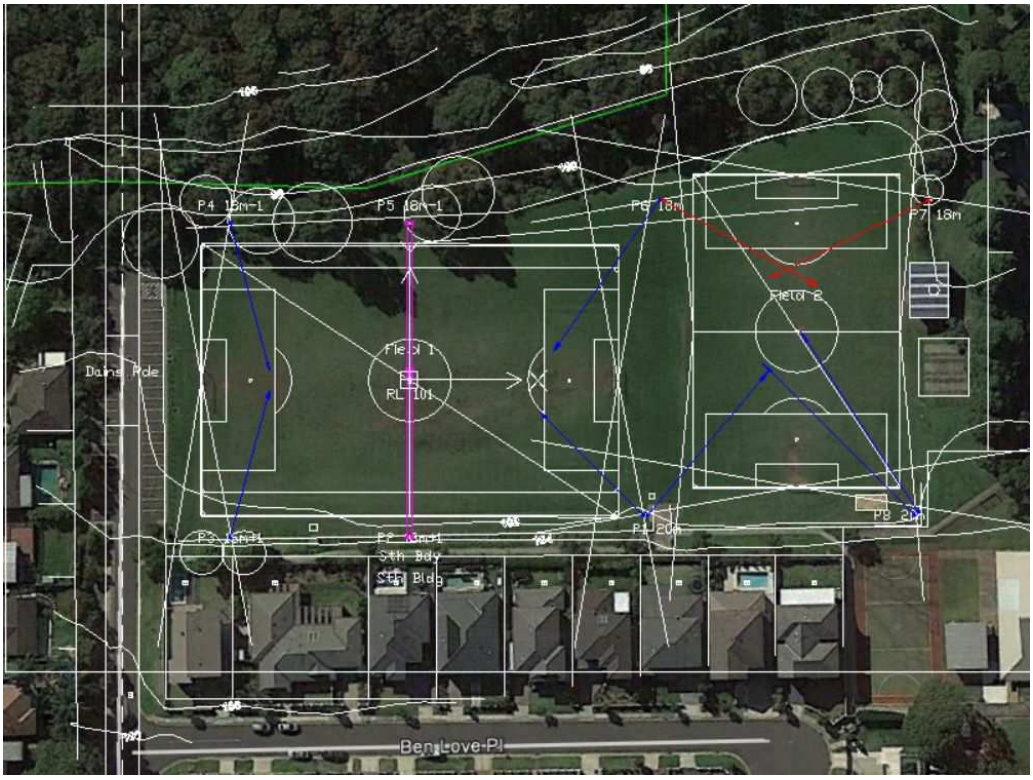
Tristram Reserve Sports Floodlighting

Concept Lighting Scheme - LED

Project code: 16089-05-B
Date: 14-11-2017



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.

APEX Lighting
2/12A Loyalty Road
North Rocks
NSW 2151

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1. Project Description

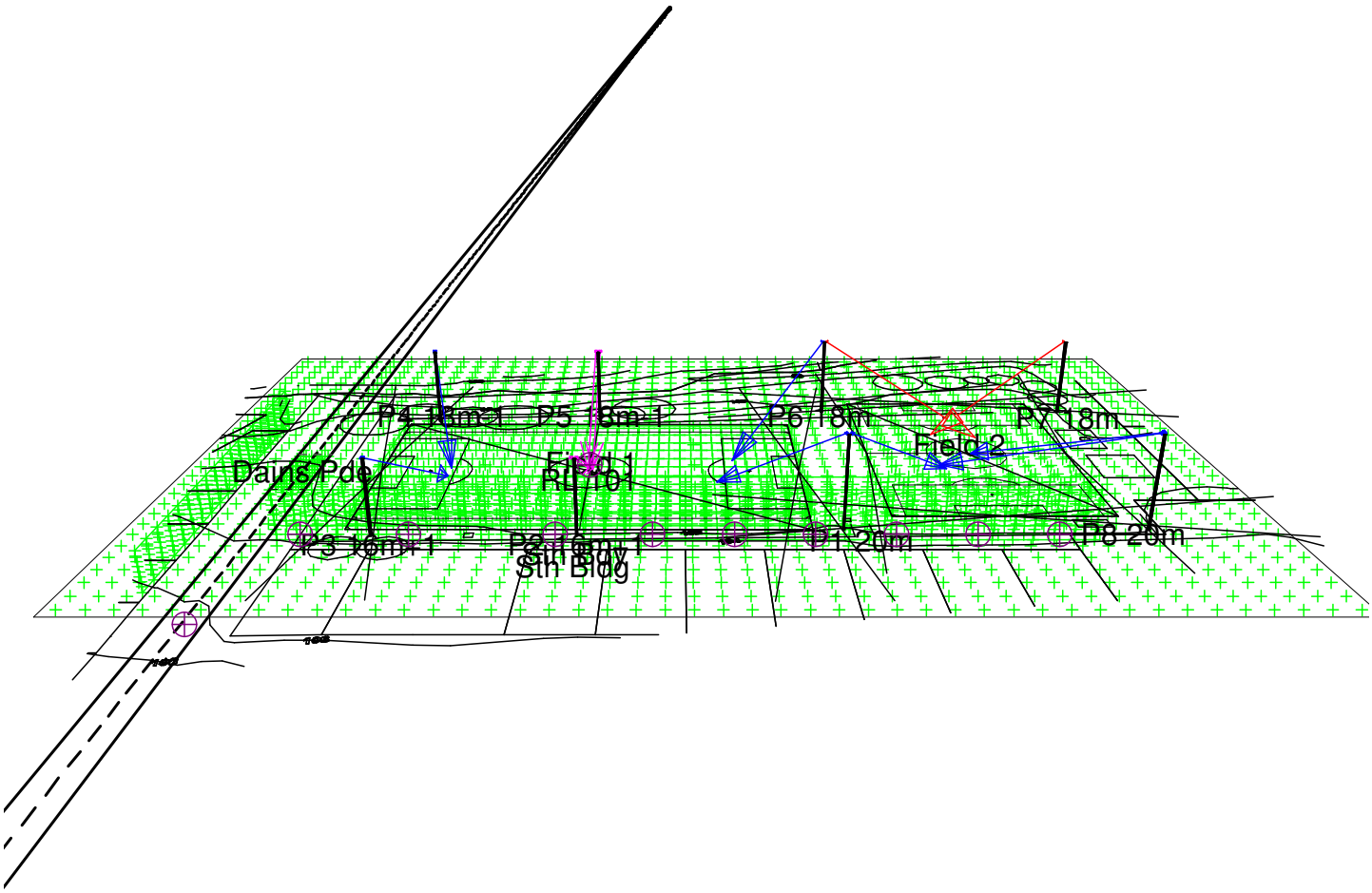
1.1 Description

Designed in accordance with:
• AS2560.2.3-2007- Lighting for football (all codes)-
Amateur level: Field 1=Competition 100 lux, Field 2= Training 50 lux (100 lux)
• AS/NZS4282 Obtrusive light:
Pre-curfew: Ev<=10 lx, Level 1 Intensity control
TI<=20% (based on adaptation luminance of 0.1 cd/m2 assuming
properties abut a road typically lit to Category P4 or lower)
On South Building line Ev<=1.0 lx, I<=3500 cd (windows)

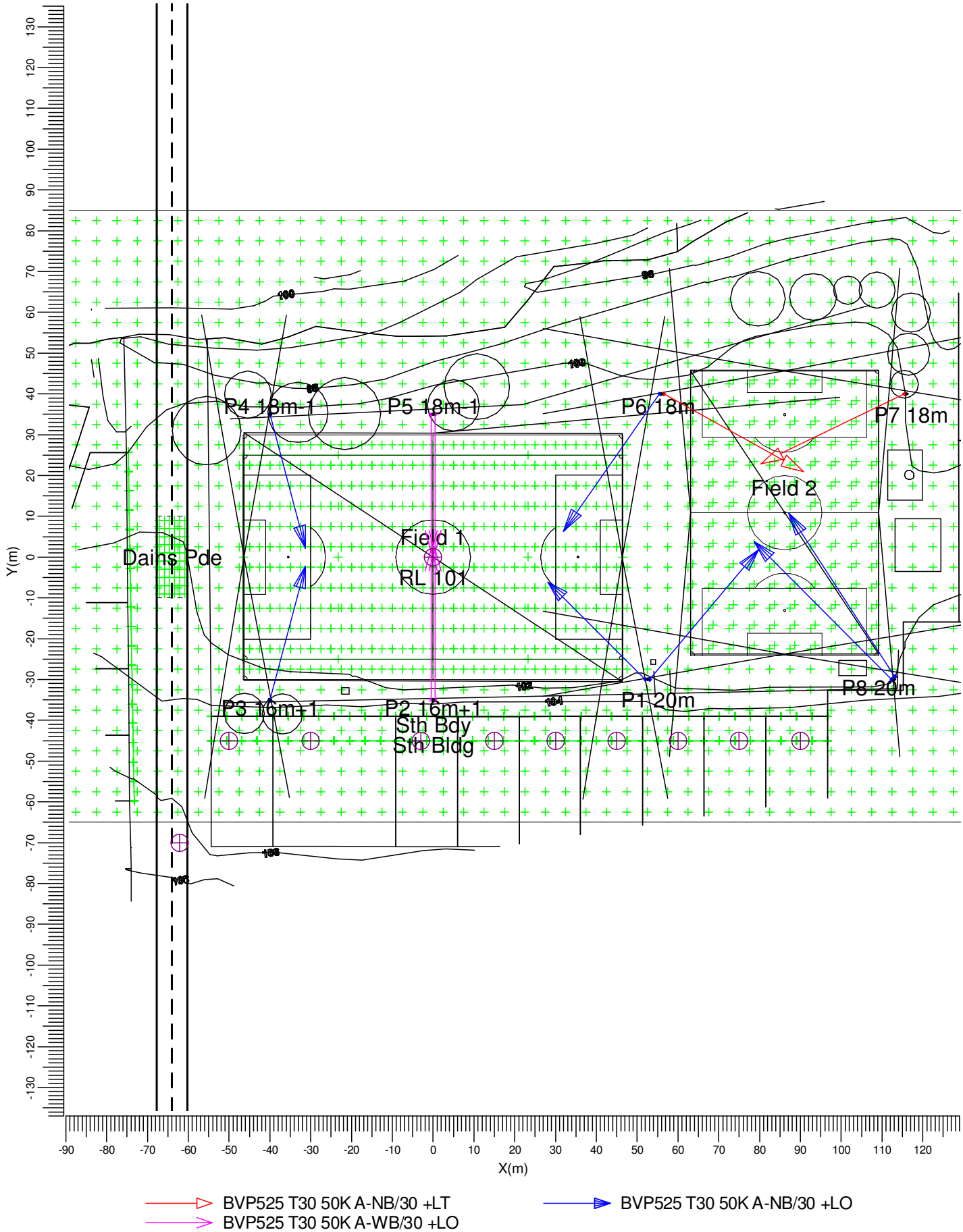
Philips OptiVision LED gen2 BVP525 50K 757 T30 IP66 3 module
Weight=24.8 kg(remote gear), Windage=0.32 m^2(at 40° tilt),
LT and LO versions used to mitigate obtrusive light (integral shields).
Can be mounted over/under without modification/accessories
Floodlight ref tilt (Imax) is noted as "TILT90".
Subtract 30° from TILT90 to get the tilt of the visor.
All luminaires are tilted with visor at <=40°.
Floodlights should be spaced at least 95cm apart.
Run current: 415V=3.6A, 240V=6.2A P=1392W
Refer to Mounting instructions for inrush current details.

MF=0.88=15000 hours, based on LLMF=0.94 from manufacturer
data, and LMF=0.94 (dirt) from BS5489.1 Table B.1
(E1/2/3/4 MH>6m and 4 year clean)
Note: L80B10=50,000 hours

1.2 3-D Project Overview



1.3 Top Project Overview



Scale
1:1250

2. Summary

2.1 Observer Information

Code	Observer	Position		
		X (m)	Y (m)	Z (m)
Aa	Centre	-0.00	-0.00	1.50
Bb	1	-50.00	-45.00	6.00
Cc	3	-30.00	-45.00	6.00
Dd	7	-3.00	-45.00	6.00
Ee	9	15.00	-45.00	6.00
Ff	11	30.00	-45.00	6.00
Gg	13	45.00	-45.00	6.00
Hh	15	60.00	-45.00	6.00
Ii	17	75.00	-45.00	6.00
Jj	19	90.00	-45.00	6.00
Kk	Dains Pde TI (O2)	-62.13	-70.00	1.50

2.2 Obstacle Information

Obstacle	Transparency (%)	Position		
		X (m)	Y (m)	Z (m)
P1 20m	0	52.50	-30.00	0.00
P2 16m+1	0	0.00	-35.00	1.00
P3 16m+1	0	-40.00	-35.00	1.00
P3 18m-1	0	-40.00	35.00	-1.00
P5 18m-1	0	0.00	35.00	-1.00
P6 18m	0	56.00	40.00	0.00
P7 18m	0	116.00	40.00	0.00
P8 20m	0	113.00	-30.00	0.00

2.3 Project Luminaires

Code	Qty	Luminaire Type	Lamp Type	Power (W)	Flux (lm)
A	2	BVP525 T30 50K A-NB/30 +LT	1 * LED1930/757	1301.5	1 * 183011
B	7	BVP525 T30 50K A-NB/30 +LO	1 * LED1930/757	1301.5	1 * 183011
C	4	BVP525 T30 50K A-WB/30 +LO	1 * LED1930/757	1301.5	1 * 183011

The total installed power: 16.92 (kWatt)

Number of Luminaires Per Switching Mode:

Switching Mode	Luminaire Code			Power (kWatt)
	A	B	C	
ALL	2	7	4	16.92
ALL - initial	2	7	4	16.92

Number of Luminaires Per Arrangement:

Arrangement	Luminaire Code			Power (kWatt)
	A	B	C	
P1 20m	0	2	0	2.60
P2 16m+1	0	0	2	2.60
P3 16m+1	0	1	0	1.30
P4 18m-1	0	1	0	1.30
P5 18m-1	0	0	2	2.60
P6 18m	1	1	0	2.60
P7 18m	1	0	0	1.30
P8 20m	0	2	0	2.60

2.4 Calculation Results

Switching Modes:

Code	Switching Mode	Maintenance factor
1	ALL	0.88
2	ALL - initial	1.00

(Il)luminance Calculations:

Calculation	Switching Mode	Type	Unit	Ave	Max	Min/Ave	Min/Max
Field 1 60x93m	1	Surface Illuminance	lux	106		0.55	0.41
Field 1 50x93m	1	Surface Illuminance	lux	108		0.66	0.50
Field 2	1	Surface Illuminance	lux	102		0.61	0.40
Sth Bdy Ev	2	Surface Illuminance	lux	0.96	6.70		
Sth Bldg Ev	2	Surface Illuminance	lux	0.46	0.89		
Dains Pde Bdy Ev	2	Surface Illuminance	lux	0.30	0.72		
Surrounds Eh	2	Surface Illuminance	lux	40.4		0.00	0.00
Surrounds Ev	2	Illuminance -> Aa	lux	12.6		0.01	0.00

Glare Rating for Grid of Observers:

Calculation	Switching Mode	Observer Grid	Reference Grid	Reflectance	GR-Max
Field 1 50x93m GR	1	Field 1 50x93m GR@1.5m	Field 1 50x93m	0.25	44.6

Obtrusive Light Calculations:

Switching Mode	Observer Code	Luminaire Code	Position			Aiming Angles			Maximum Intensity (cd)
			X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0	
2	Bb	A	115.50	40.00	18.25	-154.00	65.00	0.00	2946
2	Cc	A	115.50	40.00	18.25	-154.00	65.00	0.00	3018
2	Dd	A	115.50	40.00	18.25	-154.00	65.00	0.00	3126
2	Ee	A	115.50	40.00	18.25	-154.00	65.00	0.00	3120
2	Ff	A	115.50	40.00	18.25	-154.00	65.00	0.00	3016
2	Gg	A	115.50	40.00	18.25	-154.00	65.00	0.00	2845
2	Hh	A	115.50	40.00	18.25	-154.00	65.00	0.00	3173
2	Ii	A	115.50	40.00	18.25	-154.00	65.00	0.00	2177
2	Jj	A	56.50	40.00	18.25	-29.00	65.00	0.00	2187

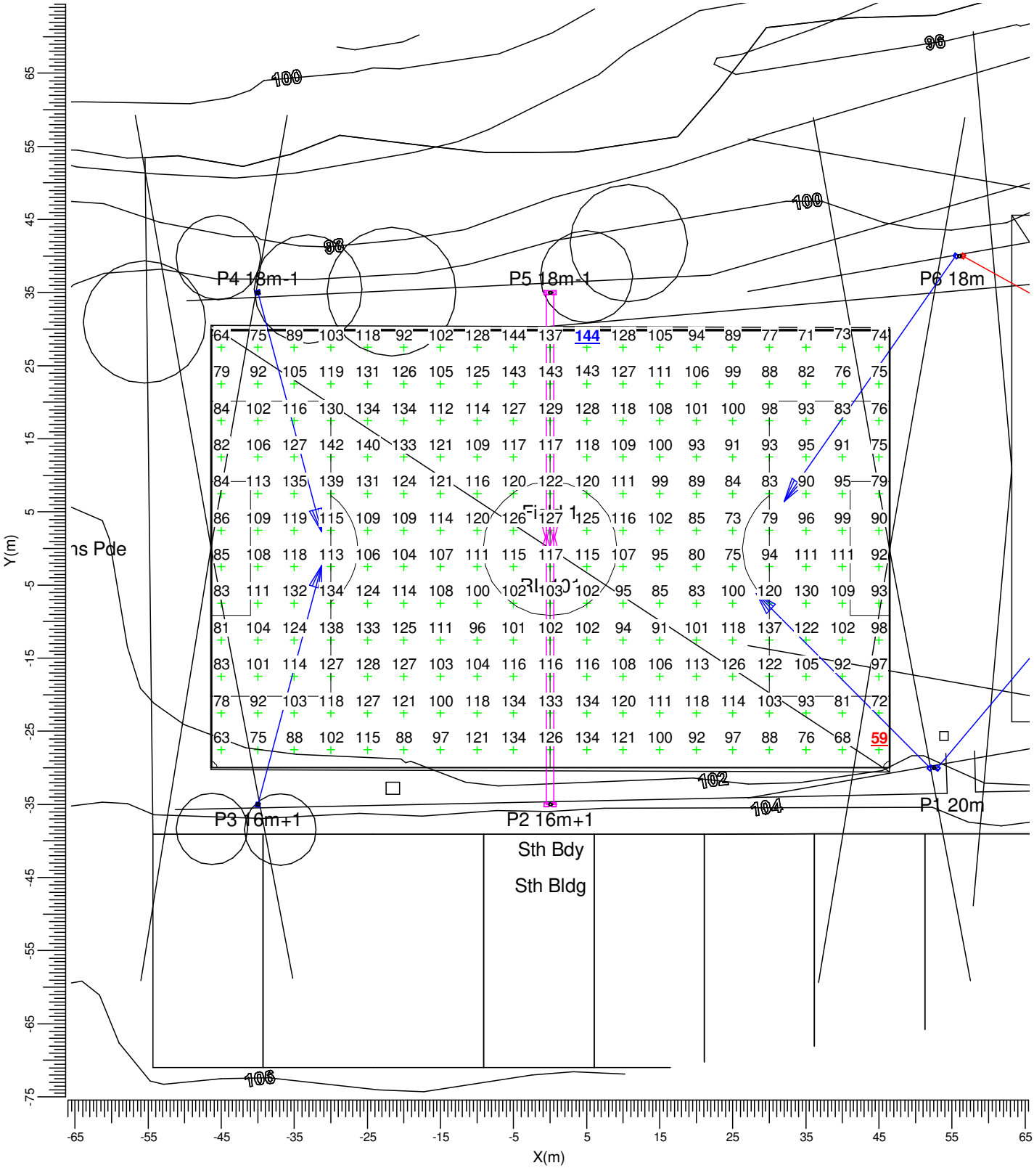
Switching Mode	Observer Code	Adaptation Luminance (cd/m2)	Direction	Threshold Increment (%)
2	Kk	0.10	+Y	0.3

Switching Mode	ULR
1	0.00
2	0.00

3. Calculation Results

3.1 Field 1 60x93m: Graphical Table ALL

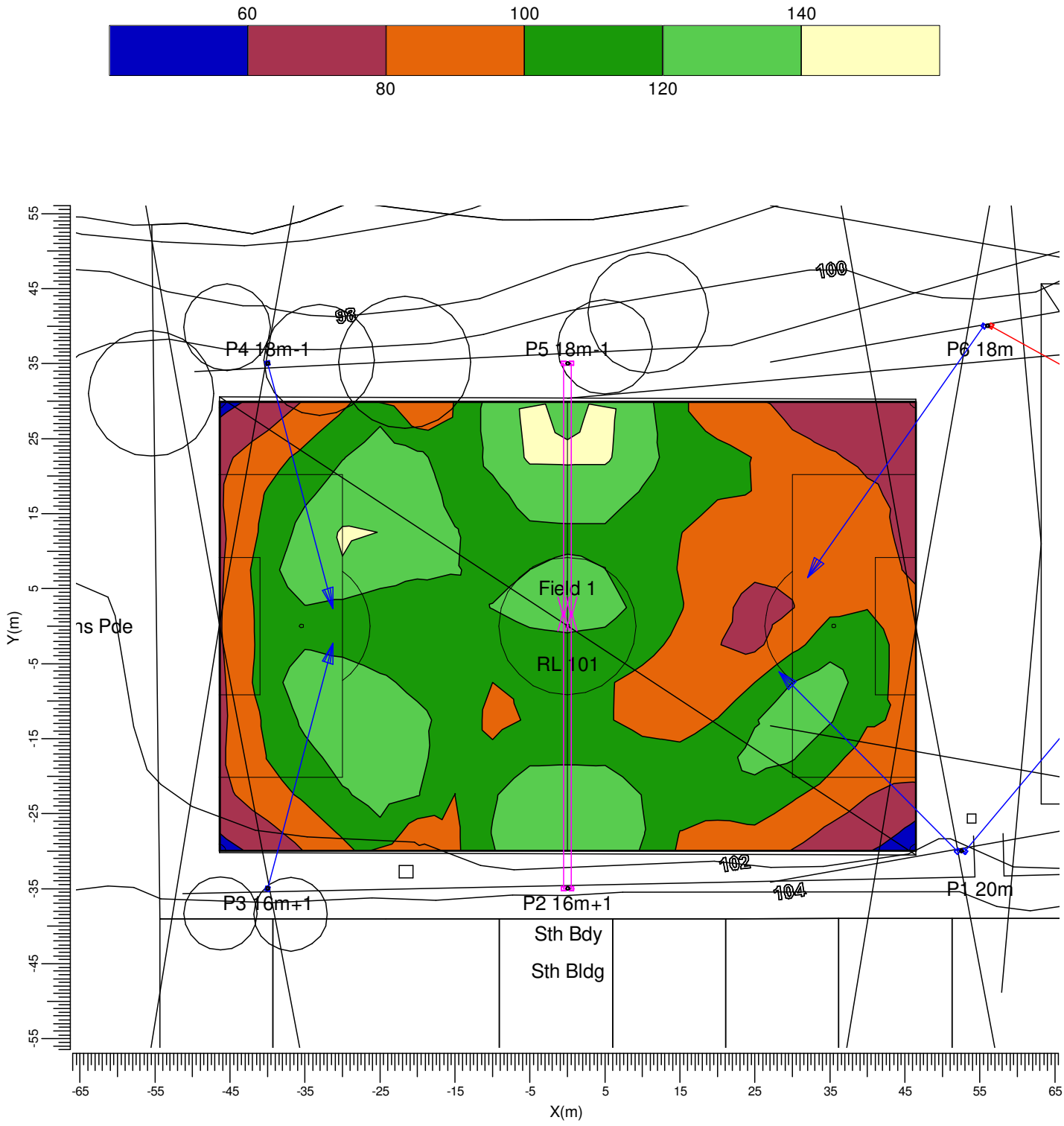
Grid : Field 1 60x93m at Z = -0.00 m
Calculation : Surface Illuminance (lux)



Average	Min/Ave	Min/Max	Project maintenance factor	Scale
106	0.55	0.41	0.88	1:750

3.2 Field 1 60x93m: Filled Iso Contour ALL

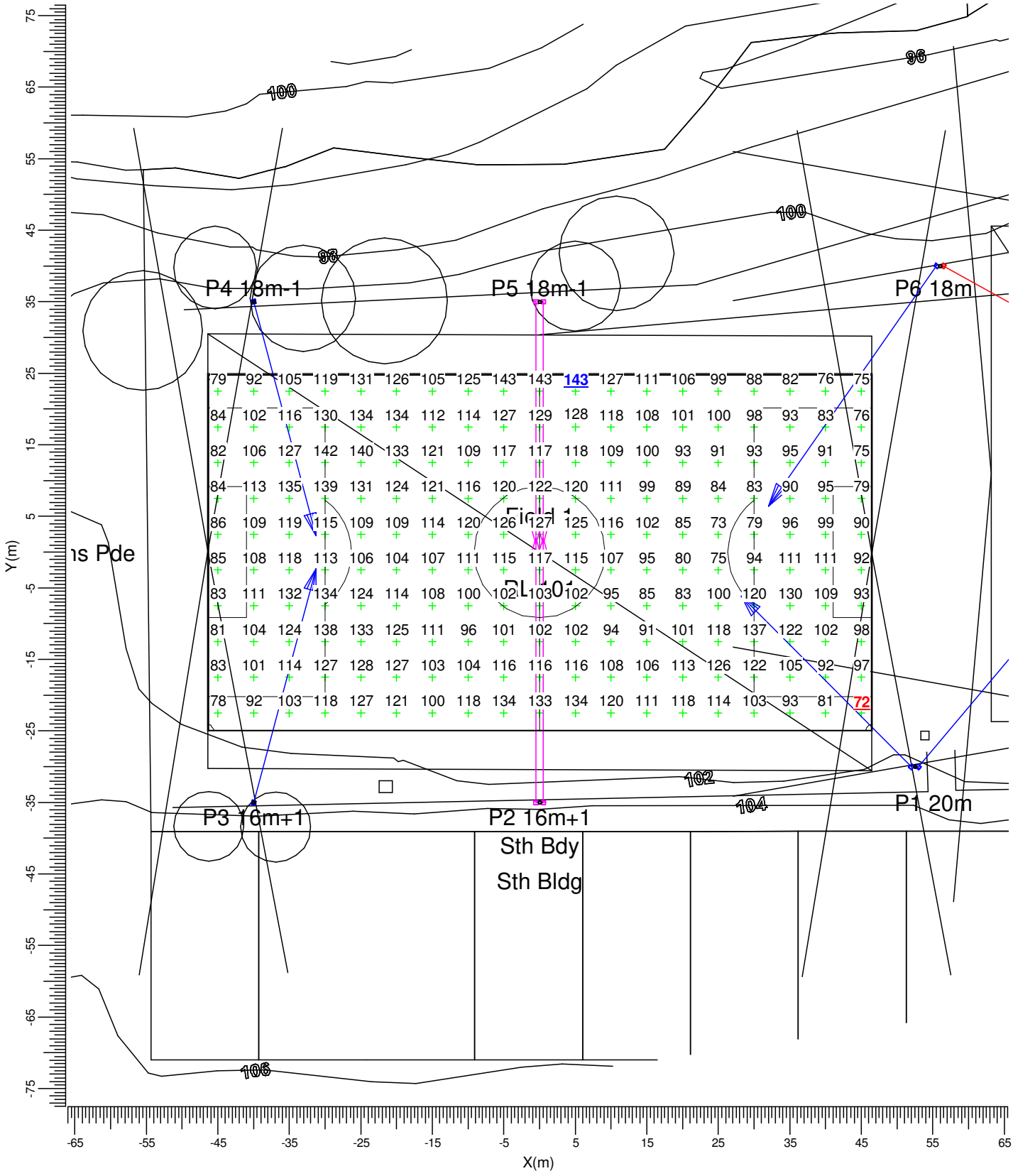
Grid : Field 1 60x93m at Z = -0.00 m
Calculation : Surface Illuminance (lux)



Average	Min/Ave	Min/Max	Project maintenance factor	Scale
106	0.55	0.41	0.88	1:750

3.3 Field 1 50x93m: Graphical Table ALL

Grid : Field 1 50x93m at Z = -0.00 m
Calculation : Surface Illuminance (lux)

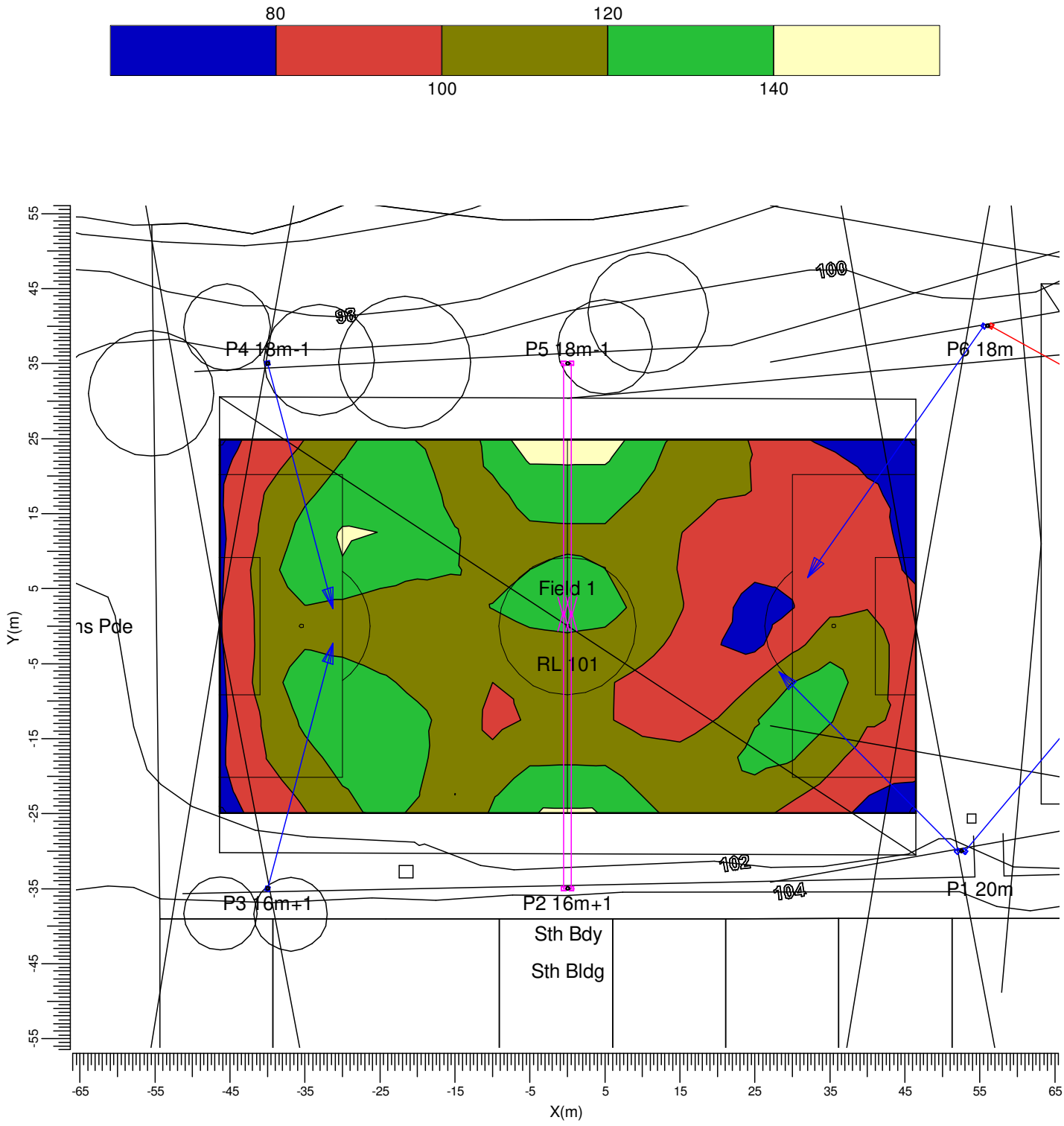


Average	Min/Ave	Min/Max	Project maintenance factor	Scale
108	0.66	0.50	0.88	1:750

3.4 Field 1 50x93m: Filled Iso Contour

ALL

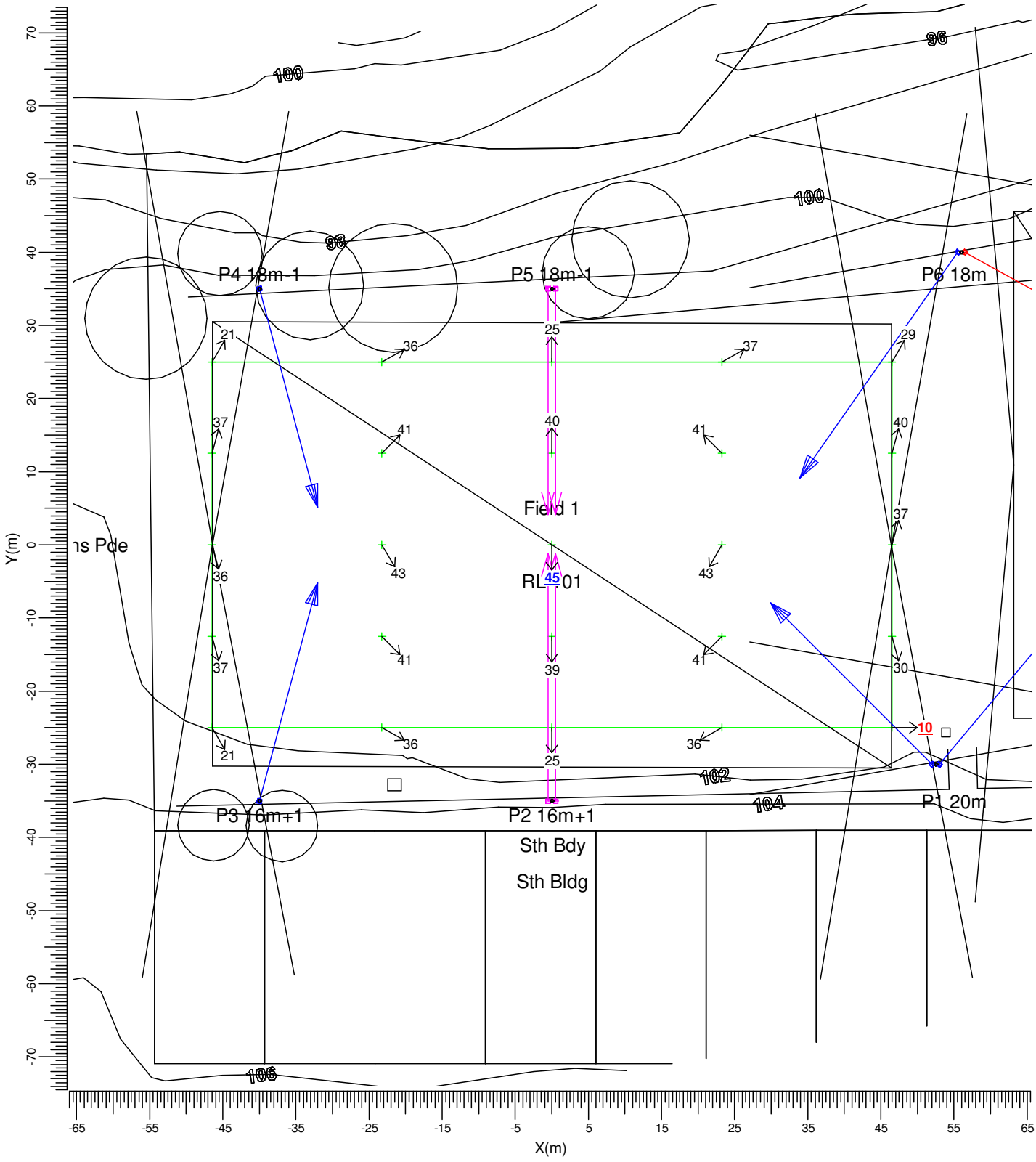
Grid : Field 1 50x93m at Z = -0.00 m
Calculation : Surface Illuminance (lux)



Average	Min/Ave	Min/Max	Project maintenance factor	Scale
108	0.66	0.50	0.88	1:750

3.5 Field 1 50x93m GR: Graphical Table ALL

Grid of Observers : Field 1 50x93m GR@1.5m
Calculation : Glare Rating
Grid for Background Luminance : Field 1 50x93m (Reflectance: 0.25)
Vertical Viewing Angle : -2.0 deg



Maximum
44.6

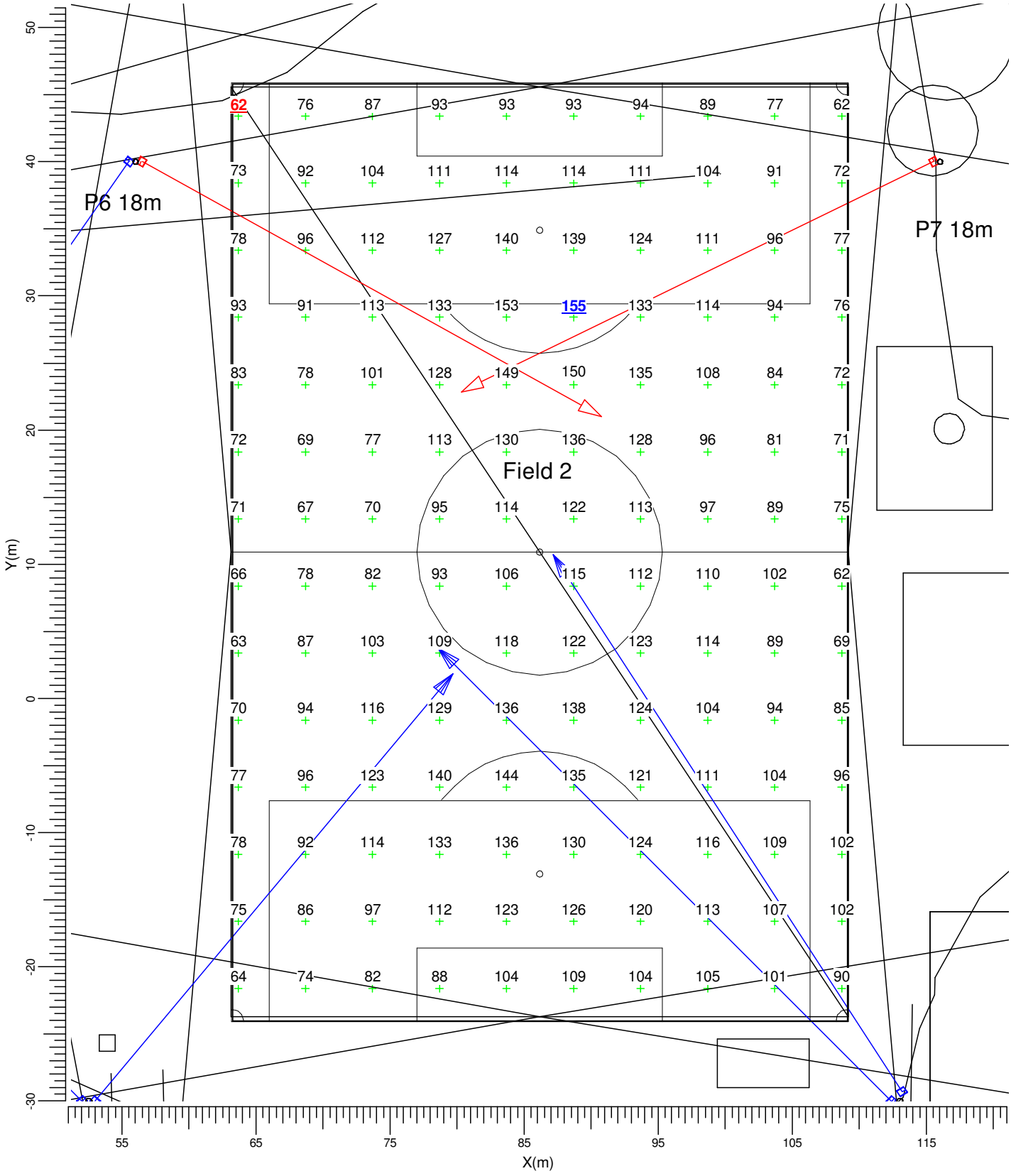
Project maintenance factor
0.88

Scale
1:750

3.6 Field 2: Graphical Table

ALL

Grid : Field 2 at Z = -0.00 m
Calculation : Surface Illuminance (lux)



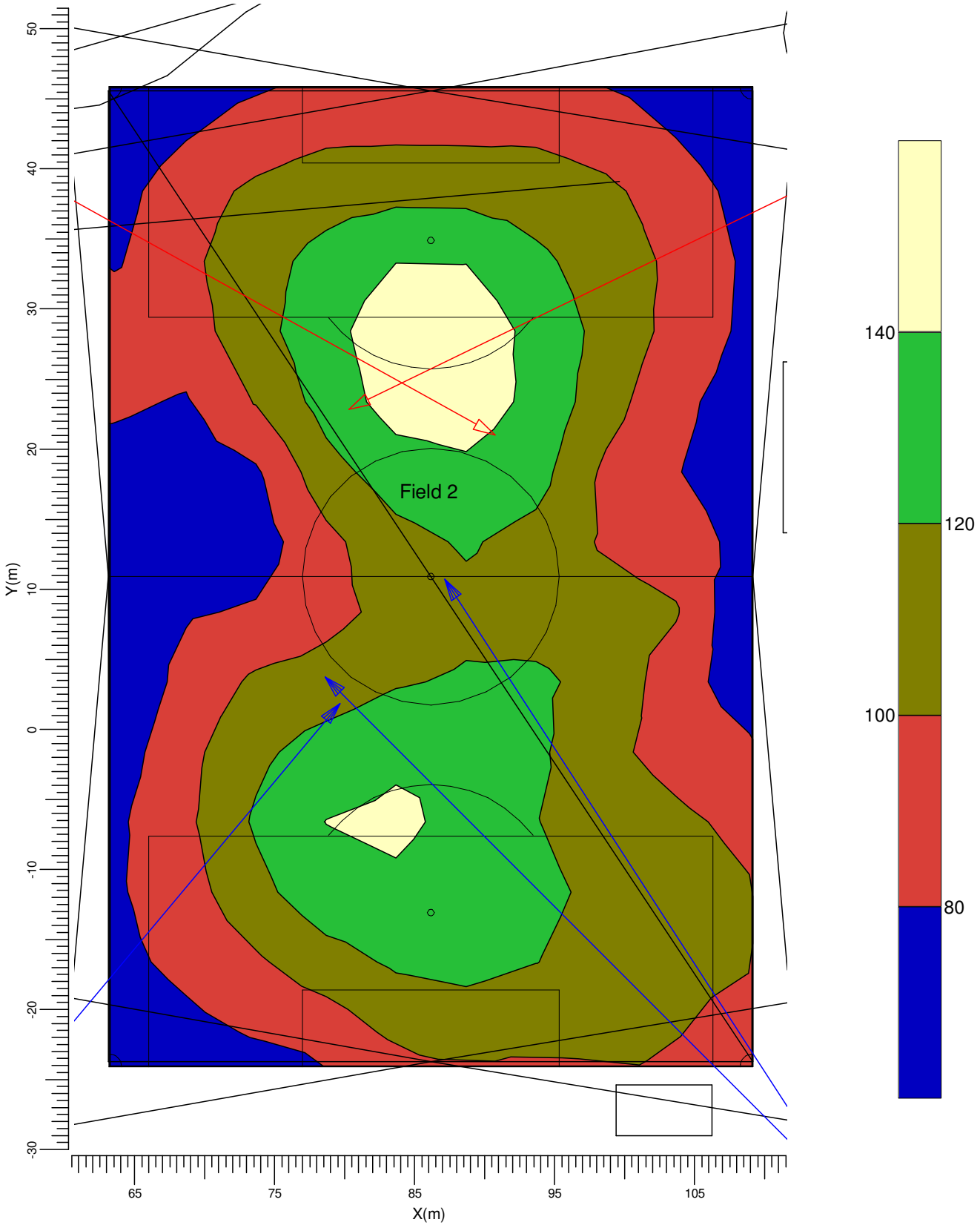
BVP525 T30 50K A-NB/30 +LT
BVP525 T30 50K A-NB/30 +LO
BVP525 T30 50K A-WB/30 +LO

Average	Min/Ave	Min/Max	Project maintenance factor	Scale
102	0.61	0.40	0.88	1:400

3.7 Field 2: Filled Iso Contour

ALL

Grid : Field 2 at Z = -0.00 m
Calculation : Surface Illuminance (lux)



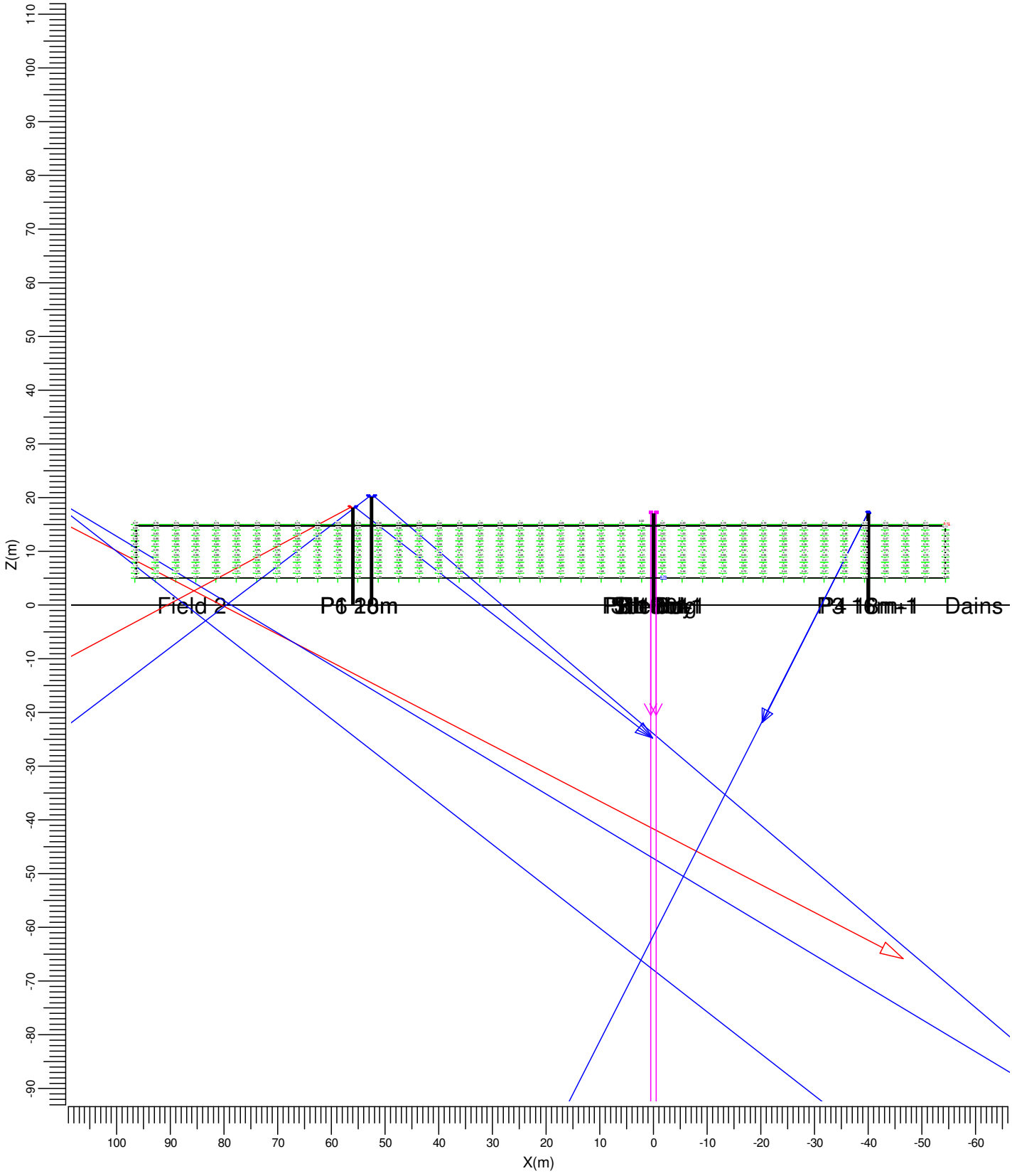
BVP525 T30 50K A-NB/30 +LT
BVP525 T30 50K A-WB/30 +LO
BVP525 T30 50K A-NB/30 +LO

Average	Min/Ave	Min/Max	Project maintenance factor	Scale
102	0.61	0.40	0.88	1:400

3.8 Sth Bdy Ev: Graphical Table

ALL - initial

Grid : Sth Bdy Ev at Y = -39.00 m
Calculation : Surface Illuminance (lux)

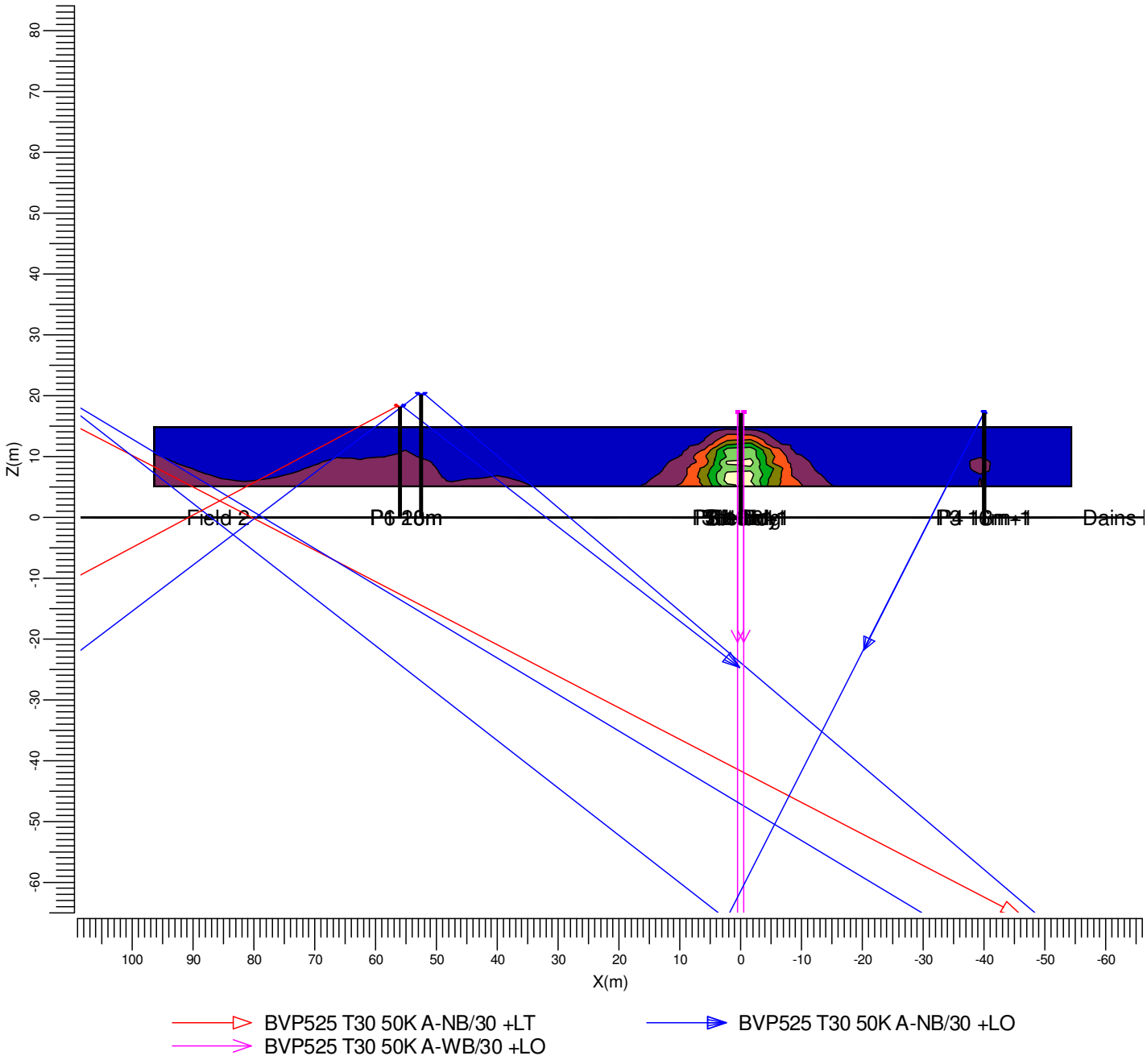


Average	Maximum	Project maintenance factor	Scale
0.96	6.70	1.00	1:1000

3.9 Sth Bdy Ev: Filled Iso Contour

ALL - initial

Grid : Sth Bdy Ev at Y = -39.00 m
Calculation : Surface Illuminance (lux)

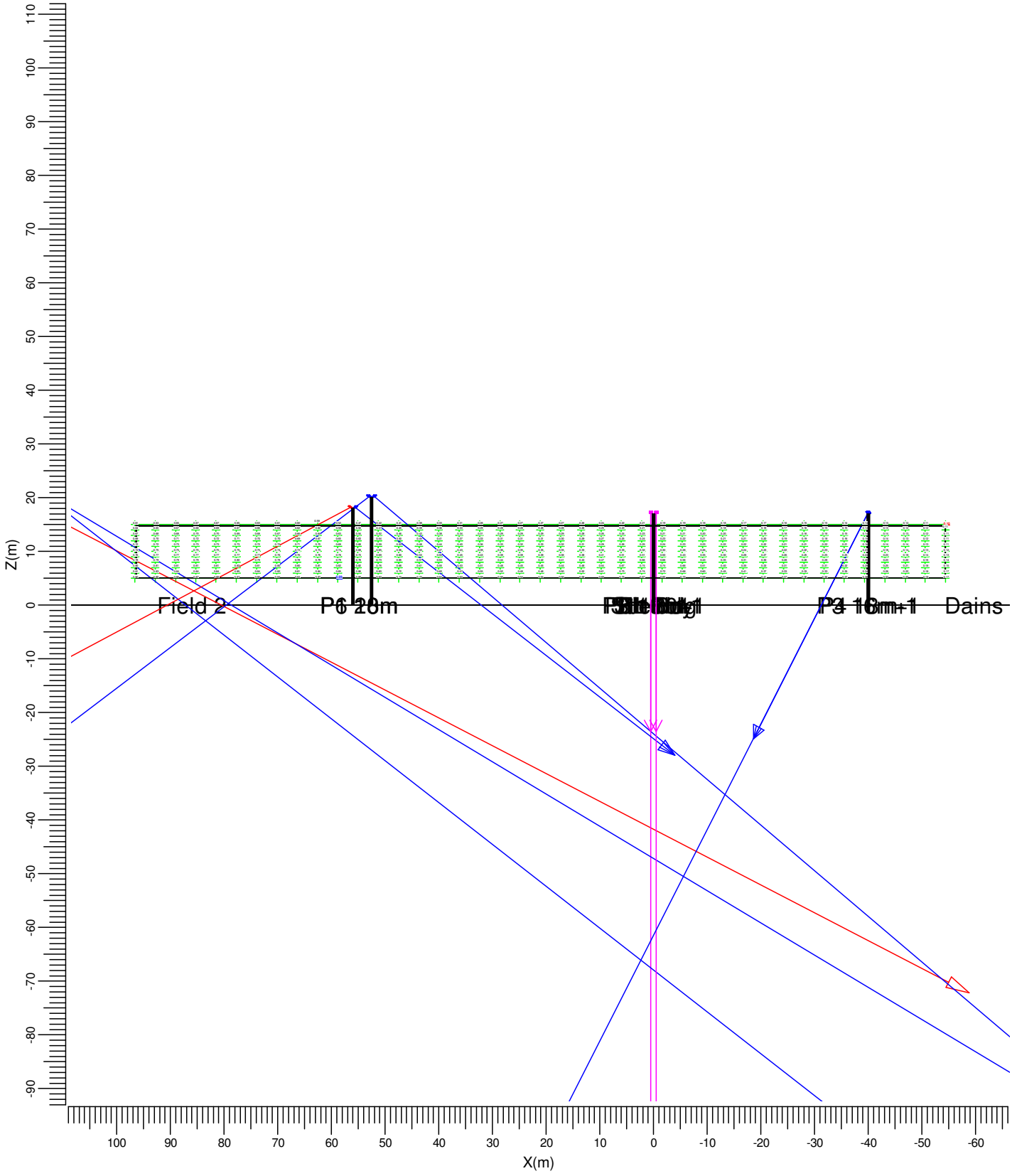


Average	Maximum	Project maintenance factor	Scale
0.96	6.70	1.00	1:1000

3.10 Sth Bldg Ev: Graphical Table

ALL - initial

Grid : Sth Bldg Ev at Y = -45.00 m
Calculation : Surface Illuminance (lux)

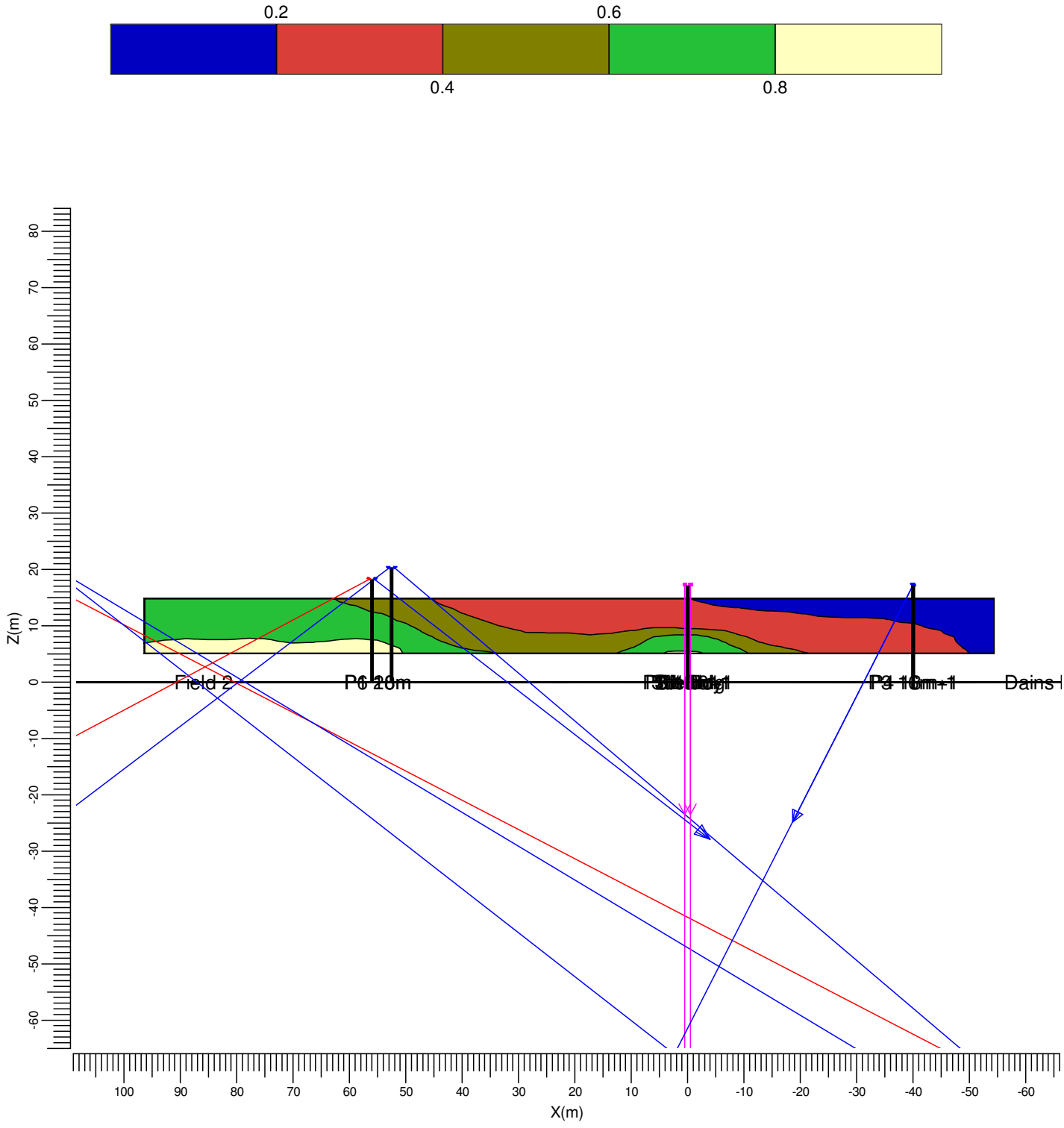


Average	Maximum	Project maintenance factor	Scale
0.46	0.89	1.00	1:1000

3.11 Sth Bldg Ev: Filled Iso Contour

ALL - initial

Grid : Sth Bldg Ev at Y = -45.00 m
Calculation : Surface Illuminance (lux)

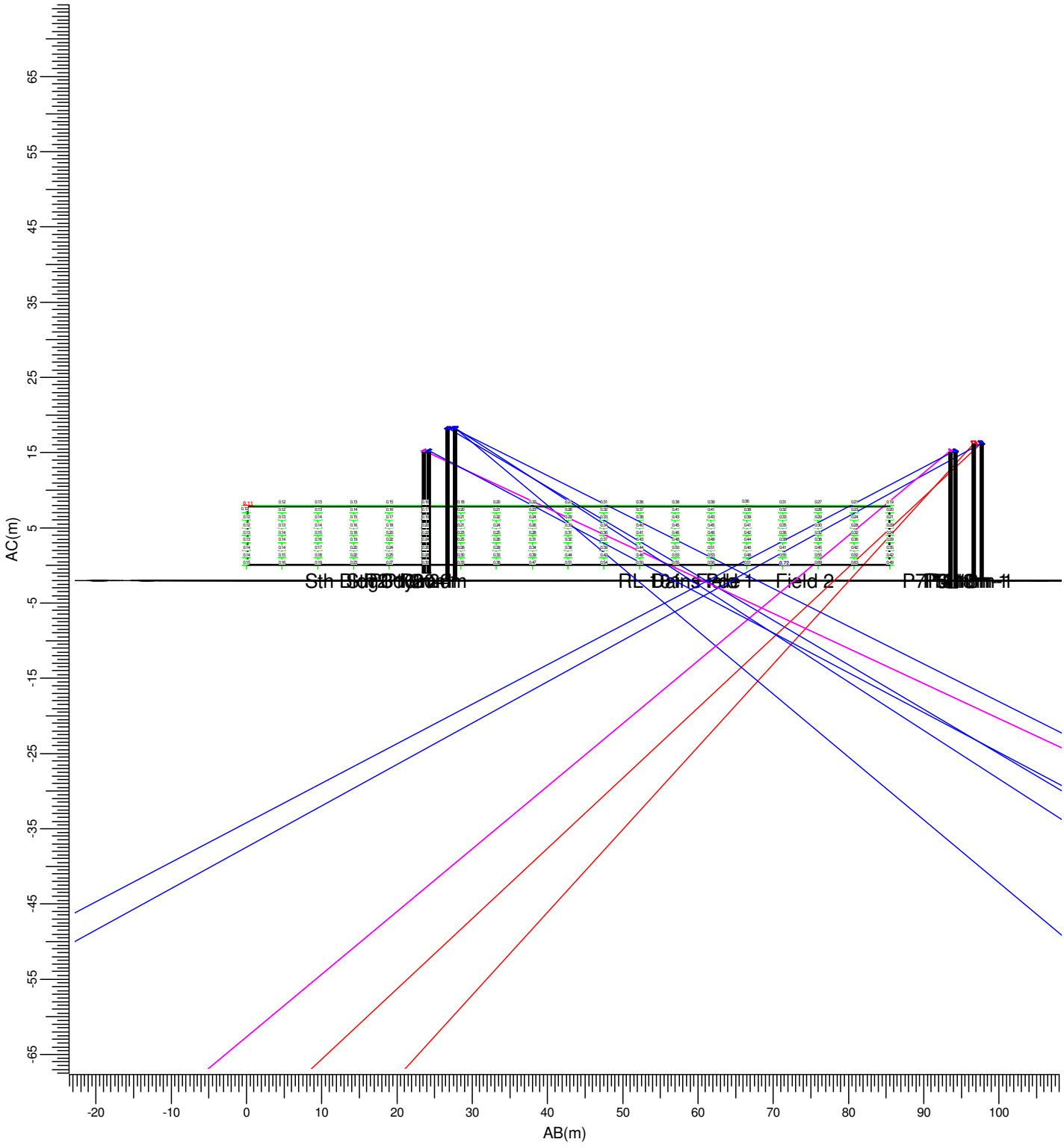


Average	Maximum	Project maintenance factor	Scale
0.46	0.89	1.00	1:1000

3.12 Dains Pde Bdy Ev: Graphical Table

ALL - initial

Grid : Dains Pde Bdy Ev
Calculation : Surface Illuminance (lux)



(-73.30, -59.80, 10.00) C-----D (-74.70, 25.70, 10.00)
(-73.30, -59.80, 2.00) A-----B (-74.70, 25.70, 2.00)

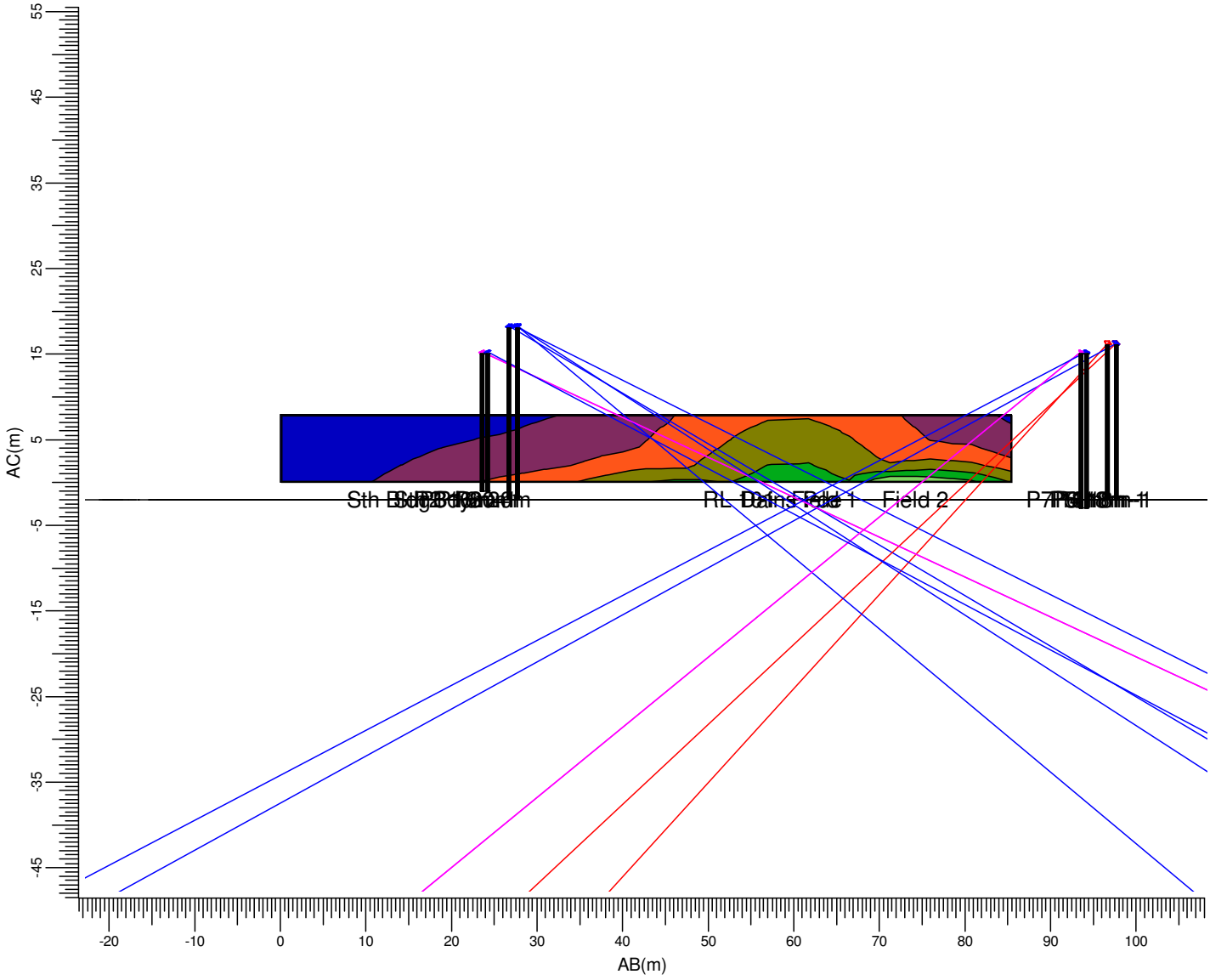
BVP525 T30 50K A-NB/30 +LT
BVP525 T30 50K A-WB/30 +LO
BVP525 T30 50K A-NB/30 +LO

Average	Maximum	Project maintenance factor	Scale
0.30	0.72	1.00	1:750

3.13 Dains Pde Bdy Ev: Filled Iso Contour

ALL - initial

Grid : Dains Pde Bdy Ev
Calculation : Surface Illuminance (lux)



(-73.30, -59.80, 10.00) C-----D (-74.70, 25.70, 10.00)
(-73.30, -59.80, 2.00) A-----B (-74.70, 25.70, 2.00)

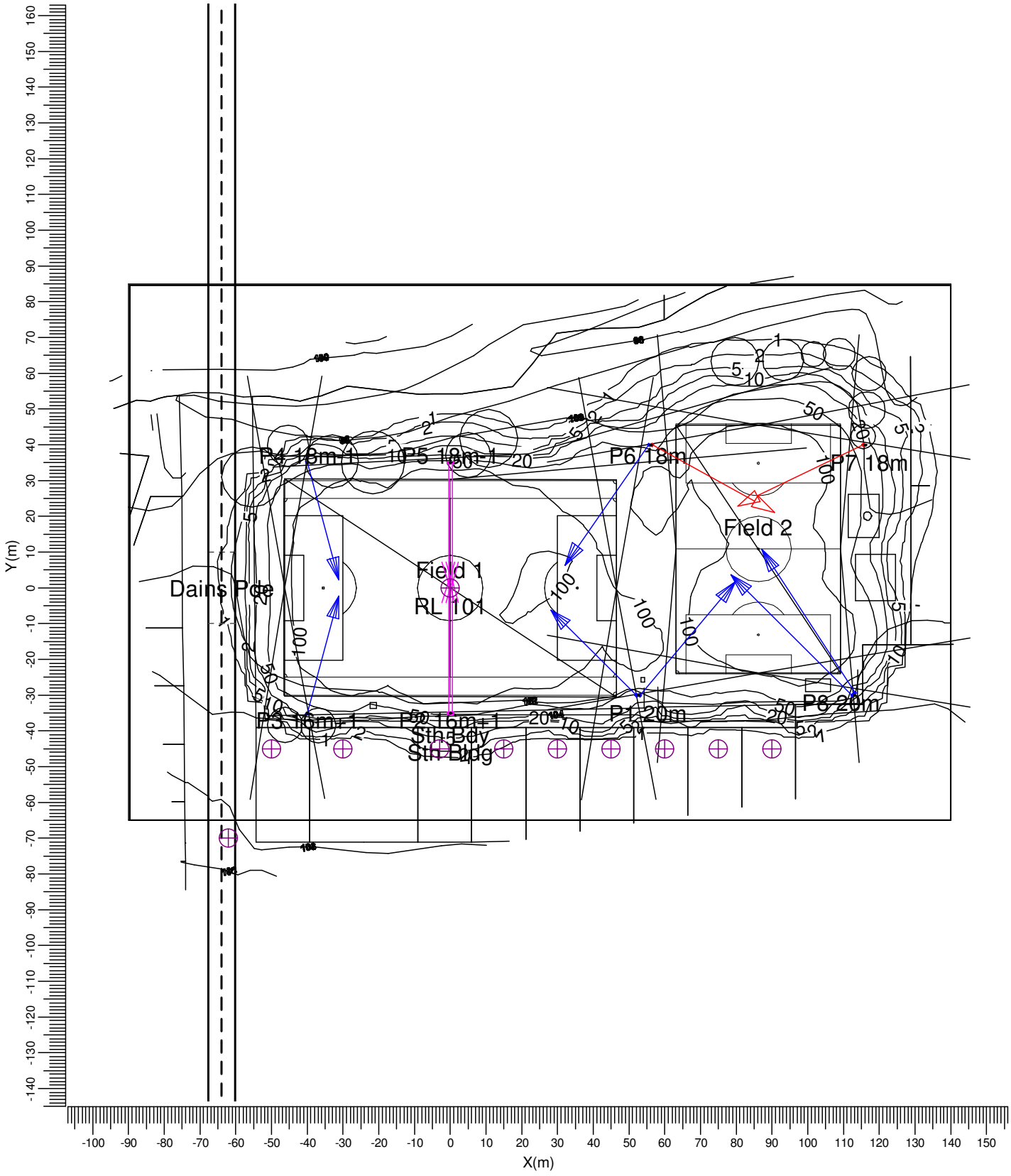
BVP525 T30 50K A-NB/30 +LT
BVP525 T30 50K A-NB/30 +LO
BVP525 T30 50K A-WB/30 +LO

Average	Maximum	Project maintenance factor	Scale
0.30	0.72	1.00	1:750

3.14 Surrounds Eh: Iso Contour

ALL - initial

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



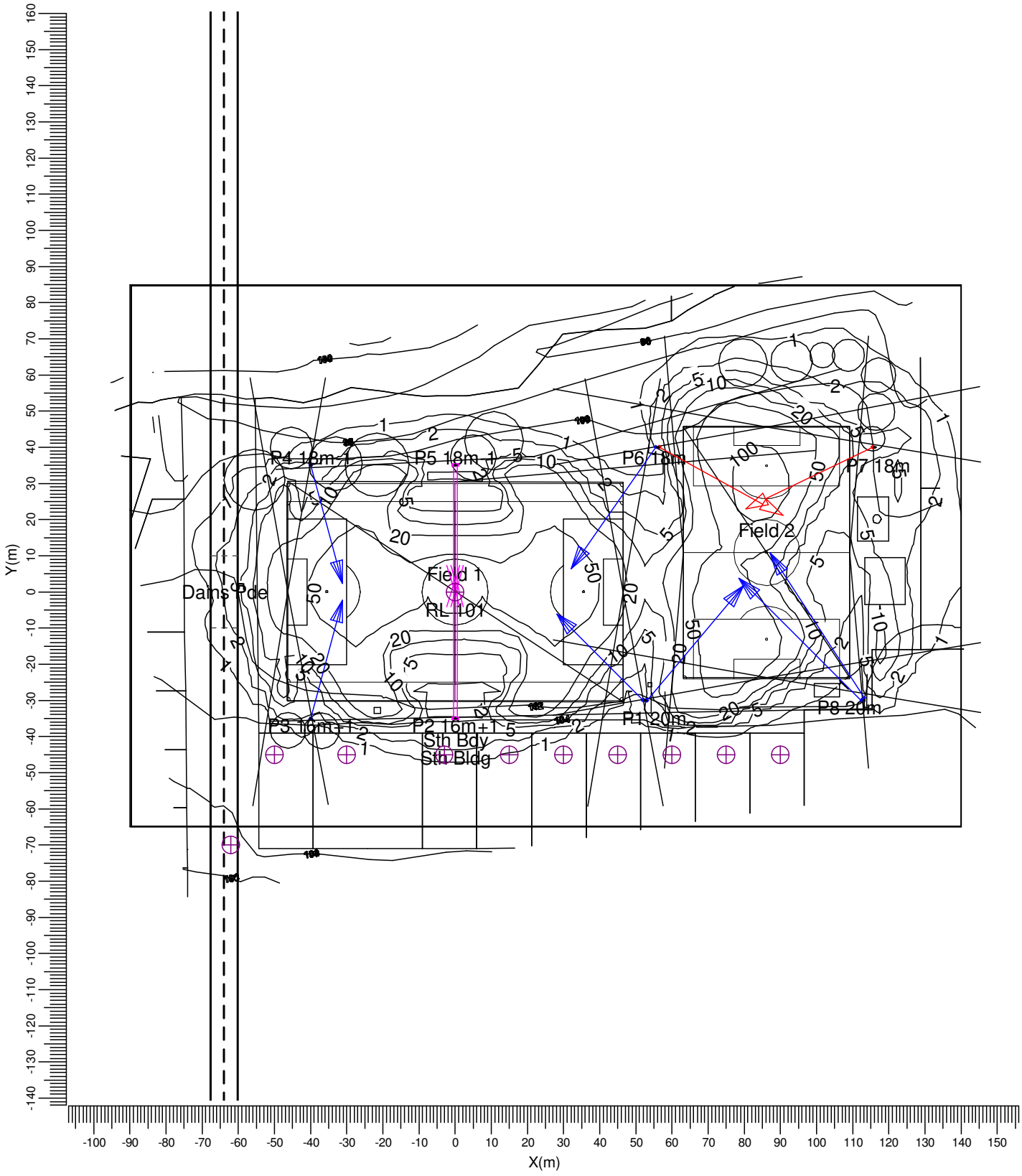
BVP525 T30 50K A-NB/30 +LT
BVP525 T30 50K A-NB/30 +LO
BVP525 T30 50K A-WB/30 +LO

Average	Min/Ave	Min/Max	Project maintenance factor	Scale
40.4	0.00	0.00	1.00	1:1500

3.15 Surrounds Ev: Iso Contour

ALL - initial

Grid : Surrounds at Z = -0.00 m
Calculation : Illuminance towards Centre (lux)
Height above grid : 1.50 m



BVP525 T30 50K A-NB/30 +LT
BVP525 T30 50K A-NB/30 +LO
BVP525 T30 50K A-WB/30 +LO

Average	Min/Ave	Min/Max	Project maintenance factor	Scale
12.6	0.01	0.00	1.00	1:1500

4. Luminaire Details

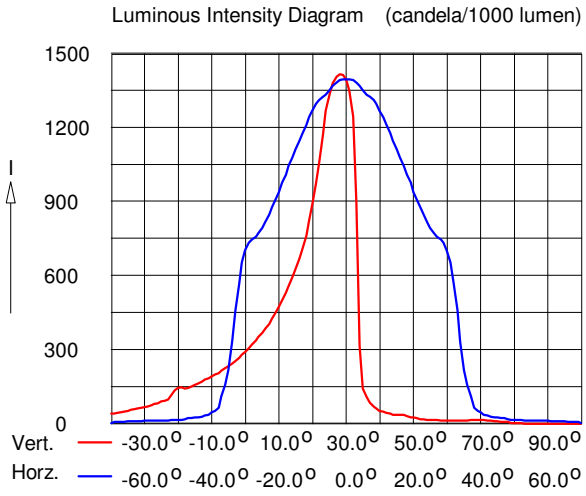
4.1 Project Luminaires

OptiVision LED
BVP525 T30 50K 1xLED1930/757 A-NB/30 +LT

Light output ratios
- DLOR : 0.74
- ULOR : 0.00
- TLOR : 0.74

Ballast : N/A
Lamp flux : 183011 lm
Luminaire wattage : 1301.5 W
Measurement code : LVA1505002

Note: Luminaire data not from database.

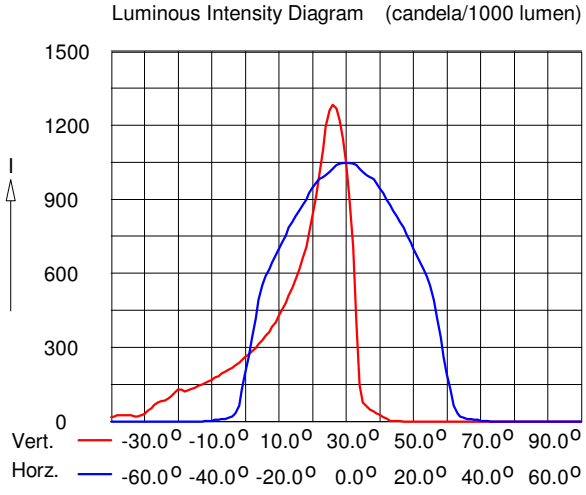


OptiVision LED
BVP525 T30 50K 1xLED1930/757 A-NB/30 +LO

Light output ratios
- DLOR : 0.52
- ULOR : 0.00
- TLOR : 0.52

Ballast : N/A
Lamp flux : 183011 lm
Luminaire wattage : 1301.5 W
Measurement code : LVA1409003

Note: Luminaire data not from database.

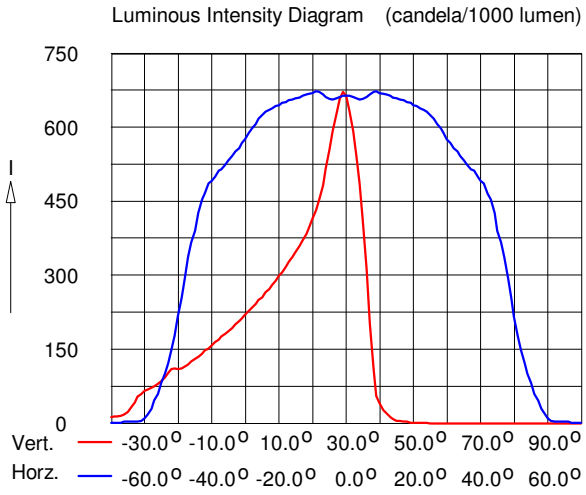


OptiVision LED
BVP525 T30 50K 1xLED1930/757 A-WB/30 +LO

Light output ratios
- DLOR : 0.64
- ULOR : 0.00
- TLOR : 0.64

Ballast : N/A
Lamp flux : 183011 lm
Luminaire wattage : 1301.5 W
Measurement code : LVA1409005

Note: Luminaire data not from database.



5. Installation Data

5.1 Legends

Project Luminaires:

Code	Qty	Luminaire Type	Lamp Type	Flux (lm)
A	2	BVP525 T30 50K A-NB/30 +LT	1 * LED1930/757	1 * 183011
B	7	BVP525 T30 50K A-NB/30 +LO	1 * LED1930/757	1 * 183011
C	4	BVP525 T30 50K A-WB/30 +LO	1 * LED1930/757	1 * 183011

Arrangements:

Code	Arrangement
1	P1 20m
2	P2 16m+1
3	P3 16m+1
4	P4 18m-1
5	P5 18m-1
6	P6 18m
7	P7 18m
8	P8 20m

Switching Modes:

Code	Switching Mode
1	ALL
2	ALL - initial

5.2 Luminaire Positioning and Orientation

Qty and Code	Position			Aiming Points			Aiming Angles			Arr.	Switching Modes	
	X (m)	Y (m)	Z (m)	X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0		1	2
1 * B	52.00	-30.00	20.25	28.17	-6.17	0.00	135.0	59.0	0.0	1	+	+
1 * B	53.00	-30.00	20.25	79.69	1.81	0.00	50.0	64.0	0.0	1	+	+
1 * C	-0.50	-35.00	17.25	-0.50	1.99	0.00	90.0	65.0	0.0	2	+	+
1 * C	0.50	-35.00	17.25	0.50	1.99	0.00	90.0	65.0	0.0	2	+	+
1 * B	-40.00	-35.00	17.25	-31.24	-2.30	0.00	75.0	63.0	0.0	3	+	+
1 * B	-40.00	35.00	17.25	-31.24	2.30	0.00	-75.0	63.0	0.0	4	+	+
1 * C	-0.50	35.00	17.25	-0.50	1.14	0.00	-90.0	63.0	0.0	5	+	+
1 * C	0.50	35.00	17.25	0.50	1.14	0.00	-90.0	63.0	-0.0	5	+	+
1 * B	55.50	40.00	18.25	31.99	6.42	0.00	-125.0	66.0	0.0	6	+	+
1 * A	56.50	40.00	18.25	90.73	21.03	0.00	-29.0	65.0	0.0	6	+	+
1 * A	115.50	40.00	18.25	80.32	22.84	0.00	-154.0	65.0	0.0	7	+	+
1 * B	112.34	-30.00	20.25	78.61	3.73	0.00	135.0	67.0	0.0	8	+	+
1 * B	113.15	-29.29	20.25	87.17	10.72	0.00	123.0	67.0	0.0	8	+	+