

Havant Rugby Football Club

100 Lux LED Lighting Design

Date: 06-06-2023

Designer: Andy Collins

Description: Floodlighting solution to relevant RFU Match Play standards:
-100 Lux average - 0.50 min/ave uniformity.

PHILIPS

Lighting



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.



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CalcuLuX Area 7.9.0.0

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1. Project Description

1.1 Description

Floodlighting solution to relevant RFU Match Play standards:
-100 Lux average - 0.50 min/ave uniformity.

The LED Luminaires perform with internal integral louvres to mitigate unnecessary spillage and glare to the adjacent surrounding area.

-Rugby Pitch :

8 Philips OptiVision Gen3.5 LED 1006w 4000K luminaires mounted on 6 proposed lighting columns at 15m high.

Rugby pitch size: 103m x 65m including 2 x 6m in-goal areas.

-Back Lighting North :

3 Philips OptiVision Gen3.5 LED 1006w 4000K luminaires mounted on the rear of 3 lighting columns at 15m high from the Rugby Pitch.

Back Lighting North application field size: 91m x 25m.

Back Lighting South :

2 Philips OptiVision Gen3.5 LED 1006w 4000K luminaires mounted on the rear of 2 lighting columns at 15m high from the Rugby Pitch.

Back Lighting South application field size: 1376 m².

Aiming Offset of Luminaire = 35 degrees.

Calculation grid complies with RFU regulations using CIBSE LG4 Sports Appendix 1.

Columns are 5m back from the playing area.

Total Installed Power = 13.08 Kw.

The estimated power saving is 47% compared to the existing conventional HID solution at 25.48 Kw.

400v power supply required.

Project Maintenance Factors:

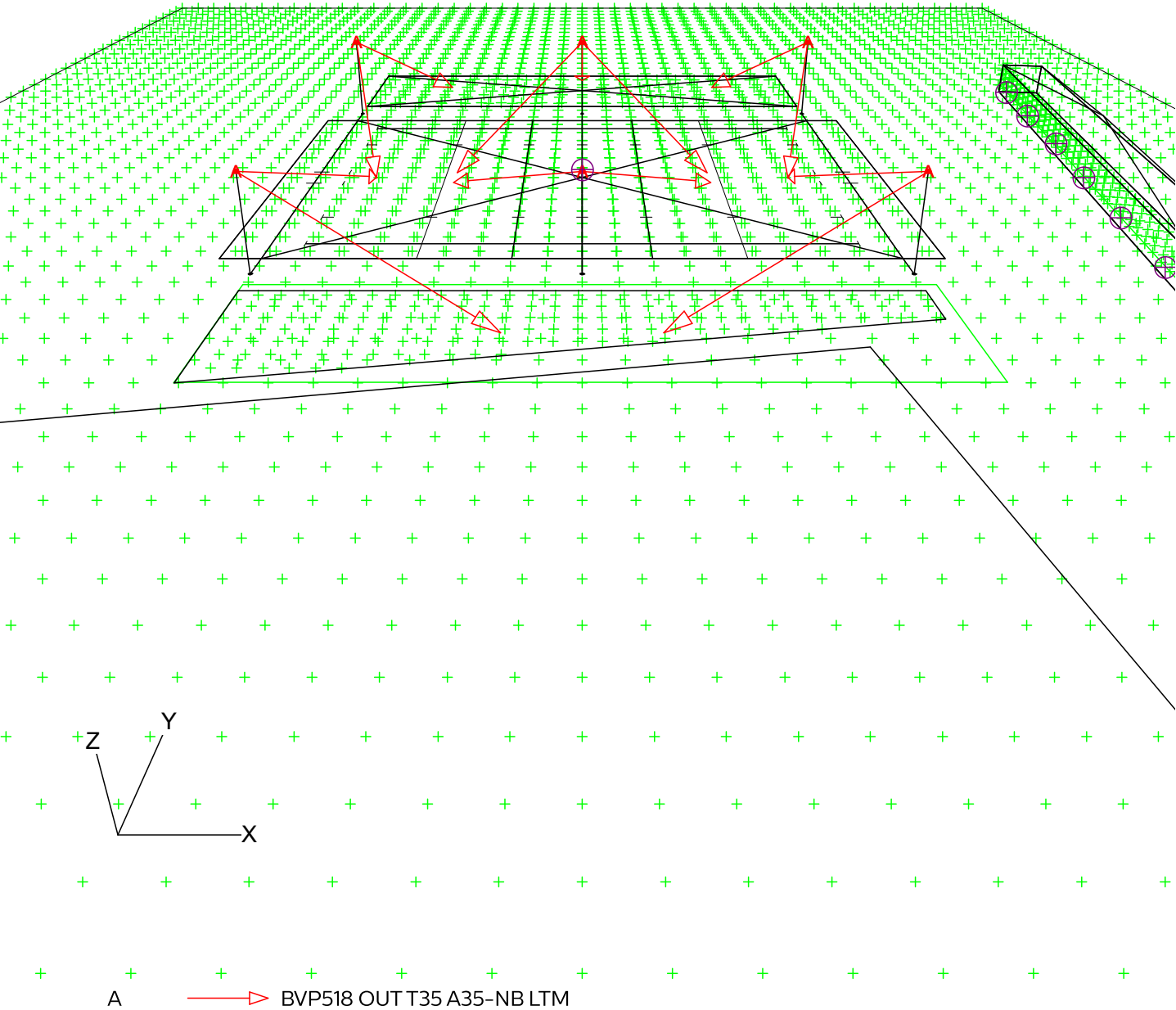
Performance Results = 0.95

Spillage Charts = 1

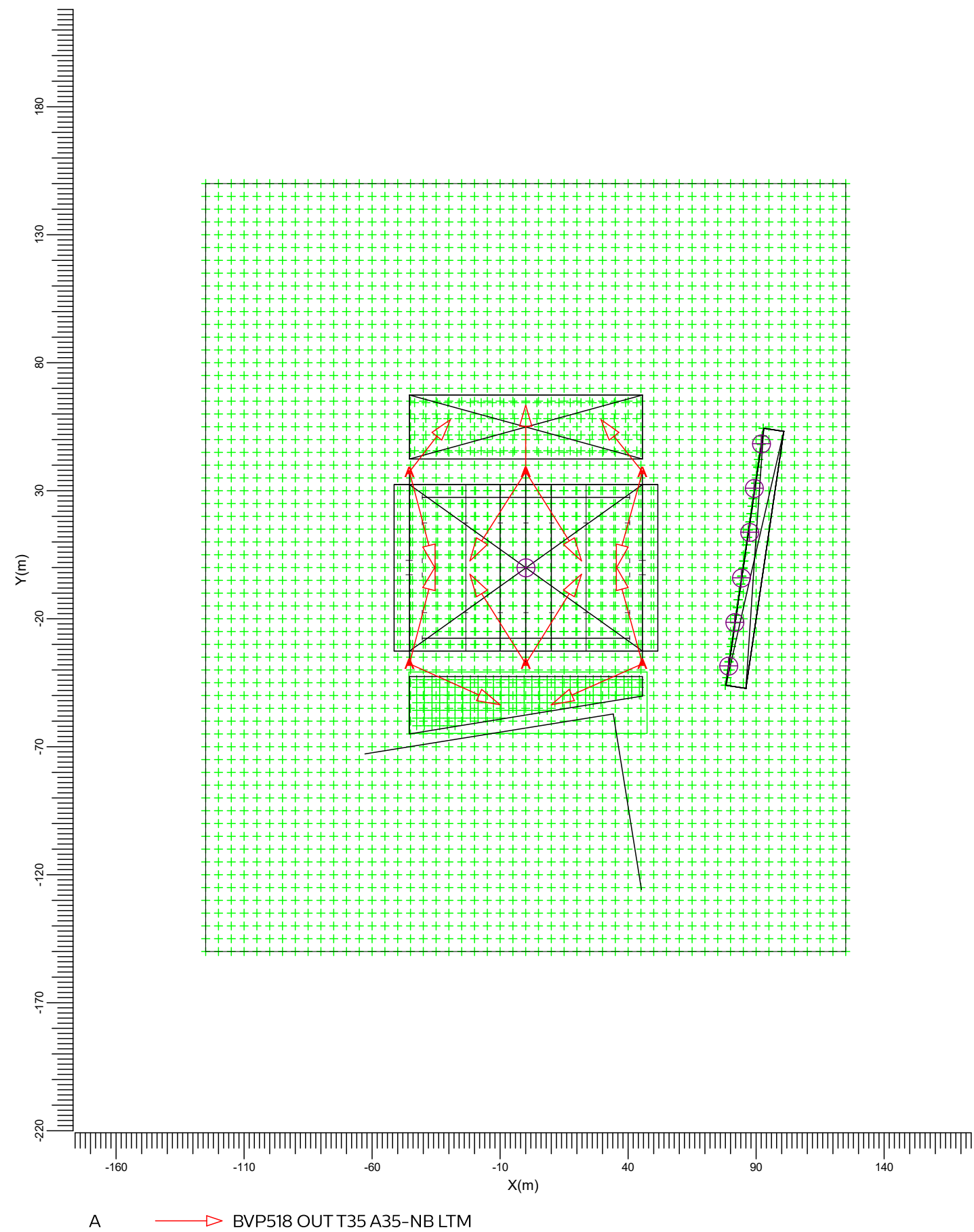
Upward Light Ratio (ULR) is 0.00

The light spill shown is not maintained and therefore demonstrates maximum lumen intensity from initial installation.

1.2 3-D Project Overview



1.3 Top Project Overview



Scale
1:2000

2. Summary

2.1 Observer Information

Code	Observer	Position		
		X (m)	Y (m)	Z (m)
Bb	Property Observer 1	79.10	-38.46	1.50
Cc	Property Observer 2	81.64	-21.41	1.50
Dd	Property Observer 3	84.18	-3.99	1.50
Ee	Property Observer 4	87.35	13.73	1.50
Ff	Property Observer 5	89.23	31.00	1.50
Gg	Property Observer 6	92.03	48.46	1.50

2.2 Project Luminaires

Code	Qty	Luminaire Type	Lamp Type	Power (W)	Flux (lm)
A	13	BVP518 OUT T35 A35-NB LTM	1 * LED1720-4S/740	1006.0	1 * 172000

The total installed power: 13.08 (kWatt)

Number of Luminaires Per Switching Mode:

Switching Mode	Luminaire Code	Power (kWatt)
	A	
Spillage	13	13.08
Rugby Pitch	8	8.05
Backlighting North	3	3.02
Backlighting South	2	2.01

Number of Luminaires Per Arrangement:

Arrangement	Luminaire Code	Power (kWatt)
	A	
Column 1+3+4+6	6	6.04
Column 2+5 R.P.	4	4.02
Column 4+6 B.L.N	2	2.01
Column 5 B.L.N	1	1.01

2.3 Calculation Results

Switching Modes:

Code	Switching Mode	Maintenance factor
1	Spillage	1.00
2	Rugby Pitch	0.95
3	Backlighting North	0.95
4	Backlighting South	0.95

(II)luminance Calculations:

Calculation	Switching Mode	Type	Unit	Ave	Max	Min/Ave	Min/Max
Rugby Pitch	2	Surface Illuminance	lux	112	0.69	0.41	
Back Lighting North	3	Surface Illuminance	lux	107	0.03	0.02	
Back Lighting South	4	Surface Illuminance	lux	69.5	0.09	0.06	

Calculation	Switching Mode	Type	Unit	Ave	Max	Min/Ave	Min/Max
Spillage Horizontal	1	Surface Illuminance	lux	20.2		0.00	0.00
Vertical Property Grid	1	Surface Illuminance	lux		1.07		

Glare Rating for Grid of Observers:

Calculation	Switching Mode	Observer Grid	Reference Grid	Reflectance	GR-Max
GR Max Rugby Pitch	2	Rugby Pitch	Rugby Pitch	0.25	45.9

Obtrusive Light Calculations:

Switching Mode	Observer Code	Luminaire Code	Position			Aiming Angles			Maximum Intensity (cd)
			X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0	
1	Bb	A	45.50	37.50	15.00	-105.00	69.00	0.00	1714
1	Cc	A	45.50	37.50	15.00	-105.00	69.00	0.00	2015
1	Dd	A	0.00	37.50	15.00	-58.00	70.00	-0.00	2277
1	Ee	A	0.00	-37.50	15.00	58.00	70.00	0.00	1967
1	Ff	A	45.50	-37.50	15.00	105.00	69.00	-0.00	1610
1	Gg	A	45.50	-37.50	15.00	105.00	69.00	-0.00	1144

Switching Mode	ULR
1	0.00
2	0.00
3	0.00
4	0.00

3. Calculation Results

3.1 Rugby Pitch: Graphical Table

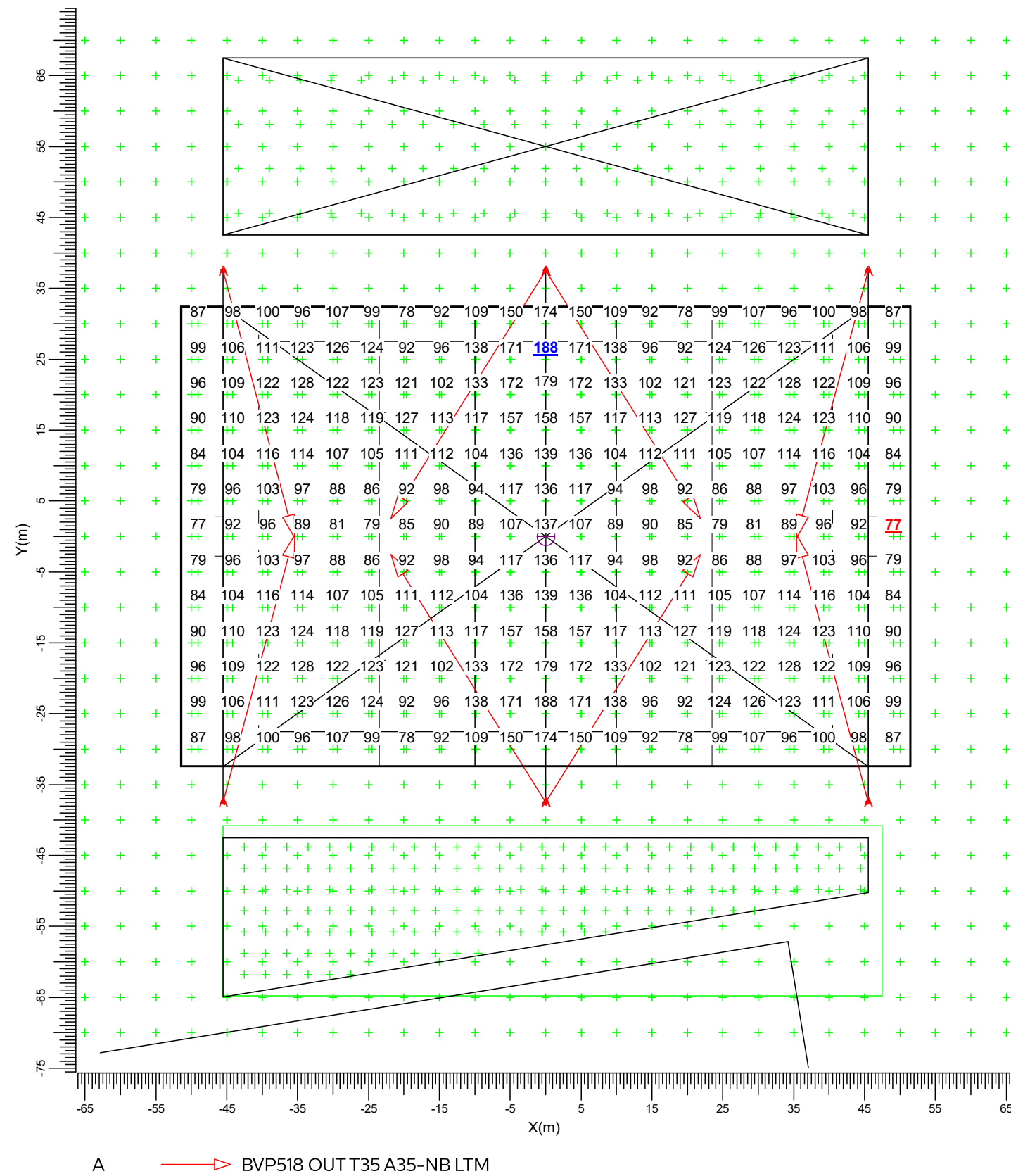
Rugby Pitch

Grid

: Rugby Pitch at Z = -0.00 m

Calculation

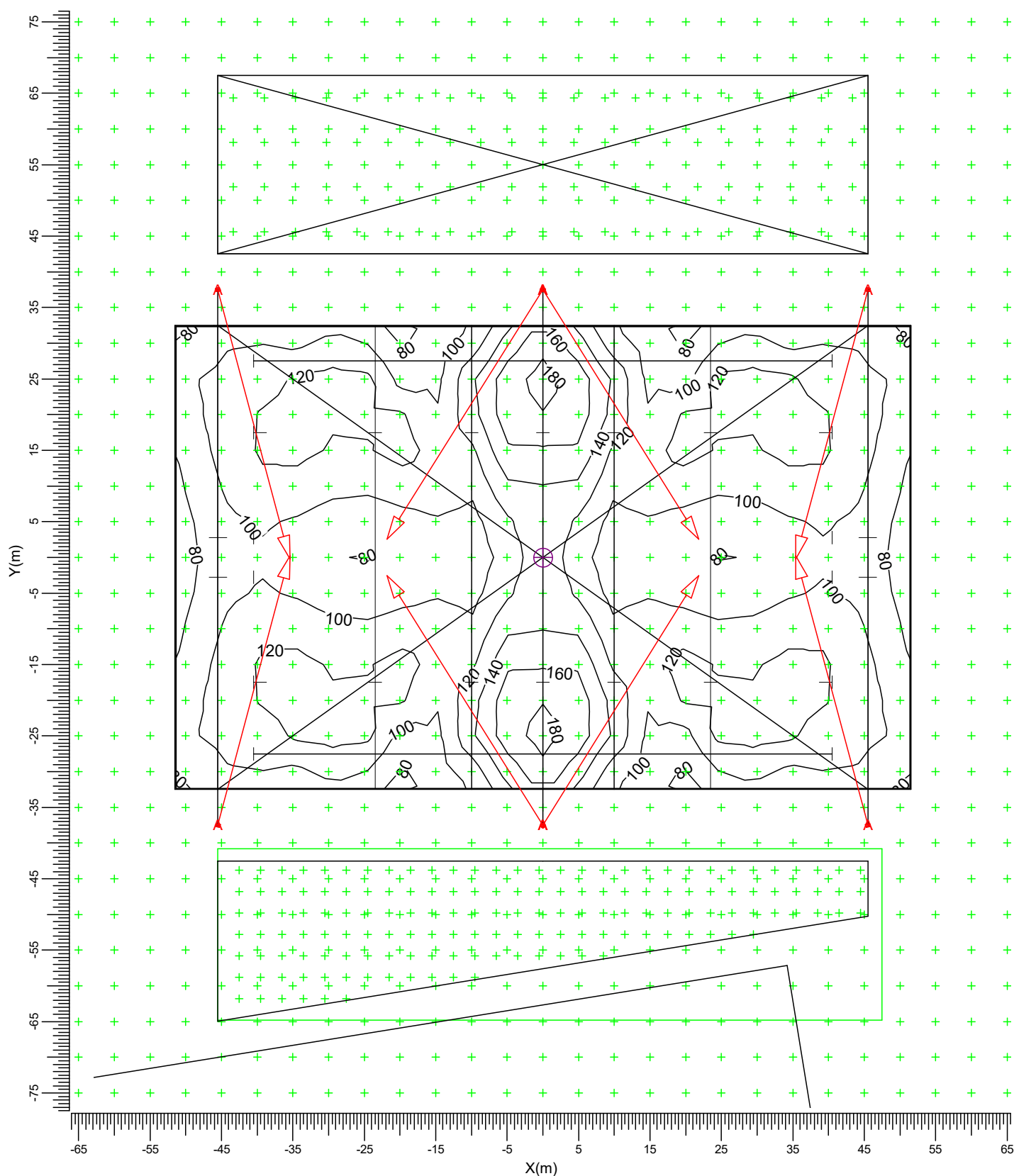
: Surface Illuminance (lux)



3.2 Rugby Pitch: Iso Contour

Rugby Pitch

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



A ➤ BVP518 OUT T35 A35-NB LTM

Average
112

Min/Ave
0.69

Min/Max
0.41

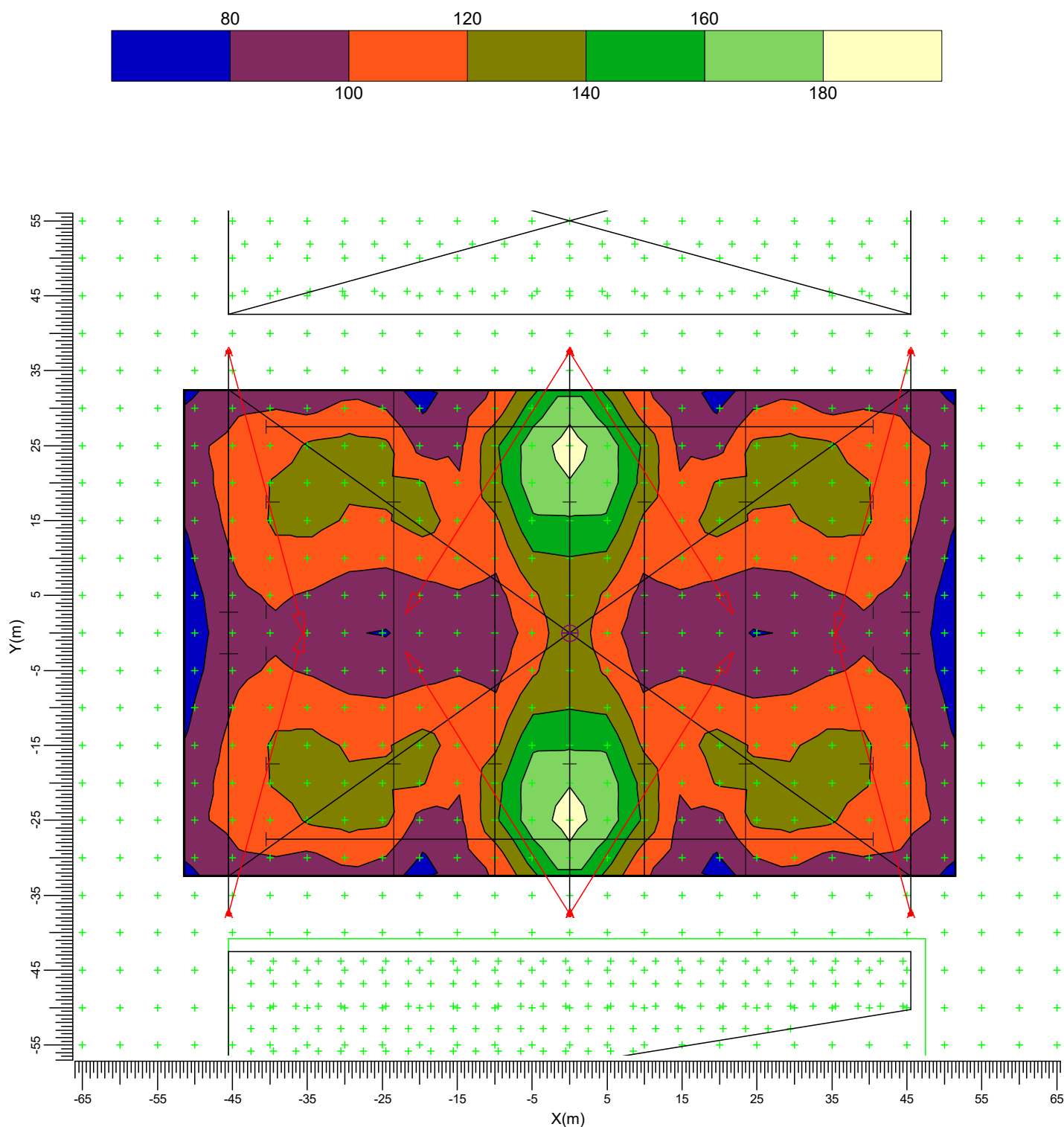
Project maintenance factor
0.95

Scale
1:750

3.3 Rugby Pitch: Filled Iso Contour

Rugby Pitch

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



A  BVP518 OUT T35 A35-NB LTM

Average
112

Min/Ave
0.69

Min/Max
0.41

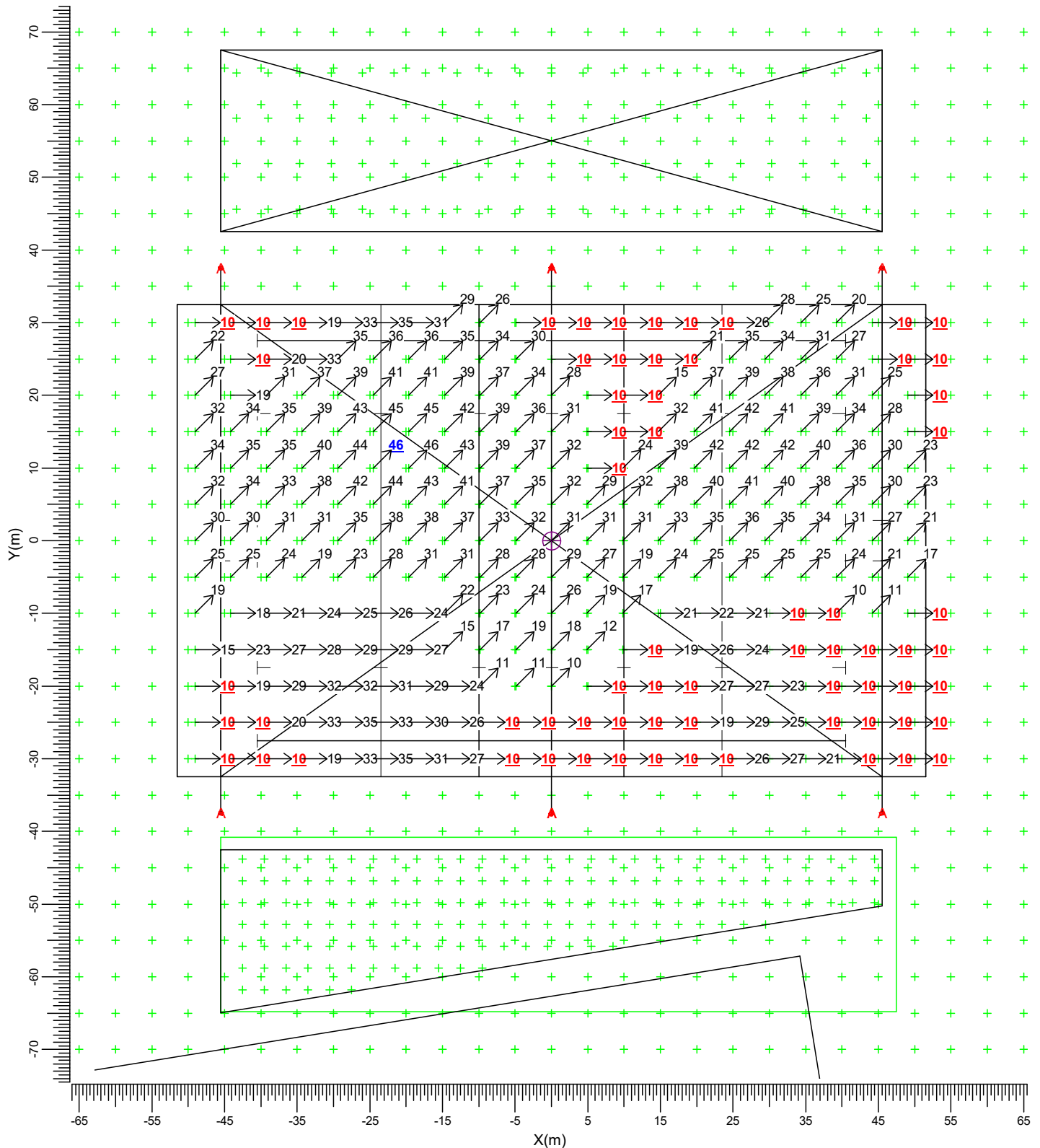
Project maintenance factor
0.95

Scale
1:750

3.4 GR Max Rugby Pitch: Graphical Table

Rugby Pitch

Grid of Observers : Rugby Pitch
 Calculation : Glare Rating
 Grid for Background Luminance: Rugby Pitch (Reflectance: 0.25)
 Vertical Viewing Angle : -2.0 deg



A : BVP518 OUT T35 A35-NB LTM

Maximum
45.9

Project maintenance factor
0.95

Scale
1:750

3.5 Back Lighting North: Graphical Table

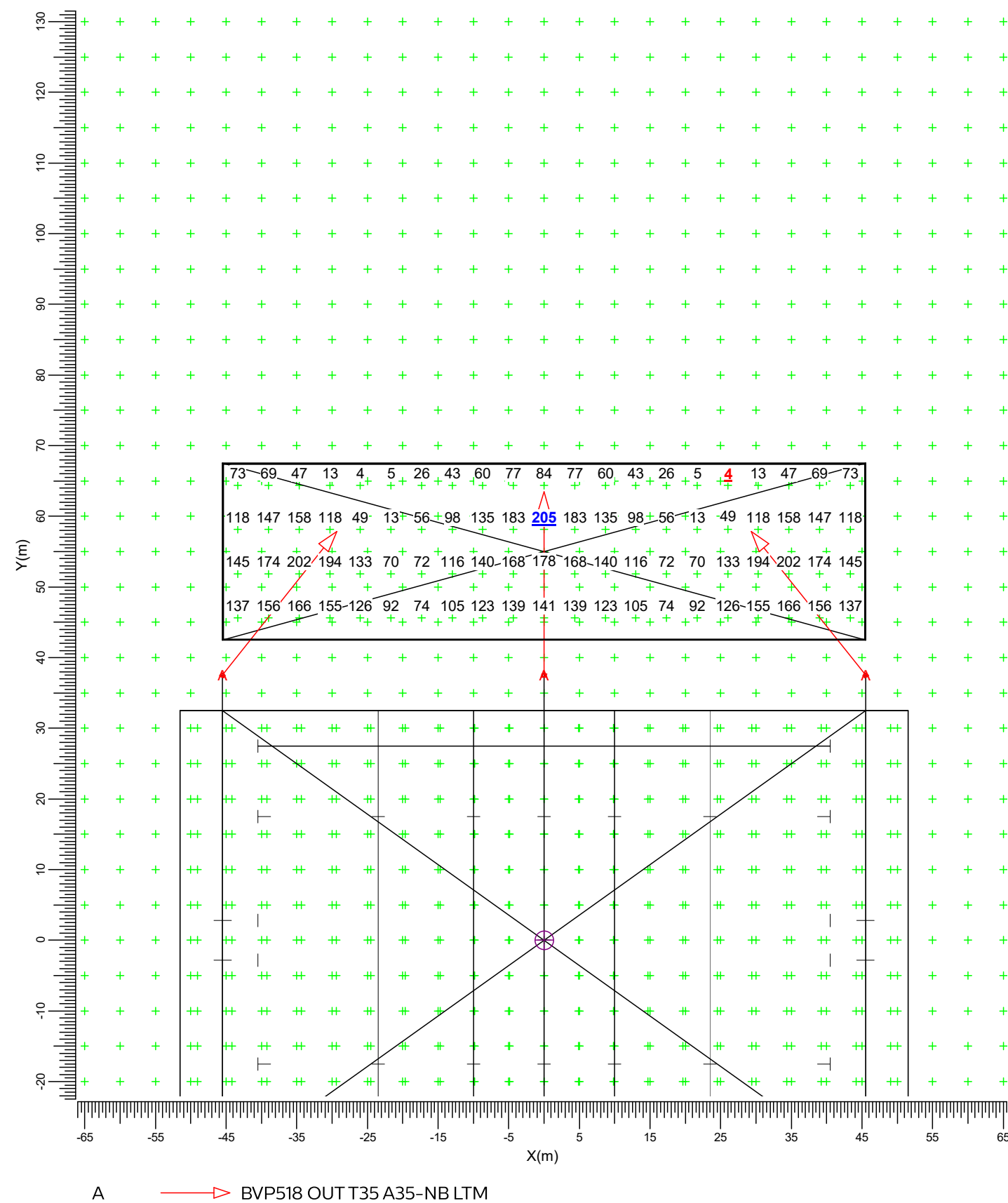
Backlighting North

Grid

Calculation

: Back Lighting North at Z = -0.00 m

: Surface Illuminance (lux)



3.6 Back Lighting North: Iso Contour

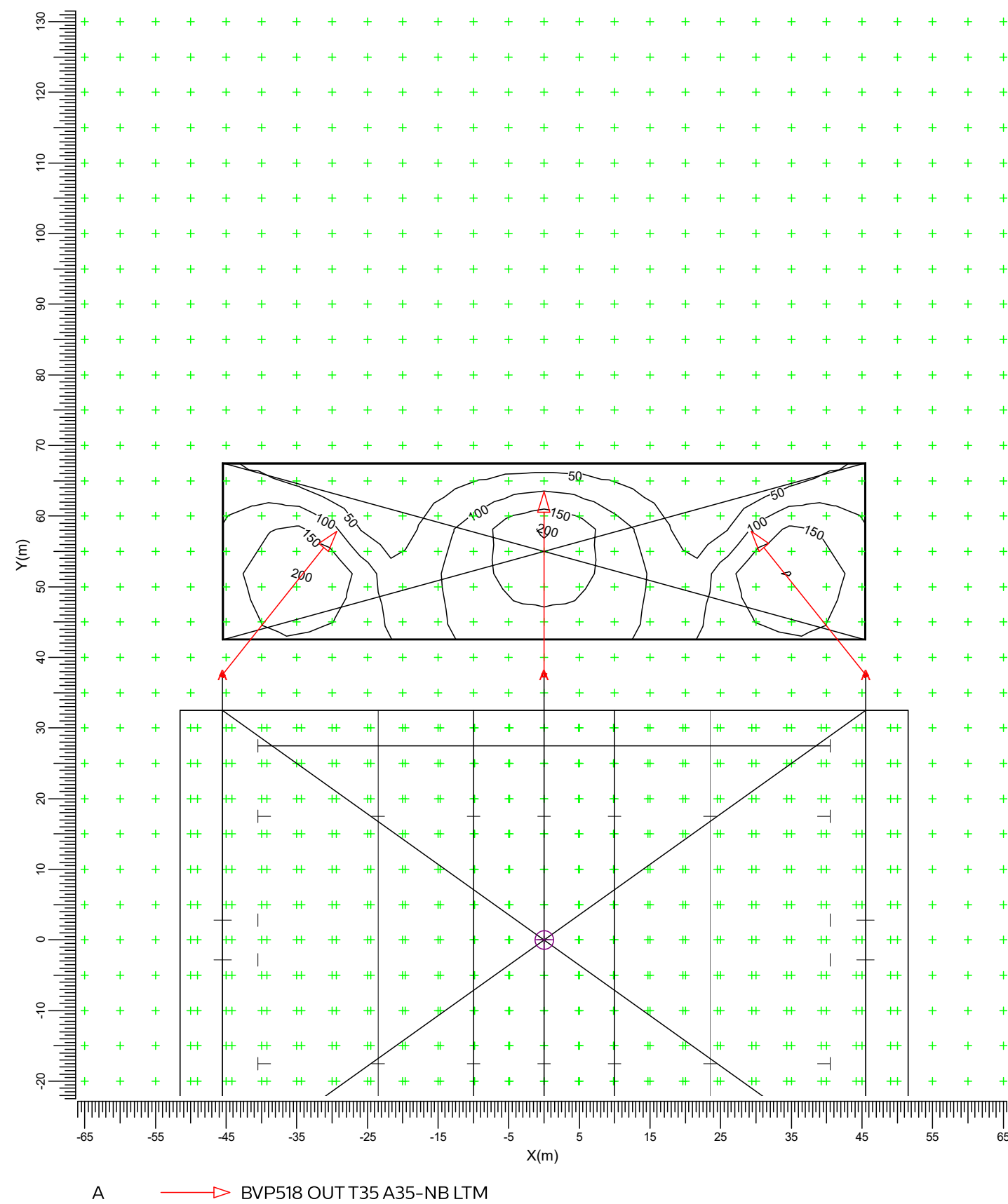
Backlighting North

Grid

Calculation

: Back Lighting North at Z = -0.00 m

: Surface Illuminance (lux)

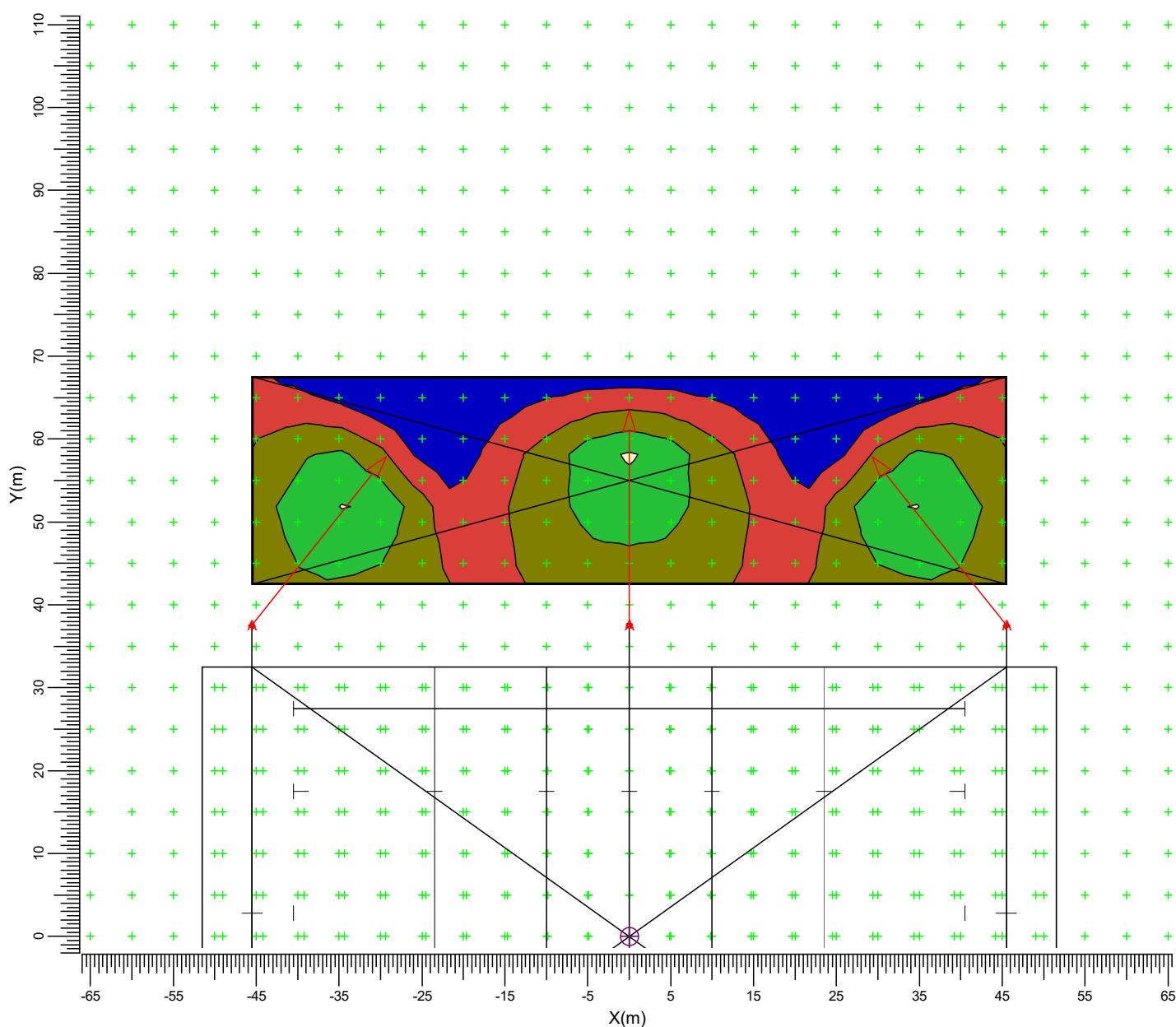


Average	Min/Ave	Min/Max	Project maintenance factor	Scale
107	0.03	0.02	0.95	1:750

3.7 Back Lighting North: Filled Iso Contour

Backlighting North

Grid : Back Lighting North at Z = -0.00 m
 Calculation : Surface Illuminance (lux)



A  BVP518 OUT T35 A35-NB LTM

Average
107

Min/Ave
0.03

Min/Max
0.02

Project maintenance factor
0.95

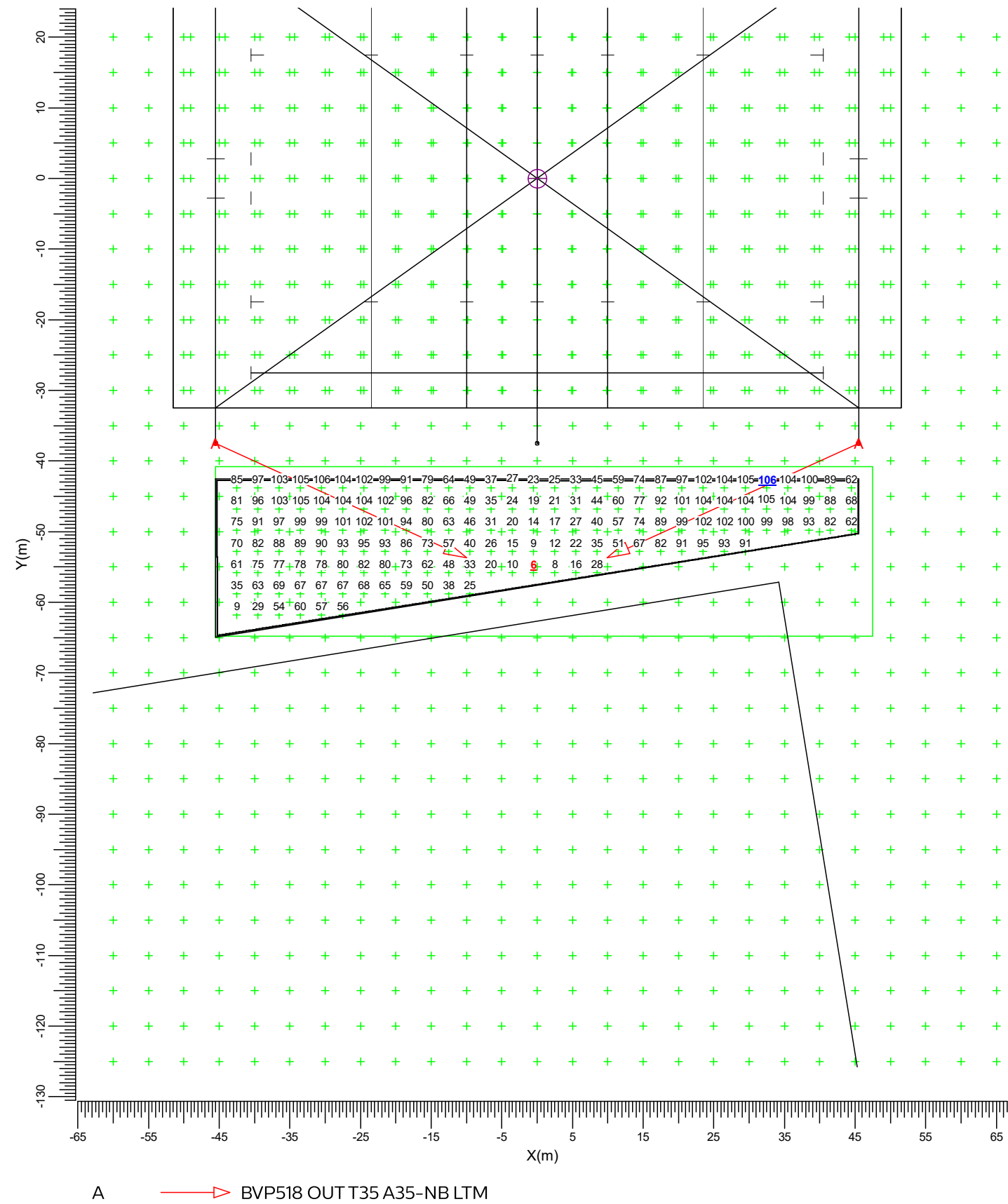
Scale
1:750

3.8 Back Lighting South: Graphical Table

Backlighting South

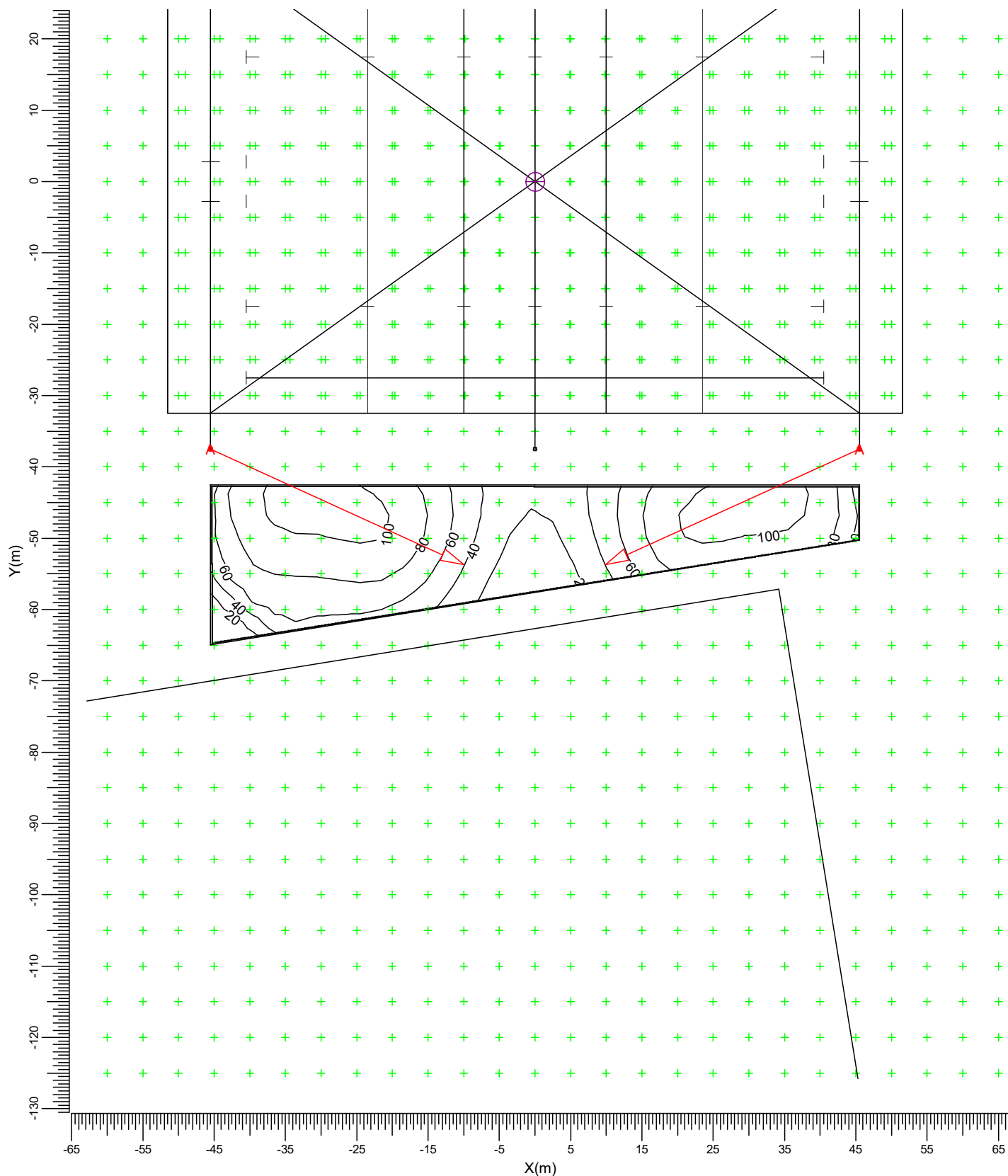
Grid : Back Lighting South at Z = -0.00 m

Calculation : Surface Illuminance (lux)



Backlighting South

Grid : Back Lighting South at Z = -0.00 m
Calculation : Surface Illuminance (lux)



A BVP518 OUT T35 A35-NB LTM

Scale
1:750

3.10 Back Lighting South: Filled Iso Contour

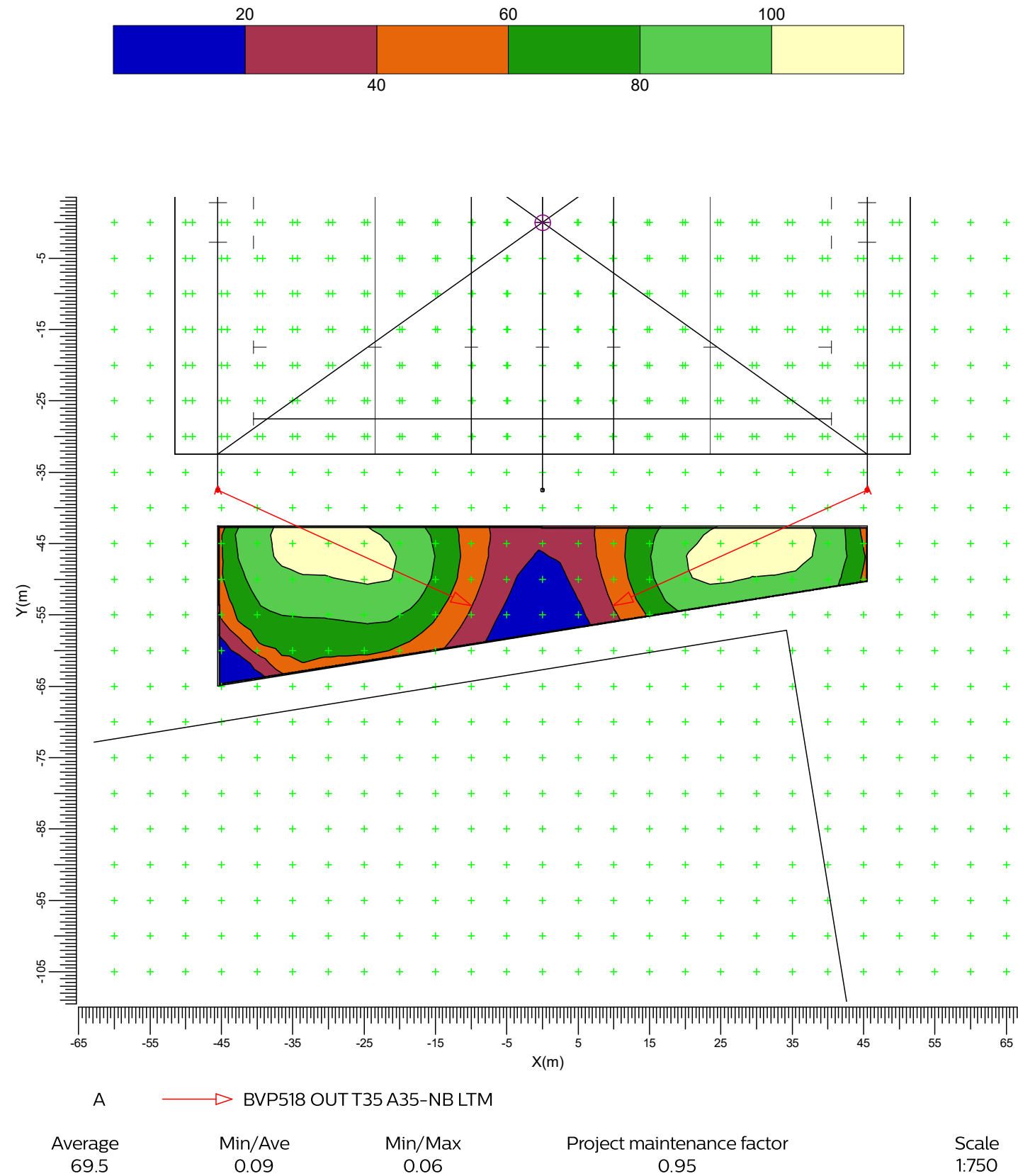
Backlighting South

Grid

Calculation

: Back Lighting South at Z = -0.00 m

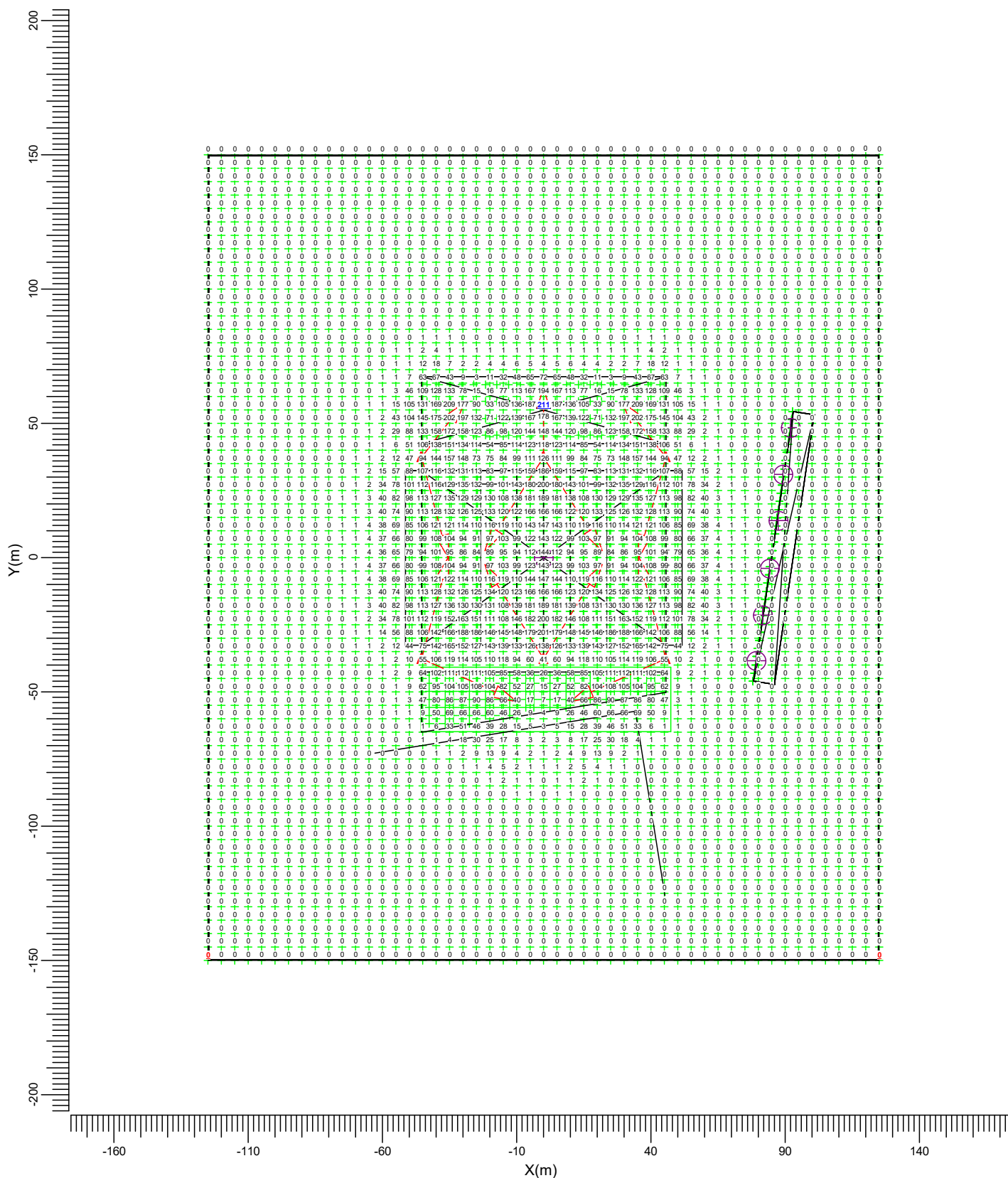
: Surface Illuminance (lux)



3.11 Spillage Horizontal: Graphical Table

Spillage

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



A BVP518 OUT T35 A35-NB LTM

Average
20.2

Min/Ave
0.00

Min/Max
0.00

Project maintenance factor
1.00

Scale
1:2000

3.12 Spillage Horizontal: Iso Contour

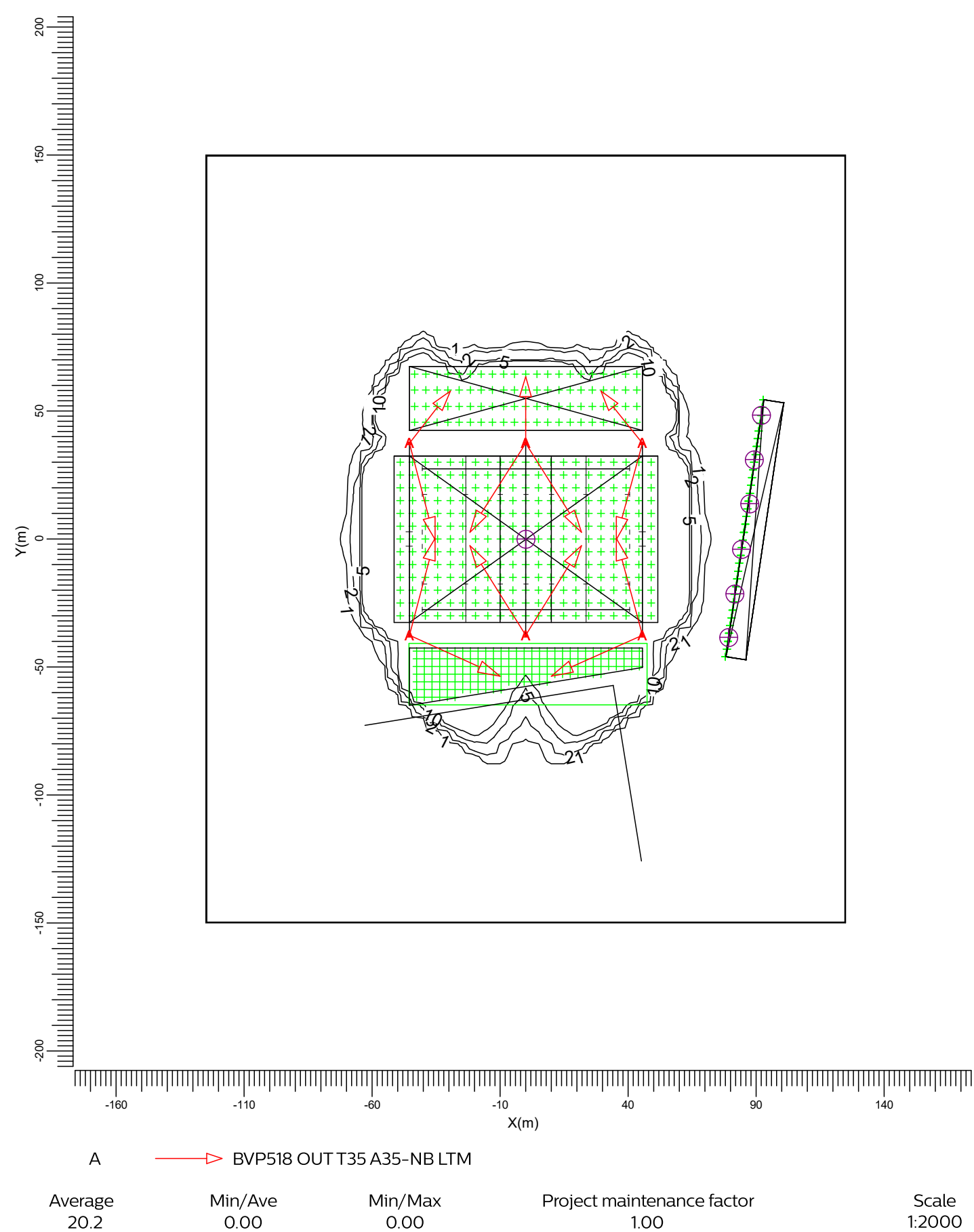
Spillage

Grid

Calculation

: Spillage at Z = -0.00 m

: Surface Illuminance (lux)



3.13 Spillage Horizontal: Filled Iso Contour

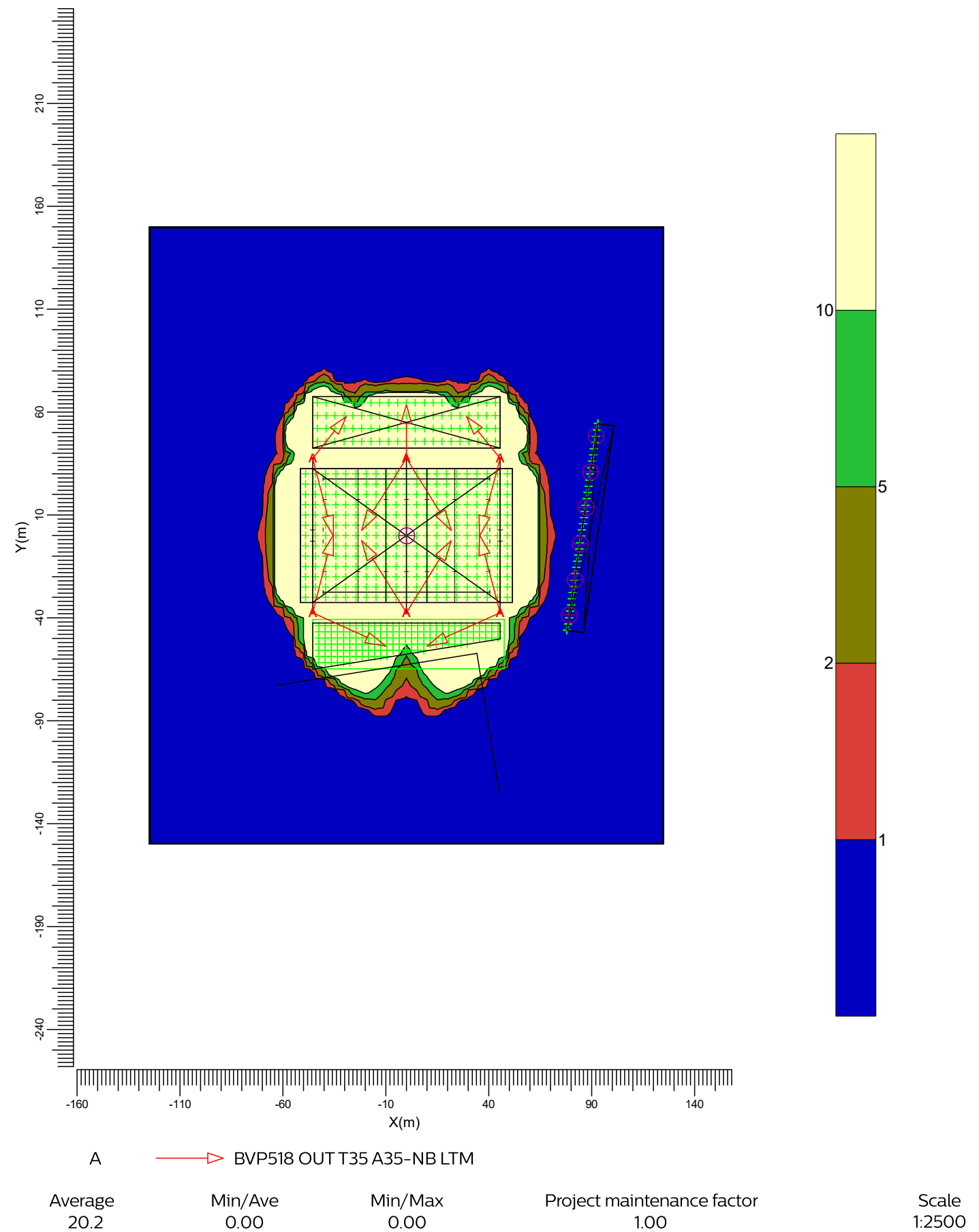
Spillage

Grid

Calculation

: Spillage at Z = -0.00 m

: Surface Illuminance (lux)



3.14 Vertical Property Grid: Filled Iso Contour

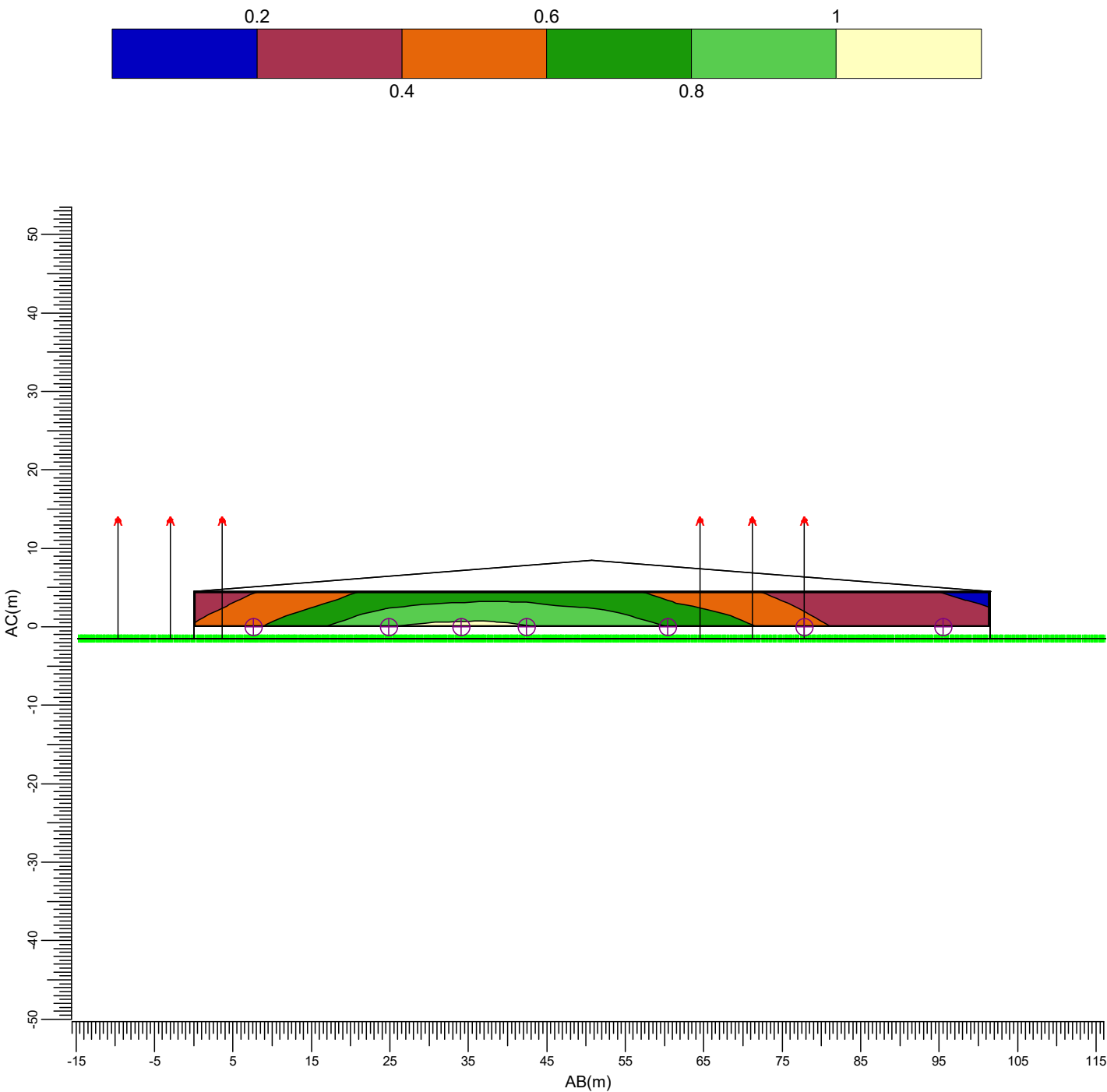
Spillage

Grid

Calculation

: Vertical Property Grid

: Surface Illuminance (lux)



(78.08, -45.99, 6.00)

C-----D (92.89, 54.38, 6.00)

(78.08, -45.99, 1.50)

A-----B (92.89, 54.38, 1.50)

A : BVP518 OUT T35 A35-NB LTM

Maximum
1.07

Project maintenance factor
1.00

Scale
1:750

4. Luminaire Details

4.1 Project Luminaires

OptiVision LED gen3.5 2022
BVP518 OUT T35 1xLED1720-4S/740/740 E3/D4I A35-NB LTM

Light output ratios	
DLOR	: 0.71
ULOR	: 0.00
TLOR	: 0.71
Ballast	: E3/D4I
Lamp flux	: 172000 lm
Luminaire wattage	: 1006.0 W
Measurement code	: LVM2047600

Note: Luminaire data not from database.

