



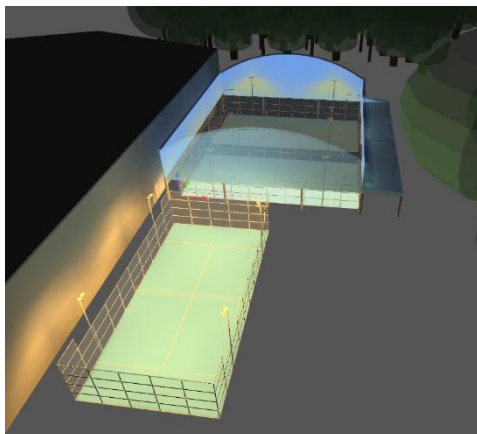
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Project:

PADEL facility – Thongsbridge
Tennis & Fitness Club

PADEL Court lighting & Obtrusive light analysis



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OBTRUSIVE LIGHT REVIEW SUMMARY

THE BASIS

A comprehensive lighting study was undertaken to ensure that the proposed lighting design and specified equipment for the PADEL Court facility would not only achieve but maintain the stringent standards required for sporting venues. According to the Lawn Tennis Association (LTA) guidelines for padel courts, the lighting must at a minimum, provide CLASS I levels of illumination. This is defined as suitable for regional competitions, schools, and recreational use, requiring an average illuminance (E_{av}) of greater than 500 lux, with a uniformity factor exceeding 0.7 to guarantee consistent light distribution across the playing surface.

The study assessed the spatial arrangement of luminaires, the height and orientation of columns, and the technical characteristics of the chosen fixtures to verify that these standards could be met under all typical operating conditions. Advanced software modelling was used to simulate real-world lighting scenarios, accounting for both direct and reflected light within the facility.

In addition to achieving the optimal lighting levels for play, a critical objective of the study was to minimize obtrusive light spill beyond the court boundaries. This involved analysing potential impacts on adjacent residential areas and local wildlife habitats, ensuring that the facility would operate in harmony with its surroundings and comply with environmental lighting regulations. Specific attention was given to controlling glare, upward light, horizontal light trespass, precise aiming of luminaires and using the optimal luminaire optics.

Overall, this rigorous lighting assessment confirms that the PADEL Court installation will deliver high-quality, competition-ready illumination while maintaining minimal obtrusive light levels, thereby balancing both performance and environmental considerations.

METHODOLOGY

To ensure accuracy and compliance with lighting standards, topographical maps and facility drawings were incorporated into advanced lighting simulation software, such as Dialux Pro. This allowed for precise modelling of artificial light distribution across the proposed PADEL Courts and surroundings. The simulations accounted for the positioning, mounting heights, and angles of all lighting fixtures, enabling a thorough evaluation of illumination levels both on the playing surface and in the immediate environment.

By replicating real-world conditions, the software was able to predict areas of potential light spill, glare, or insufficient illumination, guiding the design team in optimising fixture placement and specifications. This process not only addressed the requirements for high-quality, uniform lighting suitable for competitive play but also ensured that obtrusive light impacts on nearby residences, pathways, roads and ecological zones would be minimised through suitable luminaire selection, optics and careful adjustment of luminaire direction.

Through this meticulous approach, the lighting design could be refined iteratively, balancing the need for performance-level visibility with the imperative to protect local environmental quality and community amenity.

CONSIDERATIONS

Please see the “**EM019.24 THONGSBIDGE - Padel court + obtrusive light study**” report, for more detail.

Location:

Miry Lane,
Thongsbridge,
Holmfirth HD9 7RY,
United Kingdom

ENVIRONMENTAL ZONE CLASSIFICATION

Zone	Surrounding	Lighting environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres of suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

This has not been defined but assumed as E2.

OBSTACLES/OBJECTS DEPLOYED

- A canopy over two courts, with a light transmissibility of 15%
- There is a tree group to the north
- There are trees to the west
- The sports pavilion to the west.

Simulations

Court illumination performance.

Two forms of simulation have been made :

- All lighting on, to simulate the obtrusive light effect. (worst case scenario).
- All lighting on to check court illumination performance
- Individual courts being lit, to simulate the minimum illumination levels for Class I Padel illumination, when only a single court is lit.
- The results are as follows:

		Individual court simulation	All lighting on
Court 1	Ave lux	533	599
	Uniformity	0.74	0.76
Court 2	Ave lux	554	607
	Uniformity	0.72	0.78
Court 3	Ave lux	512	515
	Uniformity	0.75	0.75

- The total area, excluding the facility; the overspill has a Max of 468 lux and a Min of 0.0 lux with an average of 6.49 lux in a 200M diameter area around the facility

Obtrusive light assessment and analysis.

A simulation with all lighting on was conducted to represent the worst-case scenario.

For obtrusive light analysis, the luminaire maintenance factor of 1 (100% of output as new) has been used. Therefore, the luminaires output is set to the maximum obtrusive light impact.

OBTRUSIVE LIGHT, SKY GLOW AND RESIDENTIAL IMPACT

Summary

- $R_{UF(ULR)}$ 2.5% Reflected light contributing to sky glow from the entire scene
- R_{UL} 2.00% Direct upward emissions only (Upward light ratio but from the entire scene)
- R_{ULO} 1.9% Total upward flux from the entire scene
- R_{DLO} 96.1% Total downward flux from the scene

This lighting design causes minimal obtrusive light, with regard to skyglow.

LIMITATION OF SKYGLOW

Light technical parameter	Environmental zones				
	E0	E1	E2	E3	E4
Upward light ratio (ULR) / %	0	0	2.5	5	15

The main court luminaires use asymmetrical optics resulting in minimal obtrusive light. This makes the lighting appropriate for E2–E5 zones.

Residential impacts

There are no residences within 100M distance from the facility, therefore, this not an obtrusive light issue.

WILDLIFE CONSIDERATIONS & residential impact

Illumination overspill

The total measured area, approximately 31,000 m² surrounding the facility (excluding the facility itself), recorded an average illumination of 6.49 lux at ground level. The maximum observed value was 468 lux (next to courts), while the minimum value was 0.00 lux.

Light overspill drops to below 1 lux north ~15M, east ~2.4M, south ~23M and west ~18M. All measurements are from the facility boundary. (Please refer to the graphic appended) Beyond this, illumination overspill is ≤1 lux.

Therefore >~84%+ of the area is less than 1 lx.

Please refer to the appended graphic: “Graphic of site and overspill calculation area”

Bat/Bird analysis

No information has been made available regarding any bat consideration, therefor the focus at this time, is on the tree group on the north side of the facility.

Analysis has been made in the tree group on the north side as being representative.

Two measurement planes have been used:

1. At the base level of trees to indicate ground effect vertical illuminance.
2. A vertical plan measuring vertical luminance, placed in the tree canopy, starting at 6M from the ground and rising to 16M from the ground.
3. For the purposes of simulation, the trees in the study have been applied with a 20% light transmissibility.
 - a. This is of course subjective, as it is dependant of the density of the foliage and the time of the year. However, 20% seems a reasonable average.

The North side tree group is the closest group to the courts. The ground floor measurement shows a maximum of 3.26 lux vertical illuminance and a secondary measurement at a height of 11M in the canopy, with a measurement of vertical illuminance of 4.96. Both metrics are well below the max target of 10 lux.

SUMMARY

The proposed lighting system for the PADEL courts has been engineered to deliver Class I illumination standards, ensuring optimal visibility and safety for both players and spectators. The design incorporates advanced luminaire technology and precise orientation to minimise any obtrusive or stray light beyond the immediate playing areas. Notably, each court achieves the required Class I lighting levels whether illuminated individually or when all courts operate concurrently, demonstrating the robustness and flexibility of the system.

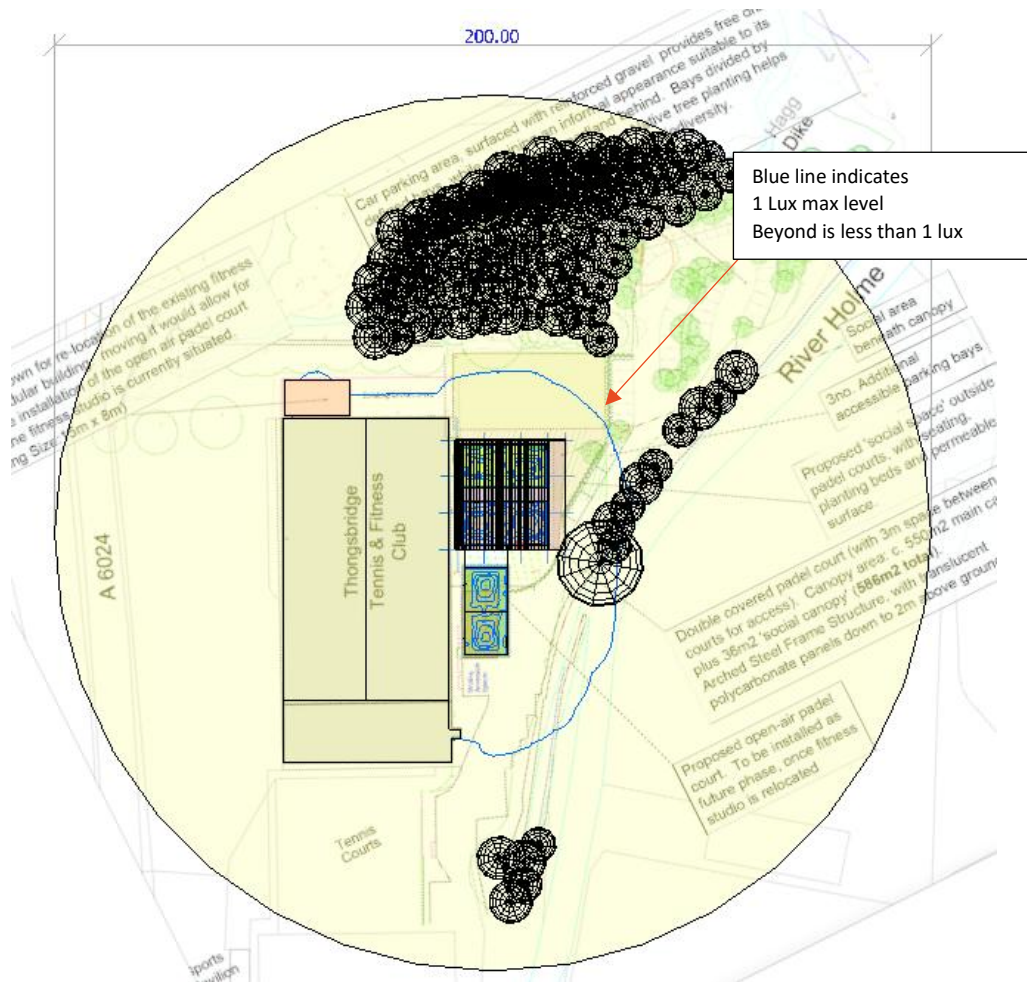
Comprehensive site analysis has confirmed that this lighting scheme adheres to the stringent criteria set forth for obtrusive light under Environmental Zone Classification E2. This means that the light emitted does not cause undue disturbance to neighbouring properties or the wider environment. The illumination simulation, performed with all court lighting fully operational, further reinforces the system's compliance by demonstrating that light overspill remains well within acceptable thresholds.

In addition, the lighting layout considers both the spatial arrangement of courts and surrounding landscape features, effectively targeting light where it is most needed and preventing unnecessary diffusion into adjacent areas. By achieving these outcomes, the lighting plan not only supports high-level sporting activity but also aligns with environmental stewardship and community expectations.

*Alan Fuller Senior Lighting consultant Europe
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APPENDED:

Graphic of site and overspill calculation area.



Graphic showing measurement objects



Site 1 (Obtrusive light scene)

Calculation objects

Calculation surfaces

Properties	\bar{E}	E_{min}	E_{max} (Target)	$U_o (g_1)$	g_2	Index
Tree group North Vertical illuminance Rotation: 0.0°, Height: 11.000 m	0.006 lx	0.00 lx	0.33 lx (≤ 10.0 lx) ✓	-	0.00	OCG1
Tree group North (ground level) Vertical illuminance Rotation: 0.0°, Height: 0.000 m	0.047 lx	0.00 lx	3.26 lx (≤ 10.0 lx) ✓	0.00	0.00	OCG3

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

Notes on planning:

All values take the initial flux (MF = 1) into account. The k_s value was calculated by limiting the spatial angle to 10e-6.

CG2 is the zone used to evaluate “ $R_{UF(ULR)}$ ”

Graphic showing False Colour representation of overspill impacts