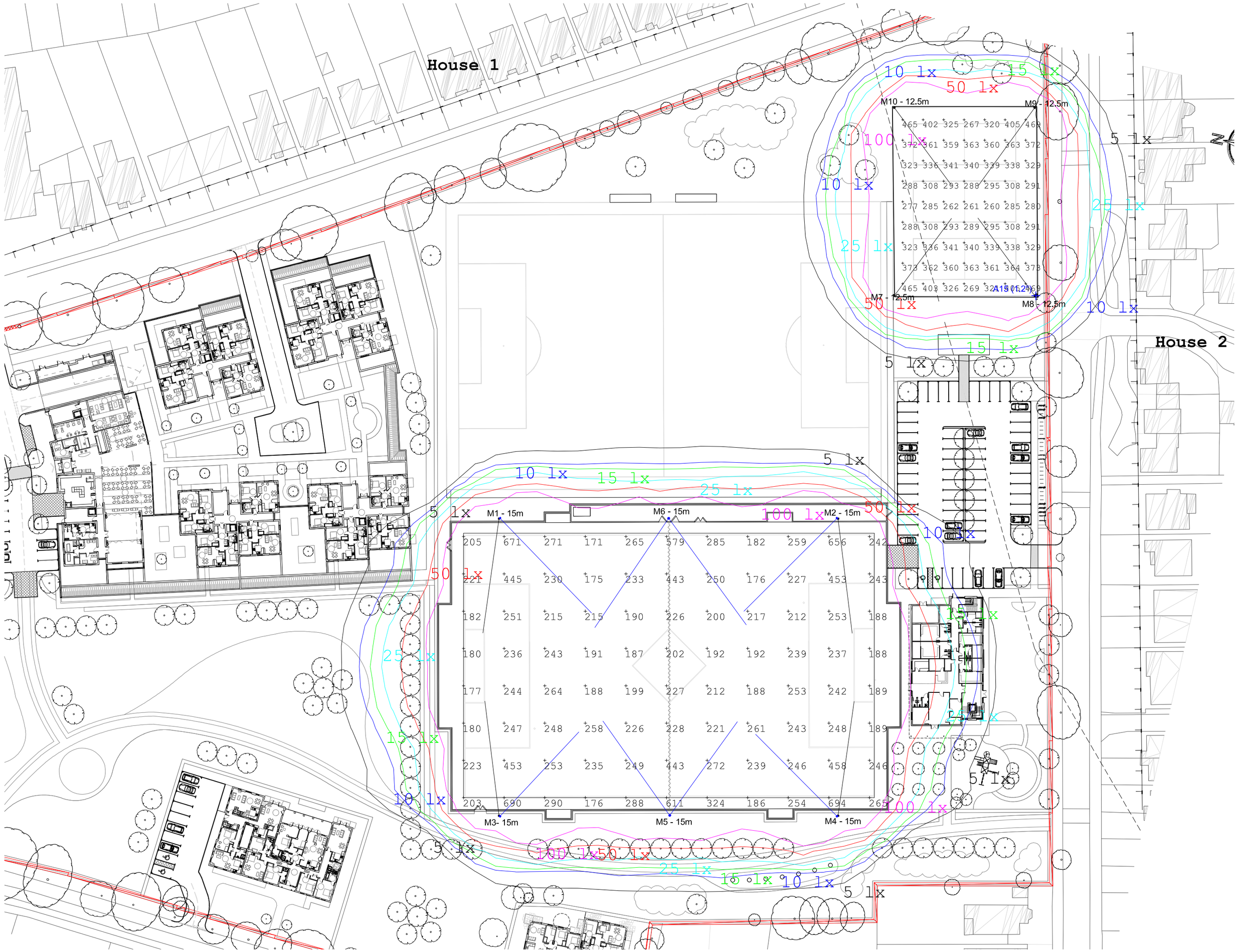
Client Logo

Client
Quantum Group

Project
Udney Park Road
Teddington
London

Title
Proposed AGP Layout

Scale	Date	Drawn by
1:200 at A1	March 2017	LMN
Project No.	Drawing No.	Revision
857	(08) 005	A00



LIGHTING EQUIPMENT

6 x 15m Masts Each Carrying the Following Challenger 1 Luminaire

M1 - M4.....1 x AL6001 (POS A)_COWL_3 - MHN - FC / 2200W / 400V / 640 / XW
1 x AL6002 (POS A)_COWL_3 - MHN - FC / 2200W / 400V / 640 / XW

M5 & M6.....2 x AL6002 (POS A)_COWL_3 - MHN - FC / 2200W / 400V / 640 / XW

4 x 12.5m Masts Each Carrying the Following Challenger 1 Luminaire

M7 - M10.....1 x AL6003 (POS A)_COWL_3 - MHN - FC / 2200W / 400V / 640 / XW

LAMPS

MHN - FC / 2200W / 400V / 640 / XW (232,000 lJm)

HORIZONTAL ILLUMINANCE LEVELS

Football
Average Initial Horizontal Illuminance (Eh.i): 250 Lux
Average Maintained Horizontal Illuminance (Eh.m): 200 Lux
Uniformity Ratio (E.min / E.av): 0.6

Maximum Glare Rating: GR =49

Muga
Average Initial Horizontal Illuminance (Eh.i): 250 Lux
Average Maintained Horizontal Illuminance (Eh.m): 200 Lux
Uniformity Ratio (E.min / E.av): 0.7

Maximum Glare Rating: GR =48

Maintenance Factor: 0.80

Based Upon:
- Luminaries Depreciation
- Lamp Lumen Depreciation
- Medium Pollution
- Pre Season Cleaning Floodlights

Grid Values & Contours In LUX
Grid Point Intervals: Meters
Contour values: 5,10,15, 25, 50 & 100 LUX

NOTE:
1. Fitting positions and suitability should be checked prior to placing an order.
2. Scheme develop based upon a flat and open area, where shadowing from plants and equipment have not been taken into consideration.
3. Initial Levels Shown

Obtrusive Light - Compliance Report
CIE 150:2003, Pre-Curfew, E3 - Suburban
Filename: UKS15746_1 Former Imperial College
07/07/2017 14:54:17

Illuminance
Maximum Allowable Value: 10 Lux
Calculations Tested (2):

Calculation Label	Test Results	Max. Illum.
Houses 1_Ill_Seg1	PASS	1
Houses 2_Ill_Seg1	PASS	5

Luminous Intensity (Cd) At Vertical Planes
Maximum Allowable Value: 10000 Cd
Calculations Tested (2):

Calculation Label	Test Results
Houses 1_Cd_Seg1	PASS
Houses 2_Cd_Seg1	PASS

ISO 9001 - ISO 14001
OHSAS 18001

ABACUS LIGHTING LTD.
Sutton-in-Ashfield, Nottinghamshire
NG17 5FT England
Tel: (+44) 01623 511111
Fax: (+44) 01623 552133
Email: light@abacuslighting.com
Home page: www.abacuslighting.com

Lighting Project: Former Imperial College

Title: Horizontal Illluminance Levels

Design Ref: UKS15746_1		Revision(s) From Previous Design:
Design By: Thomas Ford		
Date: 07/07/2017	Scale: A2 @ 1-500	

All illuminance values are the result of computer calculations, based upon precisely positioned luminaires in a fixed relationship to each other and to the area under examination. In practice the values may vary due to tolerances on luminaires, luminaire positioning, reflection properties and electrical supply.

CHALLENGER® 1 AL6000

IP66 IK08 CE

ULOR 0% 60° Light Control System Abacus

Benefits

- Reduced light overspill and glare with excellent forward throw of light
- Multiple options for effective light distribution as the adjustable lamp holder offers three variations of peak beam elevation
- Dark skies friendly fitting ideal for projects nearby residential areas with specific light regulations, with low light pollution ULOR 0%
- Ease of maintenance via two rear doors with no requirement for tools

Technical Features

- High powered lamp capabilities 1kW / 2kW metal halide
- 1000W and 2000W MHN-LA & MHN-FC 2200W, MH-TS2000W/XL, HQI-TS2000WNL
- High pressure die cast aluminium type EN AC 43400
- Stainless steel clamps and fixings
- 6mm galvanised steel mounting bracket with M20 bolt hole
- 4mm tempered, low iron, high transmission glass
- IP66, IK08 ratings, CE marked
- Available in double asymmetric: narrow, medium and wide beam distributions
- 60° peak beam elevation as standard on all beam widths
- High purity, polished and anodised aluminium reflector system
- Lamp holder support can be adjusted for 55° and 65° peak beam elevation capabilities as standard
- Upward Light Output Ratio (ULOR): < 0% at 60° peak beam elevation
- Low light pollution resulting in a dark skies friendly lantern
- Front, rear and side cowl available
- Electrical connection box : (IP66) housing containing the ignitor and the power connection, located on the side of the stirrup
- Fitted with 2 x GORE™ membrane breathers for floodlight air pressure regulation
- Toolless lamp access via two rear doors, secured with hand operated latches

Applications

- Sport

Fells Point Tennis Club, Ireland

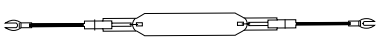
Technical Specifications

	Wattage (kW)	Beam Type	Lamp	Lamp Manufacturer	Lamp Reference	Weight (kg)
AL6001	2.2	Narrow	MHN-FC/B	Philips	MHN-FC2.2KW400V/640	21.4
AL6002	2.2	Medium	MHN-FC/B	Philips	MHN-FC2.2KW400V/640	21.4
AL6003	2.2	Wide	MHN-FC/B	Philips	MHN-FC2.2KW400V/640	21.4
AL6004	2	Narrow	MHN-LA	Philips	MHN-LA2KW400V/842	21.4
AL6005	2	Medium	MHN-LA	Philips	MHN-LA2KW400V/842	21.4
AL6006	2	Wide	MHN-LA	Philips	MHN-LA2KW400V/842	21.4
AL6007	2	Narrow	HQI-TS/N/L	Osram	HQI-TS2000WNL	21.4
AL6008	2	Medium	HQI-TS/N/L	Osram	HQI-TS2000WNL	21.4
AL6009	2	Wide	HQI-TS/N/L	Osram	HQI-TS2000WNL	21.4
AL6010	1	Narrow	MHN-FC	Philips	MHN-FC1KW230V/740	21.4
AL6011	1	Medium	MHN-FC	Philips	MHN-FC1KW230V/740	21.4
AL6012	1	Wide	MHN-FC	Philips	MHN-FC1KW230V/740	21.4
AL6013	2	Narrow	MH-TS 2kW/XL	Venture	MH-TS2000W/XL/K12/745	21.4
AL6014	2	Medium	MH-TS 2kW/XL	Venture	MH-TS2000W/XL/K12/745	21.4
AL6015	2	Wide	MH-TS 2kW/XL	Venture	MH-TS2000W/XL/K12/745	21.4
AL6016	1	Narrow	MHN-LA 842	Philips	MHN-LA1KW230V/842	21.4
AL6017	1	Medium	MHN-LA 842	Philips	MHN-LA1KW230V/842	21.4
AL6018	1	Wide	MHN-LA 842	Philips	MHN-LA1KW230V/842	21.4
AL6019	1	Narrow	MHN-LA 956	Philips	MHN-LA1KW230V/956	21.4
AL6020	1	Medium	MHN-LA 956	Philips	MHN-LA1KW230V/956	21.4
AL6021	1	Wide	MHN-LA 956	Philips	MHN-LA1KW230V/956	21.4
AL6022	2	Narrow	MHN-LA 956	Philips	MHN-LA2KW400V/956	21.4
AL6023	2	Medium	MHN-LA 956	Philips	MHN-LA2KW400V/956	21.4
AL6024	2	Wide	MHN-LA 956	Philips	MHN-LA2KW400V/956	21.4

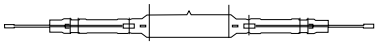
Lamp Manufacturer & Lamp Reference	Wattage (kW)	Colour Temp (K)	RA:	Lamp Lumen Output (Initial lm)	Current (A)	Supply Voltage (V)	Total Circuit Power (W)
Venture							
MH-TS2000W/XL/K12/745	2	4500	65	240,000	10.3	380/400/415	2150
Philips							
MHN-FC2.2kW400V/640	2.2	4100	60	232,000	11	380/400/415	2150
MHN-LA2KW400V/842	2	4100	80	220,000	9.6	380/400/415	2105
MHN-LA2KW400V/956	2	5600	90	190,000	10.3	380/400/415	2113
MHN-LA1KW230V/842	1	4200	70	95,800	9.3	230/240	1040
MHN-LA1KW230V/956	1	5600	80	87,000	9.3	230/240	1040
MHN-FC2KW400V/740	2	4200	60	210,000	10.11	380/400/415	2105
MHN-FC1KW230V/740	1	4100	65	93,000	8.9	230/240	1040
Osram							
HQI-TS2000WNL	2	4100	65	230,000	10.4	380/400/415	2105

Technical information may alter dependent on control gear used

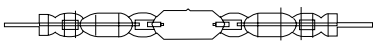
Lamp references



HQI-TS



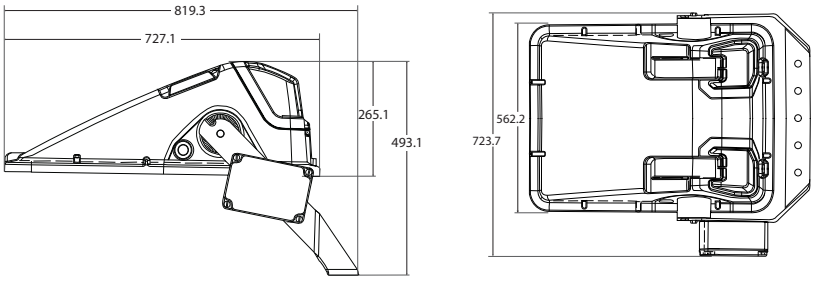
MHN-LA



MHN-FC

Dimensions

Dimensions in mm



Mounting:
Stirrup mounted using M20 fixing.
Stirrup adjustment +/- 140°
Weight: 21.4Kg.

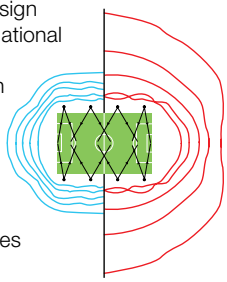
Front wind area:
@60° setting (Flat Glass) - 0.126m² 70° max setting (+10 elevation) - 0.135m². Side wind area: 0.108m²

Maintenance

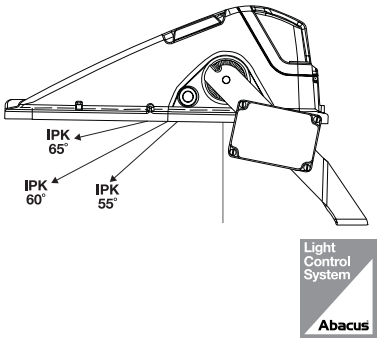
Easy Maintenance:
Access to the lamp by means of opening the rear door

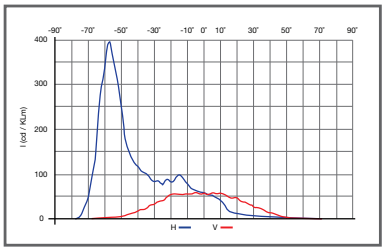
Key features

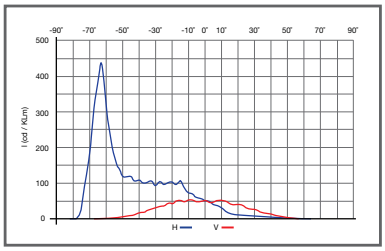
Abacus Light Control System
Efficient, careful lighting design has given Abacus an international reputation for combining powerful, sharp illumination with low light pollution. Abacus' Lighting Control System – exclusive to the Challenger® 1 – features a series of complementary technologies to help achieve this.

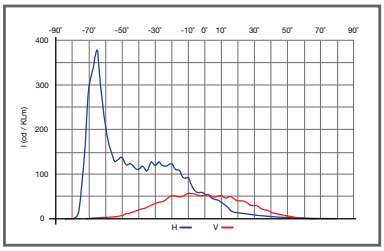


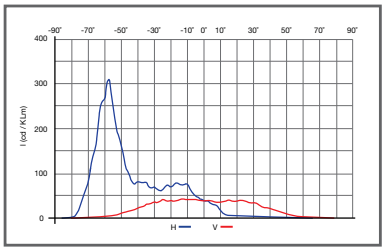
Double Asymmetric Reflector
The double asymmetric reflector is designed to better concentrate and focus the light produced by each lantern. By emitting the main beam at an angle of 55, 60 or 65 degrees from the normal to the front glass, it results in a flat appearance (right), making less of the reflector visible to spectators as well minimising glare.

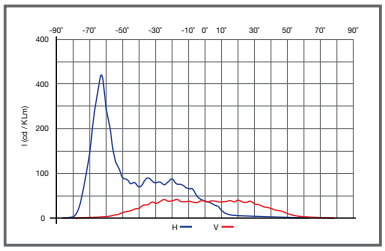


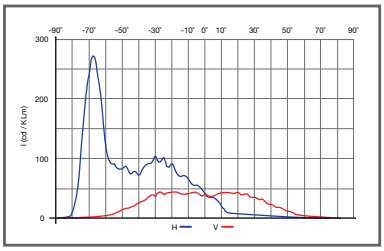

Narrow 55°

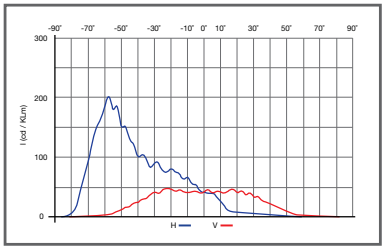

Narrow 60°

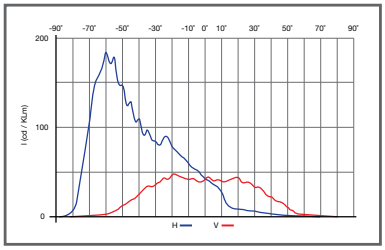

Narrow 65°

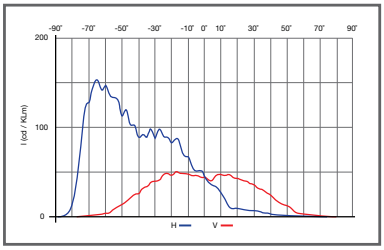

Medium 55°


Medium 60°


Medium 65°


Wide 55°


Wide 60°


Wide 65°