



Environmental Lighting Impact Assessment Report

Unsworth Cricket Club Padel Courts

Project number: SHD2356

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1. INTRODUCTION

1.1 General

- 1.1.1 This report has been prepared by SHD Lighting Consultancy Ltd on behalf of AshtonHale to support planning conditions for the proposed floodlighting system used to illuminate five proposed padel courts, during the hours of darkness (hereafter referred to as the *application site*).
- 1.1.2 SHD Lighting Consultancy Ltd has prepared this assessment report to the best of our knowledge using the information provided by AshtonHale.
- 1.1.3 The report assesses the potential effects of obtrusive light that could arise from the introduction of a padel court floodlighting system at the application site.
- 1.1.4 This lighting assessment report has been carried out by a competent person governed by the Institution of Lighting Professionals.
- 1.1.5 SHD Lighting Consultancy are an established lighting consultancy specialising in outdoor lighting design and lighting impact studies.
- 1.1.6 The design team has over thirty years of lighting design and installation knowledge, practical experience and professional qualifications to undertake lighting design calculations and environmental lighting impact assessment reports.
- 1.1.7 SHD Lighting Consultancy Ltd accepts no responsibility or liability for:
 - The consequence of this documentation cannot be used for any purpose or project other than that for which it was commissioned.
 - The issuing of this document is that it is not to be distributed to any third party with whom approval for use has not been granted.

1.2 Scope of Works

- 1.2.1 The scope of work to be undertaken includes:
 - Identification and assessment of receptors and their sensitivity.
 - Identification of the required and anticipated lighting provisions at the application site.
- 1.2.2 This report reviews the potential effects of the proposed padel court lighting and reviews the method of lighting the padel courts, while limiting potentially obtrusive effects to receptors that may have a negative response to a change in their lighting condition.
- 1.2.3 The principal objective of this lighting assessment report is to identify the effects of proposed outdoor lighting and the associated obtrusive light on potential identified sensitive receptors and propose suitable mitigation measures, if required.

2. LEGISLATION, PLANNING, AND POLICY GUIDANCE

2.1 International Guidance

The most appropriate international standards for outdoor lighting that relate to the application site are:

CIE 150: Guide on the limitations of the effects of obtrusive light from outdoor lighting installations

- 2.1.1 CIE 150, last updated in 2003. It is a technical document created by the Commission Internationale de l'Éclairage (CIE), which is an international organisation that sets standards and provides guidelines related to lighting, colour, and vision.
- 2.1.2 The purpose of CIE 150 is to provide guidance and recommendations on how to minimise the negative impacts of outdoor lighting installations, specifically focusing on obtrusive light.
- 2.1.3 Obtrusive light refers to light that spills or shines where it is not intended, causing visual discomfort, glare, or other adverse effects. This can include light trespass onto neighbouring properties, skyglow that affects astronomical observations, and other forms of light pollution.
- 2.1.4 The guide addresses various aspects related to outdoor lighting, such as fixture design, aiming, and control mechanisms, to mitigate the potential negative consequences of light pollution.
- 2.1.5 It aims to help lighting designers, planners, and decision-makers in designing and implementing outdoor lighting installations that are not only effective but also environmentally responsible and considerate of the surrounding community.
- 2.1.6 By following the recommendations outlined in CIE 150, stakeholders can work towards creating lighting designs that minimise light pollution and its impact on the environment, human health, and astronomical observations.

CIE 126: Guidelines for Minimising Sky Glow

- 2.1.7 CIE 126, last updated in 1997, is a technical document created by the Commission Internationale de l'Éclairage (CIE), an international organisation that sets standards and provides guidance on lighting, colour, and vision.
- 2.1.8 The purpose of CIE 126 is to provide guidelines specifically focused on reducing the phenomenon known as 'sky glow'.
- 2.1.9 Skyglow refers to the brightening of the night sky over populated areas due to the scattering of artificial light by particles and molecules in the atmosphere.
- 2.1.10 This effect can lead to a loss of visibility of stars and celestial objects, impacting astronomical observations and the overall quality of the night sky.
- 2.1.11 CIE 126 offers practical recommendations and strategies to minimise sky glow resulting from outdoor lighting installations.
- 2.1.12 It addresses factors such as the design and positioning of luminaires, the choice of lighting technologies, and proper lighting controls to limit the upward-directed light that contributes to sky glow.
- 2.1.13 These guidelines are relevant for the UK and other regions concerned with preserving natural nighttime conditions, reducing light pollution, and supporting astronomical observations.

2.2 National Guidance

2.2.1 The most appropriate national standards for outdoor lighting relating to the application site are:

Clean Neighbourhoods and Environmental Act

2.2.2 Light pollution was introduced within the Clean Neighbourhoods and Environment Act (2005) as a form of statutory nuisance under the Environmental Protection Act (the 'EPA', 1990), which was amended in 2006 to include the following nuisance definition:

"Artificial light emitted from premises to be prejudicial to health or nuisance"

2.2.3 Although light was described as having the potential to cause a statutory nuisance, no prescriptive limits or rules were set for impact assessment purposes.

2.2.4 While not specifically requiring external lighting schemes to be submitted for approval, it does suggest that planning authorities have the right to request such information as part of the approval process.

National Planning Policy Framework

2.2.5 The National Planning Policy Framework (NPPF) was first published in March 2012 and recently revised in February 2025.

2.2.6 The National Planning Policy Framework is a key document in the planning system of England that guides local authorities and other stakeholders on planning policies and decision-making.

2.2.7 It sets out the government's planning policies for sustainable development, including housing, the environment, and economic growth.

2.2.8 Planning policies and decisions must ensure that the application site is suitable for its specific location, with careful consideration of the potential effects, including cumulative impacts, of pollution on various factors such as public health, living conditions, and the natural environment.

2.2.9 This includes evaluating how pollutants such as light, air, noise, or water contamination could affect the well-being of residents, workers, and visitors in the area, as well as flora, fauna, and ecological systems.

2.2.10 The assessment should account for the potential sensitivity of the development site or its surrounding area to these impacts, considering any existing environmental constraints, protected areas, or features of cultural or historical significance.

2.2.11 Understanding and addressing these factors, the planning process can help mitigate adverse effects and promote sustainable development that is in harmony with its surroundings.

2.3 Relevant Lighting Standards

- 2.3.1 The most appropriate industry recognised standards for outdoor lighting that relate to the application site are:

The Exterior Environment: Lighting Guide 6

- 2.3.2 The Exterior Environment: Lighting Guide 6, last updated in 2016, is a comprehensive publication by The Chartered Institution of Building Services Engineers (CIBSE), an organisation in the UK that offers guidance and standards for building services and environmental engineering.
- 2.3.3 This guide focuses on providing in-depth recommendations and best practices for outdoor lighting design and implementation. It covers various aspects of lighting in exterior spaces such as streets, public areas, parks, and building exteriors.
- 2.3.4 The guide offers guidance on creating effective and sustainable lighting solutions that enhance safety, security, aesthetics, and functionality in outdoor environments while also considering energy efficiency and minimising light pollution.
- 2.3.5 Lighting Guide 6 is a valuable resource for lighting designers, engineers, architects, and other professionals involved in outdoor lighting projects.
- 2.3.6 It provides practical insights, technical information, and design considerations to ensure that outdoor lighting installations are well-designed, visually appealing, and environmentally responsible.

Public Lighting Guide 04: Guidance on Undertaking Environmental Lighting Impact Assessments

- 2.3.7 Public Lighting Guide 04: Guidance on Undertaking Environmental Lighting Impact Assessments, last updated in 2013, is a publication by The Institution of Lighting Professionals (ILP), an organisation based in the UK that promotes excellence in lighting.
- 2.3.8 This guide serves as a comprehensive resource for professionals involved in designing and implementing outdoor lighting projects.
- 2.3.9 Its primary focus is to guide in assessing and mitigating the potential environmental impacts of outdoor lighting installations.
- 2.3.10 The guide addresses various aspects related to lighting effects on the environment, including issues such as light pollution, sky glow, glare, and other obtrusive light-related concerns.
- 2.3.11 Key elements covered in the guide include methodologies for conducting environmental lighting impact assessments, techniques for modelling and predicting lighting effects, and recommendations for designing lighting schemes that minimise negative impacts while achieving their intended goals.
- 2.3.12 The guide considers factors like visual comfort, energy efficiency, and the preservation of natural darkness.
- 2.3.13 Public Lighting Guide 04 is a valuable tool for lighting professionals, local authorities, planners, and other stakeholders who seek to create outdoor lighting installations that are both visually effective and environmentally responsible.
- 2.3.14 It helps ensure that lighting projects contribute positively to the built environment while considering their impact on the natural surroundings and quality of life.

Guidance Notes for the Reduction of Obtrusive Light; GN01/21

- 2.3.15 Guidance Notes for the Reduction of Obtrusive Light, published by The Institution of Lighting Professionals, last updated in 2021, provides practical guidelines to minimise the negative impacts of outdoor lighting installations on the environment and neighbouring areas.
- 2.3.16 These notes offer advice on how to design, install, and manage lighting systems to mitigate issues such as light pollution, glare, and light trespass.
- 2.3.17 The guidance focuses on ensuring that lighting is effective and efficient while also being considerate of the surrounding community and environment.
- 2.3.18 GN01/21 adopts the CIE 150:2017 framework for environmental zones, which are used to determine acceptable lighting levels depending on the sensitivity of the location.
- 2.3.19 GN01/21 recommend that the immediate environment be classified systematically as shown in **Table 2.1**.
- 2.3.20 The stringency depends on the capacity to absorb lighting effects, with zone E0 requiring the strictest level of control and E4 the lowest.

ENVIRONMENTAL ZONE CLASSIFICATION AND PARAMETERS			
Zone	Surrounding	Lighting Environment	Example
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty
E2	Rural	Low district brightness	Village or relatively dark outer suburban location
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town or City centres with high levels of nighttime activity

Table 2.1: Environmental zone classificationExtract from **Guidance Notes for the Reduction of Obtrusive Light; GN01/21**

- 2.3.21 Using **Table 2.1**, the location for the two padel courts would fall into an E3 environmental zone (low district brightness) due to its suburban location and adjacent to residential areas.
- 2.3.22 It is not in a protected dark sky area, area of outstanding natural beauty or area of significant scientific interest.

Obtrusive Light Limitation for Outdoor Lighting Installations

- 2.3.23 For each environmental zone shown in **Table 2.1**, recommended obtrusive light limits for exterior lighting installations have also been determined as shown in **Table 2.2**
- 2.3.24 Obtrusive light or light pollution is any light that strays to areas other than where it is intended and can include light intrusion (spill light) into neighbouring properties, upward light (which can create sky glow), and visual source intensity (glare).
- 2.3.25 The ILP Guidance Notes for the Reduction of Obtrusive Light (ILP GN01/21) provide guidelines and threshold values applicable to each Environmental Zone.
- 2.3.26 **Table 2.2** provides guidance for obtrusive light limitations for exterior lighting installations.

OBTRUSIVE LIGHT LIMITATIONS FOR EXTERIOR LIGHTING INSTALLATIONS						
Zone	Sky Glow ULR % (i)	Light intrusion into windows Ev, measured in Lux (ii)		Luminaire intensity I, measured in kilo candelas (iii)		Building luminance L, (cd/m ²) (iv)
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Pre-curfew
E0	0	0	0	0	0	0
E1	0	2	0 (1*)	2.5	0	0
E2	2.5	5	1	7.5	0.5	5
E3	5.0	10	2	10	1	10
E4	15	25	5	25	2.5	25

Table 2.2: Obtrusive light limitations

Extract from Guidance Notes for the Reduction of Obtrusive Light; GN01/21

- (i) ULR (Upward Light Ratio) is the maximum permitted percentage of luminaire flux that goes directly into the sky.
 - (ii) Ev is vertical illuminance in Lux measured flat on the glazing centrally at each window
 - (iii) I is Light Intensity in Candelas.
 - (iv) L is Luminance in candela per square metre.
- Curfew = the time after which stricter requirements (for the control of obtrusive light) will apply, subject to the conditions of the local planning authority.
- Permitted only from public road lighting installations

2.4 British Standards

2.4.1 The most applicable British Standards for lighting that relate to the padel courts are:

BS EN 12193: 2018 Light and lighting. Sports lighting

2.4.2 The document is a British and European Standard that specifies the requirements for lighting systems used in sports facilities.

2.4.3 It provides guidelines on the design, installation, and performance of artificial lighting to ensure optimal visibility and safety for both participants and spectators.

2.4.4 The standard covers indoor and outdoor sports venues, including arenas, stadiums, and smaller recreational facilities.

2.4.5 Its primary objective is to establish consistent and reliable lighting conditions that promote fair play, minimise visual discomfort, and enhance the overall experience for players, officials, and audiences.

2.5 LTA Padel Court Datasheet

2.5.1 The document is a technical guidance publication issued by the Lawn Tennis Association (LTA) that sets out the recognised design, construction, and performance requirements for padel courts in the United Kingdom.

2.5.2 It provides detailed specifications covering court dimensions, structural design, rebound wall configurations, surfacing, drainage, access arrangements, and enclosure systems.

2.5.3 The guidance also includes requirements for lighting design, installation, and performance to ensure safe and effective use of padel courts.

2.5.4 The datasheet applies to both indoor and outdoor padel facilities, including single courts, multi-court installations, and courts constructed over existing tennis surfaces.

2.5.5 It addresses both recreational and competition-level installations and incorporates relevant international padel regulations.

2.5.6 Its primary purpose is to ensure that padel courts are designed and constructed to consistent standards that support safe play, reliable ball behaviour, appropriate structural integrity, and suitable lighting performance.

3. LIGHT POLLUTION

3.1.1 Poorly designed lighting can contribute to the following obtrusive light components:

- Obtrusive light (sometimes referred to as light pollution) refers to any light emitted in a direction in which it is not required or wanted and, as such, is detrimental to other users.
- Nuisance/intrusion, the spilling of light beyond the area or property being lit. Light nuisance can include intrusion into windows of neighbouring properties, but it can also cause issues to habitats and areas of high biodiversity interest.
- Sky glow, this is the glow that is visible around urban areas, resulting from the scattering of artificial light from reflected surfaces and badly directed light sources illuminating air molecules and other particles.

A major effect of sky glow at night is to reduce contrast in the sky. This is the most pervasive form of light pollution and can affect areas many miles from the original light source.

- Glare, the uncomfortable brightness of a light source when viewed against a contrasting darker background.

Glare forms a veil of luminance from poorly controlled and directed lighting that reduces contrast and visibility.

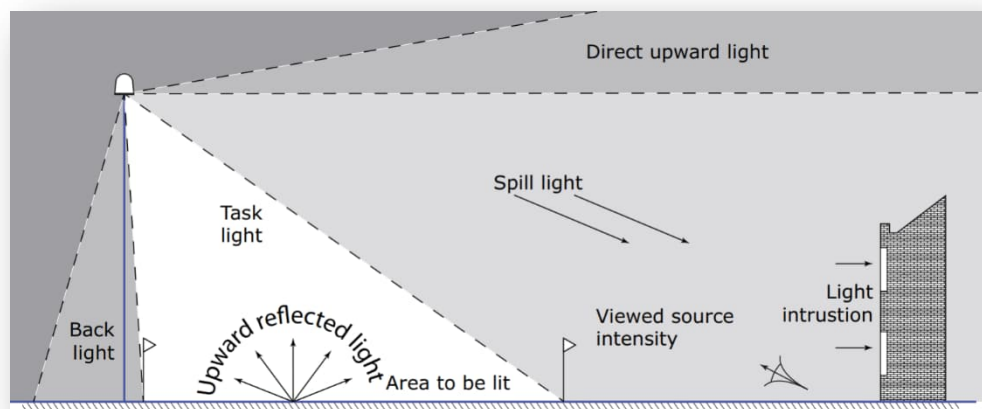


Figure 3.1: Different types of obtrusive light

Extract from Guidance Notes for the Reduction of Obtrusive Light; GN01/21

3.2 Light Design Consideration

- 3.2.1 Light levels, both as designed and installed, have the potential to create areas which have a noticeable difference in brightness.
- 3.2.2 A new lighting installation in an area that has not been lit or is significantly brighter than the surrounding area may affect both adjacent receptors in the form of light spill or glare, and those over a larger area by contributing to sky glow through over-lighting.

3.3 Light Colour

- 3.3.1 Artificial light can be described as having a 'colour' temperature which can range from >6500k, which contains high levels of blue light, down to 2200k, which is considered very warm white light.
- 3.3.2 Light colour has the potential to alter an individual's perception of their environment concerning colour and clarity, as the human eye responds best to whiter light with higher quantities of ultraviolet wavelengths.



Figure 3.2: Example of artificial light colour temperature

3.4 Mitigation

- 3.4.1 Following the guidelines outlined in ILP GN01/21, it is recommended that when carrying out the lighting design calculations, the design must ensure that luminaires are directed downward, with a tilt angle set at 0° in relation to the horizontal plane.

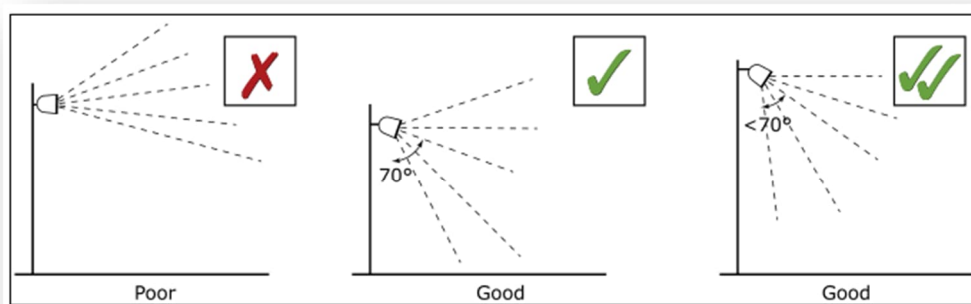


Figure 3.3: Luminaire aiming angles

Extract from Guidance Notes for the Reduction of Obtrusive Light; GN01/21

- 3.4.2 This arrangement is designed to mitigate the potential for glare from each LED luminaire.
- 3.4.3 Any deviation from the specified tilt angle will result in inaccuracies in the provided lighting calculations and Isolux line drawings.

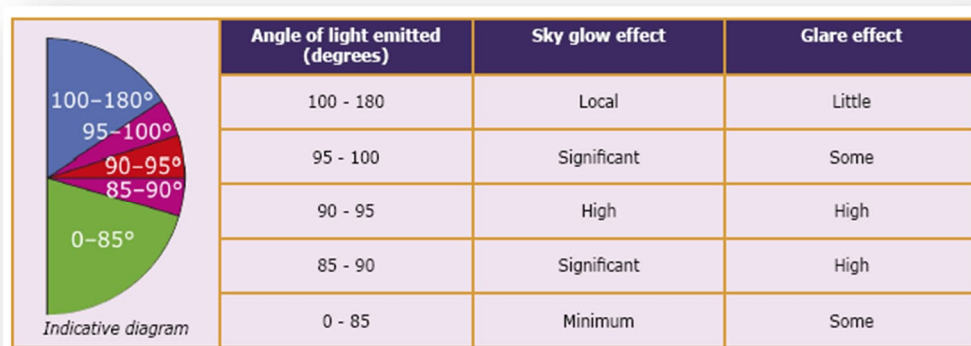


Figure 3.4: The effect on the ability to view the night sky at various angles

Extract from Guidance Notes for the Reduction of Obtrusive Light; GN01/21

4. BASELINE CONDITIONS

4.1 Site Overview

- 4.1.1 The application site lies at the southern edge of Unsworth, between Bury and North Manchester, within the grounds of Unsworth Cricket & Tennis Club.
- 4.1.2 It sits within a suburban residential setting with open recreational land and residential streets, with the M66 Northbound carriageway adjacent to the east.
- 4.1.3 Unsworth Cricket & Tennis Club is accessed from Pole Lane, a local residential distributor road running north–south through Unsworth.
- 4.1.4 The club entrance sits on the eastern side of Pole Lane, with a short driveway leading directly into the on-site parking area and clubhouse frontage.
- 4.1.5 Pole Lane connects northwards into the residential street network of Unsworth and southwards toward Hollins Lane and the wider road system linking to Manchester Road (A56) and the M66 northbound carriageway.



Figure 4.1: The application site red outline

- 4.1.6 Information in this report will assess the impact of artificial lighting, which consists of floodlighting units mounted around the edge of each of the five proposed padel courts.
- 4.1.7 No other existing or proposed outdoor lighting was considered in any part of this assessment report or any of the lighting calculations or conclusions.

5. LIGHTING STRATEGY

5.1 Lighting Brief

- 5.1.1 The lighting strategy aims to ensure that lighting is fit for purpose and compliant with the recommendations of ILP GN01/21 when used during the hours of darkness, whilst minimising the potential for obtrusive light.
- 5.1.2 Lighting performance details outlined in this section of the document are to be considered in conjunction with the following key documents:
- SHD2356-SHD-HLG-UNSW-CA-EO-1.00 Lighting Calculation-R0
 - SHD2356-SHD-HLG-UNSW-CA-EO-0.80 Lighting Calculation-R0
 - SHD2356-SHD-HLG-UNSW-DR-EO-Light Spil-R0
 - LTA-padel-court-guidance

5.2 Planning Considerations

- 5.2.1 No specific requirements were available during the time this report was produced; only a request that a lighting impact assessment be completed, a request from the approving authority.
- 5.2.2 Therefore, this lighting impact assessment will demonstrate compliance with Guidance Notes for the Reduction of Obtrusive Light; GN01/21 (2021) as published by The Institution of Lighting Professionals (ILP), whilst ensuring the padel courts are lit appropriately in accordance with LTA and BS 12193 guidelines.

5.3 Lighting Criteria

5.3.1 The padel court lighting is to be installed in the area as shown below:



Figure 5.1: Proposed site for the padel court aerial image



Figure 5.2: Padel court locations

5.3.2 **Figure 5.2** shows the application site, which consists of five proposed padel courts.

5.3.3 Each padel court will be lit using four 6m lighting columns, each with an inward-facing LED floodlighting unit, installed at 0° tilt horizontal to ground level facing downwards.

5.4 Lighting Levels

- 5.4.1 The Lawn Tennis Association (LTA) published a datasheet that details the minimum requirements of lighting levels and lighting uniformity for outdoor padel courts.

LTA Padel Datasheet

- 5.4.2 The LTA Padel Court Datasheet is a comprehensive guide designed to assist venues in the UK with the planning, construction, and maintenance of padel courts in line with Lawn Tennis Association (LTA) standards.
- 5.4.3 It provides technical specifications for court dimensions, construction materials, and drainage systems to ensure quality, safety, and compliance with UK standards.
- 5.4.4 The datasheet provides guidance on any non-intrusive floodlighting systems to meet minimum lux levels for recreational and competitive use, while minimising light spill and complying with local planning regulations.

SELECTION OF LIGHTING LEVELS		
Level of Competition	Minimum illumination at ground level	
	Light level (lux)	Minimum uniformity (Emin/Eav)
National and International Competition	500	0.70
Regional competition, school, and recreational use	300	0.50

Table 5.1: Selection of lighting class

Extract from LTA Padel Court datasheet

- 5.4.5 It is assumed that each of the padel courts shall be used for recreational use
- 5.4.6 Therefore, the padel court shall be illuminated with an average light level of 300 lux across the whole playing surface at ground level.
- 5.4.7 The padel court surface shall also achieve lighting uniformity of no less than 0.50 (50%), which is derived from the minimum light levels divided by the average lighting levels across the horizontal surface at ground level.
- 5.4.8 During the calculations, SHD designed each padel court individually with a real world practical reduced maintenance factor, to ensure each surface is lit to LTA standards, outlined in **Table 5.1**.
- 5.4.9 However, to ensure the cumulative effect for light spill was captured for the conclusion of this report, an increased maintenance factor was applied as described in **Section 5.6**, in addition to all lighting operating fully during the calculations.

5.5 Lighting Calculations and Modelling

- 5.5.1 SHD were able to produce padel court lighting calculations, in accordance with LTA guidelines for light levels and uniformity.
- 5.5.2 SHD Lighting Consultancy does not assume responsibility for any lighting designs and strategies produced by anyone other than themselves.
- 5.5.3 The application site had external lighting calculations for each of the two padel courts produced using industry-standard software, Lighting Reality.
- 5.5.4 Lighting Reality is a computer software calculation tool that employs photometric data files from manufacturers to replicate the lighting performance of selected light fixtures.
- 5.5.5 The light spill model does not consider physical obstructions and provides light spill details for the initial light output, therefore disregarding the maintenance factor used for ensuring the lighting design performs as required at the end of its life.
- 5.5.6 The calculations do not consider any blocking effect from landscaping features, foliage, trees, walls, barriers or canopies, thus presenting a 100% worse case scenario regarding light spill and sky glow.
- 5.5.7 SHD disregarded the use of canopies, coverings or other structures, as the final padel court construction details may change, treating each padel court as an uncovered playing surface.
- 5.5.8 As such, the light spill diagram presents an intensified and most extreme scenario regarding the ground-level light spill, assuming the absence of light-restricting elements.
- 5.5.9 From these calculations, drawings illustrating the illuminance levels throughout the site and at the boundary have been produced so that the lighting scheme's impact can be assessed.
- 5.5.10 The average maintained illuminance levels (Eav) calculated results are shown in **Appendix B**, are shown to exceed 300 lux, due to the cumulative effect of all lighting operating simultaneously, each luminaire having a 1.00 maintenance factor.

5.6 Design Considerations

- 5.6.1 The information on this drawing does not account for installation considerations, site conditions or provide any risk assessment.
- 5.6.2 This lighting design is based solely on information provided at the time of production.
- 5.6.3 The calculation shown by this drawing assumes that the whole area being considered is in the same plane.
- 5.6.4 No account has been taken for the blocking effect caused by buildings, trees, or other obstructions.
- 5.6.5 All calculations are indicative and assume correct installation, aiming and commissioning of luminaires by a competent contractor.
- 5.6.6 No allowance has been made for future changes in land use, vegetation growth or additional structures that may alter light spill or obtrusive light performance.
- 5.6.7 All photometric data used is assumed accurate as supplied by the manufacturer. The designer accepts no liability for changes to product performance after the date of design.
- 5.6.8 All drawings and calculations are valid only for the revision shown. Any change of site plans or product data will require recalculation.
- 5.6.9 All luminaires shall be installed, aimed and commissioned strictly in accordance with manufacturer instructions; an incorrect tilt or rotation will invalidate the predicted lighting performance.
- 5.6.10 The client is responsible for ensuring safe access for maintenance, including periodic re-aiming and cleaning of luminaires.
- 5.6.11 Lighting performance will degrade over time due to LED lumen depreciation and dirt accumulation. The client must ensure that appropriate maintenance intervals are met.
- 5.6.12 This design supports planning submissions but does not guarantee approval. Any planning driven changes may require redesign.
- 5.6.13 The client is responsible for ensuring that the installed lighting system remains compliant with all planning conditions throughout its operational life.

5.7 Maintenance Factors

- 5.7.1 In lighting assessments, the concept of a maintenance factor is used to account for the reduction in light output over time due to factors like dirt, dust, and ageing of lamps or luminaires. A maintenance factor less than 1.00 indicates a decrease in light output over time.
- 5.7.2 However, ILP GN04, which is a guidance note published by the Institution of Lighting Professionals (ILP) in the UK, suggests assigning a maintenance factor of 1.00 to luminaires in certain cases.
- 5.7.3 This is typically done when you want to assess the lighting conditions in a scenario that assumes optimal maintenance.
- 5.7.4 In other words, it assumes that the luminaires are being cleaned, maintained, and replaced as necessary to maintain their initial performance throughout the assessment period.
- 5.7.5 Assigning a maintenance factor of 1.00 simplifies the assessment process by eliminating the need to calculate and account for maintenance-related losses.
- 5.7.6 It provides a best-case scenario where the luminaires' light output remains constant throughout the assessment period.
- 5.7.7 This approach is useful for comparing different lighting designs or technologies under the assumption of ideal maintenance practices.
- 5.7.8 However, in real-world applications, maintenance factors less than 1.00 would be used to more accurately reflect the actual degradation of light output over time due to practical maintenance challenges.

6. OUTDOOR LIGHTING REQUIREMENTS

6.1 Proposed Lighting Requirements

6.1.1 Lighting performance parameters for the proposed lighting are outlined in **Table 6.1**.

LUMINAIRE SPECIFICATION	
Location:	Five proposed padel courts
Luminaire model ref:	EL NED 240 TC
Luminaire style:	Padel court LED floodlight
Mounting height:	6m from ground level
Mounting type:	Post top mounted facing inward
Luminaire tilt:	0°
Light source:	Cool White (5700k) LED
Lighting classification:	G3 (semi horizontal cut off)

Table 6.1: Padel court lighting performance parameters

6.2 Floodlighting Luminaire

- 6.2.1 The luminaires that are to illuminate the padel court surface are a professional-grade floodlighting unit that comprises a powder-coated aluminium body.



Figure 6.1: Example image of EL NED 240 TC LED floodlighting unit

- 6.2.2 The padel court lighting design has been completed using photometric data for the luminaires shown in **Table 6.1**, which use a light source with a 5700K colour temperature.
- 6.2.3 Light has a colour-correlated colour temperature, which describes the overall colour appearance of the light source in Kelvin degrees.
- 6.2.4 'Cooler' light sources will have a higher Kelvin temperature and 'warmer' light sources will have a lower Kelvin temperature.
- 6.2.5 It is recommended that >5000K is the preferred light source temperature used for commercial padel court installations.

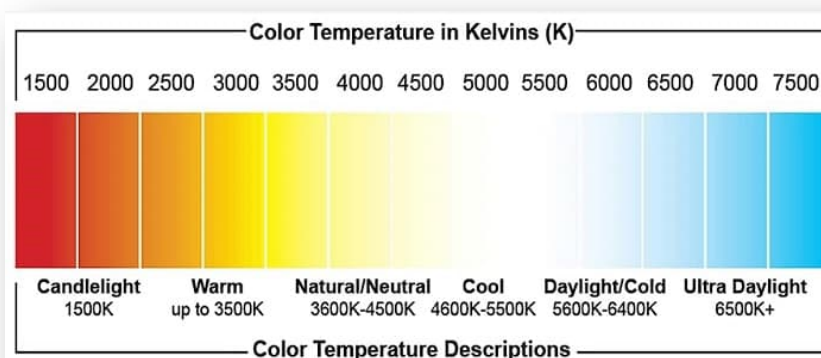


Figure 6.2: Example of light colour correlation temperatures

7. SENSITIVE RECEPTORS

7.1 Surrounding Environment

- 7.1.1 The proposed padel courts, outlined in red in **Figure 5.1**, are located east of residential housing with the M66 northbound carriageway adjacent, separated by an existing wooded section of land.
- 7.1.2 No specific sensitive receptors have been identified in any planning conditions or ecological assessment reports.
- 7.1.3 As such, SHD consider only the residential housing to the west and M66 to be considered as sensitive receptors, highlighted in yellow in **Figure 7.1**.



Figure 7.1: Aerial location plan

- 7.1.4 The residential house closest to the padel courts shall be included in the lighting calculation with a vertical calculation grid, measuring the maximum level of light in lux across the nearest façade facing the padel courts.
- 7.1.5 Although the M66 is shown to be separated by an established woodland, a vertical calculation grid has been included to demonstrate the low levels of light emitted from the padel court floodlighting units.

7.2 Vertical Calculation Grids

- 7.2.1 To ensure the levels of light spill on the identified sensitive receptors, vertical calculation grids were produced within the lighting calculation software.
- 7.2.2 Each vertical calculation grid measures 10m high from ground level and has a calculation point spacing of 1m x 1m.
- 7.2.3 Each of the 1m spaced calculation points measures the light shining onto the vertical surface.
- 7.2.4 The vertical calculation result tables show the average illumination (Eav) levels across the whole grid face and a maximum value (Emax) of lux, which is the calculated value of the light on one of the 1m spaced calculated grid points.
- 7.2.5 No blocking effects from hedgerows, trees, foliage, walls, or fencing were included during the lighting calculations.
- 7.2.6 The light levels on the vertical surface would be lower than the calculated levels if there are any physical obstacles between the calculation grids and the padel court lighting units.
- 7.2.7 The calculated results also do not factor in the reduction in lumen output which will occur during the life span of the installation, as the calculations were carried out with a luminaire maintenance factor of 1.00 as described in **Section 5.6** of this assessment.

7.3 Residential Vertical Calculation Grid

- 7.3.1 A vertical calculation grid shown in yellow in **Figure 7.2** was created within Lighting Reality and has been created across the closest façade of the nearest residential house facing the location of the proposed padel courts.



Figure 7.2: Residential vertical calculation location shown in yellow

- 7.3.2 The vertical grid has calculation points positioned from ground level and measures 10m in length and 10m in height.



Figure 7.3: Residential vertical calculation (3D view)

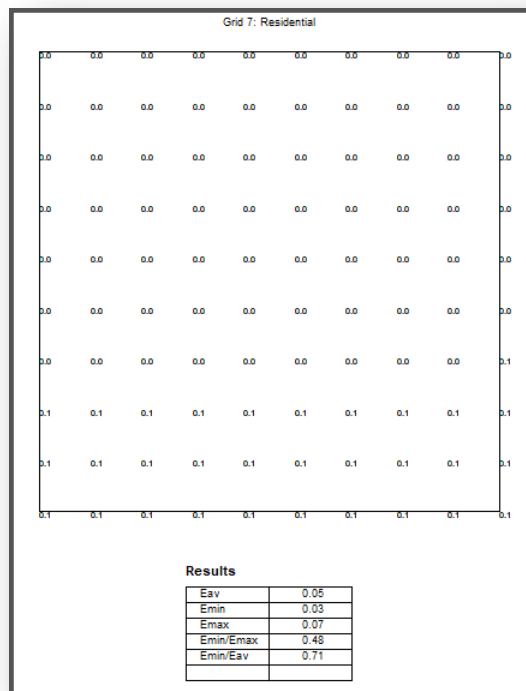


Figure 7.4: Residential vertical calculation results

- 7.3.3 The vertical calculation grid result table in **Figure 7.4** shows the maximum illuminance level (E_{max}) to be 0.07 lux.
- 7.3.4 The calculation grid results do not consider the reduction in lumen output which will occur during the life span of the installation and, therefore, are exaggerated, as reducing the maintenance factor to 0.80, which takes into consideration LED degradation, driver deterioration and lens grime, which could reduce the lux readings.
- 7.3.5 **Table 2.2** provides a maximum permissible value of 10.00 lux for light intrusion into windows for an E3 environmental zone.
- 7.3.6 Therefore, the level of light spill onto any windows facing the padel courts is considered to be acceptable.
- 7.3.7 Any blocking effect from existing trees or other landscaping features and a reduction in light output due to a lower maintenance factor would further reduce the light spill readings.

7.4 M66 Northbound Vertical Calculation Grid

- 7.4.1 A vertical calculation grid shown in yellow in **Figure 7.5** was created within Lighting Reality and has been created adjacent to the nearest edge of the M66 motorway facing the padel courts.



Figure 7.5: M66 Northbound vertical calculation location shown in yellow

- 7.4.2 The vertical grid has calculation points positioned from 2m ground level to take into consideration the change in topography and measures 150m in length and 10m in height.

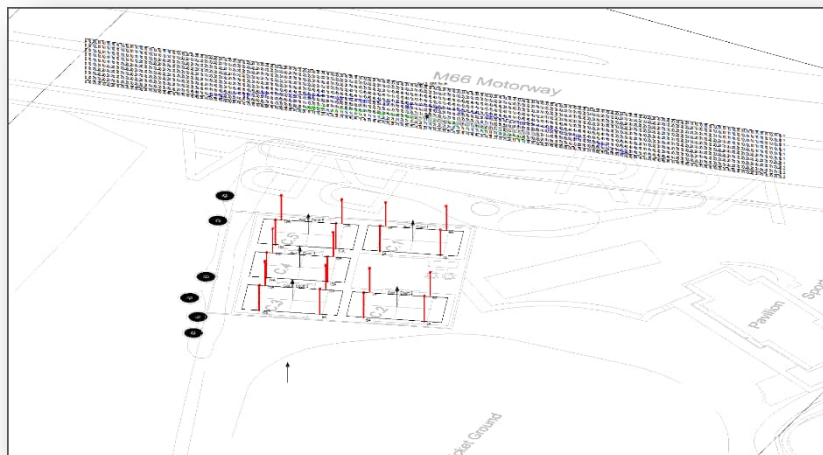


Figure 7.6: M66 Northbound vertical calculation (3D view)



- 26



Figure 7.8: Extract from Google (2026)

- 7.4.6 There is an established woodland separating the proposed padel court locations, which can be seen in **Figure 7.8**, which has not been included in the vertical calculations.



Figure 7.9: M66 Northbound carriageway drivers' view

- 7.4.7 The stretch of the northbound carriageway of the M66, which runs adjacent to the proposed padel court locations, has an established woodland separating the road surface and padel court locations.
- 7.4.8 The low level of light onto the closest edge of the hard shoulder measures 1.52 lux, not taking into consideration the increased maintenance factor, change in topography, or the blocking effect trees and foliage will have; therefore, it is not considered to be excessive.

7.5 Luminous Intensity

- 7.5.1 Guidance Notes for the Reduction of Obtrusive Light; GN01/21 (2021) as published by The Institution of Lighting Professionals (ILP) recognises that currently, software has yet to catch up with the requirements outlined in **Table 2.2**.
- 7.5.2 However, using the inverse square law, it is possible to produce manual calculations to determine the luminous intensity values
- 7.5.3 The surface area of the padel court floodlights is greater than 0.5m², so the pre-curfew value needs to be less than 10000 cd/m² for an E3 environmental zone, taken from **Table 3.2** of this assessment report.
- 7.5.4 Using the inverse square law $E = I/d^2$, the luminous intensity can be calculated.

$$\text{Intensity} = E (\text{maximum lux value}) * \text{distance}^2$$

LUMINOUS INTENSITY RESULTS				
Sensitive Receptor	Maximum Lux Value (E)	Distance (d)	Candela/m ²	Pass / Fail
Residential House Window	0.07	183m	2344	Pass

Figure 7.9: Luminous intensity result table

- 7.5.5 The results of the luminous intensity calculations all passed the permissible levels provided in **Table 3.2**.
- 7.5.6 Any blocking effect from existing trees or other landscaping features and a reduction in light output due to a lower maintenance factor, would further reduce the light spill readings.

7.6 Upward Light and Glare

- 7.6.1 The floodlighting luminaires have been designed to achieve the target lighting illuminance and uniformity at full cut-off, at 0° tilt.
- 7.6.2 As illustrated in **Table 2.2**, the ILP sky glow limitation for an area classified as environmental zone E3 is 5.00% R_{UL} .
- 7.6.3 The calculated upward light ratio of each of the floodlighting units is 0.50%, therefore, it complies with **Table 2.2** limits of less than 5.00% for an E3 environmental zone.

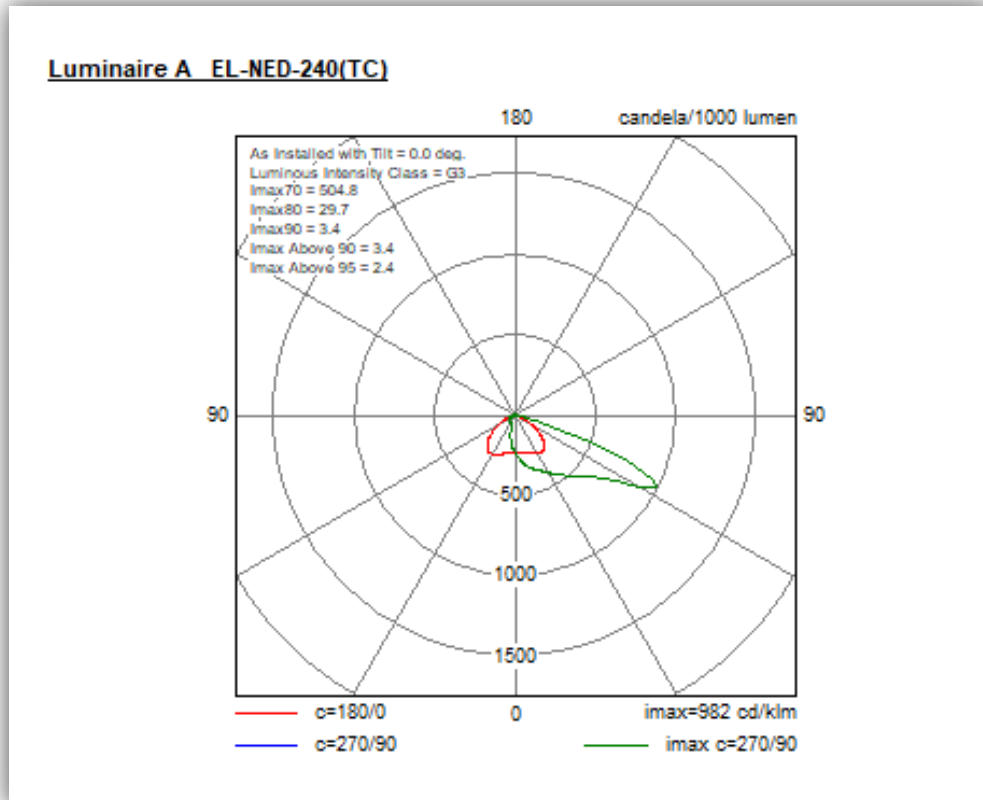


Figure 7.10: Polar diagram for EL NED 240 (TC) floodlight

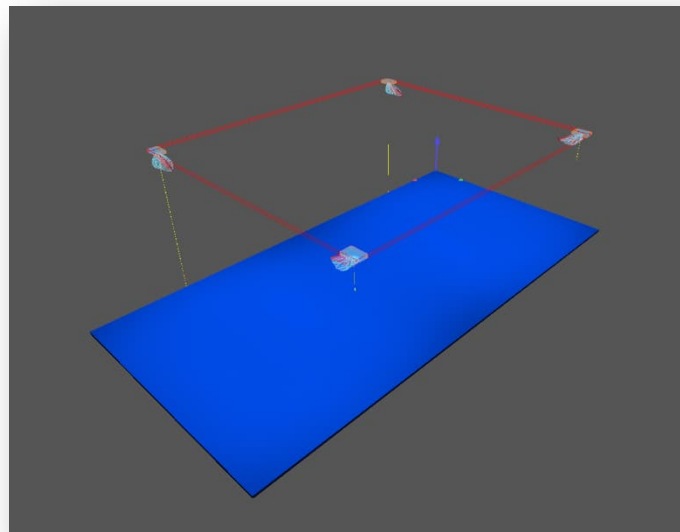


Figure 7.11: Luminaire 3D model, 6m from ground level and 0° tilt facing downward.

Site 1 (Obtrusive light scene)

Summary

General information on the obtrusive light calculation

Standard	CIE 150:2017
Zone	Environmental Zone E3
Period under review	Pre-curfew
Apply limits for	Sports facility lighting

General obtrusive light scene results

Symbol	Calculated	Threshold value	Check
R _{UL}	0.5 %	≤ 5.0 %	✓
R _{DLO}	99.5 %	–	
R _{ULO}	0.5 %	–	

Figure 7.12: Calculated upward light ratio (R_{UL})

- 7.6.4 The upward light ratio has been calculated as 0.50% which is below the 5.00% threshold for skyglow within an E3 Environmental Zone, in accordance with **Table 2.2**.

8. RECOMMENDATIONS

- 8.1.1 All external lighting, whether for the construction or operation phase, must comply with the recommended limitations given in the ILP guidance notes for an environmental zone E3 location.
- 8.1.2 The limits, set out in **Table 2.1**, prohibit excessive emission of upward light and help to minimise light spill and glare.
- 8.1.3 The use of horizontal cut-off luminaires installed at 0° tilt with flat glass lenses and internal optics is recommended to limit views of the lamp, control glare and direct light in a controlled pattern.
- 8.1.4 This will help to minimise potential glare, sky glow and light spill for all the proposed luminaires.
- 8.1.5 As the padel courts are assumed not to operate after 22:00, the levels of obtrusive light and the percentage of sky glow are both satisfactory in accordance with pre-curfew values.

9. CONCLUSION

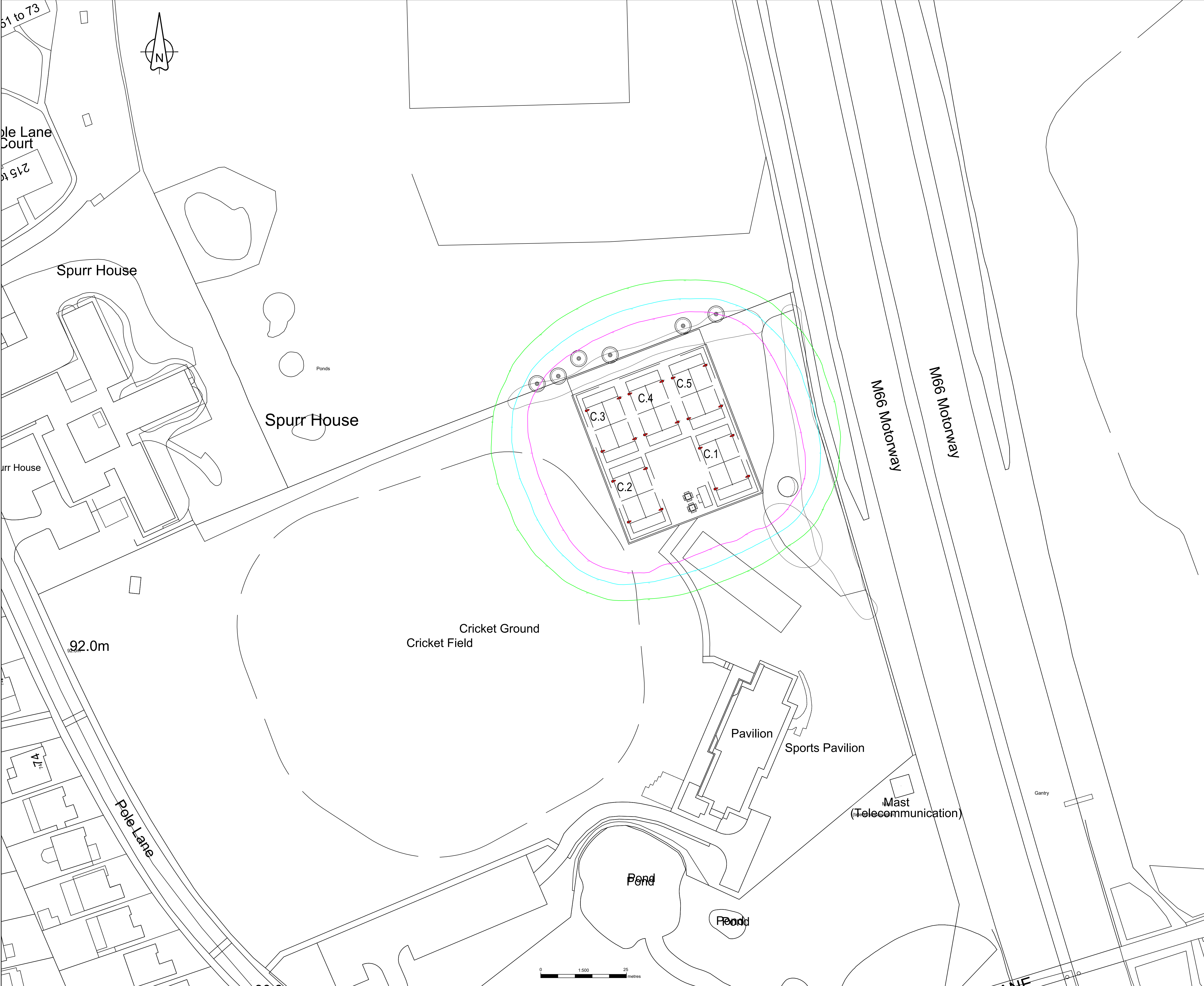
9.1 Design Commentary

- 9.1.1 As part of the lighting strategy, a review has been undertaken of the potential impact created by any proposed lighting concerning the application site.
- 9.1.2 Potentially significant effects from the padel court lighting on sensitive receptors have been managed to create a negligible night-time impact.
- 9.1.3 The lighting design strategy presented indicates that the potentially significant effects of the proposed lighting for the application site have been adequately managed, and all tested parameters are expected to meet recommended guidance benchmarks.
- 9.1.4 The lighting design strategy presented indicates the lighting installation can achieve the required minimum lighting levels and distribution to meet the applicable standards while causing negligible light trespass to the adjoining land and no impact to local sky glow.
- 9.1.5 The impact of the application site lighting is considered to be negligible with respect to sensitive receptors.
- 9.1.6 Any variation to the make, model, or lumen output of each luminaire, adjustment to the design tilt angle, location, or height of each floodlighting column will result in the provided lighting calculations, Isolux line drawings and content of this assessment report being incorrect.
- 9.1.7 The lighting strategy and assessment outline the lighting design criteria for the proposed lighting at the application site to ensure that the lighting is fit for purpose whilst maintaining sensitivity towards the environment.
- 9.1.8 Compliance with the lighting strategy will allow a safe and sensitive level of light for the people using the application site during the hours of darkness, whilst reducing the potential for obtrusive light and limiting this to a negligible level and in compliance with GN01/21 (2021) as published by The Institution of Lighting Professionals (ILP).
- 9.1.9 Isolux lines of 2.00, 1.00 and 0.50 lux have been shown on the light spill drawings in **Appendix A** and the lighting calculation report shown in **Appendix B and Appendix C**.
- 9.1.10 The light spill drawings have been produced with a luminaire maintenance factor of 1.00 as specified in the ILP publication, Public Lighting Guide 04 – Guidance on Undertaking an Environmental Assessment Report.
- 9.1.11 The Isolux lines shown in **Appendix A** represent a best case scenario, as all luminaires have been calculated with a maintenance factor of 1.00, whereas a reduced design maintenance factor of 0.80, which factors in lumen depreciation, lens degradation, and driver deterioration throughout the whole life of the lighting installation.
- 9.1.12 In summary, our expert assessment indicates that the lighting installation does not yield significant adverse effects on the immediate environment in terms of lighting and that all reasonable measures have been integrated into the design phase of this lighting scheme to minimise its impact on the environment.

10. APPENDIX A

10.1 Light Spill Drawing

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Qty 20	Luminaire Type:	Padel Court floodlight
	Luminaire Reference:	EL-NED 240 (TC)
	Mounting Type:	Post top mounted on 6m mast
	Luminaire Tilt:	0°
	Lumen Output:	37.20klm
	Luminaire Wattage:	240w
	Luminous Intensity:	G3
ISOLUX CONTOUR KEY (AT GROUND LEVEL):		
0.50 Isolux contour line		
1.00 Isolux contour line		
2.00 Isolux contour line		



EL-NED 240 (TC) LED floodlight



LOCATION PLAN: EASTINGS 382270 NORTHINGS 407001

- GENERAL NOTES**
- The site engineer shall ensure that all drawings and associated documentation are fully coordinated and consistent prior to the commencement of any works.
 - All design documents shall be read in conjunction with one another.
 - Any discrepancies, ambiguities, or conflicts identified shall be reported immediately to SHD Lighting Consultancy Ltd and the overseeing organisation.
 - SHD Lighting Consultancy Ltd accepts no responsibility for construction errors or omissions resulting from unreported design issues once works have commenced.
 - No substitutions of luminaires, drivers, optics, or control equipment shall be made without approval from SHD Lighting Consultancy Ltd. Unapproved substitutions may invalidate compliance with lighting standards and design intent.

The details provided on this drawing are subject to comments by all relevant approving authorities and/or any overseeing organisation. It is to be understood that these drawings and the information shown shall not be used for construction. This drawing should not be used any tendering, procurement of materials or construction until technical approval is received. Should any tendering, procurement, installation or removal works take place prior to obtaining written full technical approval, then it is entirely at risk and SHD Lighting Consultancy Ltd accept no responsibility for these actions.

R0	INITIAL DESIGN FOR REVIEW AND COMMENT	20/03/2026	SRH
REV	DESCRIPTION	DATE	BY



info@shdlighting.co.uk 07834 490 192 www.shdlighting.co.uk

PROJECT:	UNSWORTH CRICKET CLUB		
DRAWING:	LIGHT SPILL DRAWING		
CLIENT:	ASHTONHALE		
DRAWING NUMBER:	SHD2356-SHD-PLG-UNSWORTH-CC-Light Spill R0	DRAWN:	SRH
	SHEET 1 OF 1	CHECKED:	SRH
CONTRACT NUMBER:	SHD2356	APPROVED:	
	DATE: 20/03/2026	REVISION:	R0

SCALE @ A1: 1:500

NOT TO BE USED FOR CONSTRUCTION

11. APPENDIX B**11.1 Lighting Calculation Report 1.00 Maintenance Factor**

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DATE: 20 March 2026
DESIGNER: SHD Lighting Consultancy Limited
PROJECT No: SHD2356
PROJECT NAME: Unsworth Cricket Club



It is assumed that the flood lighting luminaires are to be angled at 0° tilt to the horizontal plane, downward firing only.

Isolux contour lines shown represent a 'day one' worst-case scenario with a maintenance factor of 1.00, as this demonstrates the maximum lumen output not taking into consideration any LED degradation, driver deterioration or weather grime and lens dirt which will occur during the lifespan of the lighting installation

Horizontal illuminance (contours indicate projected lux values at ground level, excluding the screening effect of fences, walls, buildings, trees, hedges, etc.)

1.00 Maintenance Factor

PREPARED BY: SHD Lighting Consultancy Ltd
Contact: info@shdlighting.co.uk
Phone: 07834 490 192
Website: www.shdlighting.co.uk

Layout Report

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Grid 1: Light Spill	382055.13	406878.17	330.00	201.00	1.50	1.50
2	Grid 2: Court 1	382274.94	406990.17	20.00	10.00	1.05	1.11
3	Grid 3: Court 2	382249.66	406980.44	20.00	10.00	1.05	1.11
4	Grid 4: Court 3	382241.94	407001.06	20.00	10.00	1.05	1.11
5	Grid 5: Court 4	382254.41	407005.93	20.00	10.00	1.05	1.11
6	Grid 6: Court 5	382267.06	407010.63	20.00	10.00	1.05	1.11
7	Grid 7: Residential	382078.00	406910.28	10.00	10.00	1.11	1.11
8	Grid 8: M66 South	382339.70	406925.95	150.00	10.00	1.01	1.11

Luminaires

Luminaire A Data

Supplier	
Type	EL-NED-240(TC)
Lamp(s)	LED 5050
Lamp Flux (klm)	37.42
File Name	EL-NED-240(TC).IES
Maintenance Factor	1.00
Lum. Int. Class	G3
No. in Project	20

Layout

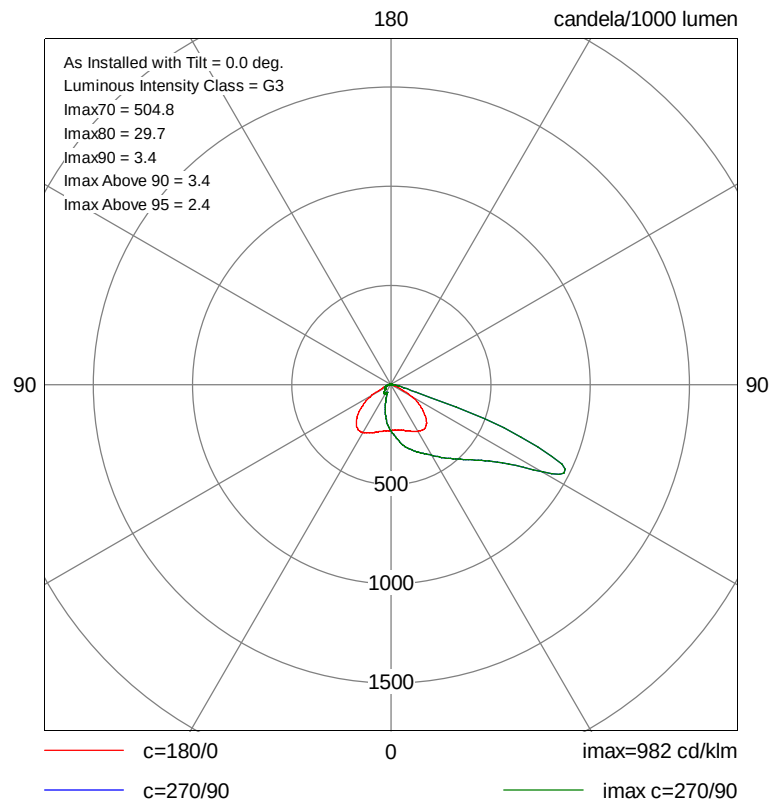
ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
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2	A	382275.97	406986.57	6.00	20.00	0.00	0.00	0.40			
3	A	382285.83	406990.38	6.00	202.00	0.00	0.00	0.40			
4	A	382290.37	406978.48	6.00	200.00	0.00	0.00	0.40			
5	A	382255.23	406965.03	6.00	22.00	0.00	0.00	0.40			
6	A	382250.68	406976.92	6.00	20.00	0.00	0.00	0.40			
7	A	382260.54	406980.73	6.00	202.00	0.00	0.00	0.40			
8	A	382265.08	406968.83	6.00	200.00	0.00	0.00	0.40			
9	A	382247.54	406985.64	6.00	22.00	0.00	0.00	0.40			
10	A	382242.99	406997.53	6.00	20.00	0.00	0.00	0.40			
11	A	382252.85	407001.34	6.00	202.00	0.00	0.00	0.40			
12	A	382257.39	406989.44	6.00	200.00	0.00	0.00	0.40			
13	A	382259.98	406990.49	6.00	22.00	0.00	0.00	0.40			

Layout Continued

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
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15	A	382265.29	407006.19	6.00	202.00	0.00	0.00	0.40			
16	A	382269.82	406994.29	6.00	200.00	0.00	0.00	0.40			
17	A	382272.63	406995.16	6.00	22.00	0.00	0.00	0.40			
18	A	382268.08	407007.05	6.00	20.00	0.00	0.00	0.40			
19	A	382277.94	407010.86	6.00	202.00	0.00	0.00	0.40			
20	A	382282.48	406998.96	6.00	200.00	0.00	0.00	0.40			

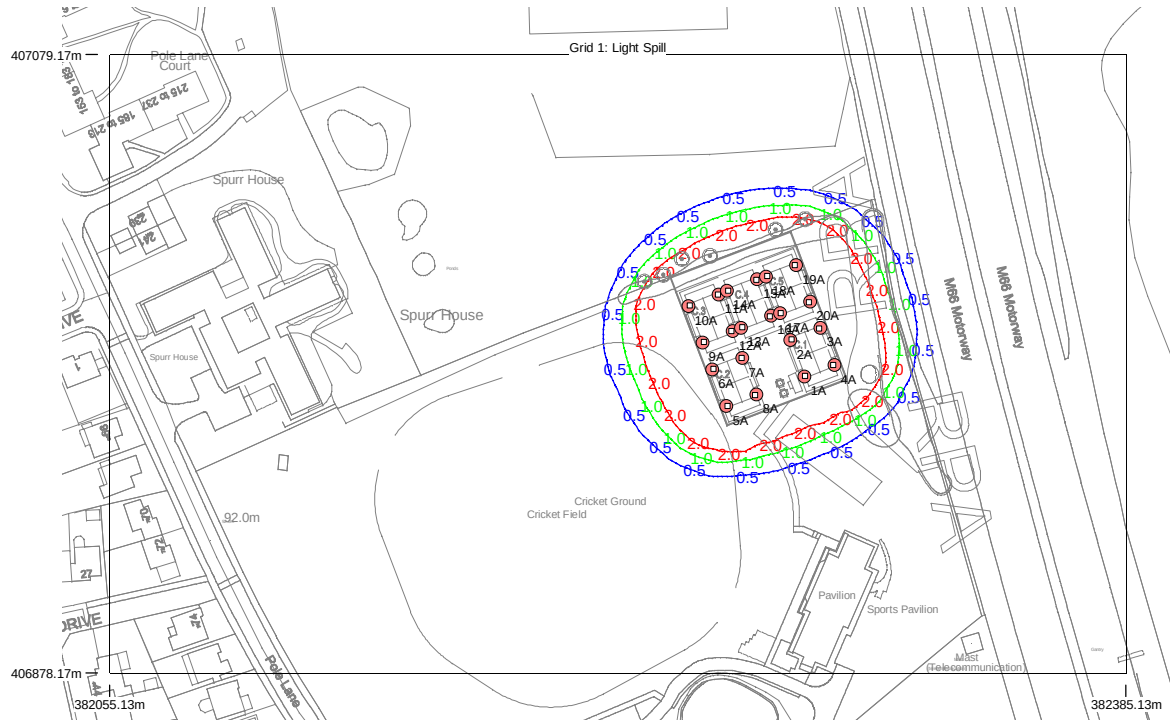
Polar Diagram

Luminaire A EL-NED-240(TC)



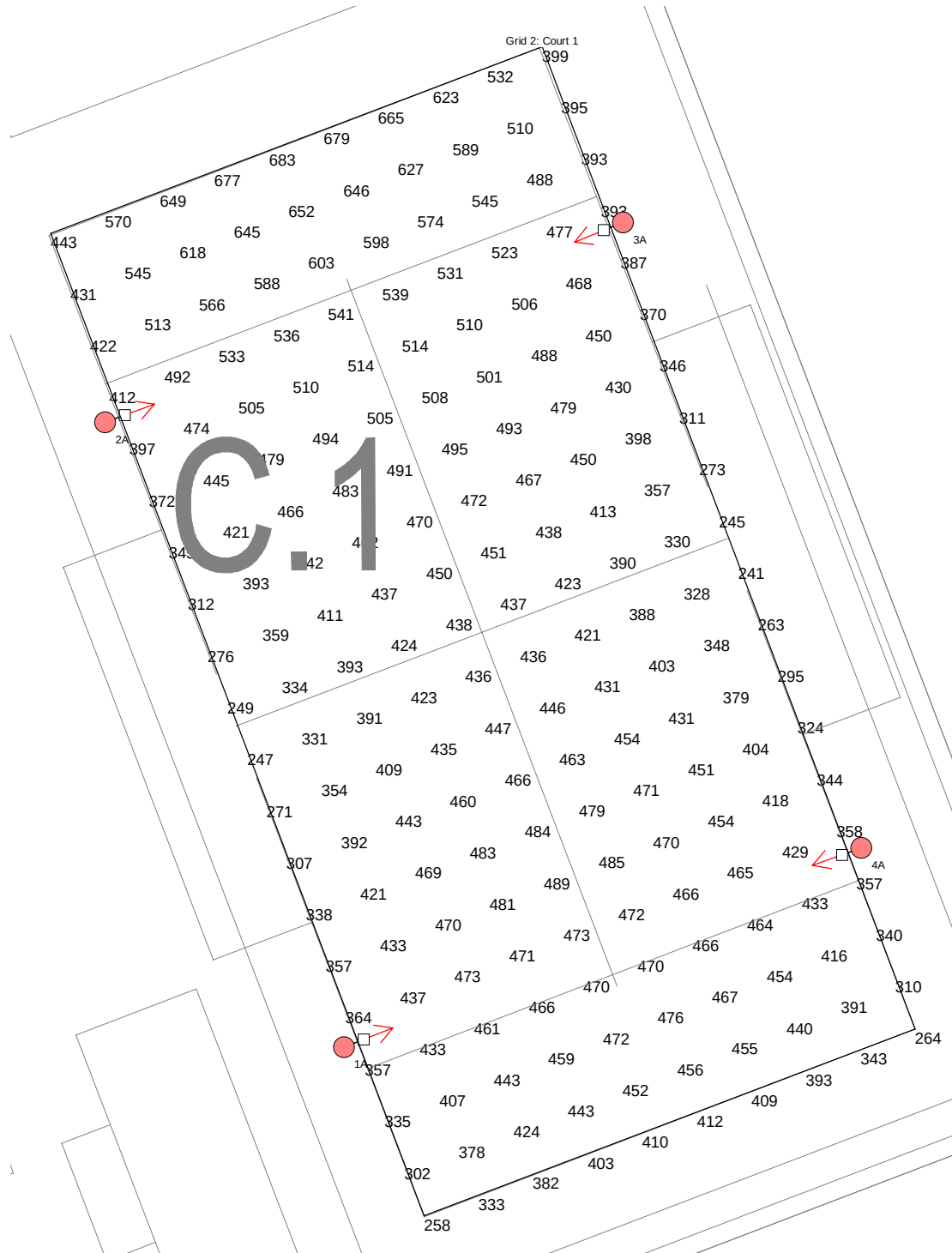
Horizontal Illuminance (lux)

Grid 1: Light Spill



Horizontal Illuminance (lux)

Grid 2: Court 1

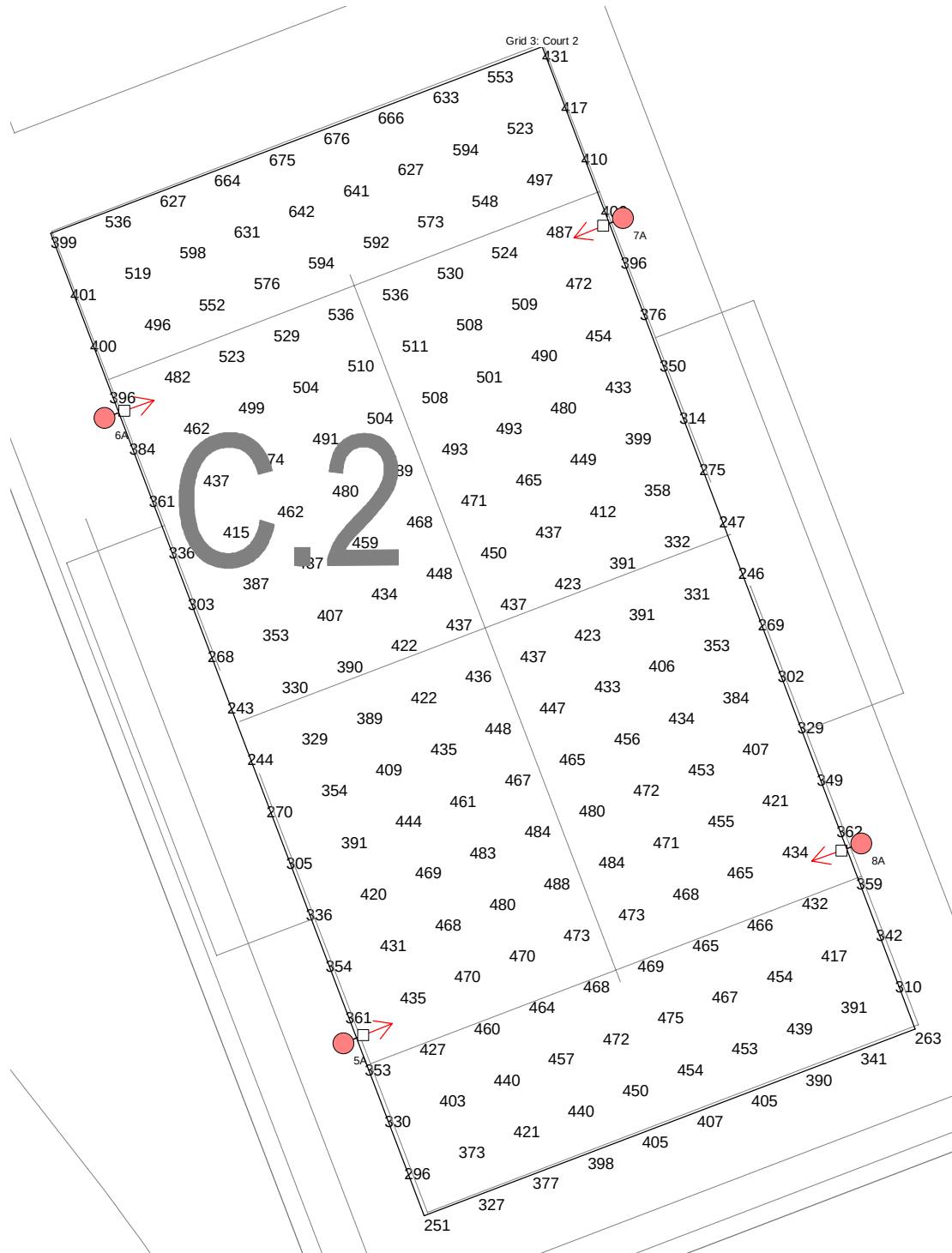


Results

Eav	441.84
Emin	240.77
Emax	683.28
Emin/Emax	0.35
Emin/Eav	0.54

Horizontal Illuminance (lux)

Grid 3: Court 2

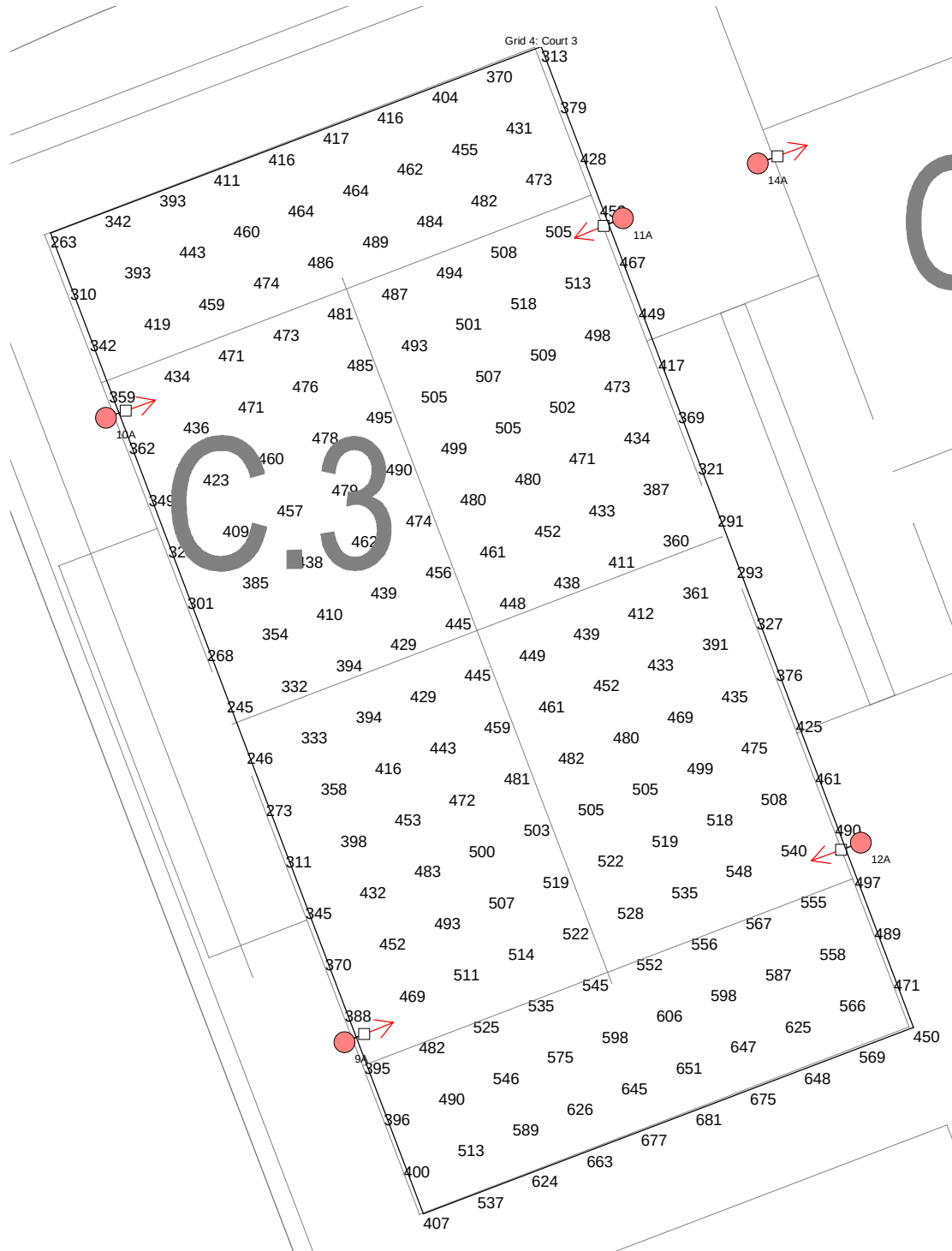


Results

Eav	440.03
Emin	243.34
E _{max}	675.57
E _{min} /E _{max}	0.36
E _{min} /E _{av}	0.55

Horizontal Illuminance (lux)

Grid 4: Court 3

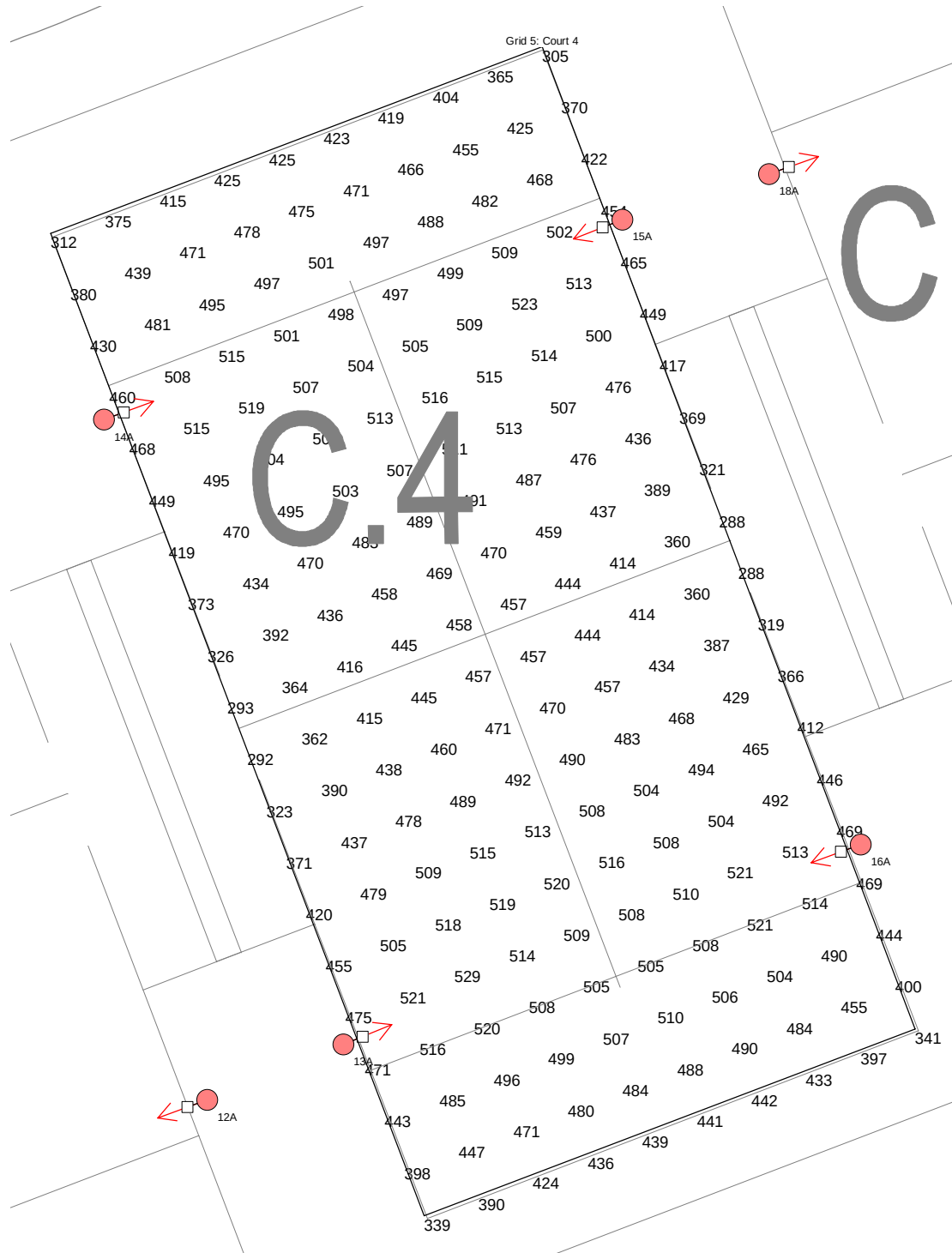


Results

Eav	461.56
Emin	244.71
E _{max}	680.76
Emin/E _{max}	0.36
Emin/Eav	0.53

Horizontal Illuminance (lux)

Grid 5: Court 4

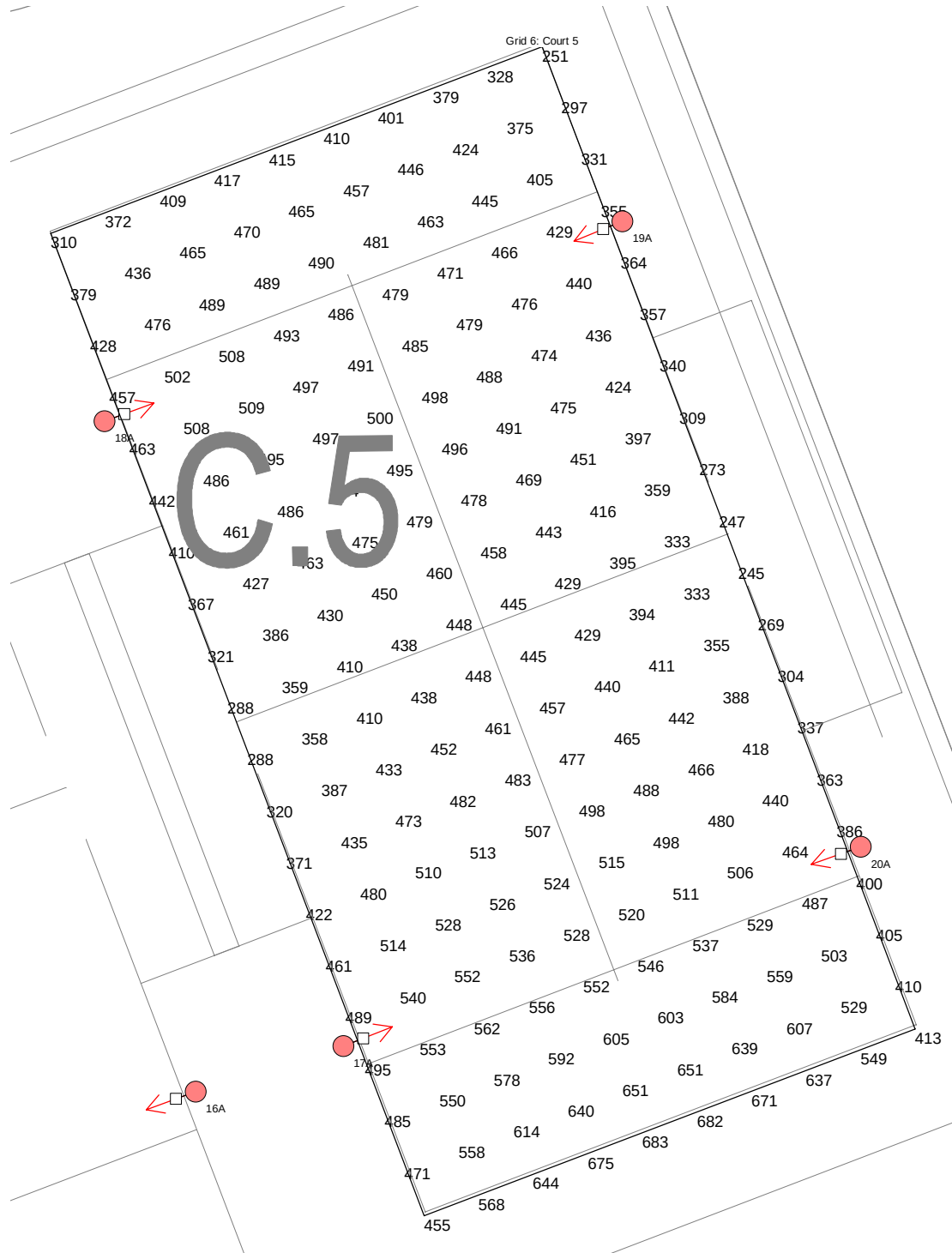


Results

Eav	457.39
Emin	287.77
Emax	529.43
Emin/Emax	0.54
Emin/Eav	0.63

Horizontal Illuminance (lux)

Grid 6: Court 5

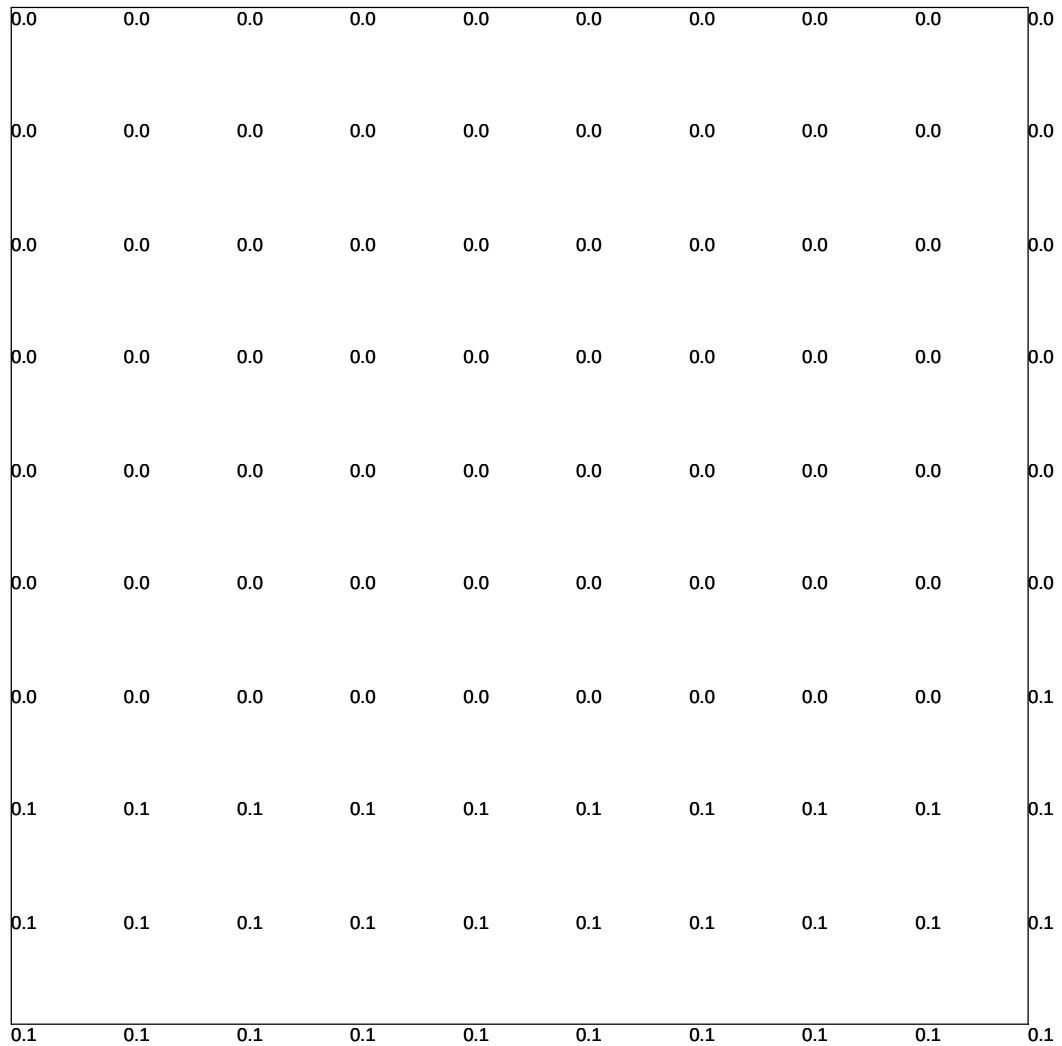


Results

Eav	460.73
Emin	245.03
Emax	683.13
Emin/Emax	0.36
Emin/Eav	0.53

Illuminance (lux)

Grid 7: Residential

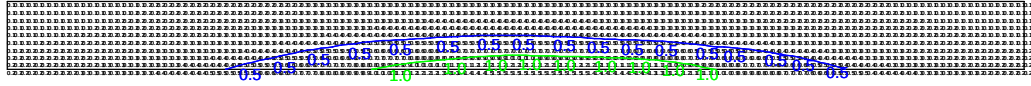


Results

Eav	0.05
Emin	0.03
Emax	0.07
Emin/Emax	0.48
Emin/Eav	0.71

Illuminance (lux)

Grid 8: M66 South



Results

Eav	0.39
Emin	0.10
Emax	1.52
Emin/Emax	0.06
Emin/Eav	0.24

12. APPENDIX C

12.1 Lighting Calculation Report 0.80 Maintenance Factor

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DATE: 20 March 2026
DESIGNER: SHD Lighting Consultancy Limited
PROJECT No: SHD2356
PROJECT NAME: Unsworth Cricket Club



It is assumed that the flood lighting luminaires are to be angled at 0° tilt to the horizontal plane, downward firing only.

Horizontal illuminance (contours indicate projected lux values at ground level, excluding the screening effect of fences, walls, buildings, trees, hedges, etc.)

0.80 Maintenance Factor

PREPARED BY: SHD Lighting Consultancy Ltd
Contact: info@shdlighting.co.uk
Phone: 07834 490 192
Website: www.shdlighting.co.uk

Layout Report

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Grid 1: Light Spill	382055.13	406878.17	330.00	201.00	1.50	1.50
2	Grid 2: Court 1	382274.94	406990.17	20.00	10.00	1.05	1.11
3	Grid 3: Court 2	382249.66	406980.44	20.00	10.00	1.05	1.11
4	Grid 4: Court 3	382241.94	407001.06	20.00	10.00	1.05	1.11
5	Grid 5: Court 4	382254.41	407005.93	20.00	10.00	1.05	1.11
6	Grid 6: Court 5	382267.06	407010.63	20.00	10.00	1.05	1.11
7	Grid 7: Residential	382078.00	406910.28	10.00	10.00	1.11	1.11
8	Grid 8: M66 South	382339.70	406925.95	150.00	10.00	1.01	1.11

Luminaires

Luminaire A Data

Supplier	
Type	EL-NED-240(TC)
Lamp(s)	LED 5050
Lamp Flux (klm)	37.42
File Name	EL-NED-240(TC).IES
Maintenance Factor	0.80
Lum. Int. Class	G3
No. in Project	20

Layout

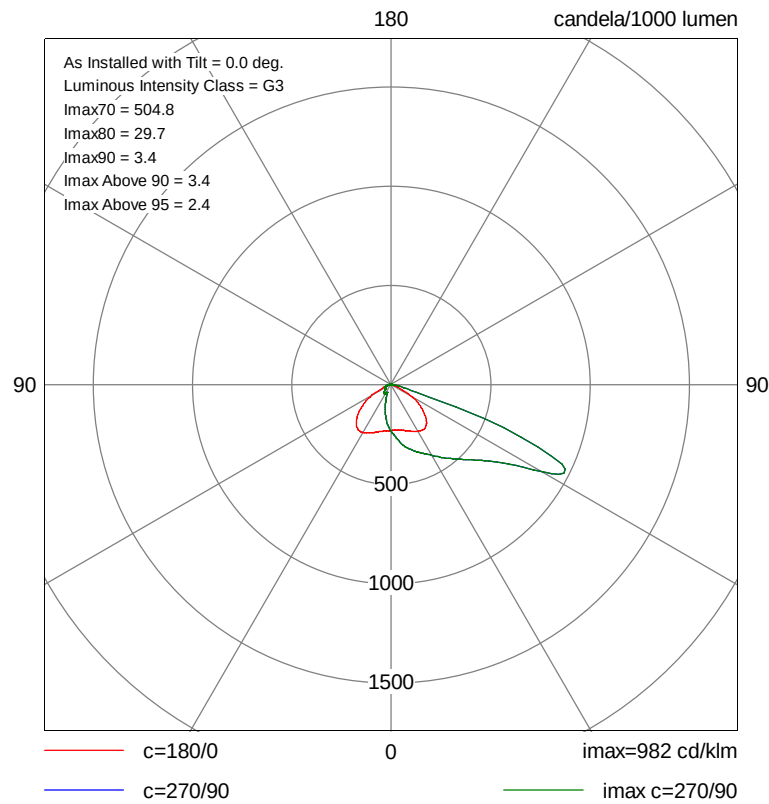
ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
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2	A	382275.97	406986.57	6.00	20.00	0.00	0.00	0.40			
3	A	382285.83	406990.38	6.00	202.00	0.00	0.00	0.40			
4	A	382290.37	406978.48	6.00	200.00	0.00	0.00	0.40			
5	A	382255.23	406965.03	6.00	22.00	0.00	0.00	0.40			
6	A	382250.68	406976.92	6.00	20.00	0.00	0.00	0.40			
7	A	382260.54	406980.73	6.00	202.00	0.00	0.00	0.40			
8	A	382265.08	406968.83	6.00	200.00	0.00	0.00	0.40			
9	A	382247.54	406985.64	6.00	22.00	0.00	0.00	0.40			
10	A	382242.99	406997.53	6.00	20.00	0.00	0.00	0.40			
11	A	382252.85	407001.34	6.00	202.00	0.00	0.00	0.40			
12	A	382257.39	406989.44	6.00	200.00	0.00	0.00	0.40			
13	A	382259.98	406990.49	6.00	22.00	0.00	0.00	0.40			

Layout Continued

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
14	A	382255.42	407002.39	6.00	20.00	0.00	0.00	0.40			
15	A	382265.29	407006.19	6.00	202.00	0.00	0.00	0.40			
16	A	382269.82	406994.29	6.00	200.00	0.00	0.00	0.40			
17	A	382272.63	406995.16	6.00	22.00	0.00	0.00	0.40			
18	A	382268.08	407007.05	6.00	20.00	0.00	0.00	0.40			
19	A	382277.94	407010.86	6.00	202.00	0.00	0.00	0.40			
20	A	382282.48	406998.96	6.00	200.00	0.00	0.00	0.40			

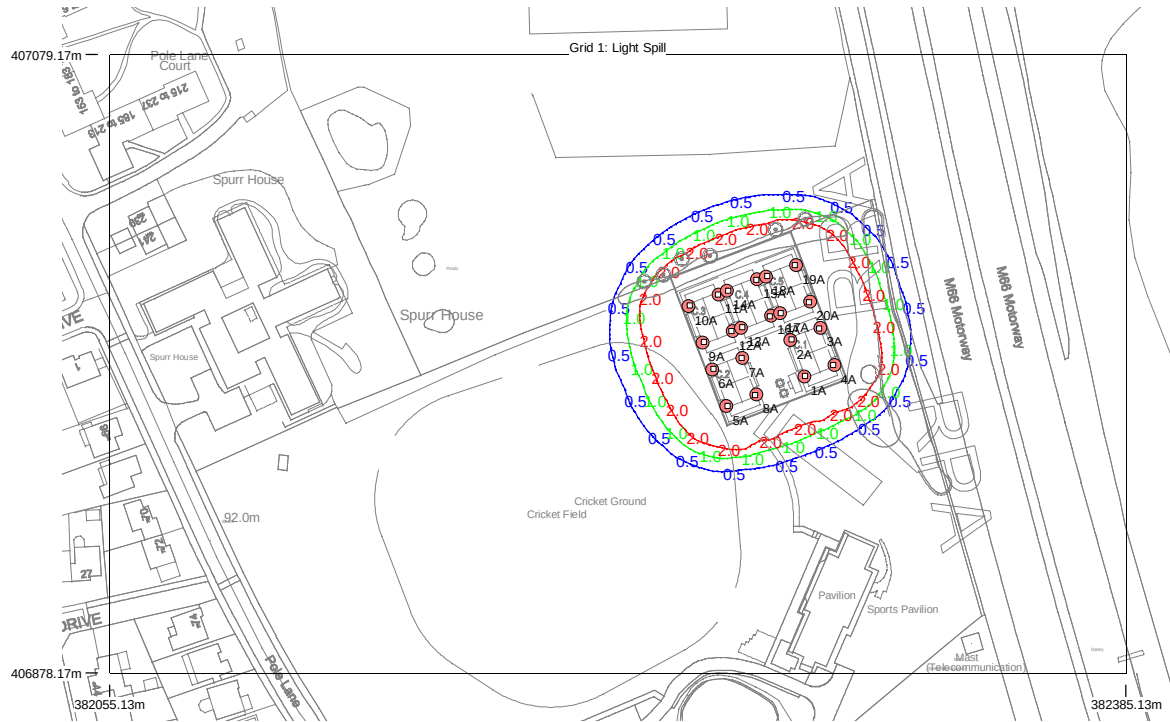
Polar Diagram

Luminaire A EL-NED-240(TC)



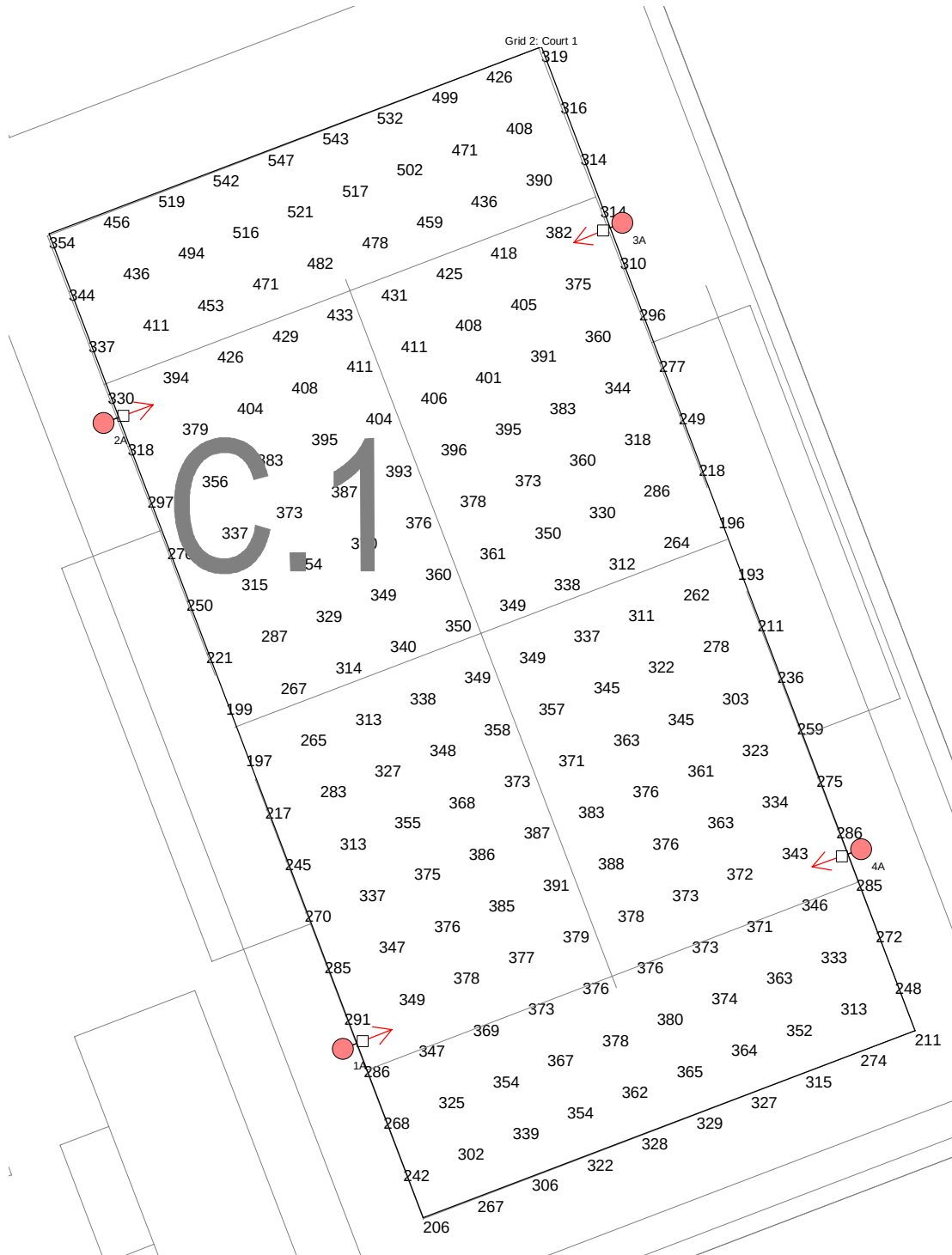
Horizontal Illuminance (lux)

Grid 1: Light Spill



Horizontal Illuminance (lux)

Grid 2: Court 1

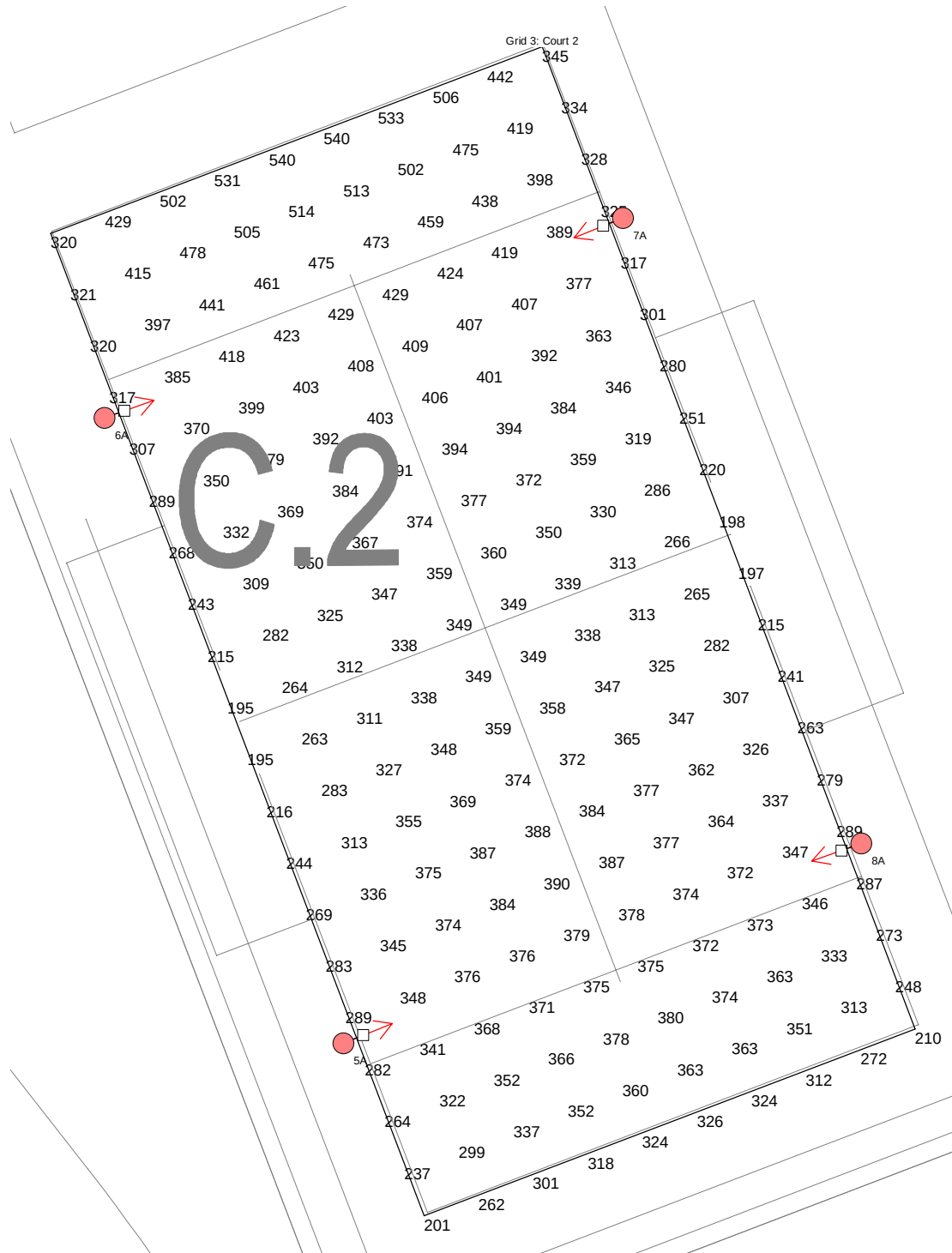


Results

Eav	353.48
Emin	192.61
Emax	546.62
Emin/Emax	0.35
Emin/Eav	0.54

Horizontal Illuminance (lux)

Grid 3: Court 2

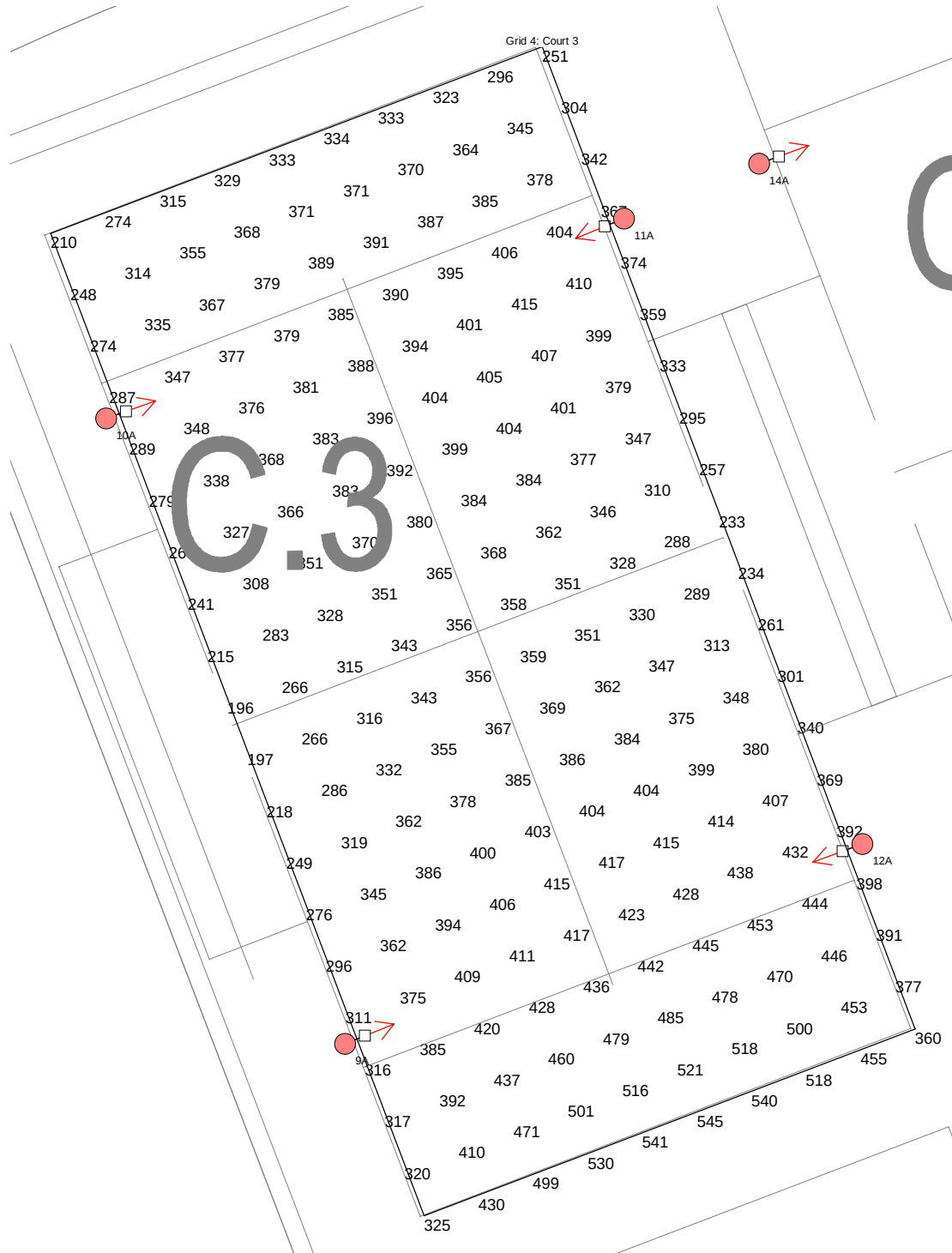


Results

Eav	352.02
Emin	194.68
Emax	540.46
Emin/Emax	0.36
Emin/Eav	0.55

Horizontal Illuminance (lux)

Grid 4: Court 3

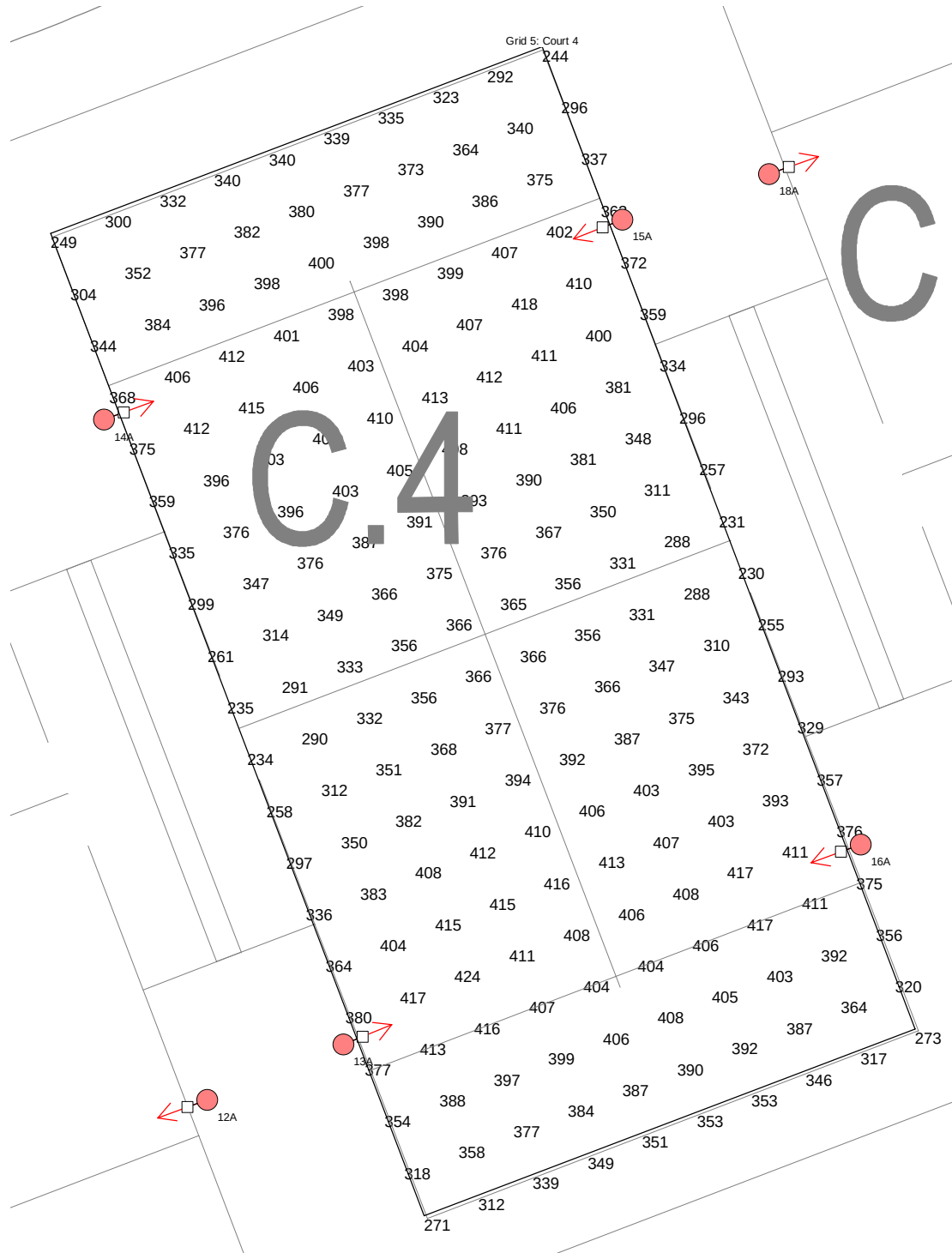


Results

Eav	369.25
Emin	195.77
Emax	544.61
Emin/Emax	0.36
Emin/Eav	0.53

Horizontal Illuminance (lux)

Grid 5: Court 4

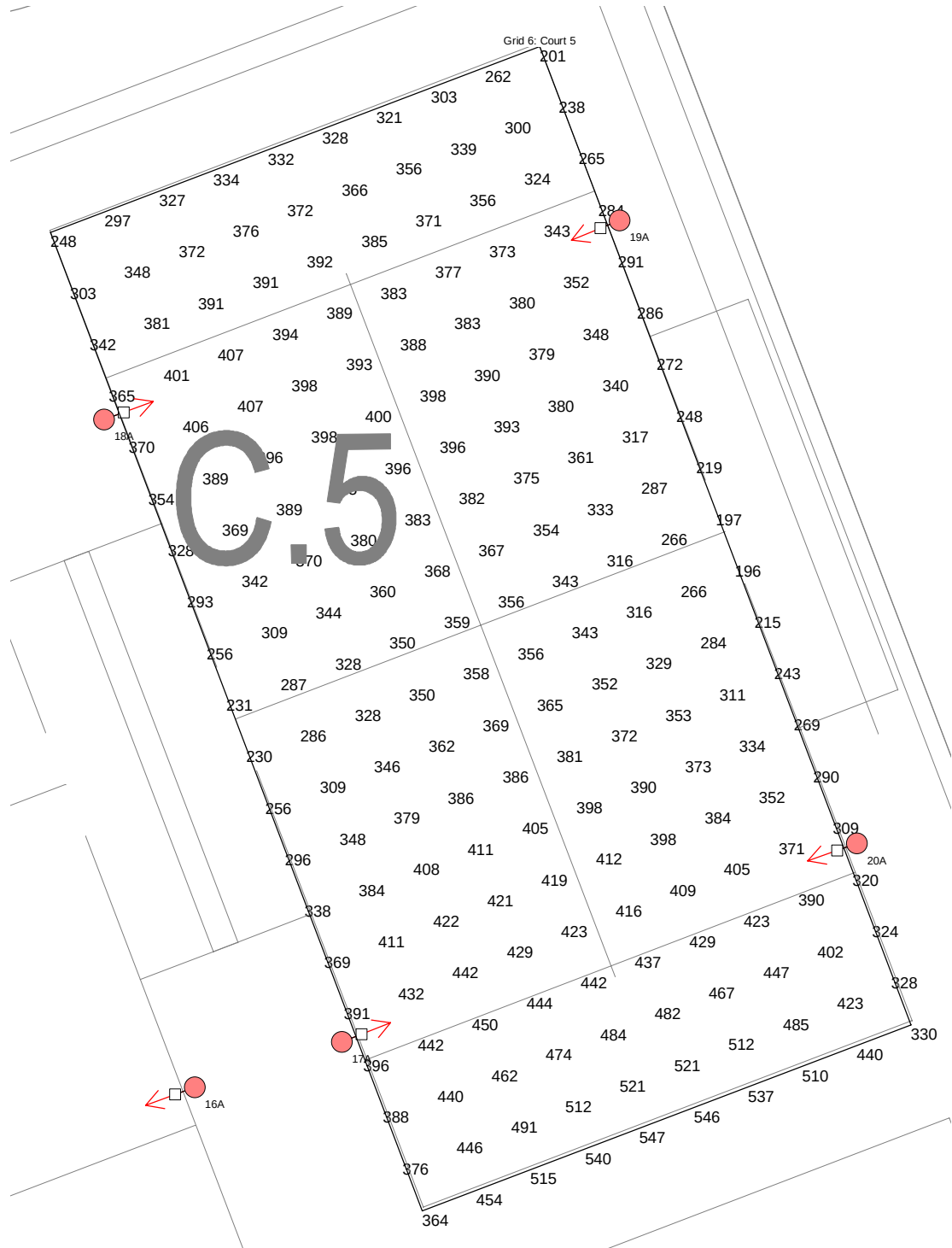


Results

Eav	365.91
Emin	230.21
Emax	423.55
Emin/Emax	0.54
Emin/Eav	0.63

Horizontal Illuminance (lux)

Grid 6: Court 5

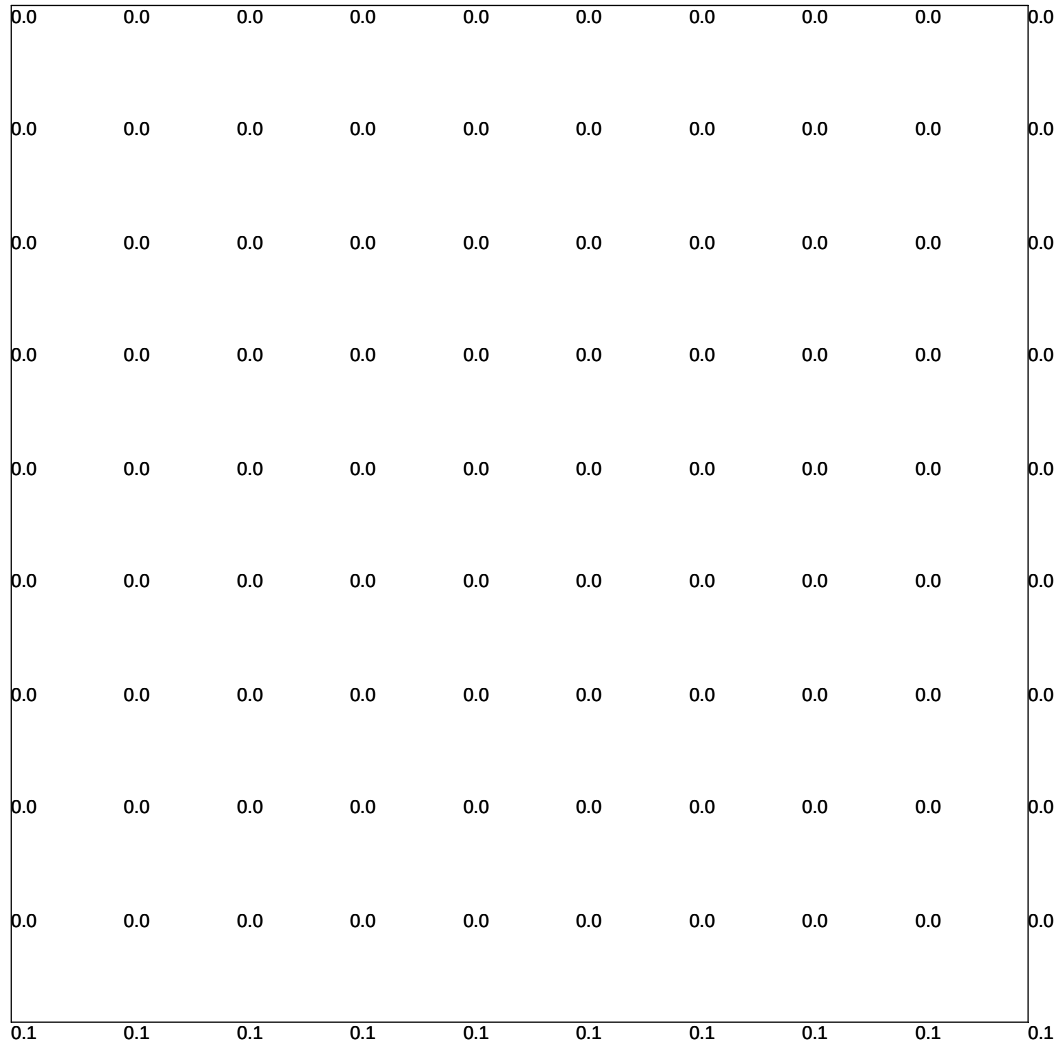


Results

Eav	368.59
Emin	196.02
Emax	546.50
Emin/Emax	0.36
Emin/Eav	0.53

Illuminance (lux)

Grid 7: Residential

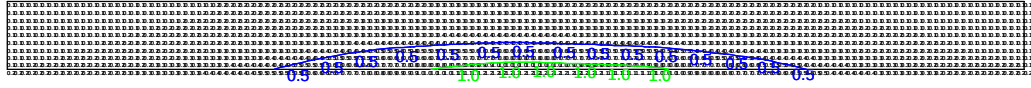


Results

Eav	0.04
Emin	0.03
Emax	0.05
Emin/Emax	0.48
Emin/Eav	0.71

Illuminance (lux)

Grid 8: M66 South



Results

Eav	0.32
Emin	0.08
Emax	1.21
Emin/Emax	0.06
Emin/Eav	0.24

13. APPENDIX D

13.1 Manufacturers Datasheets

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Tennis Light

240W / 400W / 600W LED E-Lite

FEATURES

- System Light Efficacy 150~155LPW.
- Specific glare free lens design.
- Minimal light spill outside the court.
- Extremely high lighting uniformity
- IP66 water proof.
- No warm-up time.

TYPICAL APPLICATIONS

- Tennis court lighting

SPECIFICATIONS

PERFORMANCE

LED Chip	Philips Lumileds
Color Temperature	5000K
CRI	≥70
Lumen Maintenance	L70>150,000 Hours (Calculated Using Tm-21 Calculator)
Input Voltage	100-277 VAC (347/480 VAC Optional) Dimming Optional
Power Factor	0.95 Minimum
IP Rating	IP66

ENVIRONMENTAL

Operating Temperature	-40 to 60°C (-40 to 140°F)
Storing Temperature	-40 to 80°C (-40 to 176°F)
Humidity	15% to 95% RH

PHYSICAL

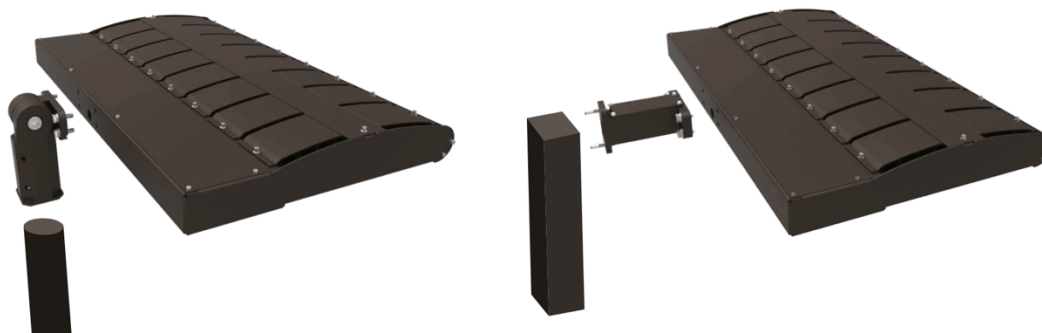
Fixture Material	Aluminum Alloy
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■ Specifications

Picture	Part#	Power	Efficacy(IES)	Total Lumen	N.W	Product Dimensions
	EL-NED-240(TC)	240W	155LPW	37,200lm	7.9kg/17.4lbs	684x408x82mm 26.9x16.1x3.2in
	EL-NED-400(TC)	400W	155LPW	62,000lm	14.8kg/32.6lbs	684x596x82mm 26.9x23.5x3.2in
	EL-NED-600(TC)	600W	150LPW	90,000lm	18.3kg/40.3lbs	684x784x82mm 26.9x30.9x3.2in

■ Mounting Options & Accessories

Image	Applicable Power	Product Code	Product Description
	240W~600W	SP-SA	Side Arm
	240W~600W	SP-SF	Slip Fitter



14. APPENDIX E

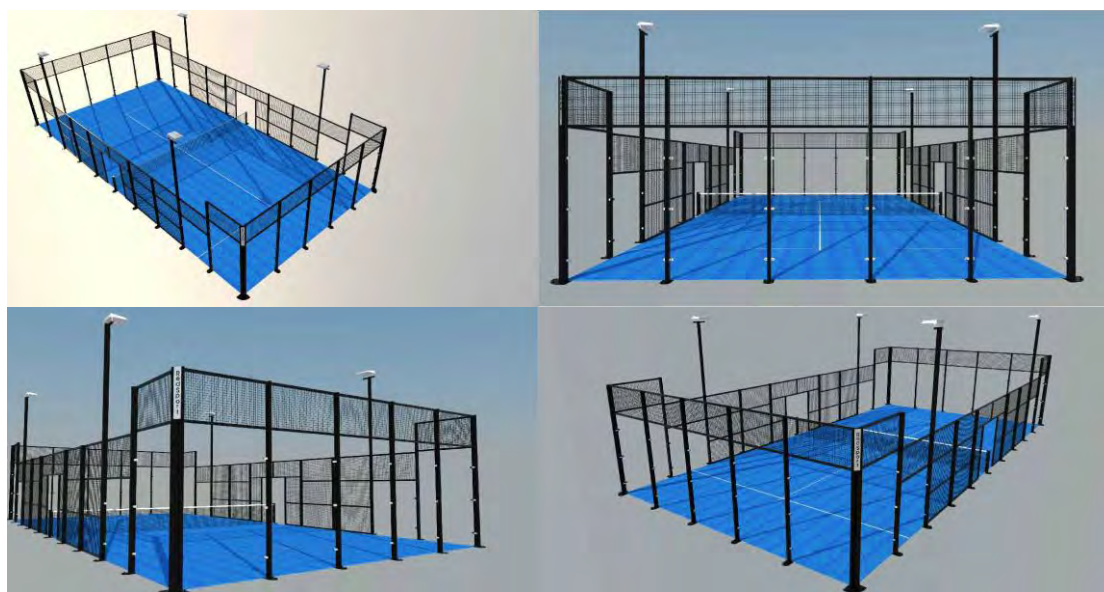
14.1 Lawn Tennis Association Datasheet

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LTA PADEL COURT DATA SHEET



LTA PADEL COURT DATASHEET



GENERAL

This data sheet has been produced in order to provide information and guidance for venues considering the construction of a padel court.

DEFINITION

A padel court is defined as area 20m long x 10m wide enclosed above ground with a combination of glass and weld mesh rebound wall and fence panels supported of steel posts fixed to a concrete foundation with a synthetic turf play surface.

PLANNING CONSENT

The construction of a padel court whether totally new on a green field site or over an existing tennis court constitutes development and therefore requires formal planning consent to be issued by the relevant Local Authority.

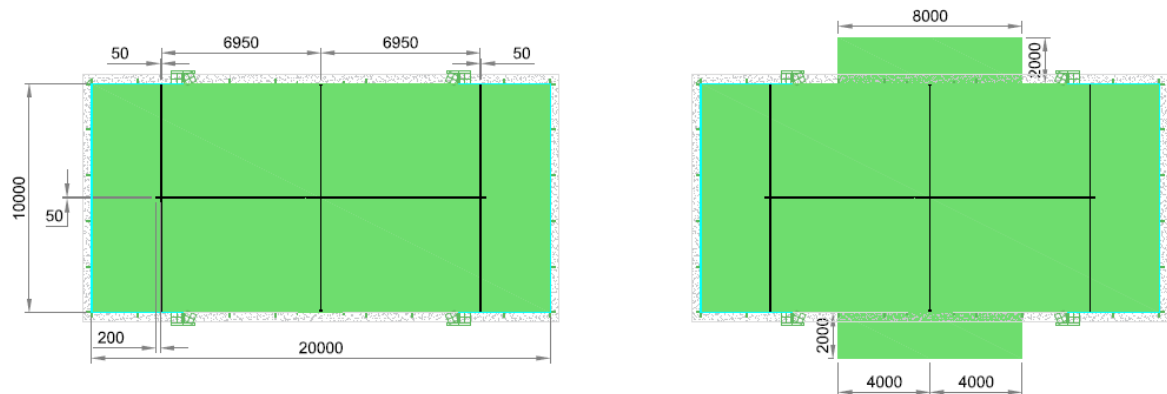
All new glass wall or mesh fencing 3.0m and 4.0m in height requires planning consent together with any proposed floodlighting posts and fittings. The site developer will be responsible for obtaining planning consent and this will be excluded from most contractors' quotations.

Careful consideration of the location of proposed padel courts should be given in relation to the impact of noise on adjacent residential properties.

KEY DIMENSIONS

The padel court internal playing area is 20m x 10m wide and is marked with two service lines and a centre line that crosses over the service line by 10cm as indicated on the right left hand diagram

The out of court area is indicated on the diagram.



The clear unobstructed height above the playing area is a minimum of 6.0m in order to accommodate floodlights attached to the structure, with a recommendation of 8.0m for new build facilities.

For out-of-court play each side of the court must have 2 central access points (one to each side). There may not be any obstacles outside the court within an area of no less than 2 metres wide (3.0m for competition purposes) and 4 metres long on either side of the court and a minimum of 4.0 metres high

SURROUNDING ENCLOSURE AND REBOUND WALLS

All padel courts have the requirement for the inclusion of rebound ends (with fencing above). At the ends of the court a total height of 4.0m metres is required. The first 3.0m, from playing surface level, can comprise any transparent or solid material (glass, bricks, etc.) which does not affect ball bounce, and the upper 1.0m is metal fence (metal weld mesh).

The transition between adjacent mesh and glass internal surfaces should be flush and neither surface should protrude further than the other as irregular ball rebound will result.

In the U.K. most padel court ends comprise toughened glass rebound panels with a weld mesh section over but could comprise other materials such as rendered blockwork for the first 3.0m

There are two variations of padel side walls as identified by the International Padel Federation (IFP) described as Variant 1 and Variant 2. The difference between the two variants are the overall height of the surround fence / rebound walls with all the fencing/ rebound walls to Variant 2 being 4.00m high.



IFP Regulation allows two variations on the lateral/side enclosures:

Variant 1 – The majority court of installation within the UK

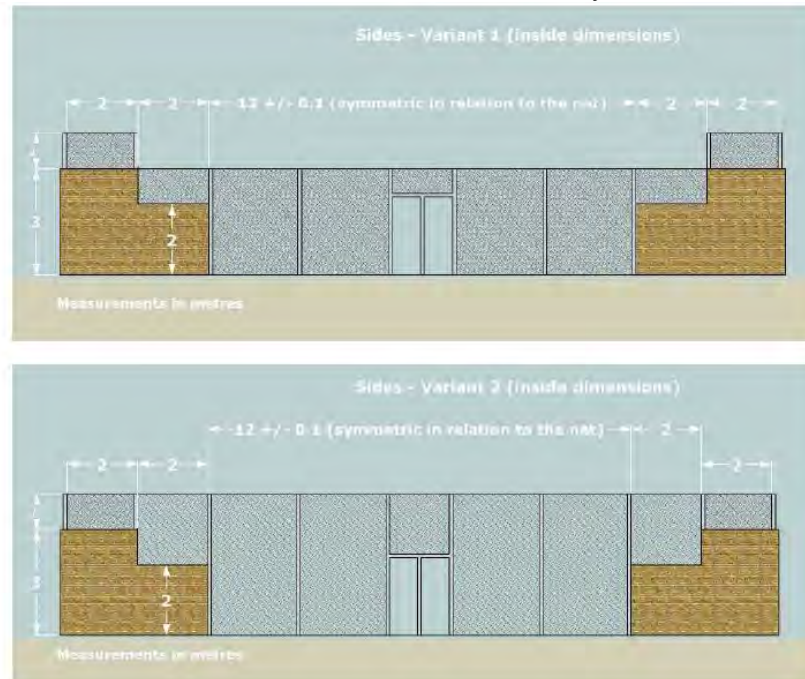
Made up of stepped wall areas at both ends, the first step 3m high x 2m long and the second step 2 m high x 2 m long. Areas of metallic fencing complete the enclosure of up to 3 metres in the centre 16 m and up to 4 metres at both ends. A crystal court variant allows side glass walls to be 3m high for 4m returns.

Variant 2

Is the same as variant 1 but with a 4m overall height.

In the UK the majority of padel courts constructed to date are Variant 1 using a combination of glass rebound and metal weld mesh panels.

The diagram below illustrates the difference between the 2 systems.



Glass rebound panels may comprise either 10mm or 12mm toughened glass. 12mm glass provides a more solid structure and is preferred by players for superior rebound characteristics and should be a minimum specification for UK installations. Glass rebound panels shall incorporate counter sunk fixings to avoid affecting ball bounce and all shall be individually kite marked to the European Standard. Consideration should be given to glass manifestation on the bottom of the court and at a height of between 850mm and 1000mm for health and safety. If further information is required then please refer to Part K of the building regulations.



Glass and weld mesh panels are supported by steel posts or framed steel panels with base plates for fixing to the concrete ring beam.



Toughened (or tempered) glass panels are used as the glass is specially treated so it will break into small blunt pieces under pressure making it much safer than shards of normal glass. The above photograph indicates a 'panoramic' padel court with framed end wall with no intermediate supporting steel posts.

The weld mesh sections of the surround walls should be made up of rhomboids or squares simply twisted or soldered with voids (diagonally measured) no less than 5 cm and no larger than 7.08 cm. Recommended thickness of the steel wire is between 1.6 mm and 3 mm. With a maximum of 4 mm and a tension which allows the ball to bounce off it. The outward facing mesh must be horizontal.

The side elevations will incorporate a central opening for player access on one or both sides, or where the out of court play area (8.00m x 2.00m overall) is to be incorporated for higher levels of play.

Openings for access may be single or double arrangement. Access opening dimensions must be as follows:-

- 1) One lateral access per side the opening must be a minimum of 1.05m x 2.00m and a maximum of 2.00m x 2.20m;
- 2) Two lateral accesses per side the openings must be a minimum of 0.72 x 2.00 m and a maximum of 1.00 x 2.20 m.

Provision shall be made for the incorporation of hinged sections of mesh to permit wide sport wheelchairs or wider opening dimensions.

SUB-BASE CONSTRUCTION & DRAINAGE

In continental Europe padel courts are generally constructed with an insitu concrete slab onto which the synthetic turf surface is laid (as the photograph below indicates). This type of concrete slab constructed is generally non porous and would be generally considered un-suitable for the UK climate where high levels of rainfall can be anticipated on a regular basis leading to reduced utilisation.



As such in the UK padel court sub-base construction should comprise a suitable free draining non frost susceptible aggregate sub-base average 250mm depth with 65mm depth of porous asphalt installed above in two separate layers.

Padel court sub-base construction can be installed with a maximum single or dual plane gradient of 1:100. Alternatively the padel court may be constructed to a level gradient with a suitable fall established to the formation level.

Padel courts may also be constructed with a crowned net line with opposing falls of 1:100 to the end walls. But this would not be envisaged with porous sub-base construction.

An internal surface water drainpipe should be incorporate with an outfall through the perimeter ring beam to the outfall position.

Where constructing a padel court over an existing tennis court, then careful consideration of the existing gradients, surface tolerance of the existing surface and the accurate of position of the new padel court is required. The upper surface of the ring beam should be established at a level above the highest point of the existing surfacing.

As such the installation contractor will have to make any allowance for shuttering of the concrete where higher than the general court area. As such a detailed survey of the existing tennis court and sub-base construction required prior to proceeding with the project.

The finished tolerance of a padel court synthetic surfacing shall be 6mm under a 3metre straight edge.

CONCRETE PERIMETER RING BEAM

The supporting posts and/or framed panels are fixed with base plates and holding down bolts to a perimeter reinforced concrete ring beam. The upper surface of the ring beam will finish at the same level as the underlying court sub-base construction.

Generally installation contractors and manufacturers will propose a rectangular reinforced concrete ring beam of limited dimensions off which to fix the surrounding above ground structure on the basis of reduced cost. Reinforced concrete ring beams of small dimension may be subject to failure at some point in the future due to the overturning force of local wind loads and the alike.



The L.T.A. would recommend that in every instance that the reinforced concrete ring beam is designed by a structural engineer (with a suitable cross section profile) with due consideration of the wind loads for the locality of the site and any other relevant loads (spectators). This design must be backed by the structural engineers' professional indemnity insurance.

The padel court structure should in turn be designed with suitable reinforcing incorporated to exceed the expected wind load calculated in the ring beam design. The structure should be bolted to the foundation using suitable anchors to fix the structure to the foundation in line with the structural engineer's calculations.

If a venue employs a contractor for both design and construction (or where this is implied) then the contractor should also carry their own professional indemnity insurance in relation to the design of the perimeter ring beam.

Courts that are secured to a concrete foundation are considered temporary or event courts. These installations should be avoided over winter months and should be checked regularly for movement. These event style courts are unsuitable for permanent outdoor installation.

Padel court manufacturer's warranties do not usually cover structural failure of the perimeter enclosure only failure of the individual components in terms of wear and corrosion. The LTA would recommend that a 10 year warranty is established for all installations.

Maximum wind loadings applicable to the surrounding enclosure supporting steelwork shall be stated by the padel court manufacturer.

Measures to prevent corrosion should be used to increase the life span of the court. The application of hot dip galvanising of steelwork components can lead to poor aesthetics and warping of mesh panels. So this is not commonly adopted by manufacturers.

In the UK we have much higher corrosion rates than in Continental Europe and in some zones this can be considered severe. Therefore no ungalvanized steel courts should be installed in the UK with pre galvanised steelwork with subsequent zinc electro plating after fabrication or the use non ferrous metal being considered suitable.

In addition further coating using epoxy basecoat or other similar product should be adopted in moderate corrosion areas with hot dip galvanising and basecoat being used in severe areas.

NET

The net must be 10 metres long and 0.88 high at the centre, rising to 0.92 metres at the ends, with a maximum tolerance of 0.005 metres.

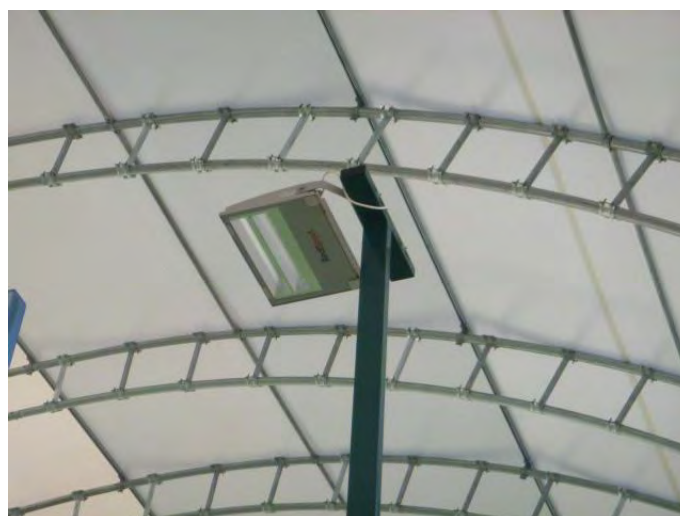
The net is suspended by a metal cable with a maximum diameter of 0.01 metres; the ends are attached to two lateral posts with a maximum height of 1.05 metres. Or a part of the court structure which allows the correct suspension and tension.

SYNTHETIC SURFACING

The padel court playing surface should comprise a single tone sand-dressed synthetic surface (either fibrillating or monofilament tufts) manufactured in accordance UNE 41958 IN. Sports surfaces with and comply with the following performance criteria of the International Padel Federation:-

Impact Absorption (Force reduction)	$RF \geq 20\%$	Artificial grass
Friction	$0,4 \leq \mu \leq 0,8$	Artificial grass
Vertical bounce of the ball	$\geq 80\%$	Artificial grass Synthetic surfaces
Sand refill	$SiO_2 \geq 96\%$ $CaO \leq 3\%$ Rounded edges Granulometry: 80% weight $\varnothing 16\text{ mm}-1.25\text{ mm}$ Visible fibre length 2mm-3mm	Artificial grass

FLOODLIGHTING



Padel courts can be floodlit by two methods.

Method 1 involves the use of integrated or extended fence posts as part of the surrounding fence enclosure with a top bracket to mount either one or two low wattage light fittings. The extended fence posts usually being inset by 4.0m from the back of the court into the side elevations.

Method 2 involves the use of stand alone floodlight columns outside of the padel court enclosure to mount floodlight fittings.

The choice between the two methods depends on the number of padel courts to be lit and the complexities of the site i.e. are there houses in close proximity which may require superior fittings to control lux level spillage and reduce potential glare.

All light fittings are required to be manufactured to British and European standards with the associated CE marking. The padel court may be delivered as a 'package kit' from the manufacturer and therefore all the electrical components shall be detailed with a suitable lighting design prior to placing any order for the works.

All light fittings shall be installed to create a minimum 6m high clear space above the padel court playing area.

Padel court lighting designs will be produced using dedicated software by competent persons (consultants or manufacturers) with relevant experience in this regard. Planning requirements may require schemes to be developed by consultants rather than manufacturers where specific criteria may be stipulated to allow compliance with regulations

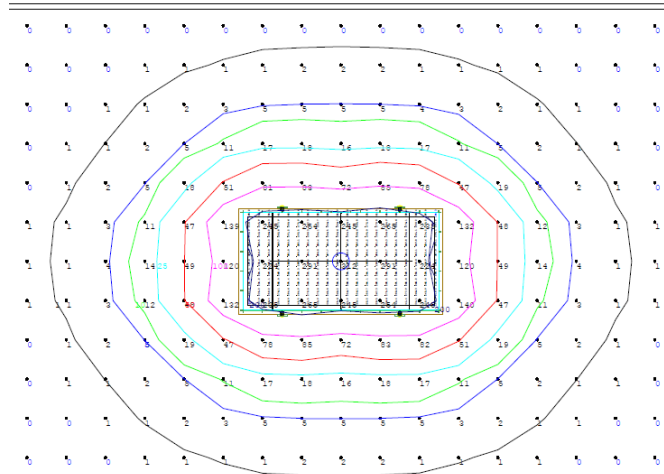
Minimum Lighting performance standards for padel courts are defined as follows:-

Outdoor courts: -	Minimum illumination at ground level (Z=0)
National and International Competition	500 lux (E av) with 0.7 uniformity
Regional competition, school & recreational use Indoor courts	300 lux (E av) with 0.5 uniformity
Indoor courts: -	Minimum Performance at ground level (Z=0)
National and International competition	500 lux (E av) with 0.7 uniformity
Regional competition, school & recreational use Indoor courts	300 lux (E av) with 0.5 uniformity

In the UK with outdoor tennis courts being usually lit to a standard higher than the minimum stated above then Clubs should undertake playing testing of floodlit padel courts to establish suitability for their scheme or may wish to adopt a higher standard.

While the minimum levels are stated above a 10% over performance should be taken into consideration when undertaking the initial design i.e. (0.9 maintenance factor).

Lighting designs shall use a sufficiently small calculation grid spacing (i.e. 1.0m x 1.0m as indicated below or lesser dimension) over the playing area centred on the net line position of the court which will remove the potential for any 'dark or over lit' patchy areas to be within the overall playing area.



This is particularly important with low cost low wattage LED fittings which are commonly employed with a symmetrical (rather than asymmetric) optical distribution for lighting general areas and are not sport specific products. Lighting designs provided by manufacturers should fully reveal the tilt angles of the fittings in order to provide key information to Client concerning potential glare issues to adjacent property owners.

As play occurs off the ends and side walls then additional vertical calculations can be also be requested and provided where considered essential by Clients.

If there is a future requirement for an outdoor court to be potentially covered at some stage in the future then the indoor minimum standard should be adopted in the first instance or provision made within the switchgear, ducting and cabling arrangement for the future upgrade.

Where padel courts are to be incorporated into existing floodlit areas then consideration should be made to maximise the existing provision in relation to the current positions of any floodlight columns, fittings and any potential conflict with underground service cabling.

COVERED FACILITIES



A range of structures are available which comprise steel portal frames sitting outside the fence / rebound wall elevations of the padel enclosure with single or double skin membrane with or without full or partial drop down walls.

Solid poly carbonate roof covering canopies are also available which offer the potential for natural light to pass onto the padel court. All steel supporting components for canopies in the UK should be hot dip galvanised for maximum longevity.

All canopies for installation in the UK should be hot dip galvanised for maximum product longevity and be designed by a structural engineer in order to permit submission to Building Control.

Consideration of the overall minimum height is necessary together with the positions of all the supporting columns so as not interfere with play or the out of court area where incorporated.

Canopy roof and wall membranes should have a minimum design life of 15 years.



KEY PROJECT CHECKLIST

Key considerations before proceeding with a padel court project:-

1. Location for proposed padel court considered appropriate in relation to noise and disturbance to neighbours;
2. Position of padel court and surrounds suitable for player access (including wheelchair users) and maintenance ;
3. Out of court play area considered – to be adopted or not ;
4. Future or current requirement for padel court to be covered ;
5. Planning consent for the proposed scheme applied for and granted ;
6. Padel Court Variant to be adopted and height of glass to side walls (All 3m high or two panels one 3m high and one 2m high with stepped down arrangement) ;
7. All metalwork components to be suitable protected against corrosion and warranted as such ;
8. Ring Beam designed by structural engineer for the locality with PI insurance ;
9. 12mm kitemark glass to be installed ;
10. Access arrangement for the court (size one side or both sides) ;
11. Lighting design to confirm minimum performance criteria of 300 lux with 0.7 uniformity and 0.9 maintenance factor. Minimum mounting height 6m.
12. Court Surface – Monofilament
13. Confirmation of the source of supply of the padel court i.e. fabricator / manufacturer to be established with certificate of origin to be supplied on completion of installation.