Northwood Lawn Tennis Club

Outdoor LED Tennis Lighting Design

Project code:	6318
Date:	04/10/2023
Client:	Northwood Lawn Tennis Club
Client Representative:	
Lighting Consultant:	
Project Consultant:	
Planning Consultant:	
Lighting Design Company:	Luminance Pro Lighting Systems Ltd
Lighting Design Representative:	Matthew Haskins
Lighting Design Software:	CalcuLux Area 7.7.0.1
Design Criteria:	To provide a lighting scheme suitable for Lawn Tennis Associations recommended standard, whilst minimising light spill and glare to neighbouring properties. PPA = 500 Lux maintained at 0.7 uniformity TPA = 400 Lux maintained at 0.6 uniformity
Columns:	15 No. Existing columns to be utilised
Luminaires:	18 No. (HiLux model: Match LED)
Notes:	This lighting design is solely based on the use of the equipment detailed. Any deviation from this equipment will produce differing results. The superior optics of the HiLux Match LED luminaire have been specifically selected to minimise the effects of nuisance overspill to adjacent dwellings.

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

luminance pro
lighting systems
PO Box 1345, Woking, Surrey, GU24 9WL

Email: info@luminancepro.co.uk
Website: www.luminancepro.co.uk
Tel: 01276 855666
Fax: 01276 855999

lighting design centre

HiLux

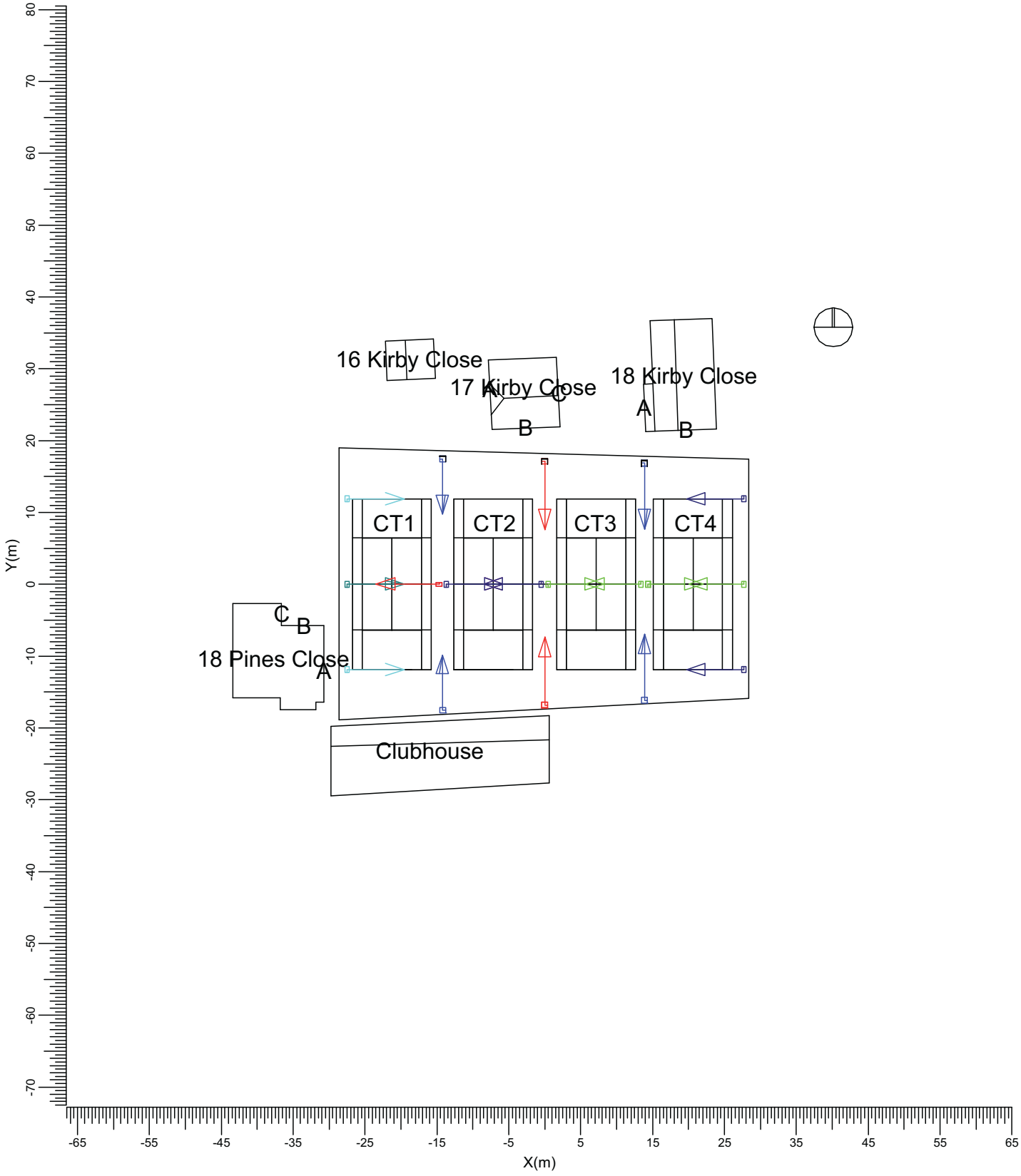
NICEIC APPROVED CONTRACTOR UKAS PRODUCT CERTIFICATION 118

SAFCA

Table of Contents

1. Project Description

1.1 Top Project Overview



Scale
1:750

2. Summary

2.1 General Information

The overall maintenance factor used for this project is 0.90.

2.2 Obstacle Information

Obstacle	Transparency (%)	Position		
		X (m)	Y (m)	Z (m)
Fence	0	-28.56	20.01	0.00
Fence 2	0	-29.80	-19.20	0.00
Side Deflector 01	0	-27.81	-0.41	6.90
Rear Deflector 01	0	-27.82	0.41	6.90
Side Deflector 02	0	-27.81	12.29	6.90
		28.01	12.29	6.90
Side Deflector 03	0	-13.79	17.83	6.89
Rear Deflector 02	0	-14.64	17.83	6.89
Rear Deflector 03	0	-0.43	17.49	6.86
Rear Deflector 04	0	13.45	17.22	6.86
Side Deflector 04	0	14.30	17.22	6.86
		13.46	17.22	6.86
Rear Deflector 05	0	-27.81	-11.49	6.90
Side Deflector 05	0	-0.43	17.49	6.86
		0.43	17.49	6.86

2.3 Project Luminaires

Code	Qty	Luminaire Type	Lamp Type	Power (W)	Flux (lm)
F	1	Match G6.10 FS 420	1 * LED 05+2	406.0	1 * 63420
G	4	Match G6.10 FS 420	1 * LED 06+1	406.0	1 * 62460
I	2	Match G6.10 FS 480	1 * LED 04+4	464.0	1 * 74430
K	4	Match G6.10 FS 480	1 * LED 06+2	464.0	1 * 72300
c	2	Match G6.14 FS 720	1 * LED 09+3	696.0	1 * 107610
d	4	Match G6.14 FS 720	1 * LED 10+2	696.0	1 * 106550
q	1	Match G6.07 FS 420	1 * LED 06+01	406.0	1 * 59495

The total installed power: 10.44 (kWatt)

Number of Luminaires Per Switching Mode:

Switching Mode	Luminaire Code						
	F	G	I	K	c	d	q
Court 1	1	0	2	0	0	2	1
Court 2	0	0	0	2	2	2	0
Court 3	0	2	0	0	2	2	0
Court 4	0	2	0	2	0	2	0
All Lights	1	4	2	4	2	4	1

Switching Mode	Power (kWatt)
Court 1	3.31
Court 2	4.06
Court 3	3.94
Court 4	3.31
All Lights	9.40

Number of Luminaires Per Arrangement:

Arrangement	Luminaire Code						
	F	G	I	K	c	d	q
CT1 P1	0	0	2	0	0	0	0

Arrangement	Luminaire Code						
	F	G	I	K	c	d	q
CT1 P2	1	0	0	0	0	0	0
CT1 P3	0	0	0	0	0	0	1
CT1,2 P1	0	0	0	0	0	2	0
CT2 P1	0	0	0	1	0	0	0
CT2 P2	0	0	0	1	0	0	0
CT2,3 P1	0	0	0	0	2	0	0
CT3 P1	0	1	0	0	0	0	0
CT3 P2	0	1	0	0	0	0	0
CT3,4 P1	0	0	0	0	0	2	0
CT4 P1	0	1	0	0	0	0	0
CT4 P2	0	0	0	2	0	0	0
CT4 P3	0	1	0	0	0	0	0

Arrangement	Power (kWatt)
CT1 P1	0.93
CT1 P2	0.41
CT1 P3	0.58
CT1,2 P1	1.39
CT2 P1	0.64
CT2 P2	0.64
CT2,3 P1	1.39
CT3 P1	0.58
CT3 P2	0.58
CT3,4 P1	1.39
CT4 P1	0.58
CT4 P2	0.93
CT4 P3	0.41

2.4 Calculation Results

Switching Modes:

Code	Switching Mode
1	Court 1
2	Court 2
3	Court 3
4	Court 4
5	All Lights

(Il)luminance Calculations:

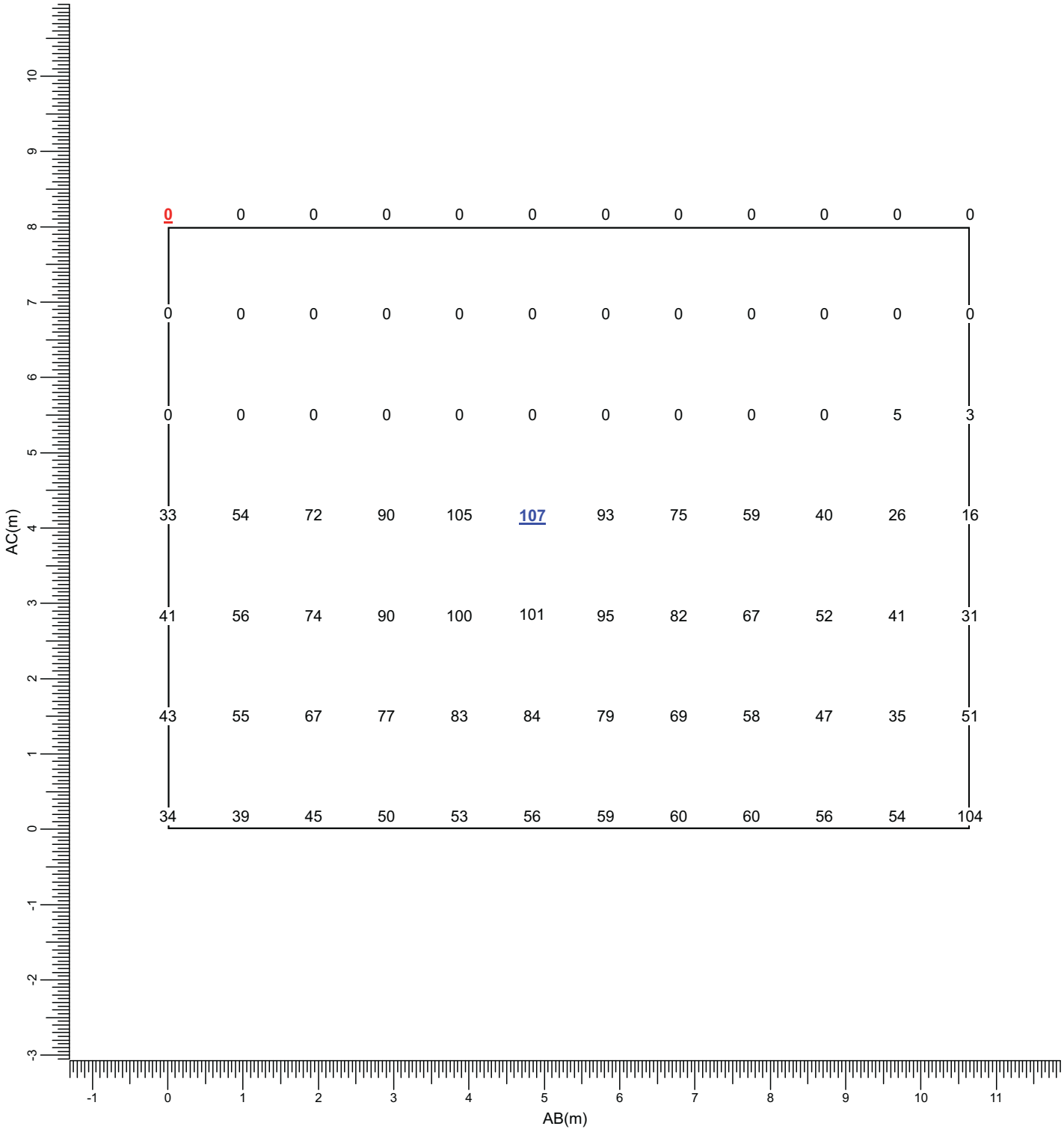
Calculation	Switching Mode	Type	Unit	Ave	Max	Min/Ave
PPA1	1	Surface Illuminance	lux	535		0.72
PPA2	2	Surface Illuminance	lux	521		0.73
PPA3	3	Surface Illuminance	lux	529		0.82
PPA4	4	Surface Illuminance	lux	548		0.82
TPA1	1	Surface Illuminance	lux	534		0.68
TPA2	2	Surface Illuminance	lux	519		0.69
TPA3	3	Surface Illuminance	lux	527		0.79
TPA4	4	Surface Illuminance	lux	531		0.63
18 Pines Close Side A	5	Surface Illuminance	lux		106.6	
18 Pines Close Side B	5	Surface Illuminance	lux		2.13	
18 Pines Close Side C	5	Surface Illuminance	lux		2.88	
16 Kirby Close	5	Surface Illuminance	lux		0.86	
17 Kirby Close Side A	5	Surface Illuminance	lux		1.20	
17 Kirby Close Side B	5	Surface Illuminance	lux		29.98	
17 Kirby Close Side C	5	Surface Illuminance	lux		0.53	
18 Kirby Close Side A	5	Surface Illuminance	lux		0.70	
18 Kirby Close Side B	5	Surface Illuminance	lux		33.42	
Overspill	5	Surface Illuminance	lux			

3. Calculation Results

3.1 18 Pines Close Side A: Graphical Table

All Lights

Grid : 18 Pines Close Side A
Calculation : Surface Illuminance (lux)



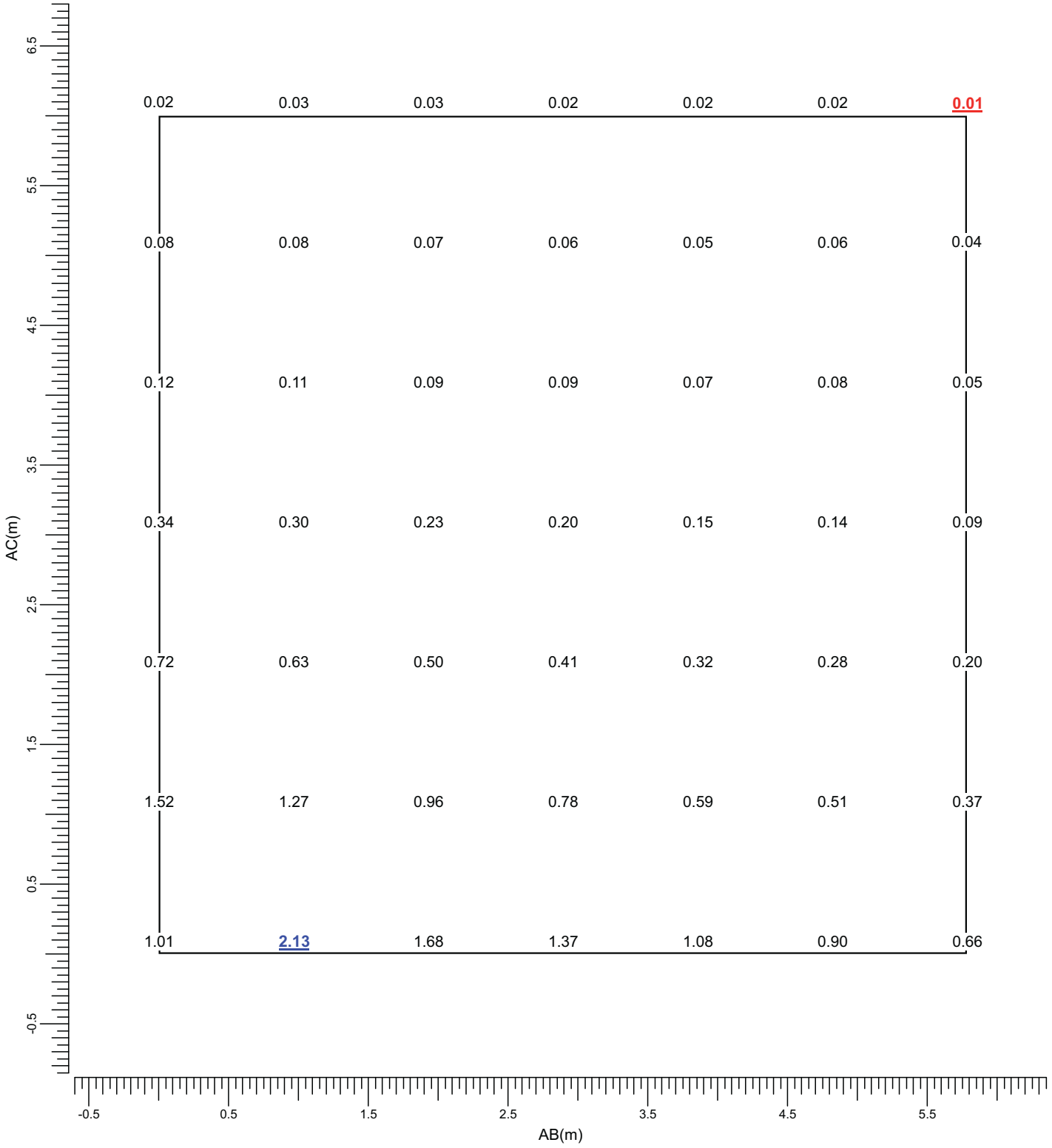
(-30.77, -16.39, 7.00) C-----D (-30.82, -5.74, 7.00)
| |
(-30.77, -16.39, -1.00) A-----B (-30.82, -5.74, -1.00)

Maximum	Project maintenance factor	Scale
106.6	0.90	1:75

3.2 18 Pines Close Side B: Graphical Table

All Lights

Grid : 18 Pines Close Side B
Calculation : Surface Illuminance (lux)



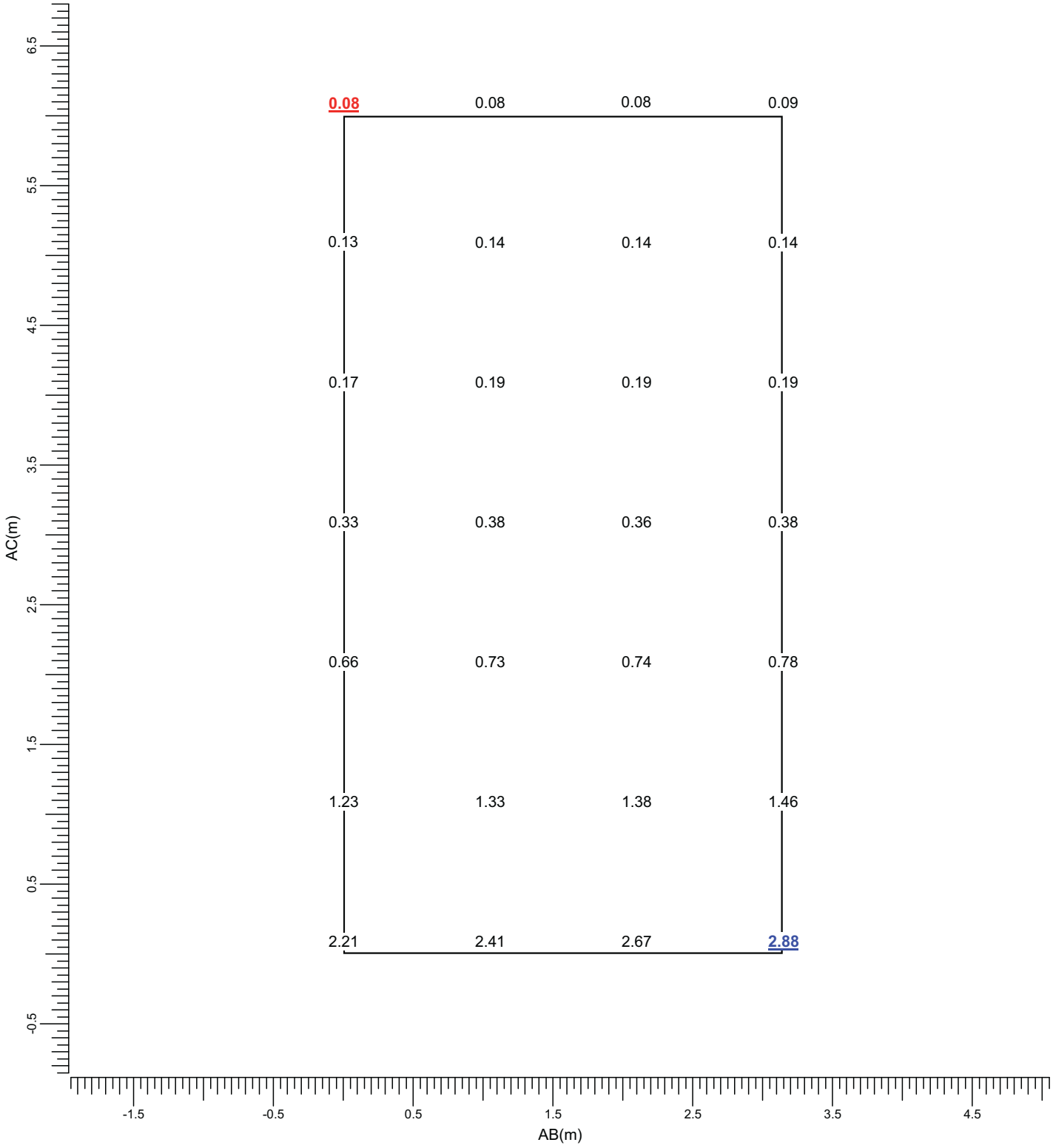
(-30.82, -5.74, 7.00) C-----D (-36.60, -5.78, 7.00)
(-30.82, -5.74, 1.00) A-----B (-36.60, -5.78, 1.00)

Maximum	Project maintenance factor	Scale
2.13	0.90	1:40

3.3 18 Pines Close Side C: Graphical Table

All Lights

Grid : 18 Pines Close Side C
Calculation : Surface Illuminance (lux)



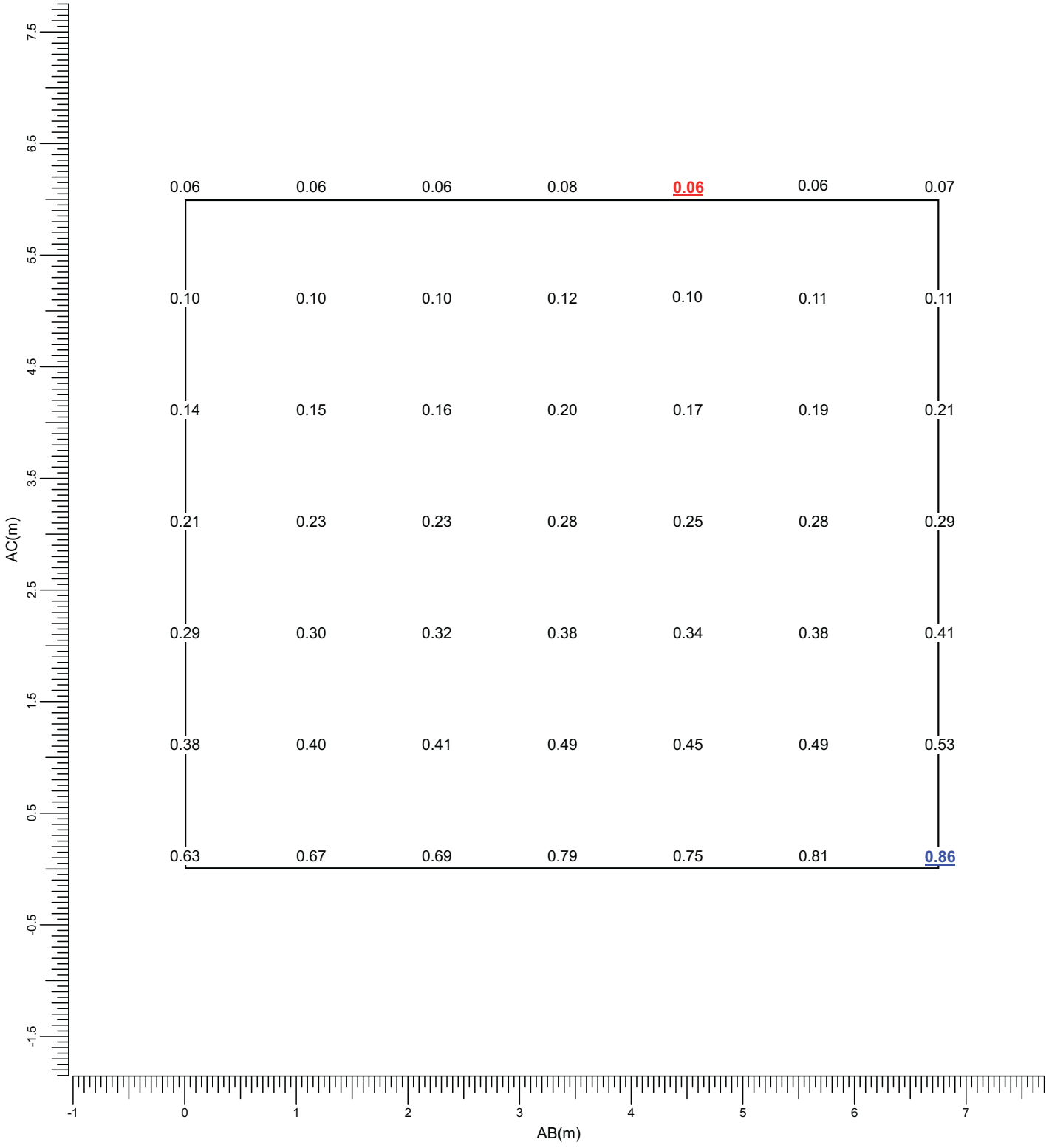
(-36.60, -5.78, 7.00) C-----D (-36.64, -2.64, 7.00)
(-36.60, -5.78, 1.00) A-----B (-36.64, -2.64, 1.00)

Maximum	Project maintenance factor	Scale
2.88	0.90	1:40

3.4 16 Kirby Close: Graphical Table

All Lights

Grid : 16 Kirby Close
Calculation : Surface Illuminance (lux)



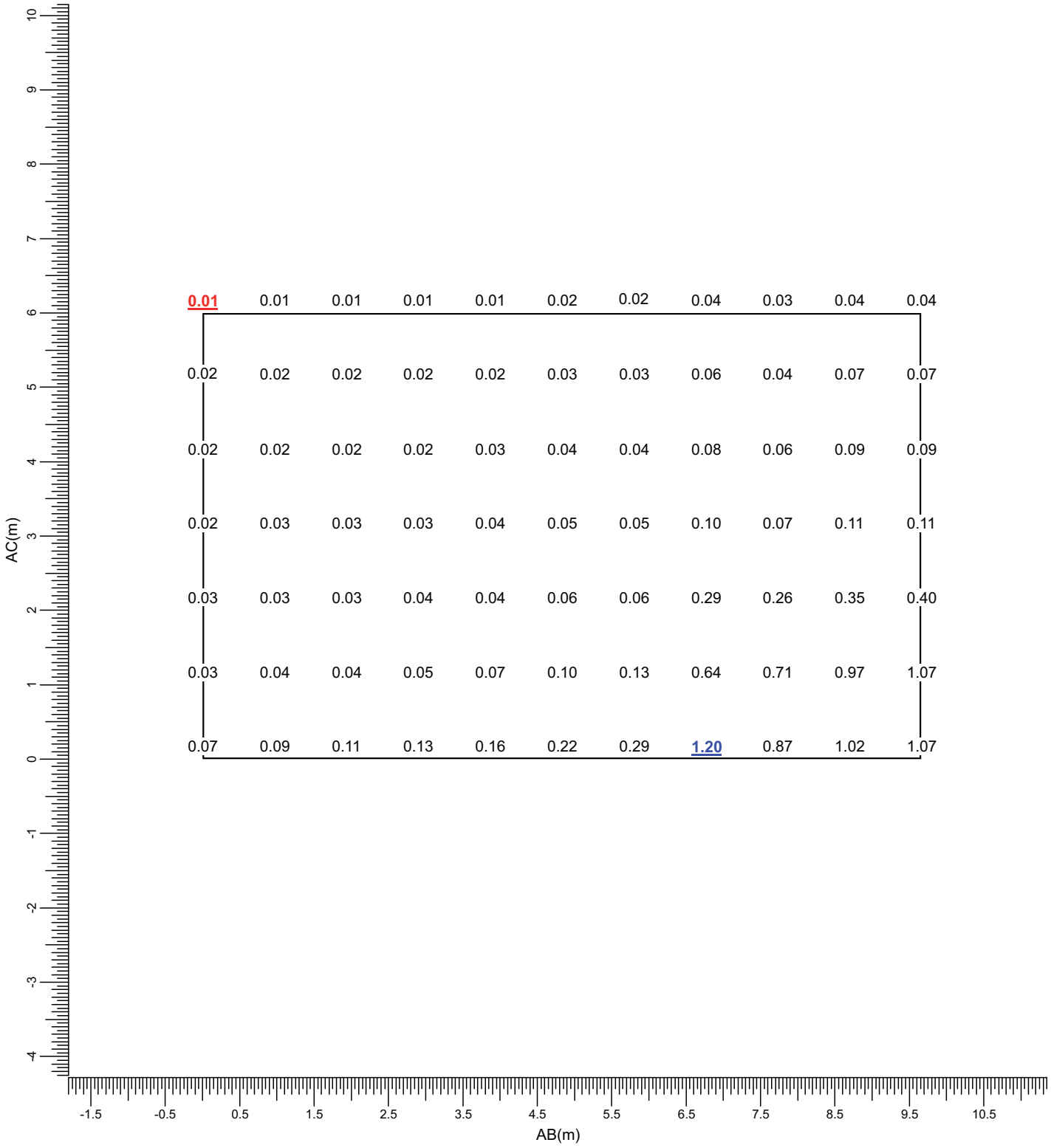
(-21.93, 28.38, 7.00) C-----D (-15.18, 28.67, 7.00)
(-21.93, 28.38, 1.00) A-----B (-15.18, 28.67, 1.00)

Maximum	Project maintenance factor	Scale
0.86	0.90	1:50

3.5 17 Kirby Close Side A: Graphical Table

All Lights

Grid : 17 Kirby Close Side A
Calculation : Surface Illuminance (lux)



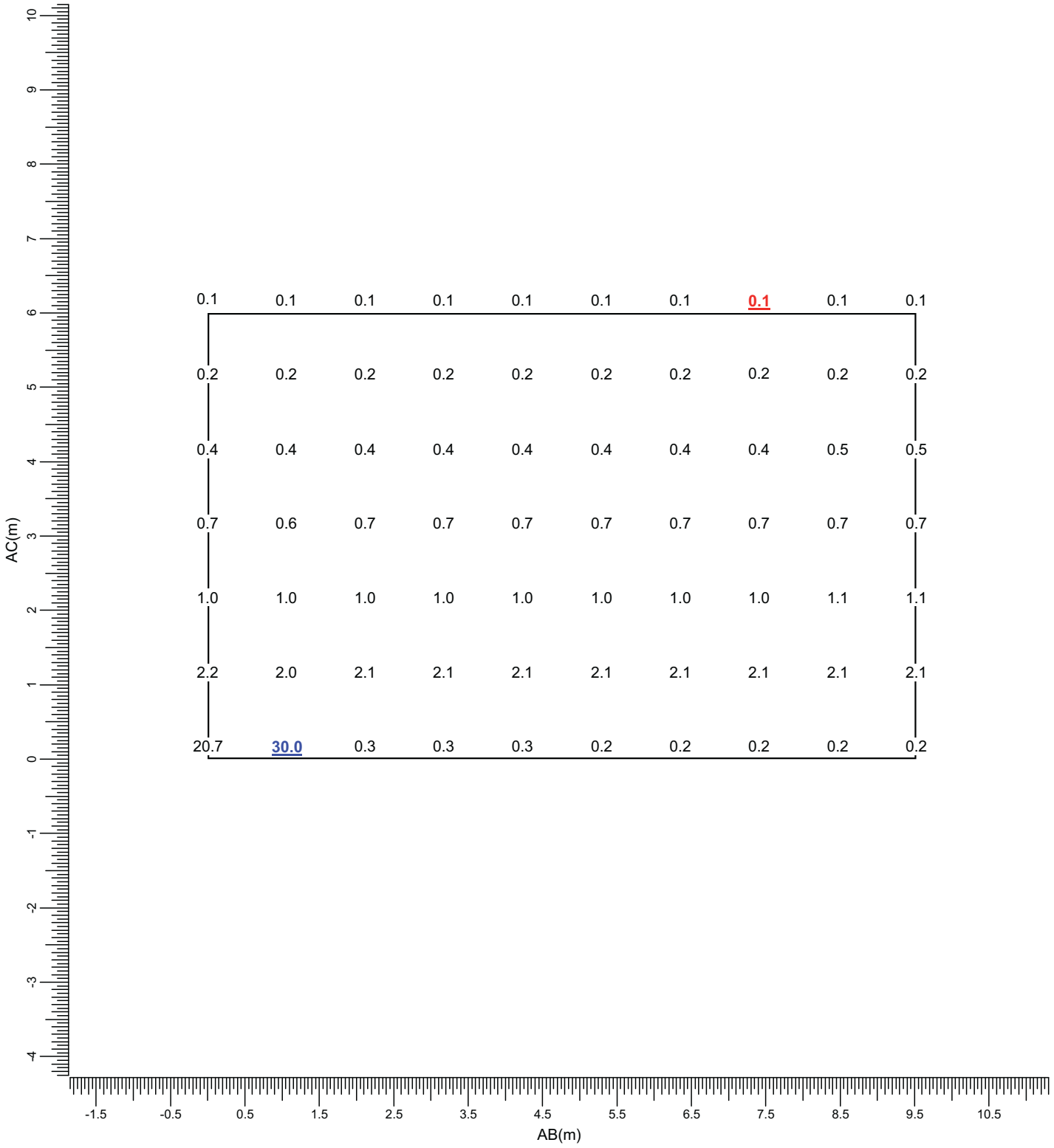
(-7.93, 31.19, 7.00) C-----D (-7.34, 21.55, 7.00)
(-7.93, 31.19, 1.00) A-----B (-7.34, 21.55, 1.00)

Maximum	Project maintenance factor	Scale
1.20	0.90	1:75

3.6 17 Kirby Close Side B: Graphical Table

All Lights

Grid : 17 Kirby Close Side B
Calculation : Surface Illuminance (lux)



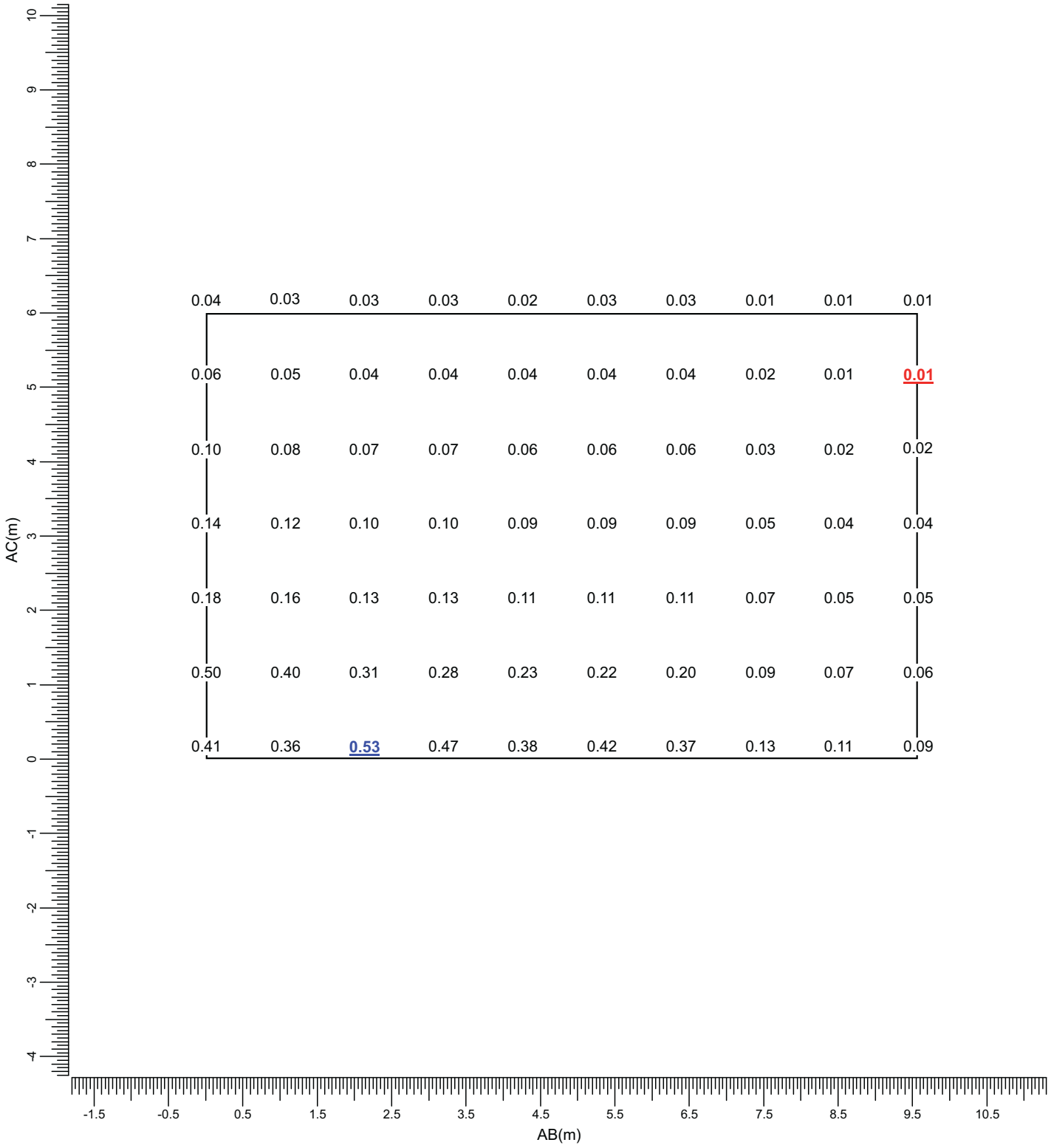
(-7.34, 21.55, 7.00) C-----D (2.17, 22.01, 7.00)
| |
(-7.34, 21.55, 1.00) A-----B (2.17, 22.01, 1.00)

Maximum	Project maintenance factor	Scale
29.98	0.90	1:75

3.7 17 Kirby Close Side C: Graphical Table

All Lights

Grid : 17 Kirby Close Side C
Calculation : Surface Illuminance (lux)



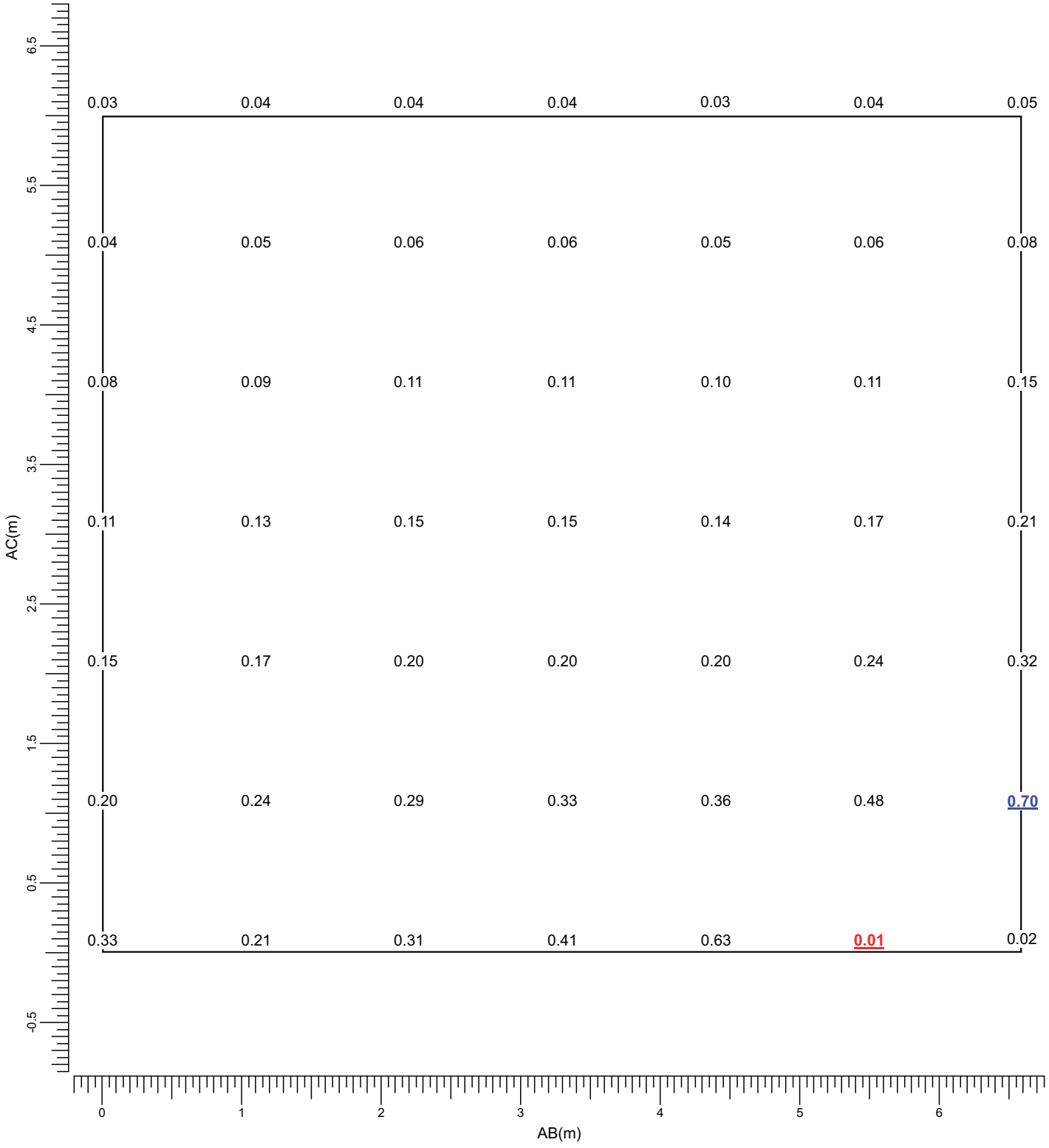
(2.17, 22.01, 7.00) C-----D (1.63, 31.57, 7.00)
(2.17, 22.01, 1.00) A-----B (1.63, 31.57, 1.00)

Maximum	Project maintenance factor	Scale
0.53	0.90	1:75

3.8 18 Kirby Close Side A: Graphical Table

All Lights

Grid : 18 Kirby Close Side A
Calculation : Surface Illuminance (lux)



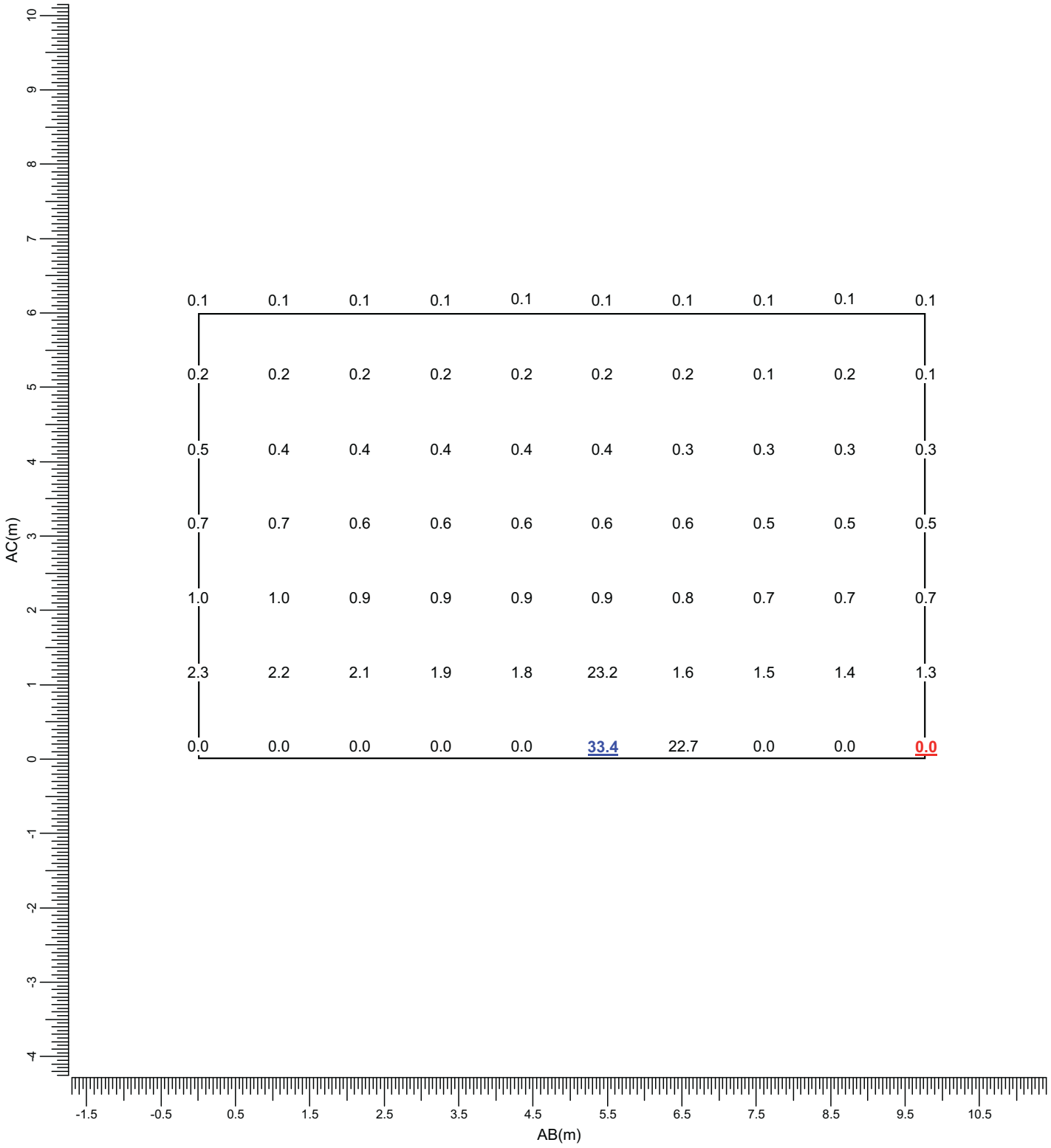
(13.74, 27.79, 7.00) C-----D (14.12, 21.21, 7.00)
(13.74, 27.79, 1.00) A-----B (14.12, 21.21, 1.00)

Maximum	Project maintenance factor	Scale
0.70	0.90	1:40

3.9 18 Kirby Close Side B: Graphical Table

All Lights

Grid : 18 Kirby Close Side B
Calculation : Surface Illuminance (lux)



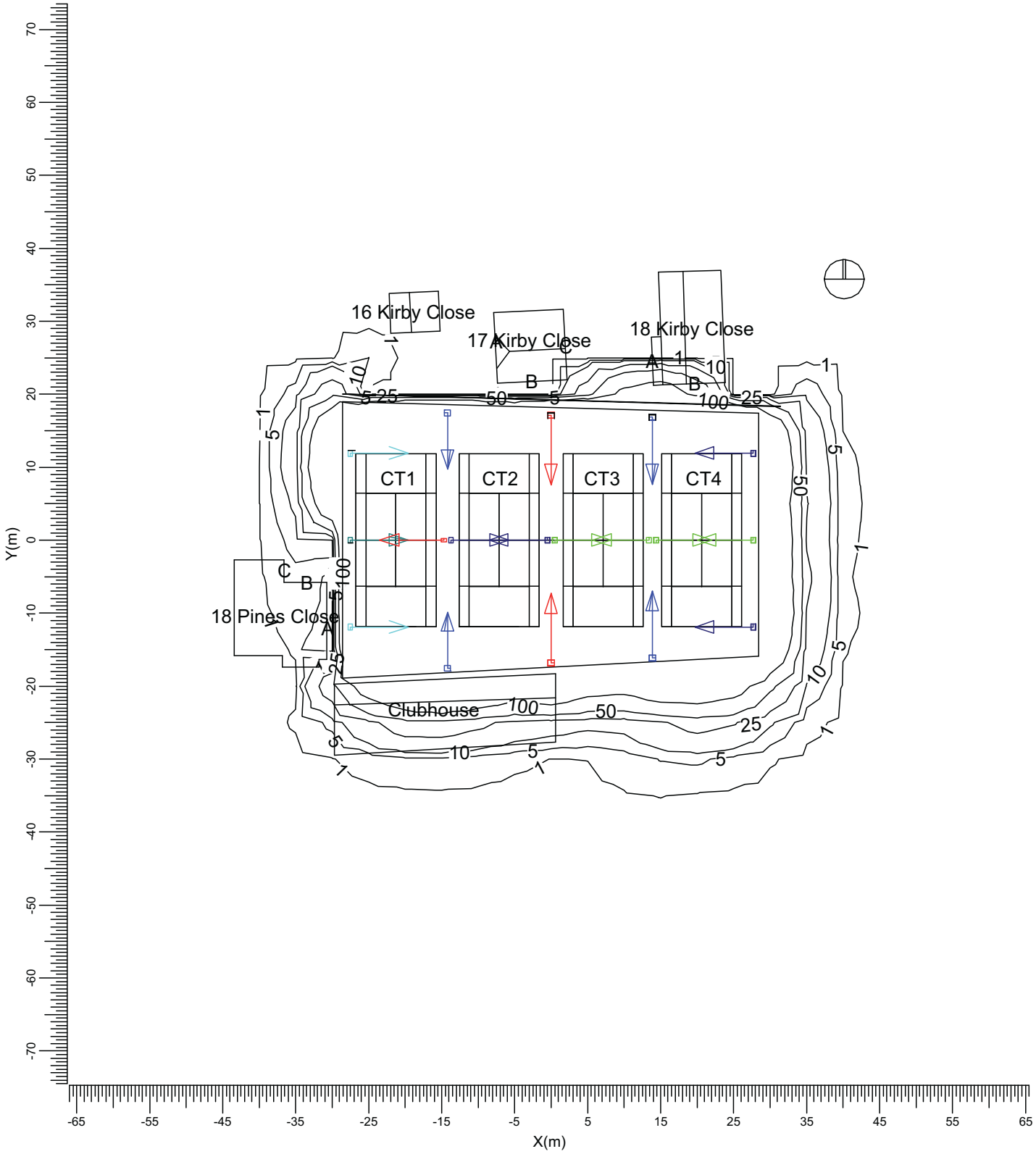
(14.12, 21.21, 7.00) C-----D (23.89, 21.59, 7.00)
(14.12, 21.21, 1.00) A-----B (23.89, 21.59, 1.00)

Maximum	Project maintenance factor	Scale
33.42	0.90	1:75

3.10 Overspill: Iso Contour

All Lights

Grid : Overspill at Z = -0.00 m
Calculation : Surface Illuminance (lux)



Project maintenance factor
0.90

Scale
1:750

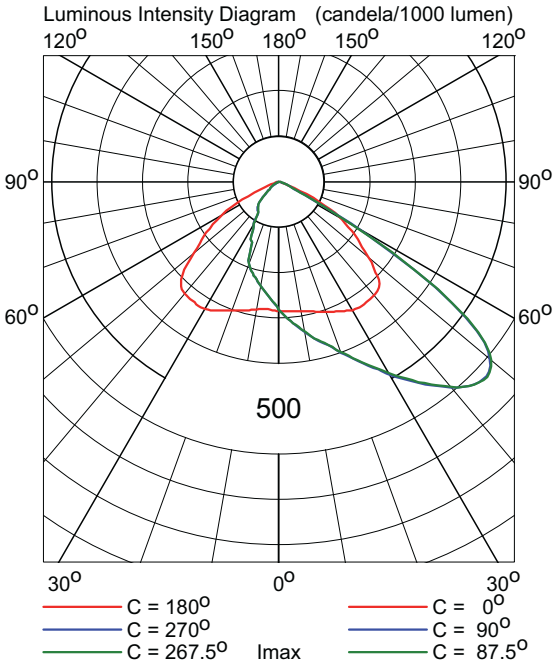
4. Luminaire Details

4.1 Project Luminaires

Match G6.10 FS 420

Light output ratios
- DLOR : 1.00
- ULOR : 0.00
- TLOR : 1.00

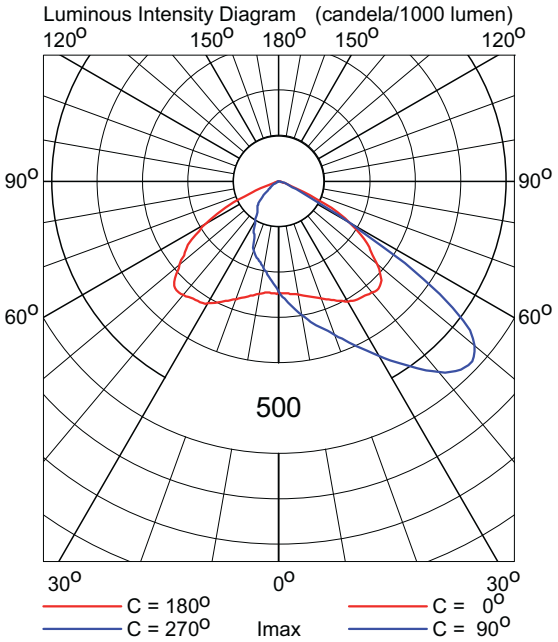
Lamp flux : 63420 lm
Luminaire wattage : 406.0 W
Measurement code : 321V1.5



Match G6.10 FS 420

Light output ratios
- DLOR : 1.00
- ULOR : 0.00
- TLOR : 1.00

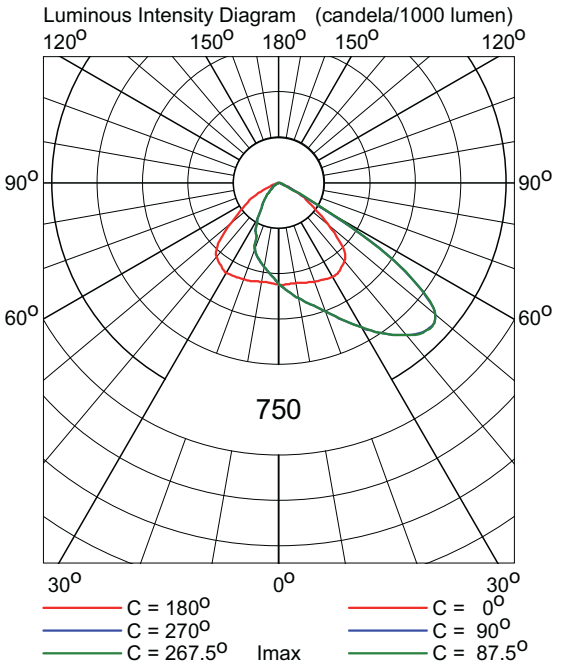
Lamp flux : 62460 lm
Luminaire wattage : 406.0 W
Measurement code : 321V1.5



Match G6.10 FS 480

Light output ratios
- DLOR : 1.00
- ULOR : 0.00
- TLOR : 1.00

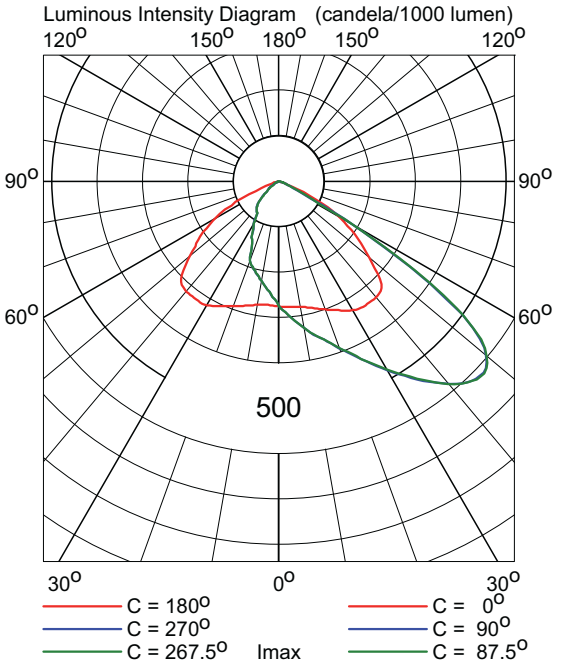
Lamp flux : 74430 lm
Luminaire wattage : 464.0 W
Measurement code : 321V1.5



Match G6.10 FS 480

Light output ratios
- DLOR : 1.00
- ULOR : 0.00
- TLOR : 1.00

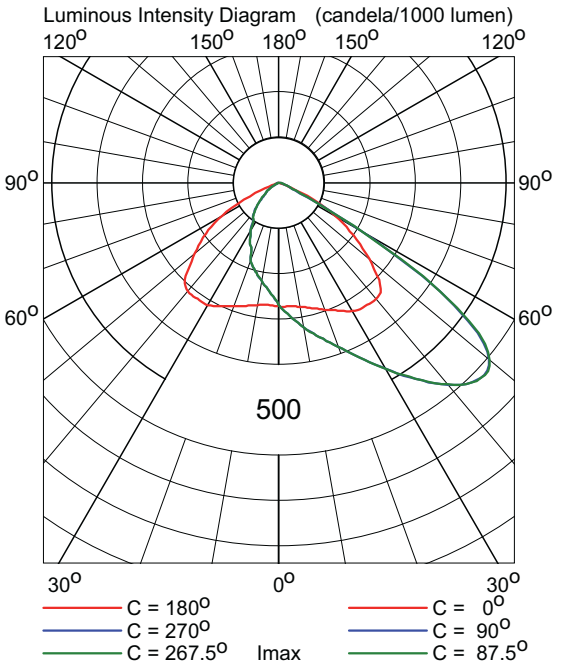
Lamp flux : 72300 lm
Luminaire wattage : 464.0 W
Measurement code : 321V1.5



Match G6.14 FS 720

Light output ratios
- DLOR : 1.00
- ULOR : 0.00
- TLOR : 1.00

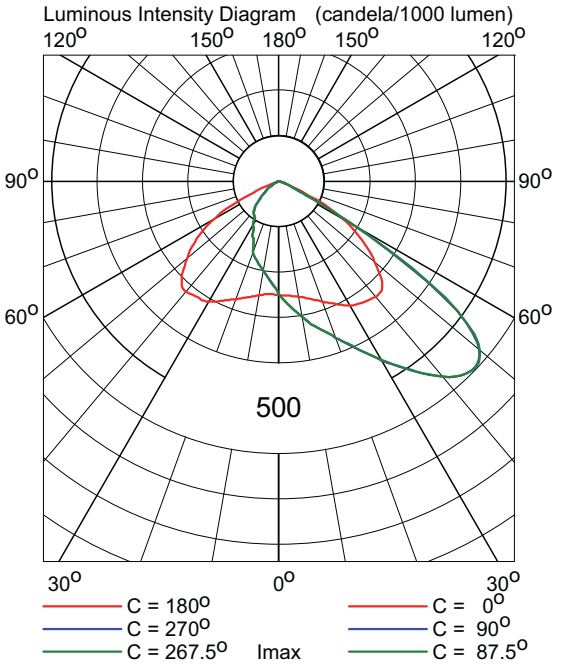
Lamp flux : 107610 lm
Luminaire wattage : 696.0 W
Measurement code : 321V1.5



Match G6.14 FS 720

Light output ratios
- DLOR : 1.00
- ULOR : 0.00
- TLOR : 1.00

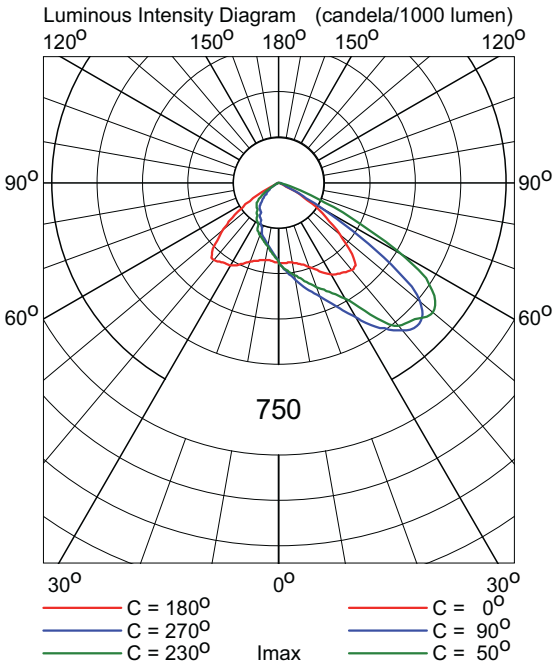
Lamp flux : 106550 lm
Luminaire wattage : 696.0 W
Measurement code : 321V1.5



Match G6.07 FS 420

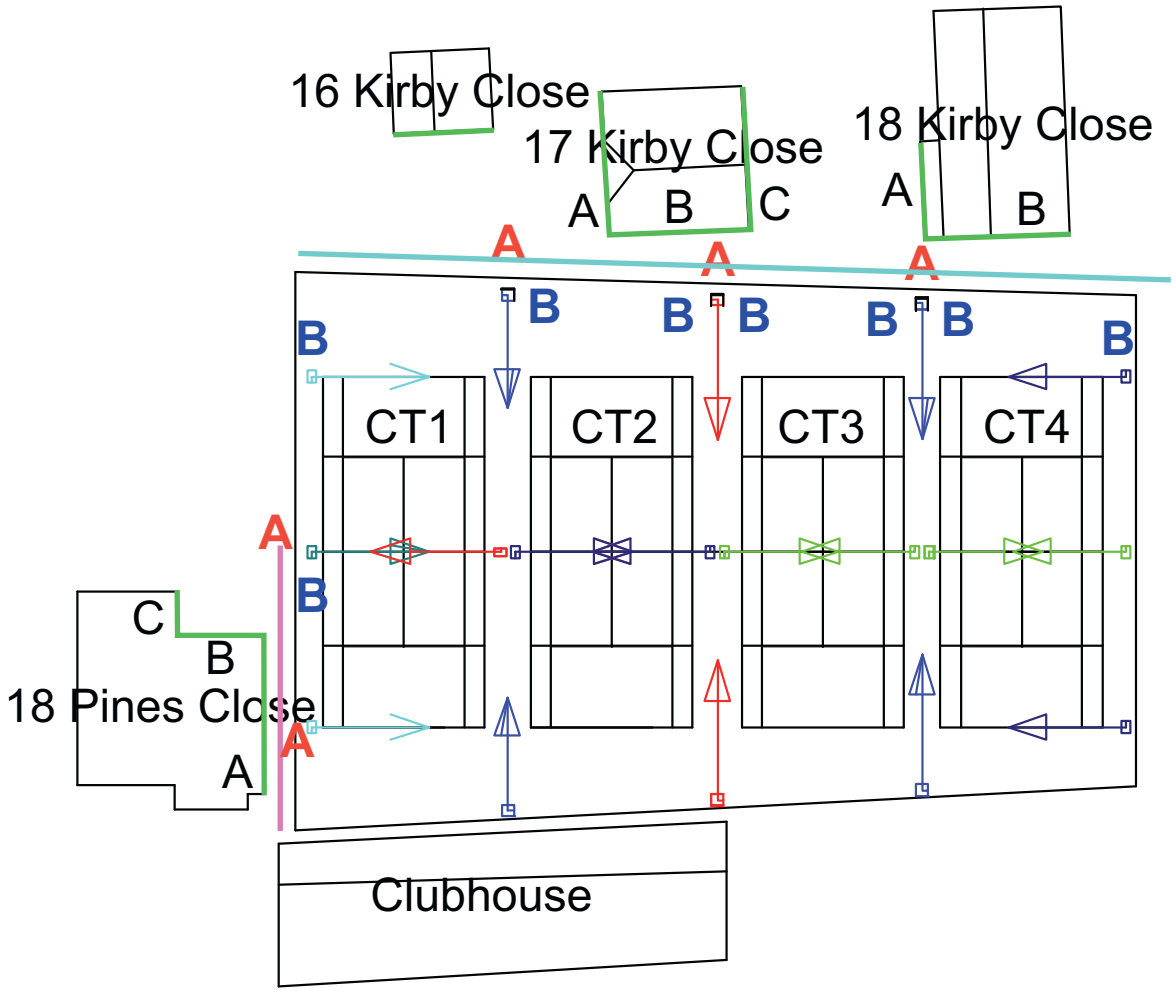
Light output ratios
- DLOR : 1.00
- ULOR : 0.00
- TLOR : 1.00

Lamp flux : 59495 lm
Luminaire wattage : 406.0 W
Measurement code : 341.07v1.6



luminance pro
lighting systems

Deflector & Vertical Grid Locations

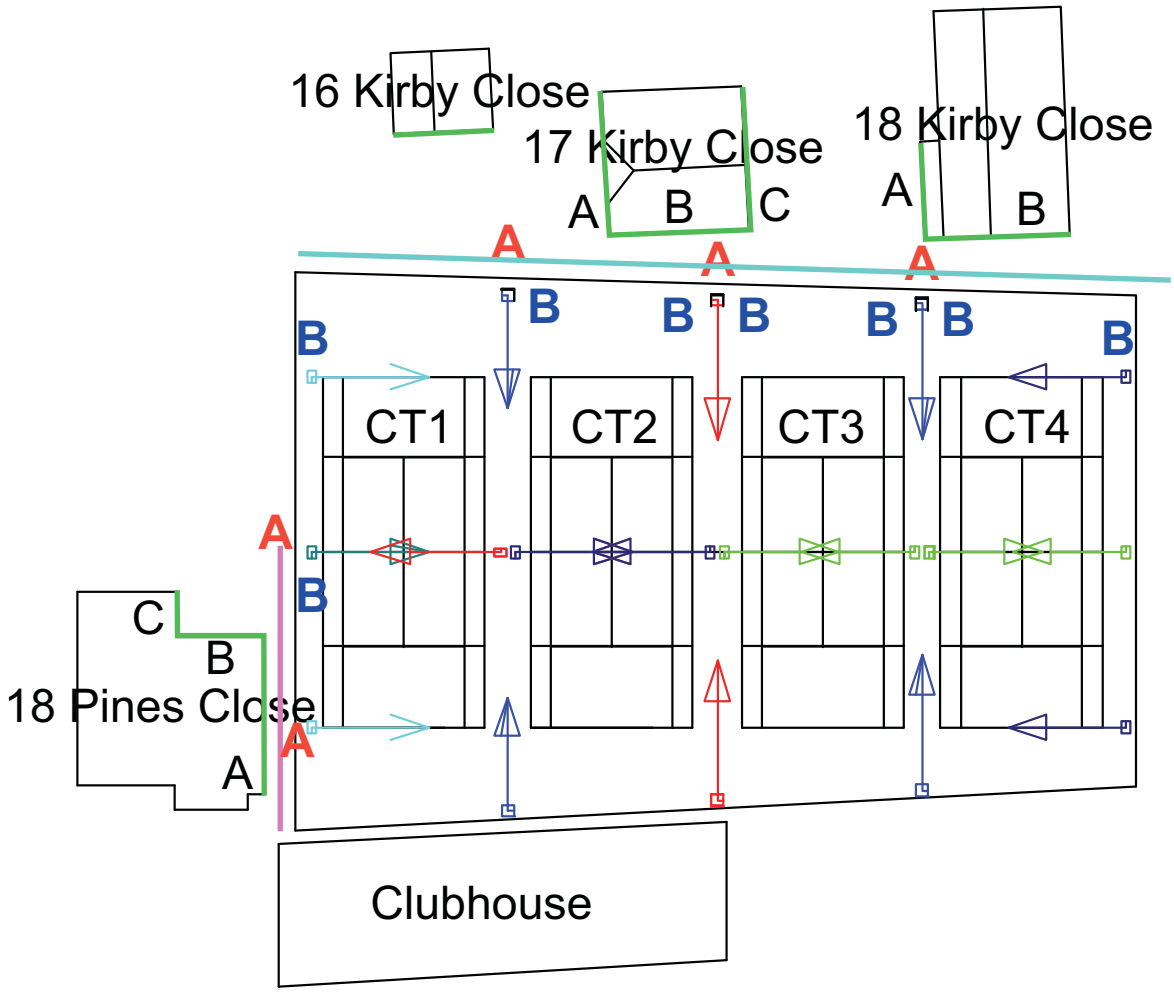


Match G6.10 FS 420
Match G6.10 FS 480
Match G6.14 FS 720
Match G6.07 FS 420
Fence 2.1m height
A Extended Rear Deflector

Match G6.10 FS 420
Match G6.10 FS 480
Match G6.14 FS 720
Verical Grid
Fence 1.4m height
B Extended Side Deflector

luminance pro
lighting systems

Illuminance values at the nearest properties



Vertical illuminance Calculations at nearest properties:

Calculation	Switching Mode	Type	Unit	LED Max (lux)	Metal Halide Max (lux)	
18 Pines Close Side A	5	Surface Illuminance	lux	106.6	136.8	∨ 30.20
18 Pines Close Side B	5	Surface Illuminance	lux	2.13	23.23	∨ 21.10
18 Pines Close Side C	5	Surface Illuminance	lux	2.88	1.30	∧ 1.58
16 Kirby Close	5	Surface Illuminance	lux	0.86	5.96	∨ 5.10
17 Kirby Close Side A	5	Surface Illuminance	lux	1.20	0.00	∧ 1.20
17 Kirby Close Side B	5	Surface Illuminance	lux	29.98	50.3	∨ 20.32
17 Kirby Close Side C	5	Surface Illuminance	lux	0.53	0.00	∧ 0.53
18 Kirby Close Side A	5	Surface Illuminance	lux	0.70	6.42	∨ 5.72
18 Kirby Close Side B	5	Surface Illuminance	lux	33.42	80.89	∨ 47.47

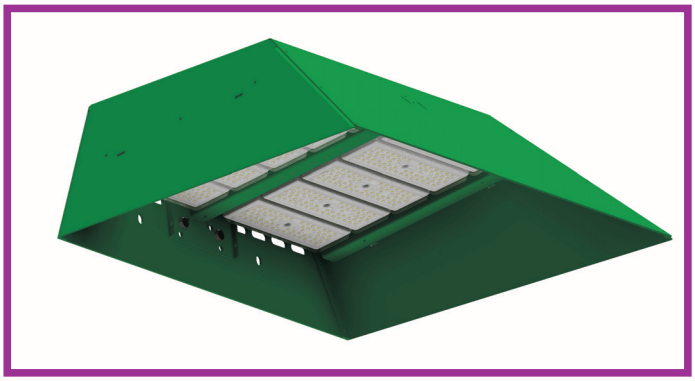
Summary

Values for illuminance have been calculated without any natural screening, vegetation, trees etc. As such, values shown are worst case scenario.

The proposed LED installation reduces the impact on all but three measured facades. These three facades are, 17 Kirby Close Side A, 17 Kirby Close Side C, and 18 Pines Close Side C. These facades only have very minimal increases in calculated illuminance.

It is worth noting that 17 Kirby Close is well screened by Evergreen foliage and trees. This natural screening will further reduce the lux levels experienced at this property. Even without the natural screening, lux levels are very minimal.

18 Pines Close Side C increases by 1.58Lux, however this facade is the side of a double garage with no windows.



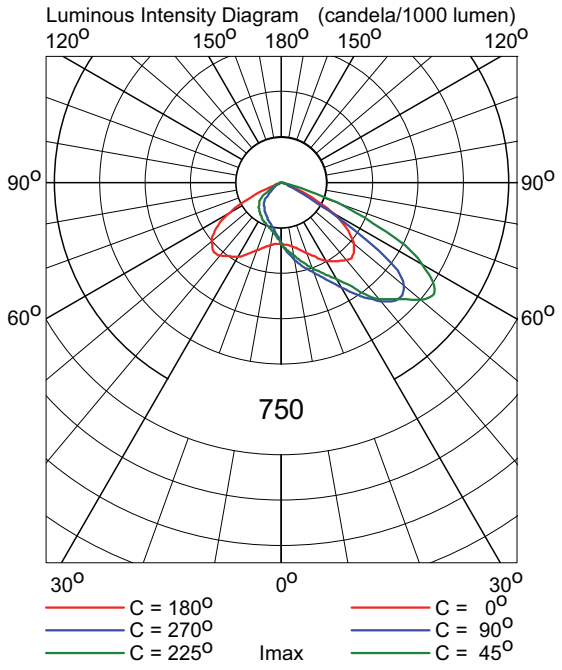
HiLux® Match® LED

The Match LED is a new generation of HiLux high performance luminaires designed for use in sports lighting.

Match LED

Box quantity	1
Net Weight	13.0 - 19.3kg
Body colour (standard)	RAL6005
Optic	Standard**
IP rating	IP68
Windage	0.28m²
Mounting method	4 x M10 factory fitted

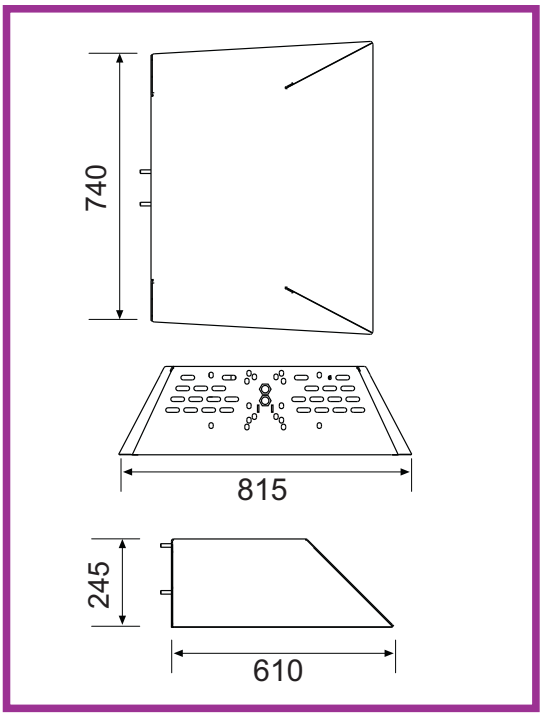
Lamp type	LED
Luminaire power	360W - 600W
Lamp colour	5000 K
Supply voltage	230v



- ✓ LED low energy lighting
- ✓ Exceptional light control
- ✓ Designed for outdoor sports lighting
- ✓ Lightweight aluminium body
- ✓ Stainless steel components
- ✓ Computer designed optics
- ✓ Heavy duty mounting
- ✓ IP68 ingress protection for main elements
- ✓ Powder coat finish (RAL 6005) Green
- ✓ 5 year limited warranty via direct install*
- ✓ 5 & 10 year onsite extended warranty available*

Product code:
MATCH-FS10/LED

Options
/C - Alternative colour finish

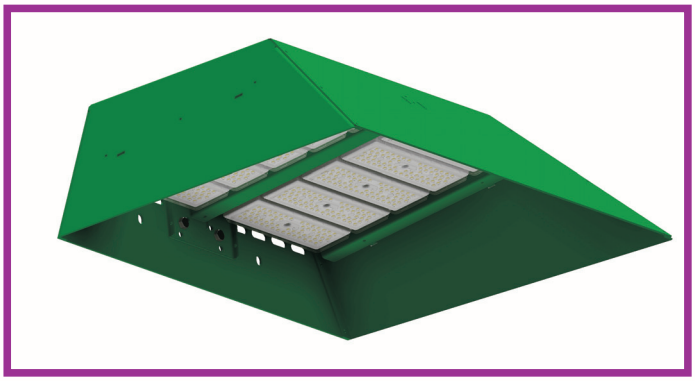


* Conditions apply
** Various optics available

luminance pro
lighting systems

Tel: +44 (0)1276 855 666 info@luminancepro.co.uk
Fax: +44 (0)1276 855 999 www.luminancepro.co.uk

Ref: MATCHFS10LED/GEN6/V1.1/Oct 2021



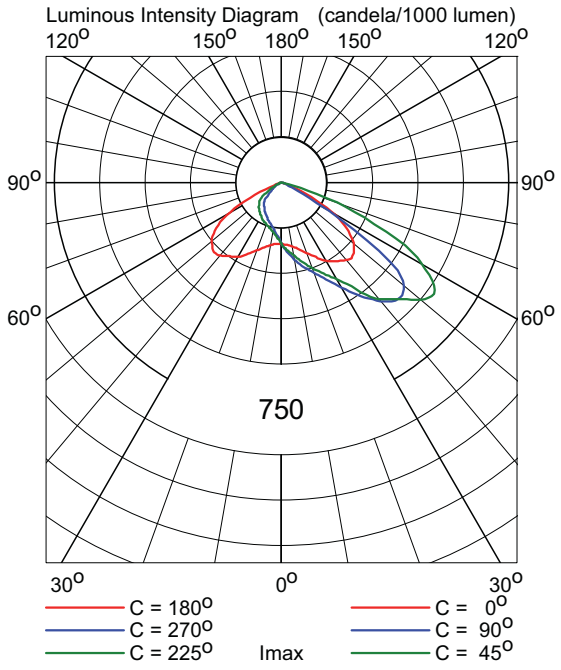
HiLux® Match® LED

The Match LED is a new generation of HiLux high performance luminaires designed for use in sports lighting.

Match LED

Box quantity	1
Net Weight	12.3 - 25.2kg
Body colour (standard)	RAL6005
Optic	Standard**
IP rating	IP68
Windage	0.28m²
Mounting method	4 x M10 factory fitted

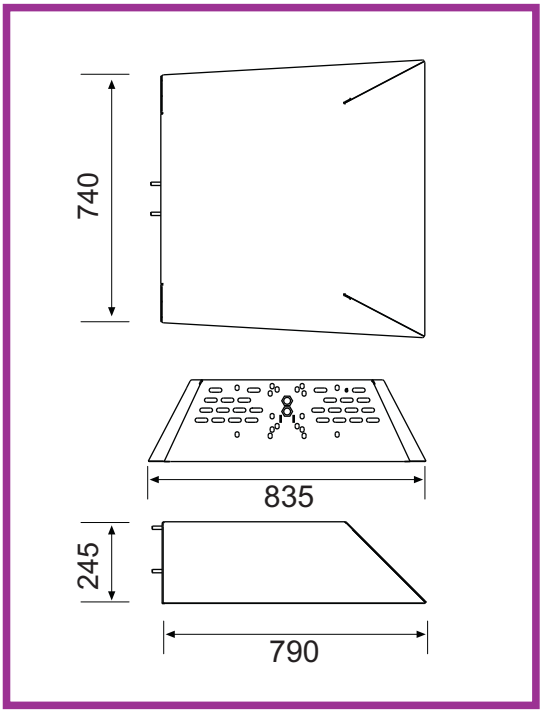
Lamp type	LED
Luminaire power	600W - 840W
Lamp colour	5000 K
Supply voltage	230v



- ✓ LED low energy lighting
- ✓ Exceptional light control
- ✓ Designed for outdoor sports lighting
- ✓ Lightweight aluminium body
- ✓ Stainless steel components
- ✓ Computer designed optics
- ✓ Heavy duty mounting
- ✓ IP68 ingress protection for main elements
- ✓ Powder coat finish (RAL 6005) Green
- ✓ 5 year limited warranty via direct install*
- ✓ 5 & 10 year onsite extended warranty available*

Product code:
MATCH-FS14/LED

Options
/C - Alternative colour finish



* Conditions apply
** Various optics available

luminance pro
lighting systems

Tel: +44 (0)1276 855 666 info@luminancepro.co.uk
Fax: +44 (0)1276 855 999 www.luminancepro.co.uk

Ref: MATCHFS14LED/GEN6/V1.1/Oct 2021