

## EXTERNAL FLOODLIGHTING PRINCIPLES

Venues providing floodlit tennis have an enormous advantage over those without lighting:-

- On average venues with floodlights have 50% more members and improved retention levels.
- Able to attract and retain coaches and deliver coaching opportunities year round.
- Increased revenue through membership and pay and play.
- Between November and April when daylight is shorter, lighting outdoor courts adds 35% more playing time.

| Facility   | Hours per annum |
|--|-----------------|
| Outdoor non floodlit court<br>(allowance of 35% for bad weather) | 2500            |
| Outdoor Floodlit court<br>(allowance of 35% for bad weather)     | 3500            |

### LED FLOODLIGHTING

The UK sports floodlighting market has been largely transformed by the introduction of LED which have the following advantages over metal halide floodlighting:-

- 1) Sustainability (i.e. lower overall power requirement).
- 2) Long design life with lower maintenance requirement with no lamp replacement.
- 3) Superior control features allowing instant controls and the ability to dim fittings.

### PLANNING CONSENT

All floodlighting schemes in the UK will require a formal planning consent to be granted by the Local Authority for their installation. Each Local Authority has a list of their local requirements for applications in addition to national requirements. For a planning application to be successful the design should be designed by specialist lighting designers, specialist tennis court lighting contractors or manufacturers who can use specialist software (such as AGI 32) to produce a lighting designs which demonstrate the required performance standards, have minimal impact on the local environment and meet the planning regulations.

It is important to make sure that before submitting a planning application the venue has all the relevant information, plan and elevation drawings and an accurate lighting. If information is not submitted correctly in the first instance then this could jeopardise the success of the planning application both at the time of submission and in the future.

### DESIGN CONSIDERATIONS

To provide tennis venues with a range of options for floodlights, the LTA are working with contractors and suppliers to provide a range of design options that meet the current planning regulations and the Institute of Lighting Professional Guidance Notes. These solutions enable venues to design a scheme that is cost effective and has minimal impact on the local environment. The following information provides some general information on lighting design and configurations.

### Height of Columns and Luminaires

- The choice of luminaire with the right optical distribution at the right mounting height is critical to minimising light spill and obtrusive light effects, while providing the right lighting performance for playing tennis.
- Luminaires should be installed with the front glazing installed at relatively low tilt angles of less than 35 degrees to the surface being lit. This is especially important where venues are located near neighbouring properties and if necessary the luminaire might be fitted with louvres and shields to minimise obtrusive light.
- Normally a tennis lighting system consists of a number of different types of luminaires with varying optical distributions and wattages mounted on several columns located at various points around the courts.
- Generally column heights range from 6m – 10m.
- The luminaire should provide high quality colour rendition with minimum glare, sky glow and spillage.

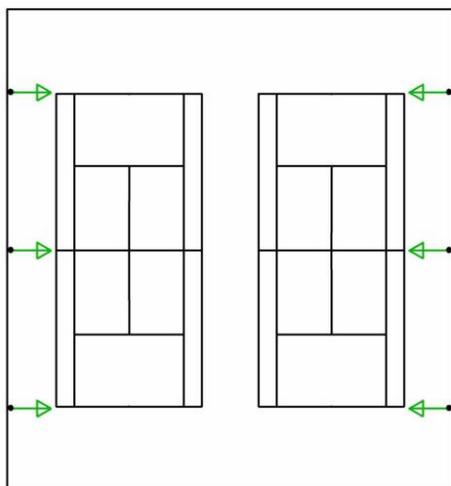
### Performance

The lighting system must provide adequate lighting to enable tennis to be played safely. The LTA has developed standards alongside the International Tennis Federation. These standards are defined in **Appendix A**. Lighting consultants and contractors should be able to produce designs to meet this standard.

## FLOODLIGHTING GENERIC LAYOUTS

### Side Lit Scheme

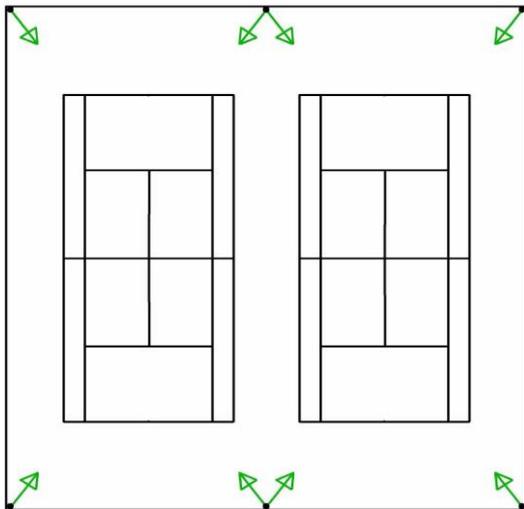
This is typically lit with 10m columns with high wattage fittings.



| Advantages  | Disadvantages   |
|---|---|
| <ul style="list-style-type: none"><li>➤ Less glare within the court area.</li><li>➤ Less glare outside intended area.</li><li>➤ Good control of light spillage.</li><li>➤ With columns 8m high and above – high levels of uniformity.</li><li>➤ Multi court lighting in blocks of two only.</li></ul> | <ul style="list-style-type: none"><li>➤ Difficulties experienced where two or more courts are to be illuminated individually, unless a minimum of 6.1m is available to safely locate columns in-between courts at the baseline.</li><li>➤ Usually a minimum of three columns is required each side of each court, hence not as cost effective as other solutions when lighting courts individually.</li></ul> |

### Corner Lit Scheme

Corner lit layout - typically 10m with minimum column height 8m.

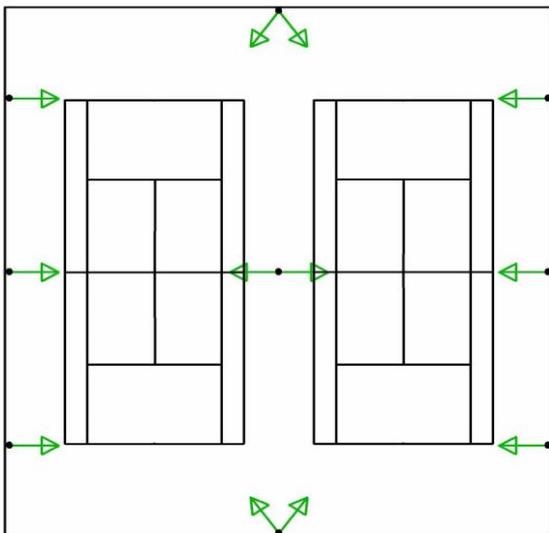


(Two courts lit & controlled individually from the corners of each court)

| Advantages  | Disadvantages   |
|---|---|
| <ul style="list-style-type: none"> <li>➤ More suitable for three or more courts, where individual court switching is required and limited room is available between courts.</li> <li>➤ High level of illumination on surface of ball approaching player.</li> <li>➤ High standards of uniformity.</li> <li>➤ Least number of columns.</li> <li>➤ Cost effective.</li> </ul> | <ul style="list-style-type: none"> <li>➤ Potential for glare.</li> <li>➤ Careful selection of aiming angles required.</li> <li>➤ Column height may be considered obtrusive in daylight.</li> <li>➤ Column locations usually required outside the fence area.</li> </ul> |

### Corner and Side Lit Scheme

Corner and side lit – typically from 6.7m or 8.0m



| Advantages  | Disadvantages   |
|---|---|
| <ul style="list-style-type: none"> <li>➤ Uses lowest column heights.</li> <li>➤ Uses lower wattage fittings.</li> <li>➤ More suitable for two or more courts, where limited room is available between courts.</li> <li>➤ Good control of glare, sky glow and spillage.</li> </ul> | <ul style="list-style-type: none"> <li>➤ Large number of columns required to achieve minimum standards</li> <li>➤ Larger number of fittings than the equivalent corner lit scheme.</li> <li>➤ Can be more costly to install.</li> </ul> |

## HOW MUCH WILL IT COST?

The overall feasibility of a floodlighting project will depend upon the standard required, the initial cost of the system, the hourly running costs and the cost of maintenance and eventual replacement. All these factors should therefore be given careful consideration, particularly as a more costly installation could also mean a more efficient (and therefore less expensive) system overall. The following costs are guideline costs and do not take account of any site specific issues particularly the provision of underground ducting or new power supplies. Please note that the prices do not include Fees, Contingencies or VAT.

|                          |         |
|--------------------------|---------|
| <b>Individual court</b>  | £17,000 |
| <b>Block of 2 courts</b> | £30,000 |
| <b>Block of 3 courts</b> | £42,000 |
| <b>Block of 4 courts</b> | £48,000 |

## POWER SUPPLY

One of the major issues involved in the design of a new floodlighting system is whether or not the existing power supply is adequate. There are a number of demands on the power supply to the site e.g. the clubhouse. The total of all existing loads will need to be checked to verify any spare capacity for the new floodlighting installation. Advice can be sought from a design consultant, electrical contractor or installer of the system. A club with up to 2 to 3 courts may be able to utilise the existing “domestic” single phase supply for floodlighting.

At sites with more than three floodlit courts the Network Power Supply Company will usually require a “commercial” three-phase power supply to be installed to ensure they can match the overall demands of all consumers by balancing the loads on the supply.

## DUCTING & DRAW PITS

Cable Ducts are heavy duty purpose designed plastic tubes that provide power cables that provide power to the floodlights and drawpits are “manholes” that enable the cables to be installed and maintained. Together the cable ducts and drawpits form a containment system to facilitate the initial installation and or future replacement of the power cables serving each of the columns. Where possible ducting and drawpits should be kept outside of the court block or as a minimum be located outside of the playing area. This normally means that they are located in between courts.

## HOW TO APPROACH YOUR PROJECT

If you are starting out on installing floodlights, it is inevitable you will have a lot of questions and it can be a daunting prospect. The steps should help in developing a floodlighting project.

1. It is recommended that venues engage a sports lighting consultant or a specialist tennis lighting contractor/manufacture to prepare a design that meets the performance criteria and has maximum chance of receiving planning permission. Careful consideration must be given if the lighting scheme is close to housing. If this is the case specialist lighting design input will be required to be able to provide the relevant information to the planning and environmental health officers.
2. Undertake a review of the site to establish if there is adequate power supply and the location of the supply in relation to the courts. Also identify any facilities or objects the floodlighting could impact. This could be things such as neighbouring properties, trees or any wildlife around the site.
3. Prepare the initial design brief and present this to the local community and planning authority to gain their views on the proposal. If possible the venue should refine the design to mitigate any objections.

4. Use the initial design to obtain a quote from a minimum of 3 tenderers. It is important to understand that the potential contractors can provide a scheme that meets the design brief and who are NICEIC or ECA registered or similarly approved. The LTA has a list of contractors that can produce a tennis court design and this can be found in **Appendix B**.
5. Once the contractor has been appointed then finalise the design and submit a planning application with all the relevant documentation. Please note that the lighting design will need to be supplemented with plan and elevation drawings.
6. Once planning permission has been gained make sure that any conditions are discharged before starting on site.
7. Install floodlights. Once complete, make sure they are tested to ensure the installation has been installed correctly.
8. Manage the project on site and drawdown funding. Once the project is complete obtain the operation and maintenance manuals from the contractor. These documents will provide information on how to operate the air hall and maintain it in the long term.

## CONVERSION FROM METAL HALIDE LIGHTS TO LED

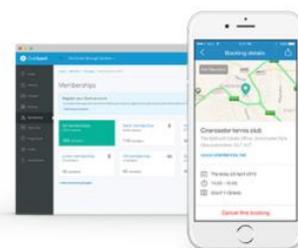
If converting from metal halide lights to LED then the following process should be adhered to:-

1. Make sure you have the existing planning consent and all the associated documents at the time of approval. Review if the existing lighting meets the consent and that all planning conditions have been discharged.
2. If the aim is to use the existing lighting columns. If they are over 20 years old, they will need to be structurally checked for strength.
3. If the location of the floodlights are in close proximity to houses (30m) then seek specialist design advice to design a new scheme that meets the existing planning conditions. It is essential that the design has fully dimensioned plans, supplemented by ordinance survey maps and datapacks which model vertical light trespass onto the properties.
4. If the new design can meet the existing planning consent then the venue should apply to the Local Authority for a non-material amendment to the existing planning consent.
5. If this is refused then the venue would have to make a new planning application.
6. Once consent has been approved then tender the project making sure that the new fittings can be installed on the existing columns if they are being used.
7. The typical cost for conversion is £7k to £8k per court.

## OPERATIONAL CONSIDERATIONS

Adding floodlights to courts will most likely require a change to the way you manage your venue, court allocation and bookings. Although each venue is different below are areas to consider:-

- Before installing floodlights venue needs to understand how the floodlights will be operated. If the venue installs a gate access system. The LTA rally app can control the floodlights when a booking is made.
- Lighting controls
  - clubSpark SmartAccess system can control the lights
  - Direct Switching which can be located within a clubhouse
  - Tokens
- Need to balance the time allocated to the coaching programme, member and pay and play bookings.
- Think about your charging levels for members, non members and coaches.
- Running costs for LED lights are approx. £1 per hour per court, but is dependent on the configuration and type of lamp.
- The LTAs recommended sinking fund for floodlights is £600 per court per year to cover lamp and column replacement.



### ClubSpark for LTA registered venues

Simple set up for booking, memberships and more.  
Find out what ClubSpark can offer your venue.

## APPENDIX A – PERFORMANCE STANDARDS

The LTA performance standards for artificial lighting within the prescribed areas of a tennis court are set out as follows:-

| Standard    | Maintained average illumination on P.P.A. | Maintained average illumination on T.P.A. | Uniformity within PPA Emin/Eav | Uniformity within TPA Emin/Eav |
|-------------|---|---|--------------------------------|--------------------------------|
| Recommended | 500 Lux                                   | 400 Lux                                   | 0.7                            | 0.6                            |
| Minimum     | 400 Lux                                   | 300 Lux                                   | 0.7                            | 0.6                            |

**Principal Play Area (P.P.A.)** - The area bounded by the doubles court lines.

**Total Play Area (T.P.A.)** - The PPA plus the run-back areas to a depth of 4.5M and the Side-runs to a width of 2.5M.

**Uniformity ratio** - The ratio of Minimum illuminance value to Average value within the prescribed area.

**Initial Illuminance** - The value of illuminance predicted at initial installation and /or after re-lamping and cleaning of reflectors.

**Maintained Illuminance** - The value of illuminance predicted after reduction in output to be experienced over the working life of the lamps.

NB. **Emin**= lowest recorded value within the prescribed area. **Eav** = Arithmetic average of all readings within the prescribed area.

The performance standards can be applied to an individual court operating on its own or block switching. Measurements or calculations within designs must be taken at playing surface level.

Calculation grids for lighting design modelling:-

A total of forty five (45 : 5 x 7) readings are required on the P.P.A.

A total of one hundred and fourteen (117 : 9 x 13) readings are required on the T.P.A.

A minimum maintenance factor to be employed within LED outdoor lighting designs to achieve the above levels of prescribed LTA performance shall be 0.9 i.e. 10% reduction in performance.

Please note some designs that are close to neighbouring properties have to have a maintenance factor of 1 to show the maximum effect on residential properties when lights are initially turned on.

## Appendix B – Floodlighting Contractors

The following matrix of contractors have provided concept designs to the LTA and these have been reviewed to establish that the floodlighting systems can meet the performance standards. Each contractor offers a wide range of solutions and the design must be tailored to each site. The LTA is not responsible for the contractor's designs and does not approve contractors. It is recommended that each venue undertakes its own due diligence before engaging a contractor.

| Contractor                             | 6m – 8m high columns | 8m – 10m and above column solution |
|--|----------------------|------------------------------------|
| Highlights Floodlighting Limited       | X                    | X                                  |
| Halliday Lighting Limited              | X                    | X                                  |
| Luminance Pro Lighting Systems Limited | X                    | X                                  |
| Surface Lux Limited                    | X                    | X                                  |
| Exclusive Leisure                      | X                    | X                                  |
| LTL Contracts                          | X                    | X                                  |

Lighting schemes below 6m mounting height are normally very difficult to achieve adequate uniformity therefore they need to be designed by a specialist consultant.