



## Project Technical Details

**Project: LED Lighting upgrade**

**Location: Carrick OnShannon Tennis Club**

**Contact: Philip Kelly**

**Ref: 25146**

**Date: 4/7/25**



## Project Brief

Specification: 400lx average

Uniformity: PPA:>0.7 TPA :>0.6

lowest level of light to be 70% of average on PPA

$E_{av}$  [lx]

Symbol for average Lux levels

$u_0$

Symbol for uniformity (lowest level as a % of Average)

Better Energy Management Ltd

Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, IrelandOperator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

## Table of contents

### DIALux Simulation for Tennis Courts

|                                       |    |
|---------------------------------------|----|
| Project Cover                         | 1  |
| Table of contents                     | 2  |
| <b>Carrick on Shannon Tennis Club</b> |    |
| Luminaire parts list                  | 3  |
| Luminaires (coordinates list)         | 4  |
| Pole Positions (Coordinates List)     | 5  |
| Calculation Grid (Coordinates List)   | 7  |
| <b>Light scenes</b>                   |    |
| <b>Court 1 Only</b>                   |    |
| Planning data                         | 8  |
| Planning data                         | 9  |
| Sport Luminaires (Coordinates List)   | 10 |
| False Colour Rendering                | 11 |
| <b>Exterior Surfaces</b>              |    |
| <b>Court 1 Calculation Grid (PPA)</b> |    |
| Value Chart (E, Perpendicular)        | 12 |
| <b>Court 1 Calculation Grid (TPA)</b> |    |
| Value Chart (E, Perpendicular)        | 13 |
| <b>Cour 2 Only</b>                    |    |
| Planning data                         | 14 |
| Planning data                         | 15 |
| Sport Luminaires (Coordinates List)   | 16 |
| False Colour Rendering                | 17 |
| <b>Exterior Surfaces</b>              |    |
| <b>Court 2 Calculation Grid (PPA)</b> |    |
| Value Chart (E, Perpendicular)        | 18 |
| <b>Court 2 Calculation Grid (TPA)</b> |    |
| Value Chart (E, Perpendicular)        | 19 |
| <b>All Lights On</b>                  |    |
| Planning data                         | 20 |
| Planning data                         | 21 |
| Sport Luminaires (Coordinates List)   | 22 |
| GR Observer (Results Overview)        | 24 |
| 3D Rendering                          | 26 |
| False Colour Rendering                | 27 |
| <b>Exterior Surfaces</b>              |    |
| <b>Court 1 Calculation Grid (PPA)</b> |    |
| Value Chart (E, Perpendicular)        | 28 |
| <b>Court 1 Calculation Grid (TPA)</b> |    |
| Value Chart (E, Perpendicular)        | 29 |
| <b>Court 2 Calculation Grid (PPA)</b> |    |
| Value Chart (E, Perpendicular)        | 30 |
| <b>Court 2 Calculation Grid (TPA)</b> |    |
| Value Chart (E, Perpendicular)        | 31 |

Better Energy Management Ltd

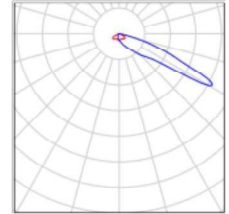
Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, Ireland

Operator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

## Carrick on Shannon Tennis Club / Luminaire parts list

8 Pieces VG-1200-AS-1 Front+Rear Visors  
Article No.:  
Luminous flux (Luminaire): 143165 lm  
Luminous flux (Lamps): 143344 lm  
Luminaire Wattage: 1196.6 W  
Luminaire classification according to CIE: 100  
CIE flux code: 23 62 97 100 100  
Fitting: 1 x User defined (Correction Factor 1.000).

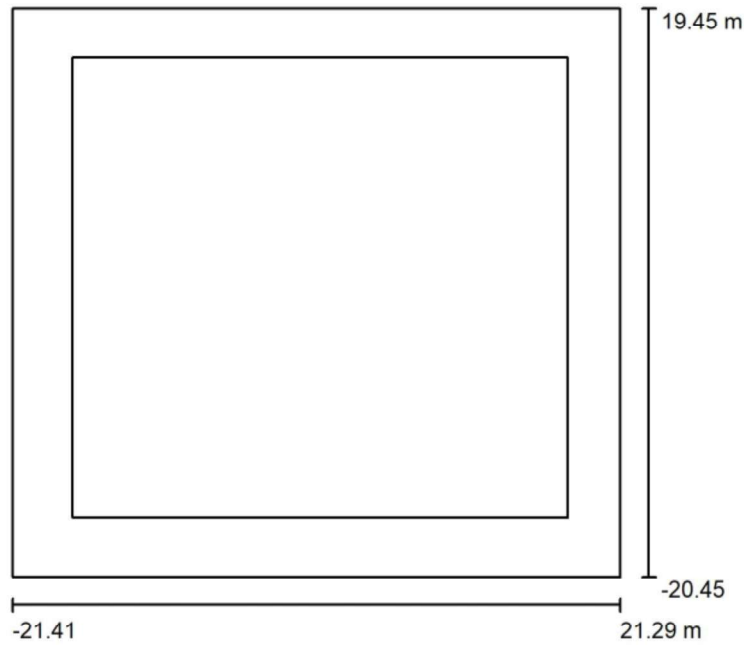
See our luminaire catalog for an image of the luminaire.



Better Energy Management Ltd  
Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, Ireland

Operator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

### Carrick on Shannon Tennis Club / Court 1 Only / Planning data



Maintenance factor: 0.85, ULR (Upward Light Ratio): 0.0%

Scale 1:500

#### Luminaire Parts List

| No.    | Pieces | Designation (Correction Factor)        | $\Phi$ (Luminaire) [lm] | $\Phi$ (Lamps) [lm] | P [W]  |
|--------|--------|----------------------------------------|-------------------------|---------------------|--------|
| 1      | 4      | VG-1200-AS-1 Front+Rear Visors (1.000) | 143165                  | 143344              | 1196.6 |
| Total: |        |                                        | 572659                  | 573376              | 4786.4 |

#### Existing electrical load:

8no 1kw Mh = 8kw (allowing for ballast) total = 9.2kw

Running cost: €0.3112 +9% = €0.34/kw  $9.2 * .34 = €3.13$  per hour to run one court

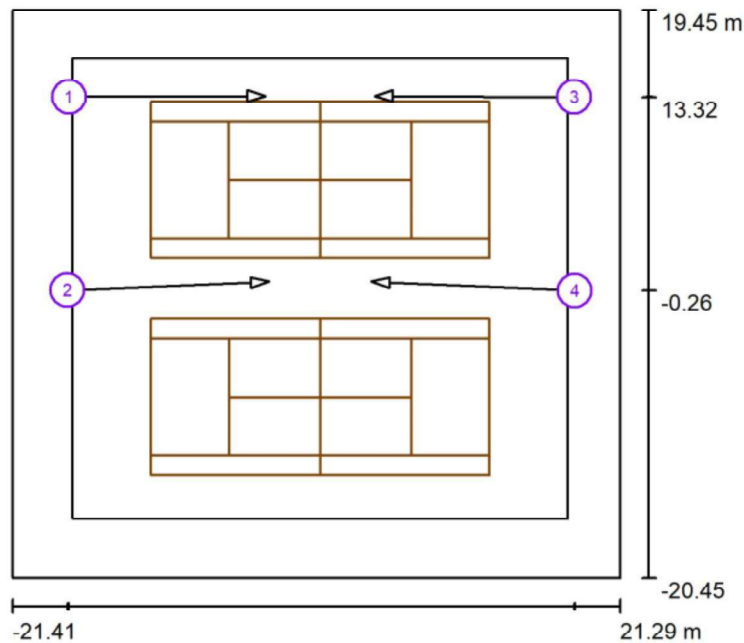
#### LED Lighting

4no 1.2kw = 4.8kw

Running cost: €0.3112 +9% = €0.34/kw  $4.8 * .34 = €1.63$  per hour to run one court

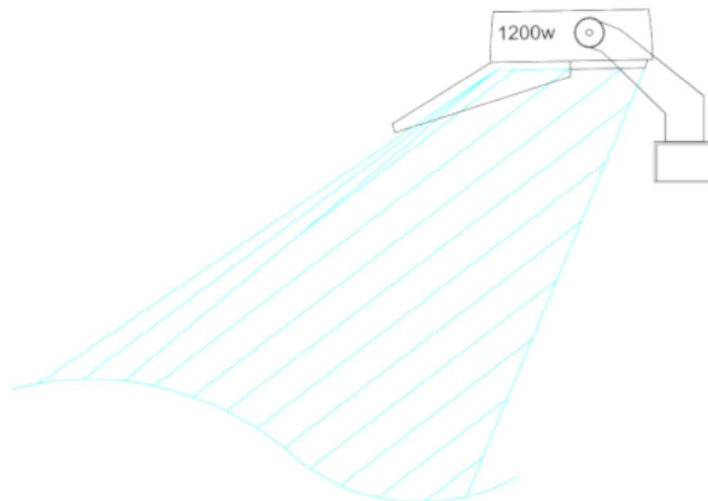
Energy saving = 48%

Better Energy Management Ltd

Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, IrelandOperator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com**Carrick on Shannon Tennis Club / Court 1 Only / Sport Luminaires (Coordinates List)**

Scale 1 : 500

Actual angle of fitting

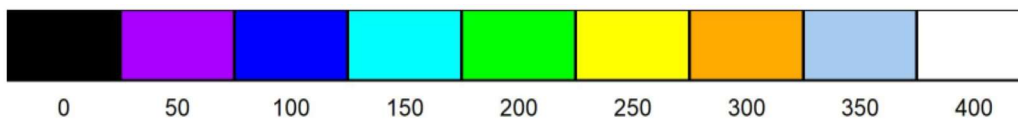
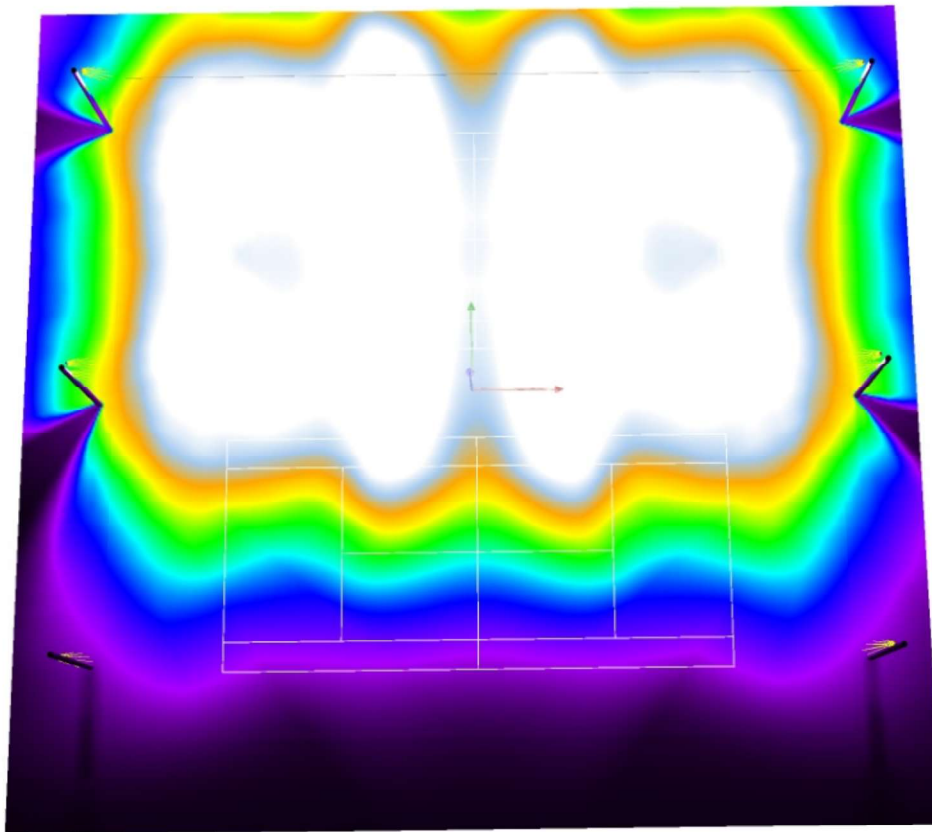


New design from BEM Ltd  
ASYMMETRICAL LENS ALLOWS FOR  
LIGHT TO BE DIRECTED FORWARD  
RESULTING IN LOW GLARE

Better Energy Management Ltd  
Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, Ireland

Operator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

## Carrick on Shannon Tennis Club / Court 1 Only / False Colour Rendering

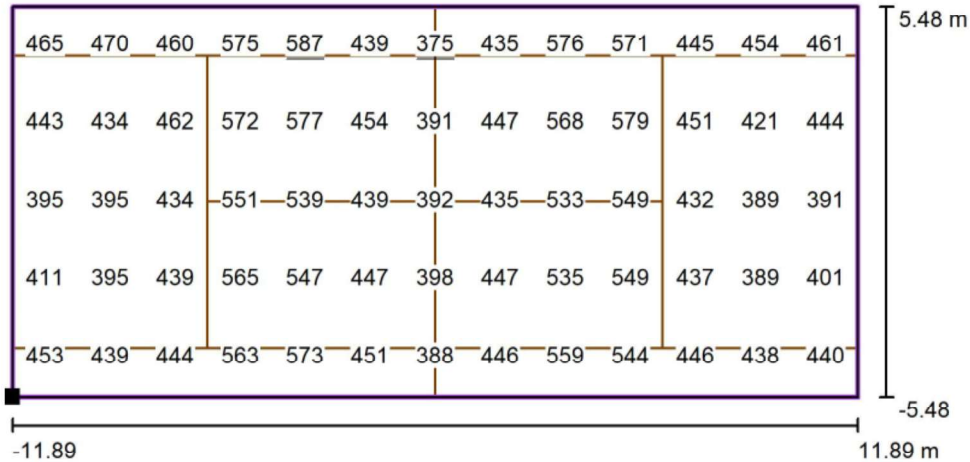


lx

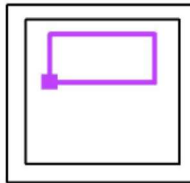
Better Energy Management Ltd

Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, IrelandOperator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

### Carrick on Shannon Tennis Club / Court 1 Only / Court 1 Calculation Grid (PPA) / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 200

Position of surface in external scene:  
Marked point: (-11.690 m, 2.020 m,  
0.000 m)

Grid: 13 x 5 Points

 $E_{av}$  [lx]  
470

 $E_{min}$  [lx]  
375

 $E_{max}$  [lx]  
587

 $u_0$   
0.80

 $E_{min} / E_{max}$   
0.64

### Principle Playinig Area

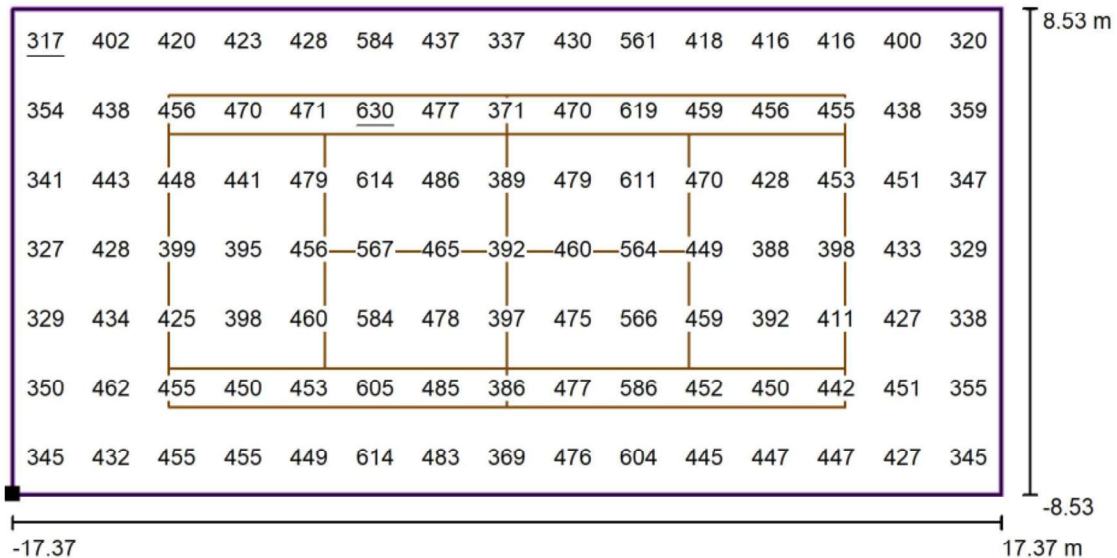
Average Lux: 470Lx

Uniformity: 0.8 (Lowest level of light is 80% of average)

Better Energy Management Ltd

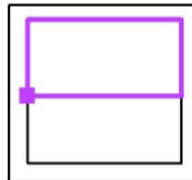
Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, IrelandOperator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

### Carrick on Shannon Tennis Club / Court 1 Only / Court 1 Calculation Grid (TPA) / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 250

Position of surface in external scene:  
Marked point: (-17.175 m, -1.035 m, 0.000 m)



Grid: 15 x 7 Points

 $E_{av}$  [lx]  
446

 $E_{min}$  [lx]  
317

 $E_{max}$  [lx]  
630

 $u0$   
0.71

 $E_{min} / E_{max}$   
0.50

Total Playing Area

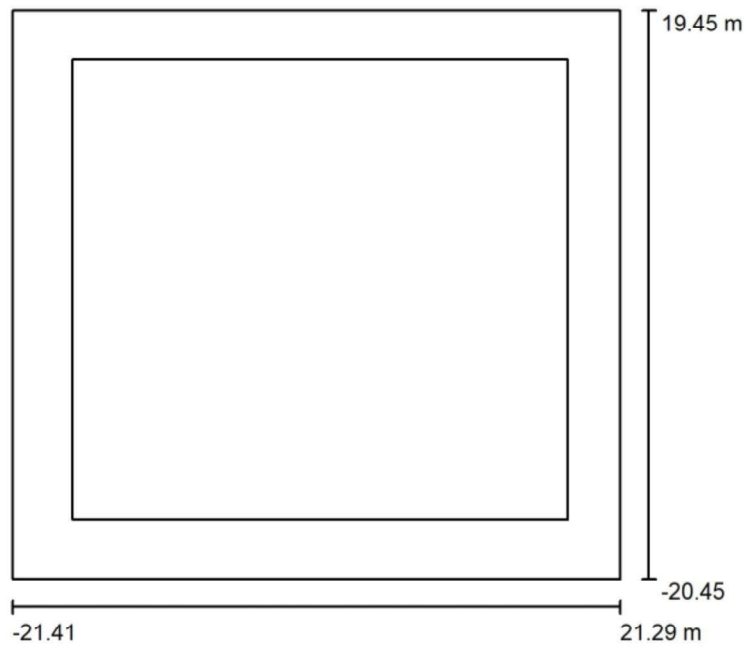
Average Lux: 446Lx

Uniformity: 0.71 (Lowest level of light is 71% of average)

Better Energy Management Ltd  
Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, Ireland

Operator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

### Carrick on Shannon Tennis Club / Cour 2 Only / Planning data



Maintenance factor: 0.85, ULR (Upward Light Ratio): 0.0%

Scale 1:500

#### Luminaire Parts List

| No.    | Pieces | Designation (Correction Factor)        | $\Phi$ (Luminaire) [lm] | $\Phi$ (Lamps) [lm] | P [W]  |
|--------|--------|----------------------------------------|-------------------------|---------------------|--------|
| 1      | 4      | VG-1200-AS-1 Front+Rear Visors (1.000) | 143165                  | 143344              | 1196.6 |
| Total: |        |                                        | 572659                  | 573376              | 4786.4 |

#### Existing electrical load:

8no 1kw Mh = 8kw (allowing for ballast) total = 9.2kw

Running cost: €0.3112 +9% = €0.34/kw  $9.2 * .34 = €3.13$  per hour to run one court

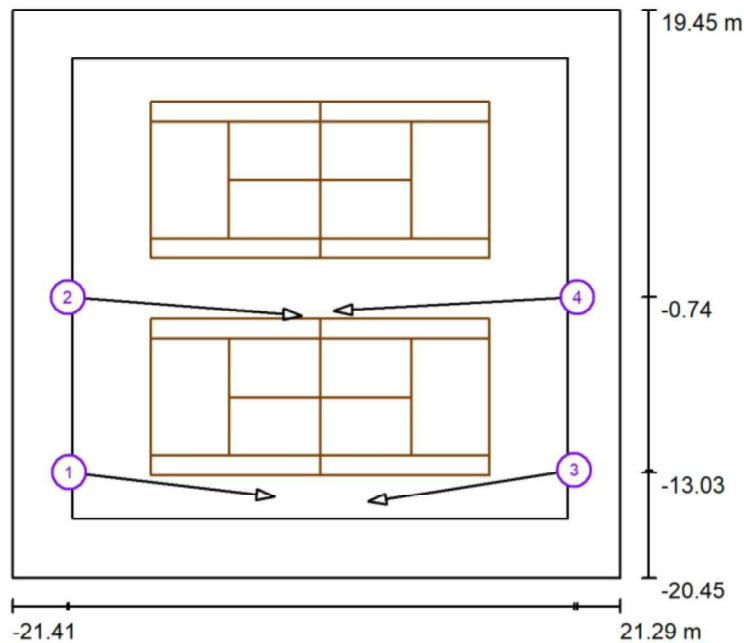
#### LED Lighting

4no 1.2kw = 4.8kw

Running cost: €0.3112 +9% = €0.34/kw  $4.8 * .34 = €1.63$  per hour to run one court

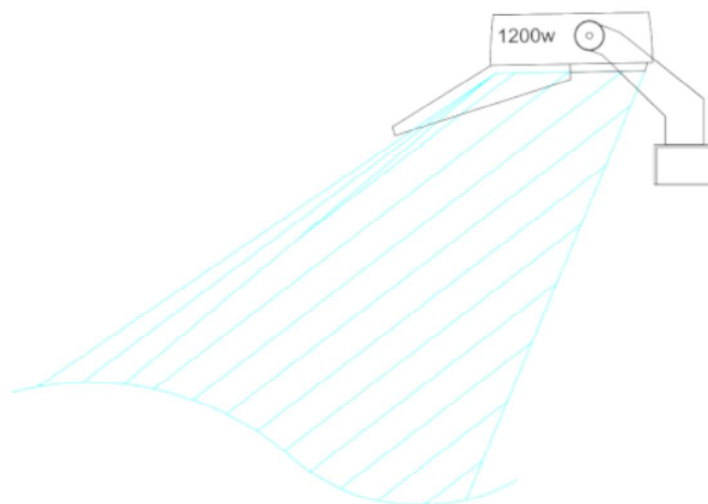
Energy saving = 48%

Better Energy Management Ltd

Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, IrelandOperator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com**Carrick on Shannon Tennis Club / Cour 2 Only / Sport Luminaires (Coordinates List)**

Scale 1 : 500

Actual angle of fitting

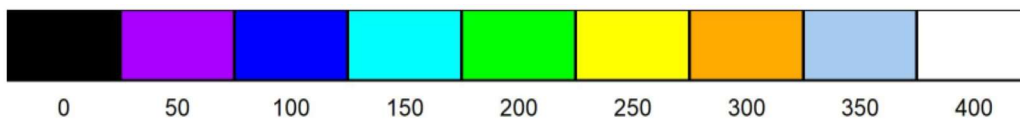
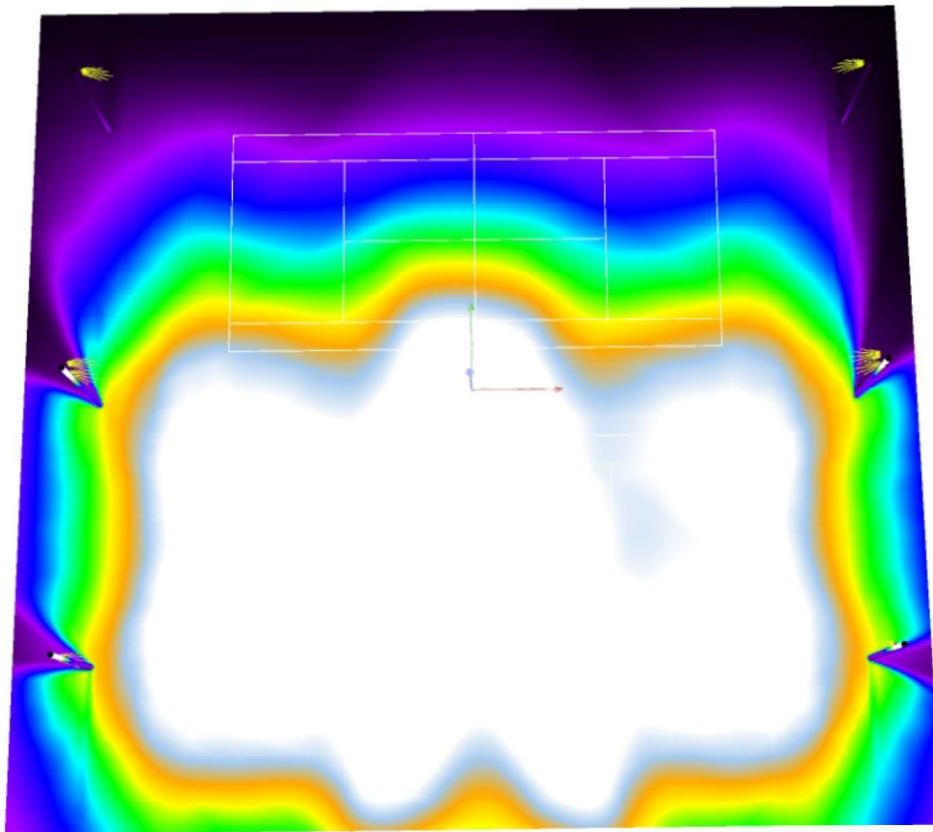


New design from BEM Ltd  
ASYMMETRICAL LENS ALLOWS FOR  
LIGHT TO BE DIRECTED FORWARD  
RESULTING IN LOW GLARE

Better Energy Management Ltd  
Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, Ireland

Operator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

## Carrick on Shannon Tennis Club / Cour 2 Only / False Colour Rendering

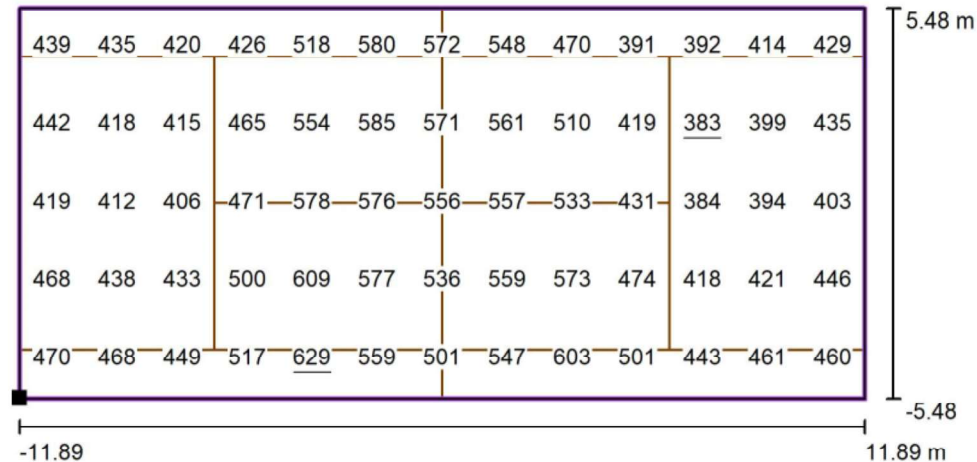


lx

Better Energy Management Ltd

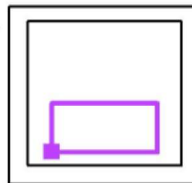
Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, IrelandOperator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

## Carrick on Shannon Tennis Club / Cour 2 Only / Court 2 Calculation Grid (PPA) / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 200

Position of surface in external scene:  
Marked point: (-11.672 m, -13.233 m,  
0.000 m)



Grid: 13 x 5 Points

 $E_{av}$  [lx]  
483

 $E_{min}$  [lx]  
383

 $E_{max}$  [lx]  
629

 $u_0$   
0.79

 $E_{min} / E_{max}$   
0.61

### Principle Playinig Area

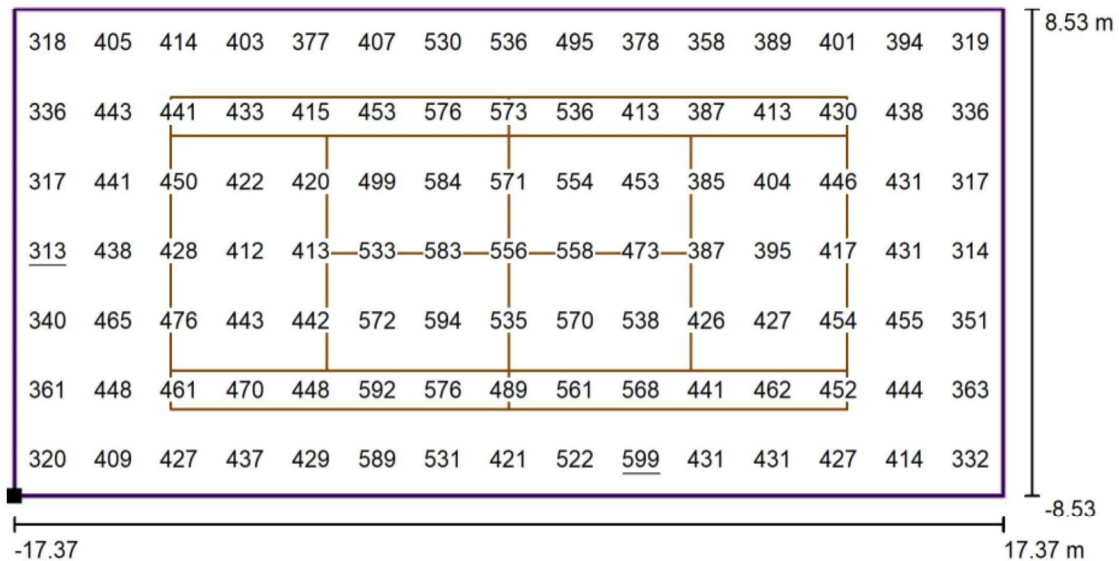
Average Lux: 483Lx

Uniformity: 0.79 (Lowest level of light is 79% of average)

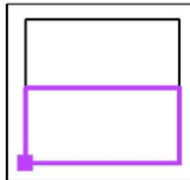
Better Energy Management Ltd

Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, IrelandOperator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

### Carrick on Shannon Tennis Club / Cour 2 Only / Court 2 Calculation Grid (TPA) / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 250

Position of surface in external scene:  
Marked point: (-17.157 m, -16.288 m,  
0.000 m)

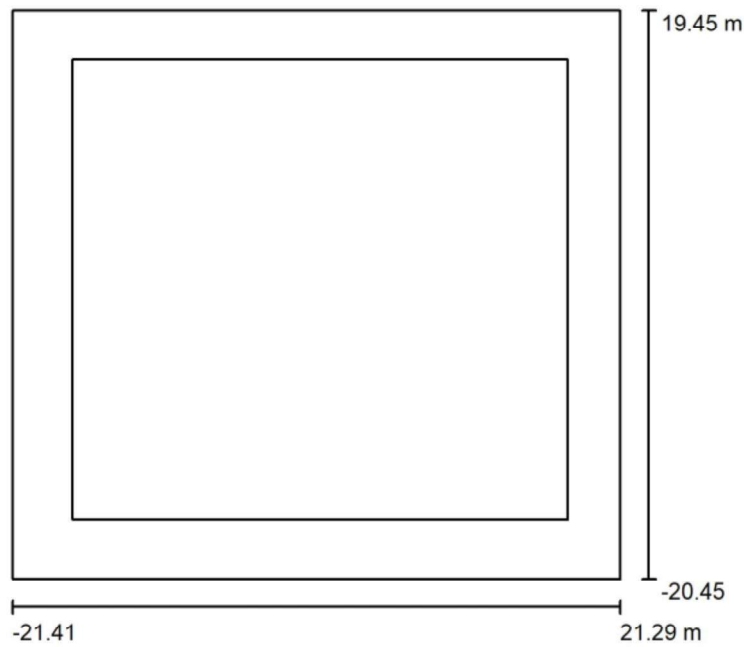
Grid: 15 x 7 Points

 $E_{av}$  [lx]  
448 $E_{min}$  [lx]  
313 $E_{max}$  [lx]  
599 $u0$   
0.70 $E_{min} / E_{max}$   
0.52**Total Playing Area****Average Lux: 448Lx****Uniformity: 0.70 (Lowest level of light is 70% of average)**

Better Energy Management Ltd  
Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, Ireland

Operator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

### Carrick on Shannon Tennis Club / All Lights On / Planning data



Maintenance factor: 0.85, ULR (Upward Light Ratio): 0.0%

Scale 1:500

#### Luminaire Parts List

| No.    | Pieces | Designation (Correction Factor)        | $\Phi$ (Luminaire) [lm] | $\Phi$ (Lamps) [lm] | P [W]  |
|--------|--------|----------------------------------------|-------------------------|---------------------|--------|
| 1      | 8      | VG-1200-AS-1 Front+Rear Visors (1.000) | 143165                  | 143344              | 1196.6 |
| Total: |        |                                        | 1145318                 | Total: 1146752      | 9572.8 |

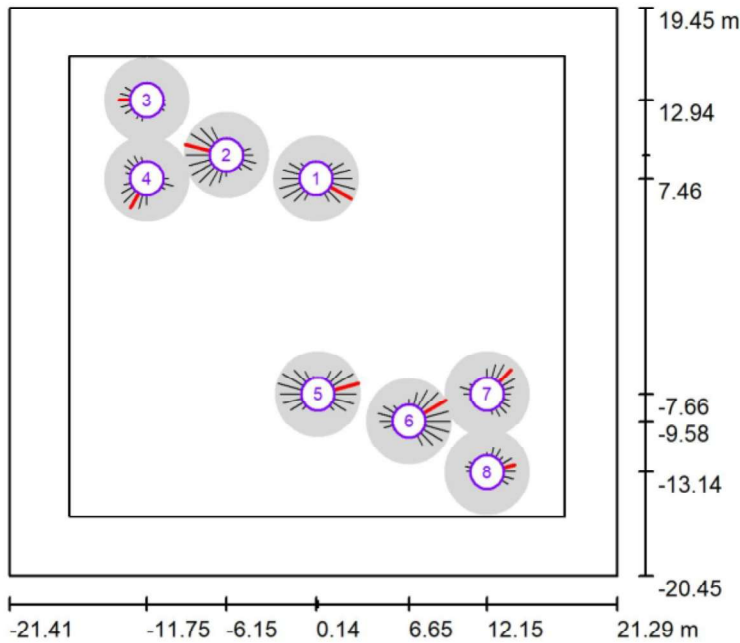
**Total Electrical Load for 2 courts**

**9.6kw**

Better Energy Management Ltd  
Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, Ireland

Operator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

**Carrick on Shannon Tennis Club / All Lights On / GR Observer (Results Overview)**



Scale 1 : 500

**GR Observerlist**

| No. | Designation   | Position [m] |        |       | Viewing sector [°] |       |           |             | Max              |
|-----|---------------|--------------|--------|-------|--------------------|-------|-----------|-------------|------------------|
|     |               | X            | Y      | Z     | Start              | End   | Increment | Slope angle |                  |
| 1   | GR Observer 1 | 0.145        | 7.460  | 1.500 | 0.0                | 360.0 | 15.0      | -2.0        | 44 <sup>2)</sup> |
| 2   | GR Observer 1 | -6.155       | 9.110  | 1.500 | 0.0                | 360.0 | 15.0      | -2.0        | 47 <sup>2)</sup> |
| 3   | GR Observer 1 | -11.745      | 12.940 | 1.500 | 0.0                | 360.0 | 15.0      | -2.0        | 31 <sup>2)</sup> |
| 4   | GR Observer 1 | -11.745      | 7.460  | 1.500 | 0.0                | 360.0 | 15.0      | -2.0        | 37 <sup>2)</sup> |

Better Energy Management Ltd

Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, IrelandOperator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

## Carrick on Shannon Tennis Club / All Lights On / GR Observer (Results Overview)

### GR Observerlist

| No. | Designation   | Position [m] |         |       | Start | Viewing sector [°] |           | Slope angle | Max              |
|-----|---------------|--------------|---------|-------|-------|--------------------|-----------|-------------|------------------|
|     |               | X            | Y       | Z     |       | End                | Increment |             |                  |
| 5   | GR Observer 2 | 0.255        | -7.660  | 1.500 | 0.0   | 360.0              | 15.0      | -2.0        | 46 <sup>2)</sup> |
| 6   | GR Observer 2 | 6.655        | -9.578  | 1.500 | 0.0   | 360.0              | 15.0      | -2.0        | 47 <sup>2)</sup> |
| 7   | GR Observer 2 | 12.145       | -7.660  | 1.500 | 0.0   | 360.0              | 15.0      | -2.0        | 37 <sup>2)</sup> |
| 8   | GR Observer 2 | 12.145       | -13.140 | 1.500 | 0.0   | 360.0              | 15.0      | -2.0        | 31 <sup>2)</sup> |

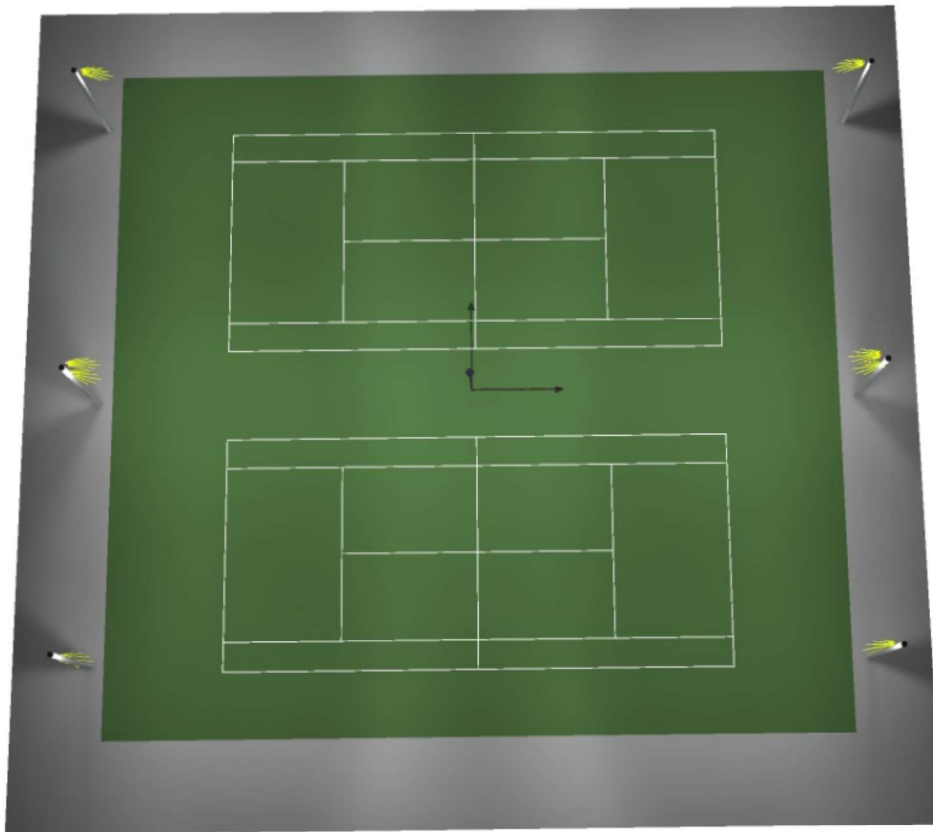
2) The calculated equivalent veil luminance of the environment is based on the assumption of a complete diffuse reflection behavior of the environment (acc. EN 12464-2).

Better Energy Management Ltd

Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, Ireland

Operator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

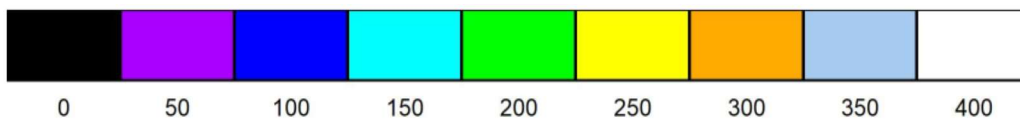
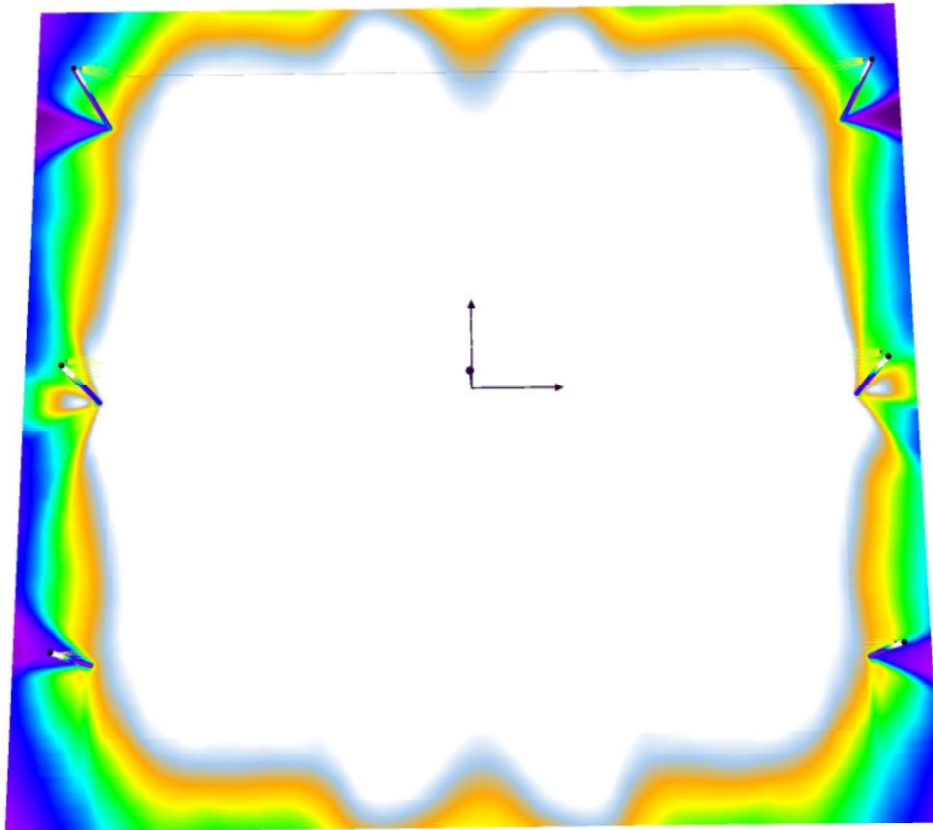
### Carrick on Shannon Tennis Club / All Lights On / 3D Rendering



Better Energy Management Ltd  
Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, Ireland

Operator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

## Carrick on Shannon Tennis Club / All Lights On / False Colour Rendering

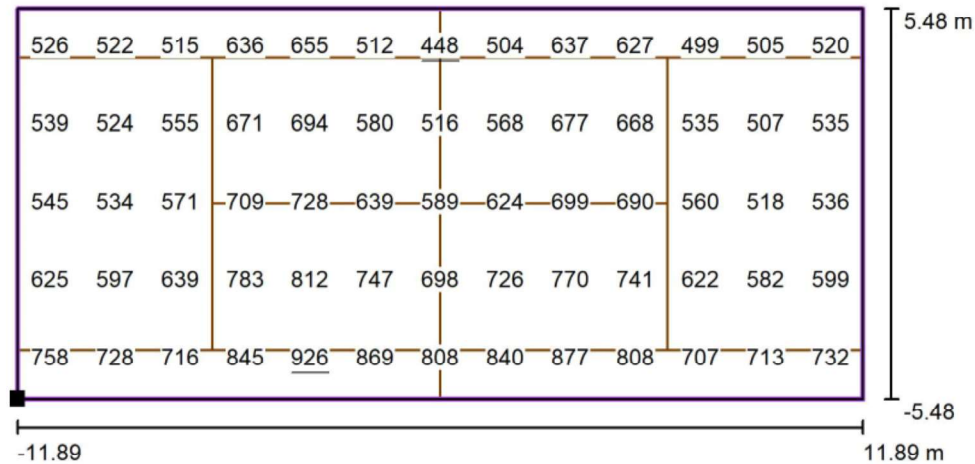


lx

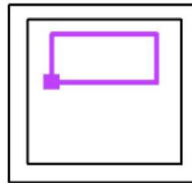
Better Energy Management Ltd

Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, IrelandOperator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

### Carrick on Shannon Tennis Club / All Lights On / Court 1 Calculation Grid (PPA) / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 200

Position of surface in external scene:  
Marked point: (-11.690 m, 2.020 m,  
0.000 m)

Grid: 13 x 5 Points

 $E_{av}$  [lx]  
644

 $E_{min}$  [lx]  
448

 $E_{max}$  [lx]  
926

 $u_0$   
0.70

 $E_{min} / E_{max}$   
0.48

### Both Courts Lighting

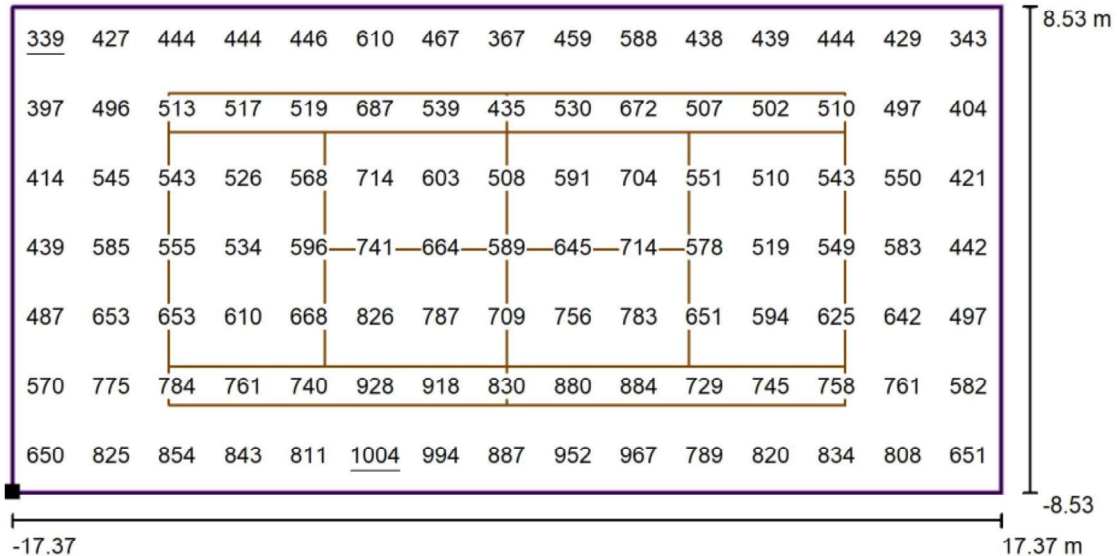
Average Lux Court 2 = 664lx

Uniformity: 0.7

Better Energy Management Ltd

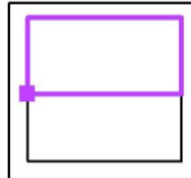
Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, IrelandOperator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

### Carrick on Shannon Tennis Club / All Lights On / Court 1 Calculation Grid (TPA) / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 250

Position of surface in external scene:

Marked point: (-17.175 m, -1.035 m,  
0.000 m)

Grid: 15 x 7 Points

 $E_{av}$  [lx]  
626

 $E_{min}$  [lx]  
339

 $E_{max}$  [lx]  
1004

 $u0$   
0.54

 $E_{min} / E_{max}$   
0.34

### Both Courts Lighting

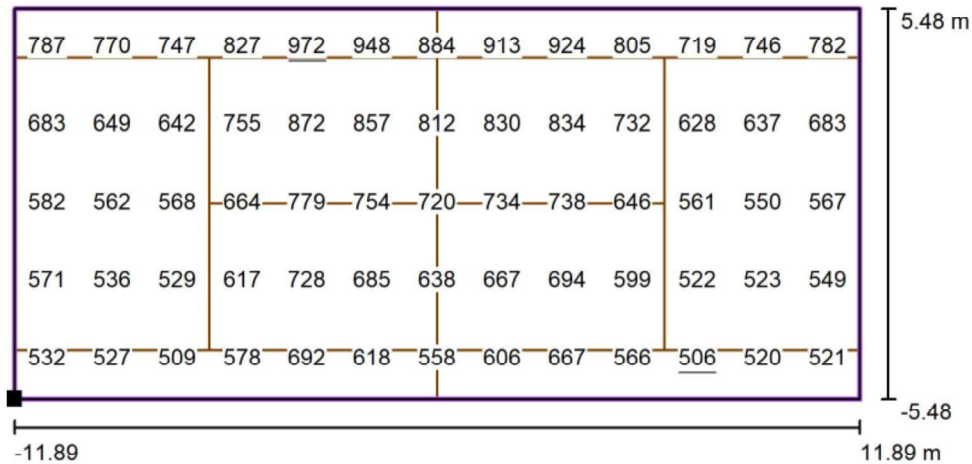
Average Lux Court 2 = 626lx (Total Playing Area)

Uniformity: 0.54

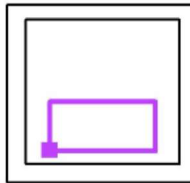
Better Energy Management Ltd

Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, IrelandOperator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

### Carrick on Shannon Tennis Club / All Lights On / Court 2 Calculation Grid (PPA) / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 200

Position of surface in external scene:  
Marked point: (-11.672 m, -13.233 m,  
0.000 m)

Grid: 13 x 5 Points

 $E_{av}$  [lx]  
679

 $E_{min}$  [lx]  
506

 $E_{max}$  [lx]  
972

 $u_0$   
0.75

 $E_{min} / E_{max}$   
0.52

### Both courts Lighting

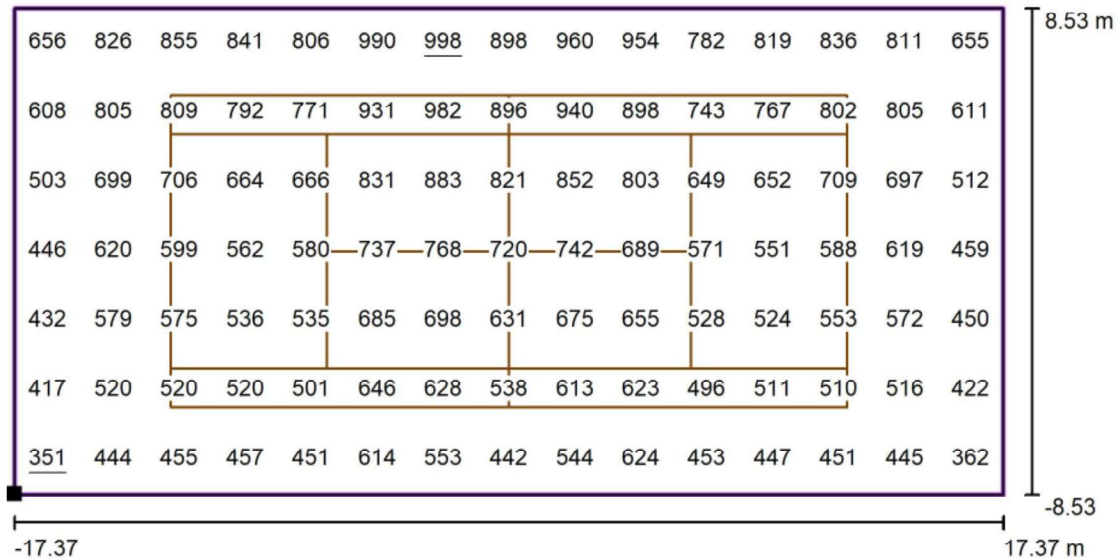
Average Lux: 679lx (Principle Playing Area)

Uniformity: 0.75

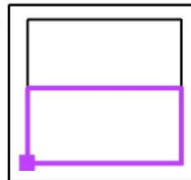
Better Energy Management Ltd

Unit 4, Enterprise Centre, Church Street  
Banagher Co Offaly, R42 VP70, IrelandOperator Brendan Benny Murphy  
Telephone +353 (0)86 7926161  
Fax  
e-Mail bmurphy@bem-ltd.com

### Carrick on Shannon Tennis Club / All Lights On / Court 2 Calculation Grid (TPA) / Value Chart (E, Perpendicular)



Values in Lux, Scale 1 : 250

Position of surface in external scene:  
Marked point: (-17.157 m, -16.288 m,  
0.000 m)

Grid: 15 x 7 Points

 $E_{av}$  [lx]  
652 $E_{min}$  [lx]  
351 $E_{max}$  [lx]  
998 $u0$   
0.54 $E_{min} / E_{max}$   
0.35

### Both Courts Lighting

Average Lux Court 2 = 652lx (Total Playing Area)

Uniformity: 0.54