



Stag Brewery, Mortlake

Sports Pitch Lighting Assessment

For Reselton Properties

March 2022

Former Stag Brewery, Mortlake.

Sports Pitch Lighting Assessment Summary

Document: 547-(010)-RP-EX-LA-A

Introduction

1.1 This Lighting Strategy has been prepared by Michael Grubb Studio on behalf of Reselton Properties Limited (“the Applicant”) in support of two linked planning applications (“the Applications”) for the comprehensive redevelopment of the former Stag Brewery Site in Mortlake (“the Site”) within the London Borough of Richmond upon Thames (LBRuT).

Proposals

1.2 The Applications seek planning permission for:

Application A:

“Hybrid application to include the demolition of existing buildings to allow for comprehensive phased redevelopment of the site:

Planning permission is sought in detail for works to the east side of Ship Lane which comprise:

- a) Demolition of existing buildings (except the Maltings and the façade of the Bottling Plant and former Hotel), walls, associated structures, site clearance and groundworks**
- b) Alterations and extensions to existing buildings and erection of buildings varying in height from 3 to 9 storeys plus a basement of one to two storeys below ground**
- c) Residential apartments**
- d) Flexible use floorspace for:**
 - i. Retail, financial and professional services, café/restaurant and drinking establishment uses**
 - ii. Offices**
 - iii. Non-residential institutions and community use**

iv. Boathouse

- e) Hotel / public house with accommodation**
- f) Cinema**
- g) Offices**
- h) New pedestrian, vehicle and cycle accesses and internal routes, and associated highway works**
- i) Provision of on-site cycle, vehicle and servicing parking at surface and basement level**
- j) Provision of public open space, amenity and play space and landscaping**
- k) Flood defence and towpath works**
- l) Installation of plant and energy equipment**

Planning permission is also sought in outline with all matters reserved for works to the west of Ship Lane which comprise:

- a) The erection of a single storey basement and buildings varying in height from 3 to 8 storeys**
- b) Residential development**
- c) Provision of on-site cycle, vehicle and servicing parking**
- d) Provision of public open space, amenity and play space and landscaping**
- e) New pedestrian, vehicle and cycle accesses and internal routes, and associated highways works”**

Application B:

“Detailed planning permission for the erection of a three-storey building to provide a new secondary school with sixth form; sports pitch with floodlighting, external MUGA and play space; and associated external works including landscaping, car and cycle parking, new access routes and other associated works”

1.3 Together, Applications A and B described above comprise the ‘Proposed Development’.

Background to Submission

- 1.4 The Applications follow earlier planning applications which were refused by the Greater London Authority. The refused applications were for:
- a) Application A – hybrid planning application for comprehensive mixed use redevelopment of the former Stag Brewery site consisting of:
 - i. Land to the east of Ship Lane applied for in detail (referred to as ‘Development Area 1’ throughout); and
 - ii. Land to the west of Ship Lane (excluding the school) applied for in outline (referred to as ‘Development Area 2’ throughout).
 - b) Application B – detailed planning application for the school (on land to the west of Ship Lane).
 - c) Application C – detailed planning application for highways and landscape works at Chalkers Corner.
- 1.5 The LBRuT (the Council) originally resolved to grant planning permission for Applications A and B but refuse Application C.
- 1.6 Following the LBRuT’s resolution to approve the applications A and B, the Mayor called-in the applications and became the determining authority. The Mayor’s reasons for calling in the applications were set out in his Stage II letter (dated 4 May 2020) but specifically related to concerns regarding what he considered was a low percentage of affordable housing being proposed for the Site and the need to secure a highways solution for the scheme following the LBRuT’s refusal of Application C.
- 1.7 Working with the Mayor’s team, the Applicant sought to meaningfully respond to the Mayor’s concerns on the applications. A summary of the revisions to the scheme made and submitted to the GLA in July 2020 is as follows:
- i. Increase in residential unit provision from up to 813 units to up to 1,250 units;
 - ii. Increase in affordable housing provision from (up to) 17%, to 30%;
 - iii. Increase in height for some buildings of up to three storeys;

- iv. Change to the layout of Blocks 18 and 19, conversion of Block 20 from a terrace row of housing to two four storey buildings;
 - v. Reduction in the size of the western basement, resulting in an overall car parking spaces reduction of 186 spaces and introduction of an additional basement storey under Block 1;
 - vi. Internal layout changes and removal of the nursing home and assisted living in Development Area 2;
 - vii. Landscaping amendments, including canopy removal of four trees on the north west corner of the Site; and
 - viii. Alternative options to Chalkers Corner in order to mitigate traffic impacts through works to highway land only and allow the withdrawal of Application C.
- 1.8 Application A was amended to reflect these changes.
- 1.9 Notwithstanding this, and despite GLA officers recommending approval, the Mayor refused the applications in August 2021.
- 1.10 The Mayor's reasons for refusal in respect of Application A were:
- (i) height, bulk and mass, which would result in an unduly obtrusive and discordant form of development in this 'arcadian' setting which would be harmful to the townscape, character and appearance of the surrounding area;
 - (ii) heritage impact. The proposals, by reason of its height, scale, bulk and massing would result in less than substantial harm to the significance of several listed buildings and conservation areas in the vicinity. The Mayor considered that the less than substantial harm was not clearly and convincingly outweighed by the public benefits, including Affordable Housing, that the proposals would deliver;
 - (iii) neighbouring amenity issues. The proposal, by reason of the excessive bulk, scale and siting of Building 20 and 21 in close proximity to the rear of neighbouring residential properties in Parliament Mews and the rear gardens of properties on Thames Bank, would result in an unacceptable overbearing and unneighbourly impact, including direct overlooking of private amenity spaces. The measures in the Design Code would not sufficiently mitigate these impacts; and

(iv) no section 106 agreement in place.

1.11 Application B was also refused because it is intrinsically linked with Application A and therefore could not be bought forward in isolation.

The Proposed New Scheme

1.12 This 3rd iteration of the scheme seeks to respond directly to the Mayors' reasons for refusal and in doing so also addresses a number of the concerns raised by the LBRuT.

1.13 The amendments can be summarised as follows:

i. A revised energy strategy is proposed in order to address the London Plan (2021) requirements;

ii. Several residential blocks have been reduced in height to better respond to the listed buildings along the Thames riverfront and to respect the setting of the Maltings building, identified as a Building of Townscape Merit (BTM) by the LBRuT;

iii. Reconfiguration of layout of Buildings 20 and 21 has been undertaken to provide lower rise buildings to better respond to the listed buildings along the Thames riverfront; and

iv. Chalkers Corner light highways mitigation works.

1.14 The school proposals (submitted under 'Application B') are unchanged. The Applicant acknowledges LBRuT's identified need for a secondary school at the Site and the Applications continue to support the delivery of a school. It is expected that the principles to be agreed under the draft Community Use Agreement (CUA) will be the same as those associated with the refused school application (LBRuT ref: 18/0548/FUL, GLA ref: GLA/4172a/07).

1.15 Overall, it is considered that together, the Applications respond successfully to the concerns raised by the GLA which also reflect some of the concerns raised by stakeholders in respect of the previous schemes and during pre-application discussions on the revised Proposed Development. As a result, it is considered that the scheme now represents a balanced development that delivers the principle LBRuT objectives from the Site.

Overview & Planning Policy

Michael Grubb Studio (the Lighting Consultant) has considered various lighting options for the Sports Pitch. The challenge being to provide appropriate levels of illumination and uniformity for Sport England / FA without over-lighting and creating excessive glare or light spill into adjacent properties.

Lighting designs for both Class II and FA Class III have been developed, with both complying to the relevant ILP guidelines. These lighting designs are detailed in the appended documents. Whilst both schemes are considered acceptable, the preference is for the FA Class III scheme as this is deemed to be most appropriate when considering use and location.

The planning policy context for the Proposed Development is as follows:

- i London Plan (2021); and
- ii The London Borough of Richmond upon Thames Local Plan (2018) (as amended in 2020).

Regard has been had to these documents, in particular LBRuT Local Plan Policy LP 9 which states that floodlighting of sports pitches, courts and historic or other architectural features will be permitted unless there is demonstrable harm to character biodiversity or amenity and living conditions. The Stag Brewery Planning Brief was also considered when developing the design of the lighting at the site.

Design & Specification

Both lighting schemes have been designed to Sport England Outdoor Football Pitch Class guidelines, which are:

- Class III FA Standard = 120 lux ave, 0.6 Uo 60 Ra.
- Class II = 200 lux ave, 0.6 Uo 60 Ra

Both schemes are based on 8 No 15m columns with 2 No luminaires on each column. 16 No fittings in total. Luminaires for the Class II scheme would be higher output.

The proposed luminaire (floodlight) from Phillips Lighting contains an internal louvre, which limits spill in all directions as well as reducing light intensity and glare. An additional external louvre is also proposed to ensure that all efforts are made to reduce glare and light spill.

Compliance

Lighting calculations are contained within the appended assessments and are based on Sport England Document and ILP Guidance Notes for Obtrusive Light 2021.

Lighting calculations also include 3 No. 'Observer' locations for each row of houses at 1.5m height (as this represents a person looking out the window). The Maximum Lighting Intensity Obtrusive Light towards each observer is considered acceptable and within ILP Guidelines.

Finally, it should be noted that a 'worst case' scenario approach has been taken in order to ensure a robust assessment – in reality, soft landscaping proposals around the perimeter of the school site (Application B) , especially on the western site boundary, will further protect residents from any impact relating to artificial light.

Mortlake Stage Brewery Development

F/ball Pitch LED Ltg15m 120 Lx 0.6 U0 LO

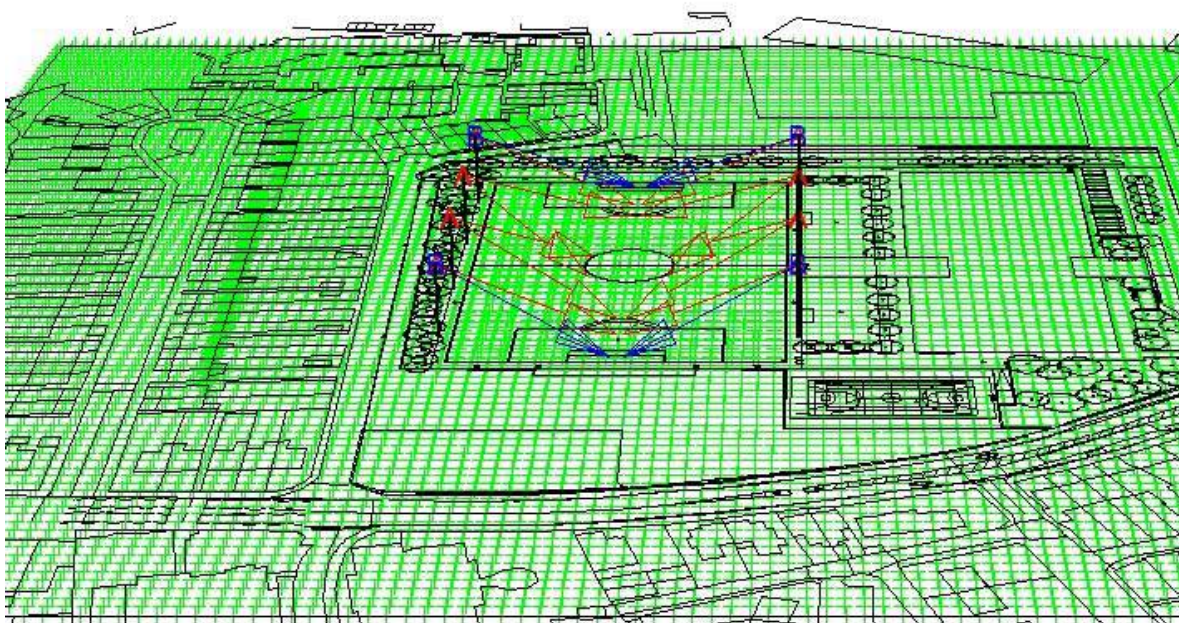
Project code: 0400061129, D-227389

Date: 31-01-2018

Customer: Michael Grubb Studios

Customer Representative: Alastair Aiken

Designer: Steve Johnston



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 7.7.2.0

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1. Project Description

1.1 Description

Designed to Sport England Outdoor Football Pitch Class II
FA Standard = 200 lux ave, 0.6 Uo
60 Ra

Pitch now rotated 90 degrees and new drawing layout included

MF for OptiVivision LED Sports Lighting = 0.9 MF

8 No 15m columns with 2 No luminaires on each

Luminaires are Philips OptiVision LED luminaires with Louvre
BVP525 OUT T15 100K 1xLED1940/740 A-NB/30 +LO = 4 No
BVP525 OUT T15 100K 1xLED1940/740 A-WB/30 +LO = 12 No

16 No fittings in total
GR Max claculation shown on Pitch grid

Grid points doubled to be within 5m spacing. Not placed on lines as helps
Calculation result and not required for Commissioning results.

Spill Light Isocontours are shown outside Pitch Area based upon the Spill Light
levels shown in Sport England Document and ILP Guidance Notes for Obtrusive
Light 2011. These are 2,5,10 & 25 lux levels.

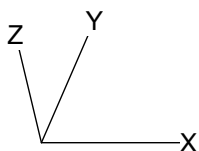
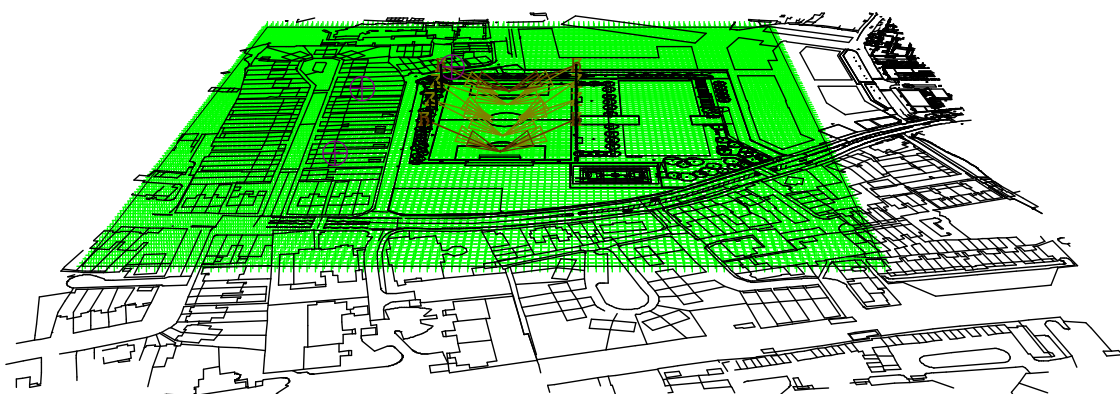
Spill lighting iso-contour results are shown with an MF of 1.0 which is worst
case when newley installed.





Pre Curfew Spill light through windows are E1 = 2 lux, E2 = 5 lux, E3 = 10 lux,
calculation with internal louvre fitted is below 5 lux so conforms wit E2-E4
Zones. Observers at houses added @ 1.5m for Lighting Intensity Calc

Tilt angles are no higher than 68 degree peak beam.
Peak beam angle included in Tilt 90 of calculation so
68 deg peak beam tilt (38 degree Physical housing tilt as 30 deg asymmetric)

Louvres are fitted internally around each LED to reduce spill in all directions
Light intensity at angles and glare reduction.





1.2 3-D Project Overview



- | | | | | |
|---|---|------------------------------|---|-----------------------------|
| G |  | BVP525 OUT T15 100K A-VWB/ N |  | BVP651 T25 DW10 BL1 |
| Z |  | BVP515 OUT T15 100K A-WB/3 b |  | BVP515 OUT T15 100K A-NB/30 |

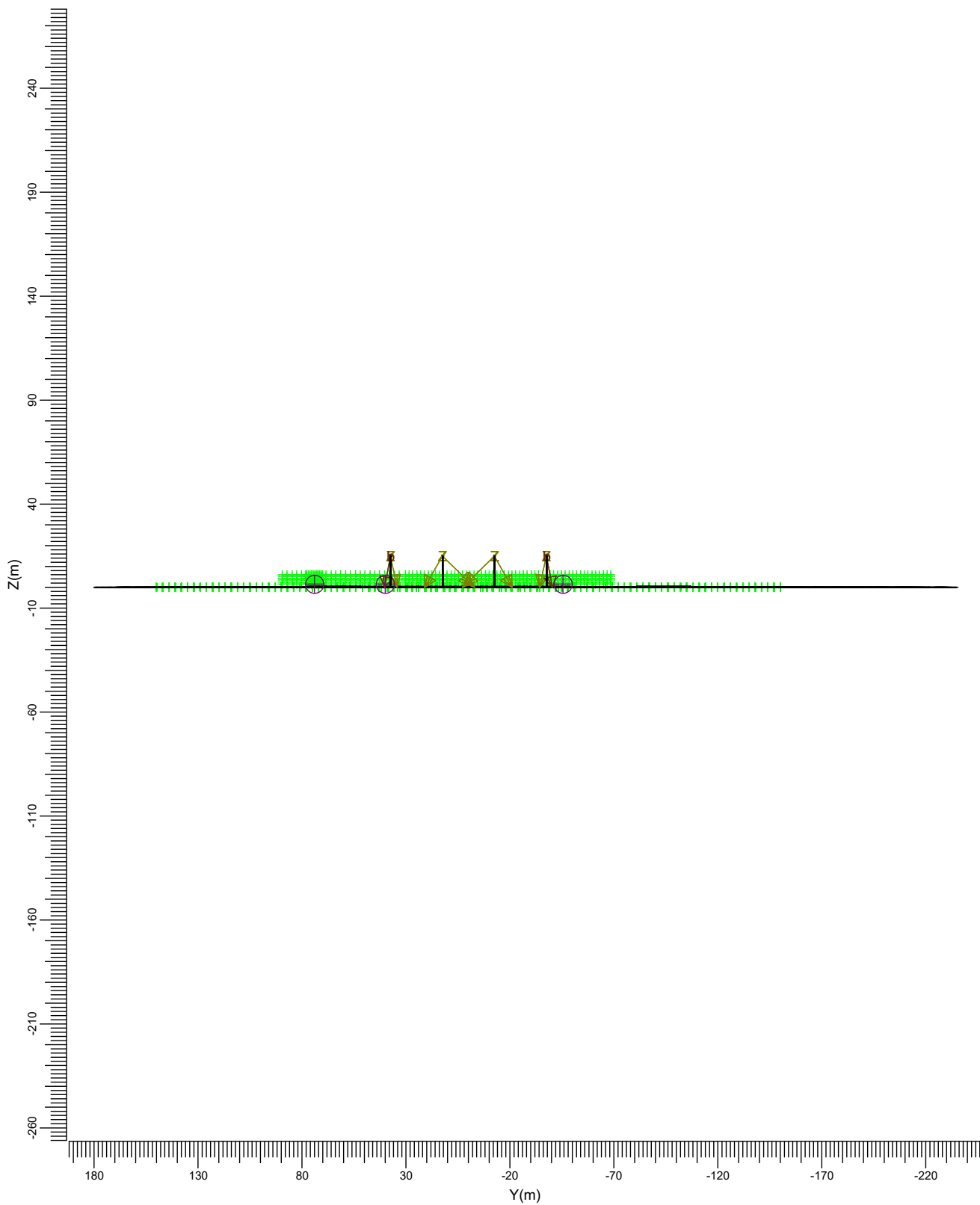
1.3 Top Project Overview







- | | | | | |
|---|---|------------------------------|---|-----------------------------|
| G |  | BVP525 OUT T15 100K A-VWB/ N |  | BVP651 T25 DW10 BL1 |
| Z |  | BVP515 OUT T15 100K A-WB/3 |  | BVP515 OUT T15 100K A-NB/30 |

Scale
 1:2500

1.4 Left Project Overview



- | | | | | |
|---|---|------------------------------|---|-----------------------------|
| G |  | BVP525 OUT T15 100K A-VWB/ N |  | BVP651 T25 DW10 BL1 |
| Z |  | BVP515 OUT T15 100K A-WB/3 b |  | BVP515 OUT T15 100K A-NB/30 |

Scale
 1:2500

2. Summary

2.1 Observer Information

Code	Observer	Position		
		X (m)	Y (m)	Z (m)
Aa	North Houses	-33.00	74.00	1.50
Bb	North West Houses	-76.00	40.00	1.50
Cc	South West Houses	-74.50	-45.50	1.50

2.2 Obstacle Information

Obstacle	Transparency (%)	Position		
		X (m)	Y (m)	Z (m)
Corner Columns	0	-34.50	-37.50	0.00
		34.50	-37.50	0.00
		-34.50	37.50	0.00
		34.50	37.50	0.00
Centre Columns	0	-34.50	-12.50	0.00
		34.50	-12.50	0.00
		-34.50	12.50	0.00
		34.50	12.50	0.00

2.3 Project Luminaires

Code	Qty	Luminaire Type	Lamp Type	Power (W)	Flux (lm)
Z	12	BVP515 OUT T15 100K A-WB/30 +LO	1 * LED1290/740	917.2	1 * 122450
b	4	BVP515 OUT T15 100K A-NB/30 +LO	1 * LED1290/740	917.2	1 * 122450

The total installed power: 14.68 (kWatt)

Number of Luminaires Per Switching Mode:

Switching Mode	Luminaire Code		Power (kWatt)
	Z	b	
Performance	12	4	14.68
Spill Ltg	12	4	14.68

Number of Luminaires Per Arrangement:

Arrangement	Luminaire Code		Power (kWatt)
	Z	b	
Centre Columns	0	0	0.00
Centre Columns plus 1m	0	0	0.00
End Columns	4	4	7.34
End Columns plus 1m	0	0	0.00
Half way line 1	0	0	0.00
Half way line 2	8	0	7.34
Half way line 3	0	0	0.00
Half way line 4	0	0	0.00

2.4 Calculation Results

Switching Modes:

Code	Switching Mode	Maintenance factor
1	Performance	0.90
2	Spill Ltg	1.00

(II) Luminance Calculations:

Calculation	Switching Mode	Type	Unit	Ave	Min	Max	Min/Ave	Min/Max	CV
Football	1	Surface Illuminance	lux	144	93	188	0.65	0.50	
Spill Ltg Grid	2	Surface Illuminance	lux						
Ev West houses @1.5m-6m	2	Surface Illuminance	lux	0.17	0.10	0.24	0.61	0.43	
Ev NWest house @1.5m-6m	1	Surface Illuminance	lux	0.11	0.06	0.19	0.55	0.33	0.311
Ev Nth houses @1.5m-6m1	1	Surface Illuminance	lux	0.39	0.22	0.75	0.55	0.29	0.281

Glare Rating for Grid of Observers:

Calculation	Switching Mode	Observer Grid	Reference Grid	Reflectance	GR-Max
GR Max for Pitch	1	Football	Football	0.25	43.9

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	Aa	Z	34.50	12.50	15.00	166.07	67.00	0.00	911
1	Bb	Z	34.50	-12.50	15.00	-166.07	67.00	-0.00	643
1	Cc	Z	34.50	12.50	15.00	166.07	67.00	0.00	690

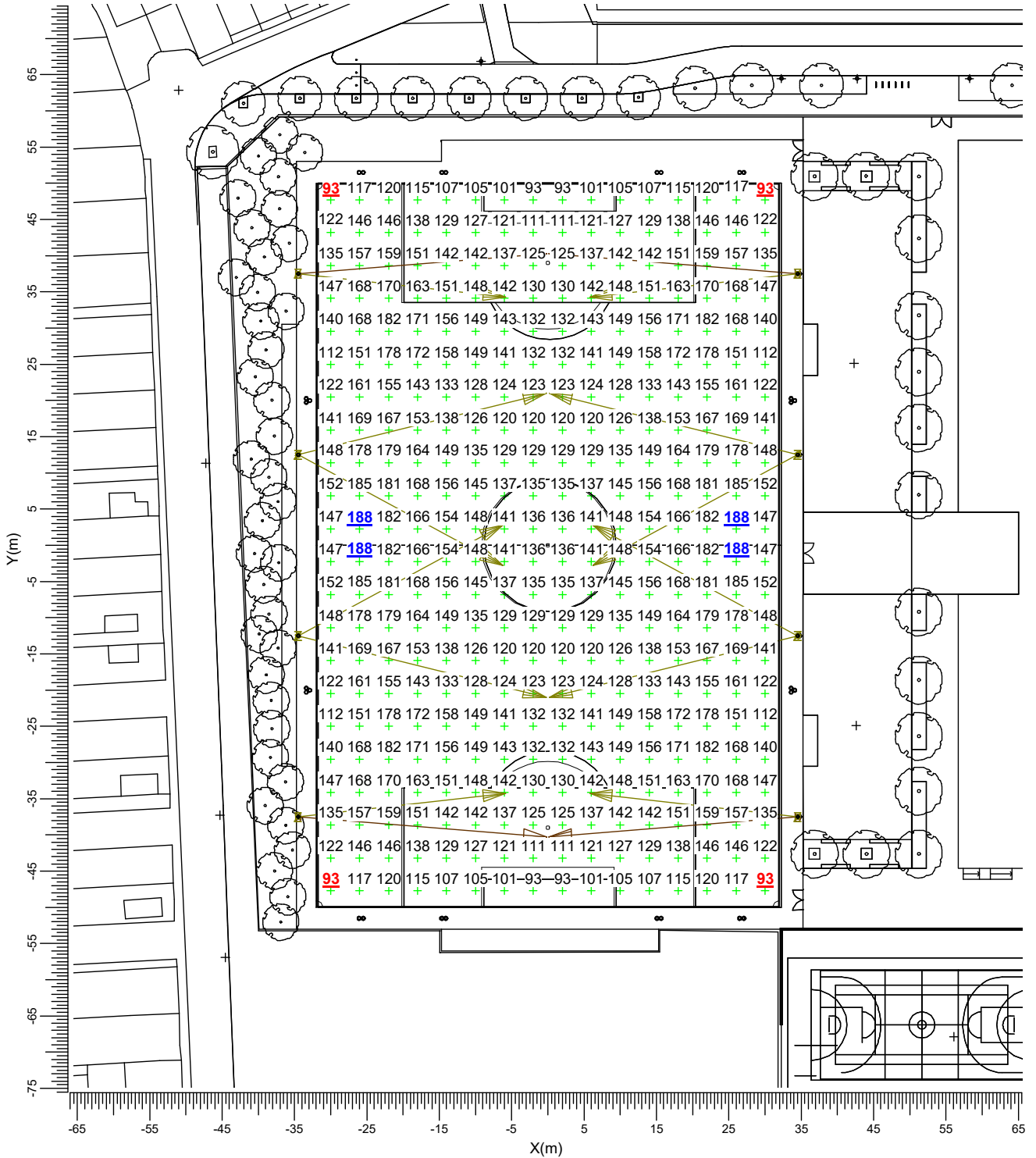
Switching Mode	ULR
1	0.00
2	0.00

3. Calculation Results

3.1 Football: Graphical Table

Performance

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



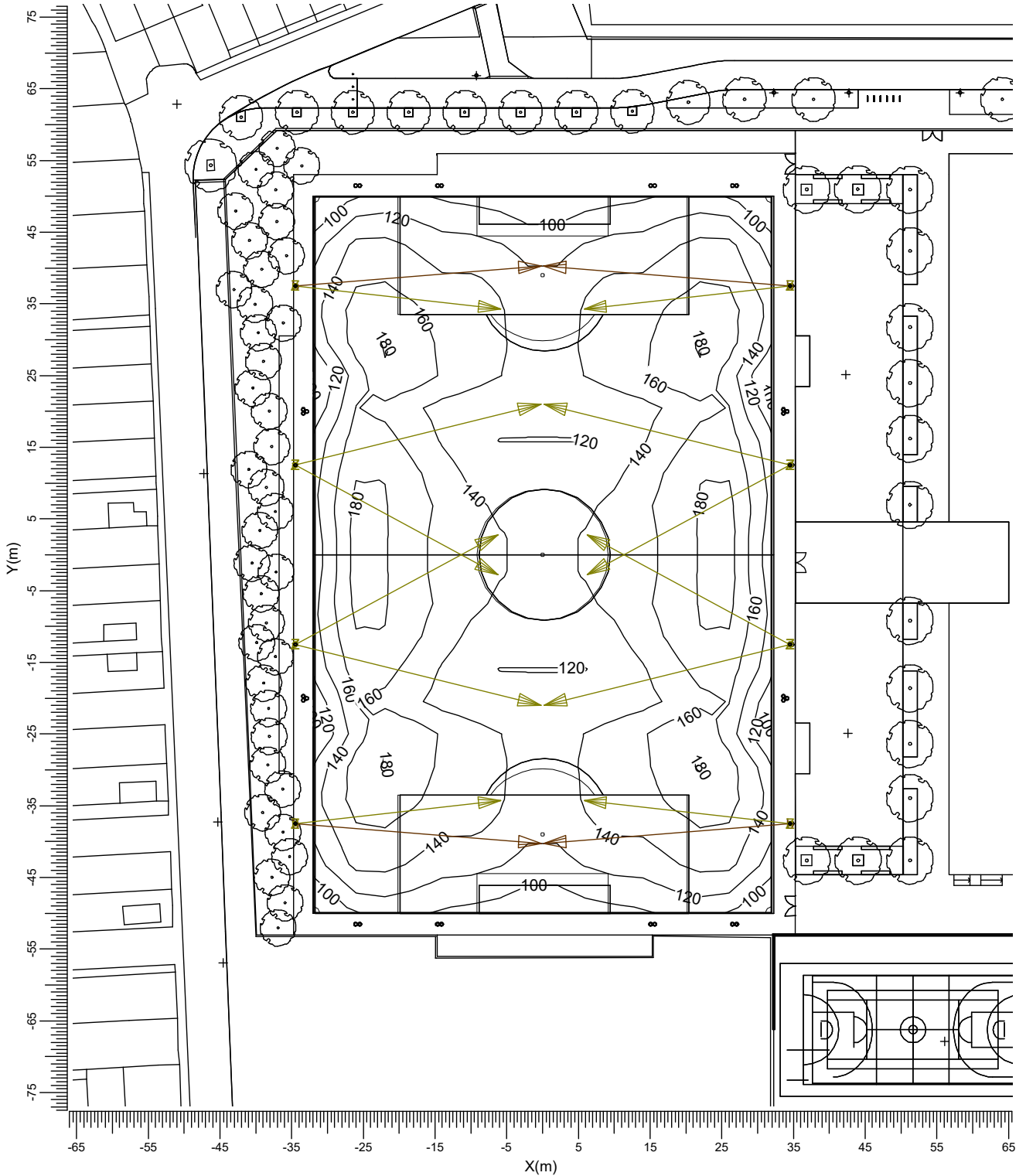
G ▶ BVP525 OUT T15 100K A-VWB/ N ▶ BVP651 T25 DW10 BL1
Z ▶ BVP515 OUT T15 100K A-WB/3 b ▶ BVP515 OUT T15 100K A-NB/30





Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
144	93	188	0.65	0.50	0.90	1:750

3.2 Football: Iso Contour

Performance

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



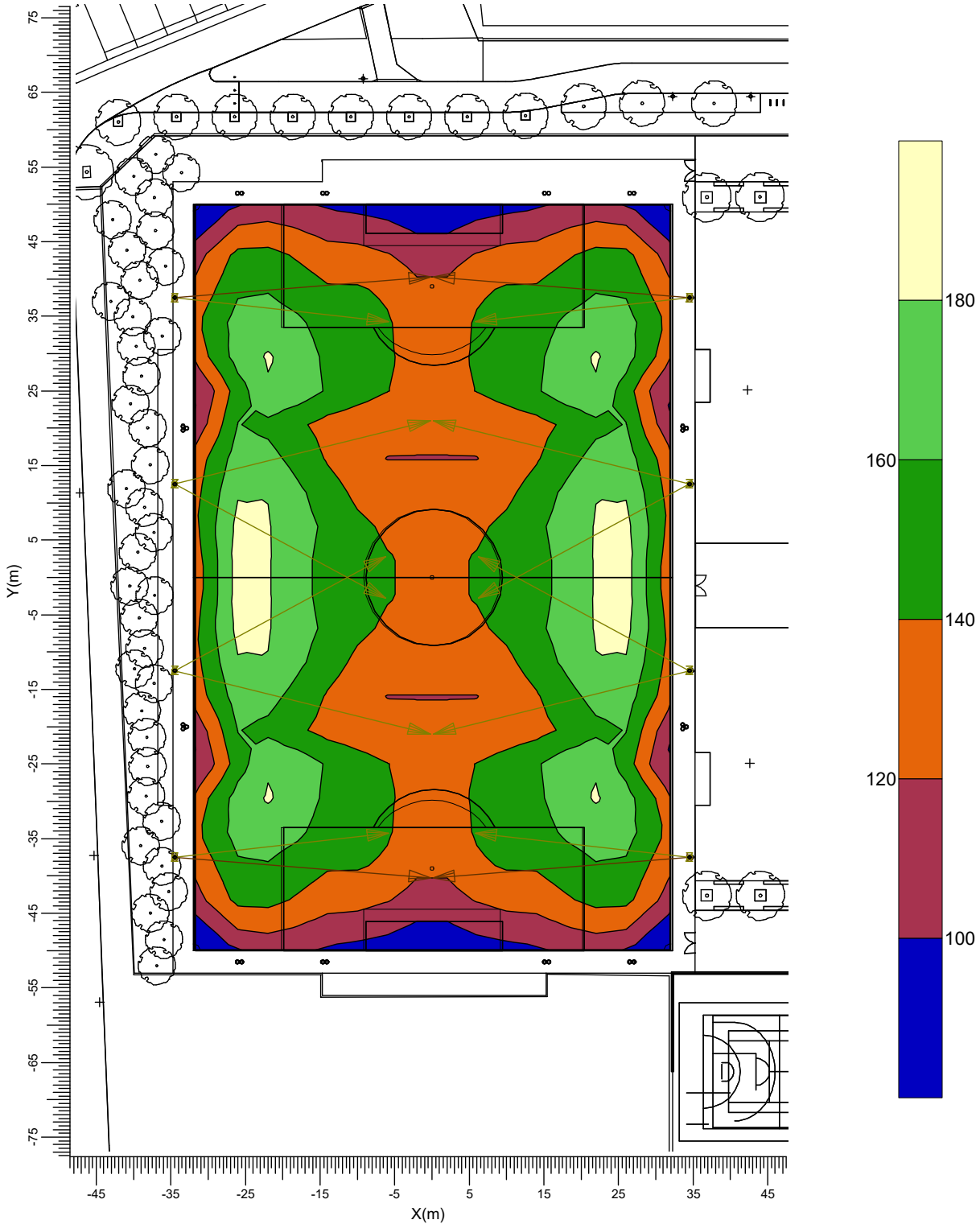
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|---|---|------------------------------|---|-----------------------------|
| G |  | BVP525 OUT T15 100K A-VWB/ N |  | BVP651 T25 DW10 BL1 |
| Z |  | BVP515 OUT T15 100K A-WB/3 |  | BVP515 OUT T15 100K A-NB/30 |

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
144	93	188	0.65	0.50	0.90	1:750

3.3 Football: Filled Iso Contour

Performance

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



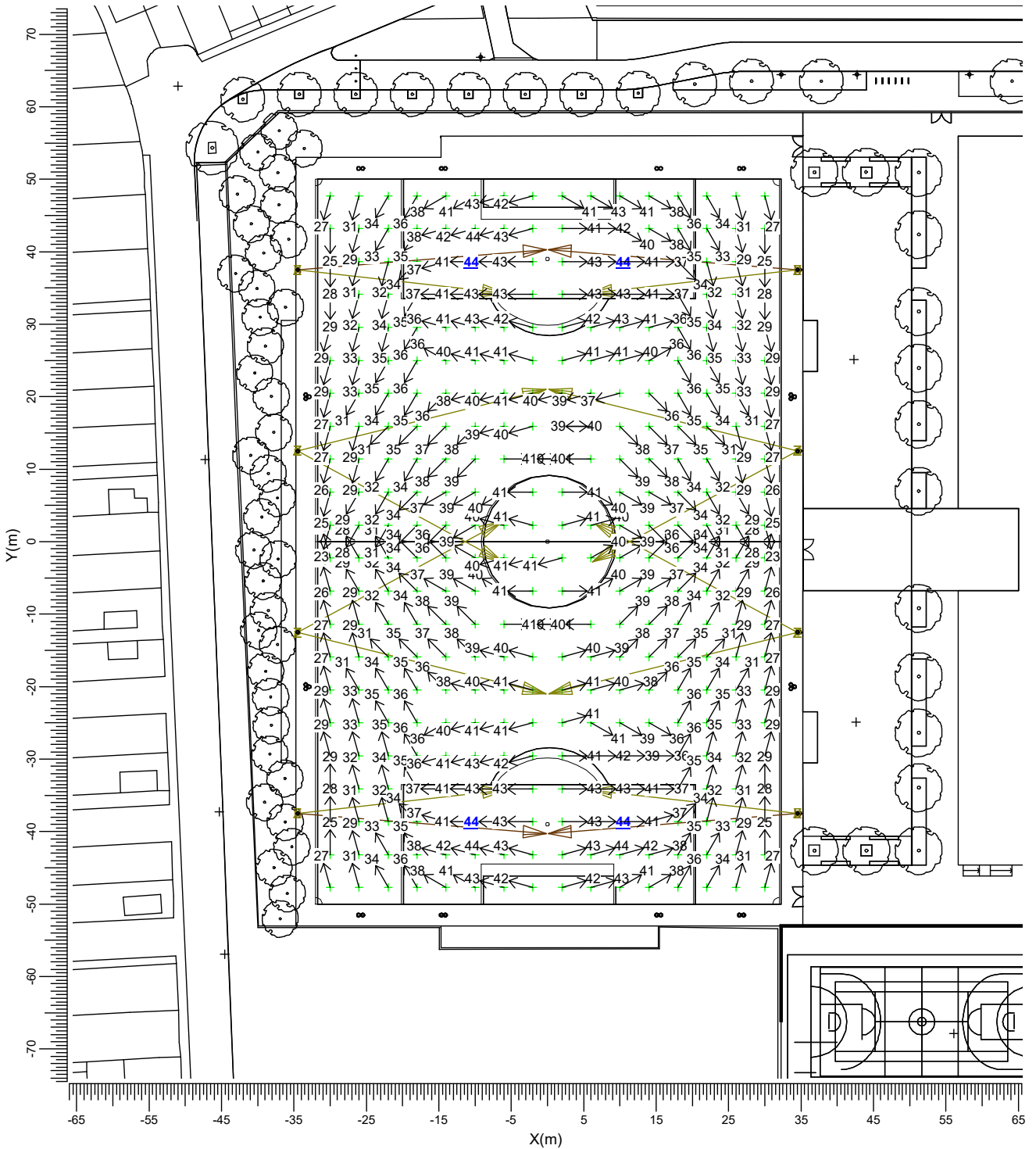
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|---|--|------------------------------|---|--|-----------------------------|
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| Z | | BVP515 OUT T15 100K A-WB/3 | b | | BVP515 OUT T15 100K A-NB/30 |

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
144	93	188	0.65	0.50	0.90	1:750

3.4 GR Max for Pitch: Graphical Table

Performance

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



G		BVP525 OUT T15 100K A-VWB/ N		BVP651 T25 DW10 BL1
Z		BVP515 OUT T15 100K A-WB/3		BVP515 OUT T15 100K A-NB/30

Maximum
43.9

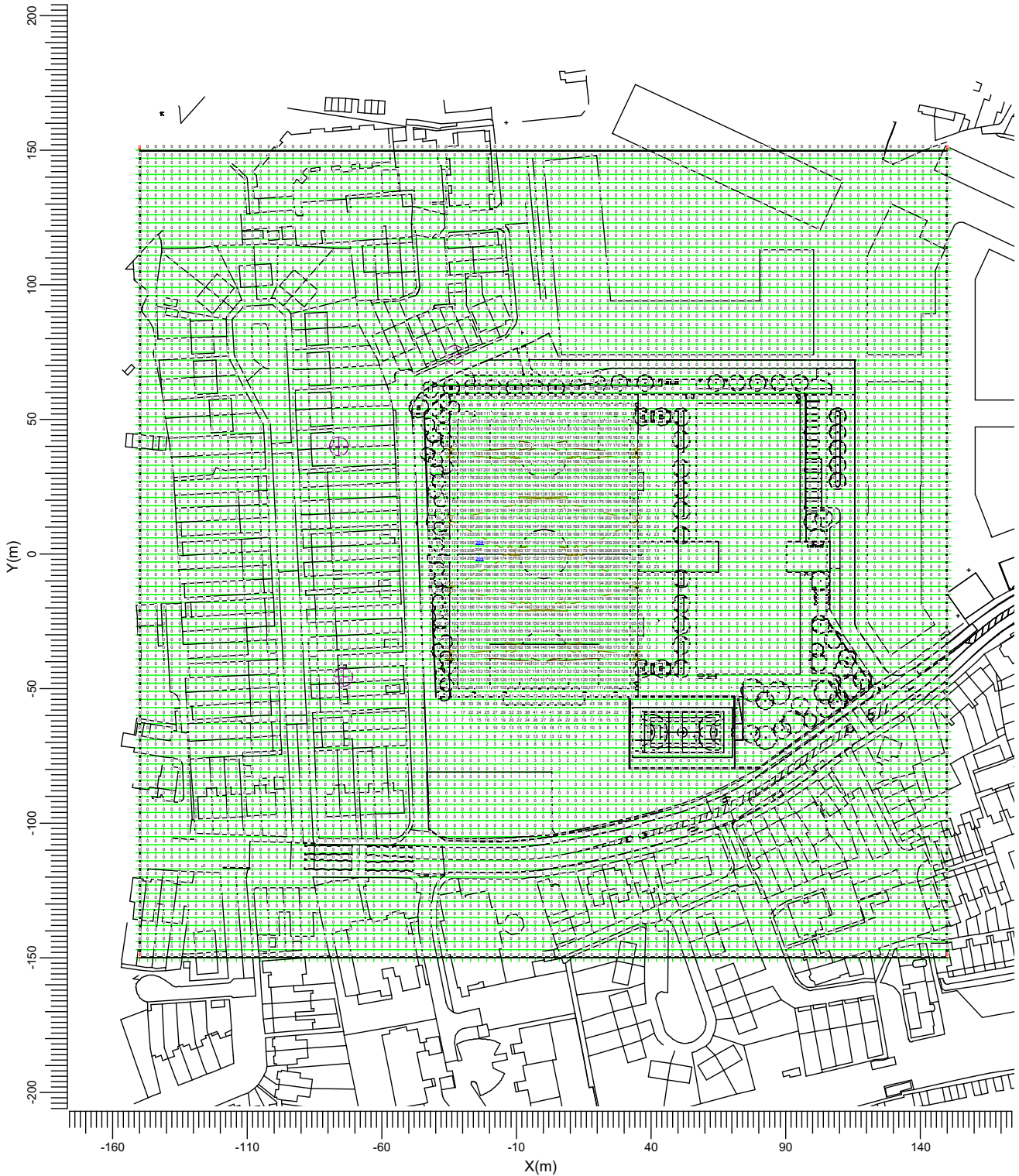
Project maintenance factor
0.90





Scale
1:750

3.5 Spill Ltg Grid: Graphical Table

Spill Ltg

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



- | | | | | |
|---|---|------------------------------|---|-----------------------------|
| G |  | BVP525 OUT T15 100K A-VWB/ N |  | BVP651 T25 DW10 BL1 |
| Z |  | BVP515 OUT T15 100K A-WB/3 |  | BVP515 OUT T15 100K A-NB/30 |

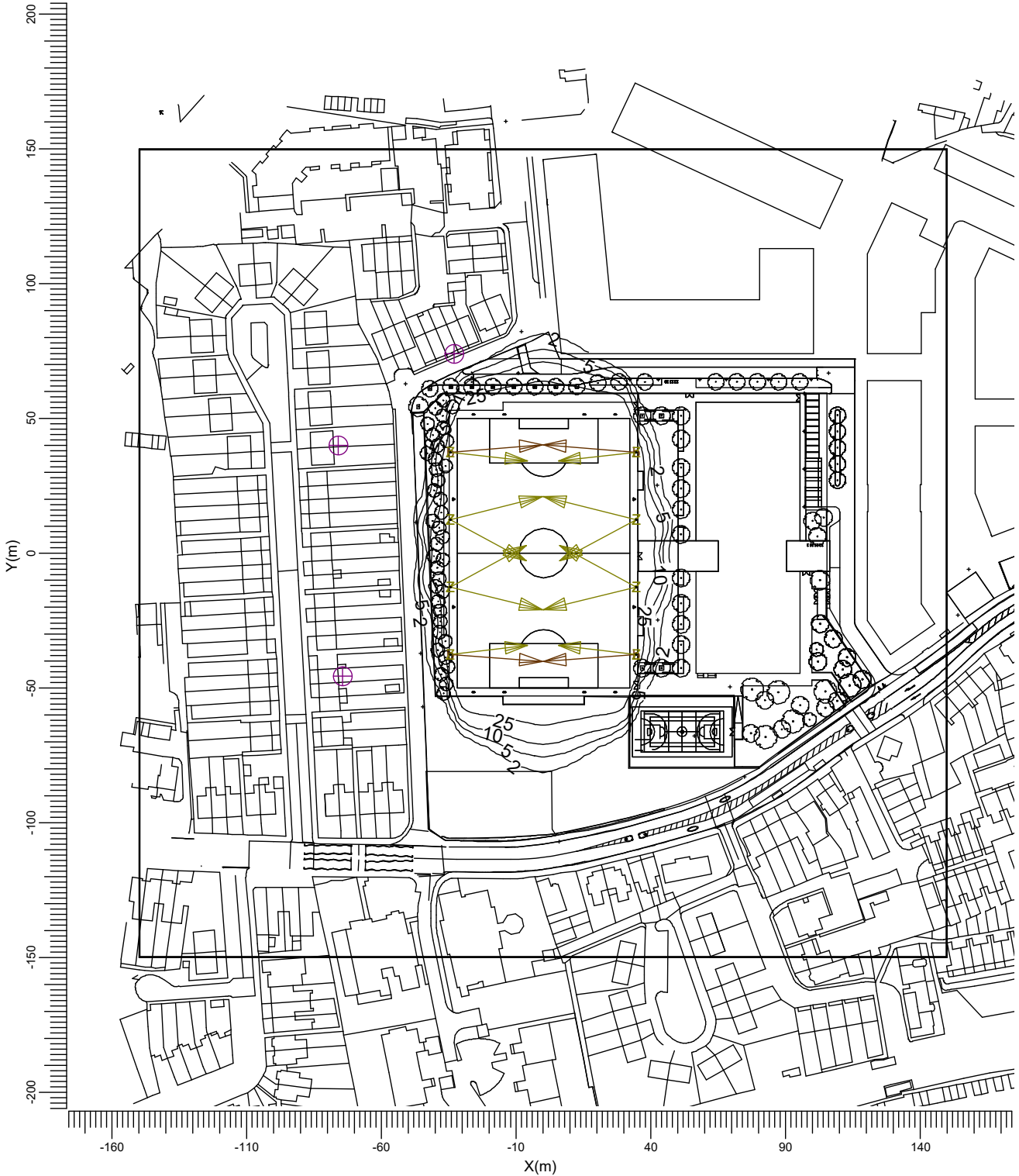
Project maintenance factor
1.00

Scale
1:2000

3.6 Spill Ltg Grid: Iso Contour

Spill Ltg

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



- | | | | | |
|---|--|------------------------------|--|-----------------------------|
| G | | BVP525 OUT T15 100K A-VWB/ N | | BVP651 T25 DW10 BL1 |
| Z | | BVP515 OUT T15 100K A-WB/3 b | | BVP515 OUT T15 100K A-NB/30 |

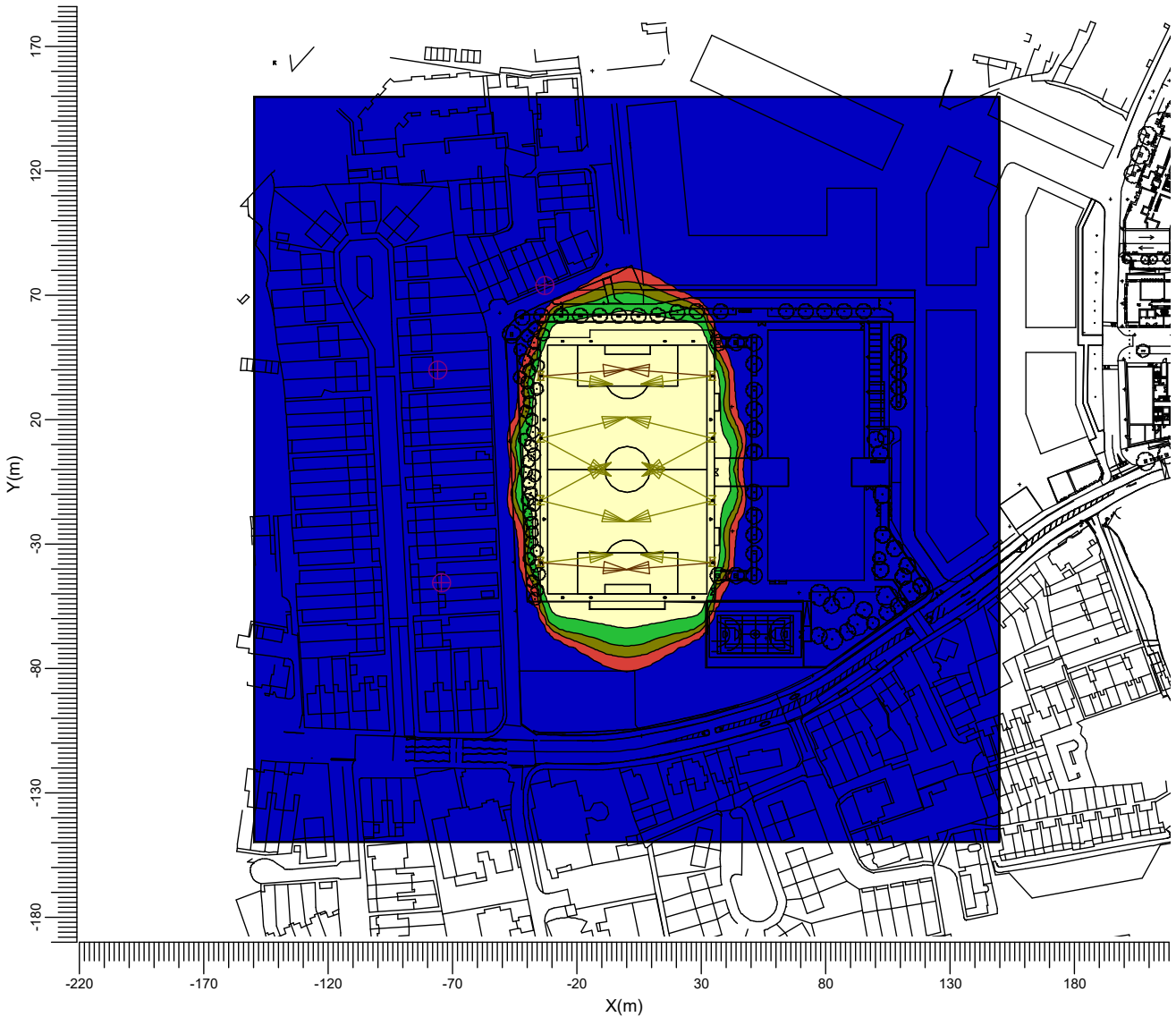
Project maintenance factor
 1.00

Scale
 1:2000

3.7 Spill Ltg Grid: Filled Iso Contour

Spill Ltg

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



- | | | | | |
|---|--|------------------------------|--|-----------------------------|
| G | | BVP525 OUT T15 100K A-VWB/ N | | BVP651 T25 DW10 BL1 |
| Z | | BVP515 OUT T15 100K A-WB/3 b | | BVP515 OUT T15 100K A-NB/30 |

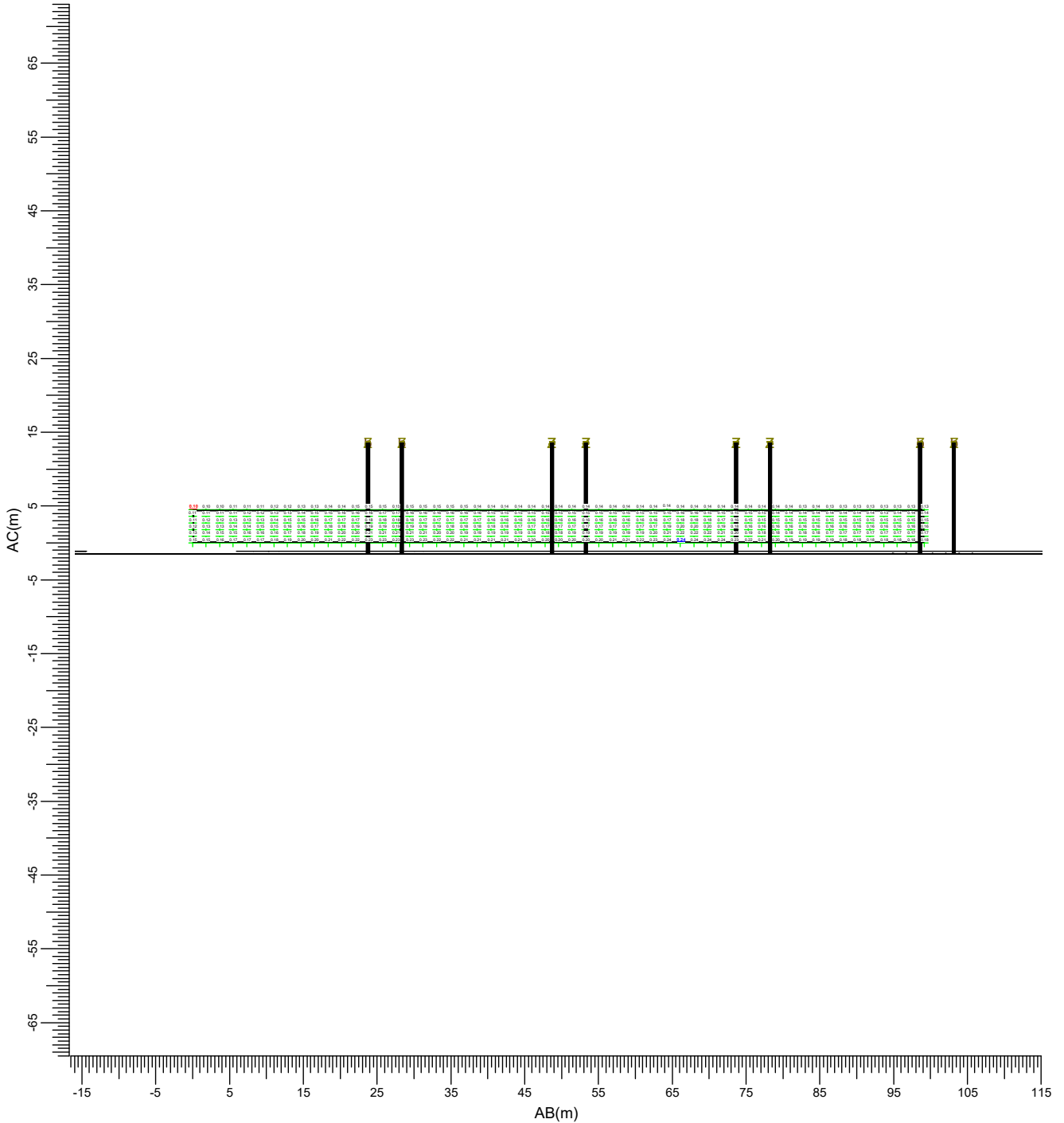
Project maintenance factor
 1.00

Scale
 1:2500

3.8 Ev West houses @1.5m-6m: Graphical Table

Spill Ltg

Grid : Ev West houses @1.5m-6m
 Calculation : Surface Illuminance (lux)



(-73.29, -68.50, 6.00) C-----D (-79.88, 30.44, 6.00)
 (-73.29, -68.50, 1.50) A-----B (-79.88, 30.44, 1.50)

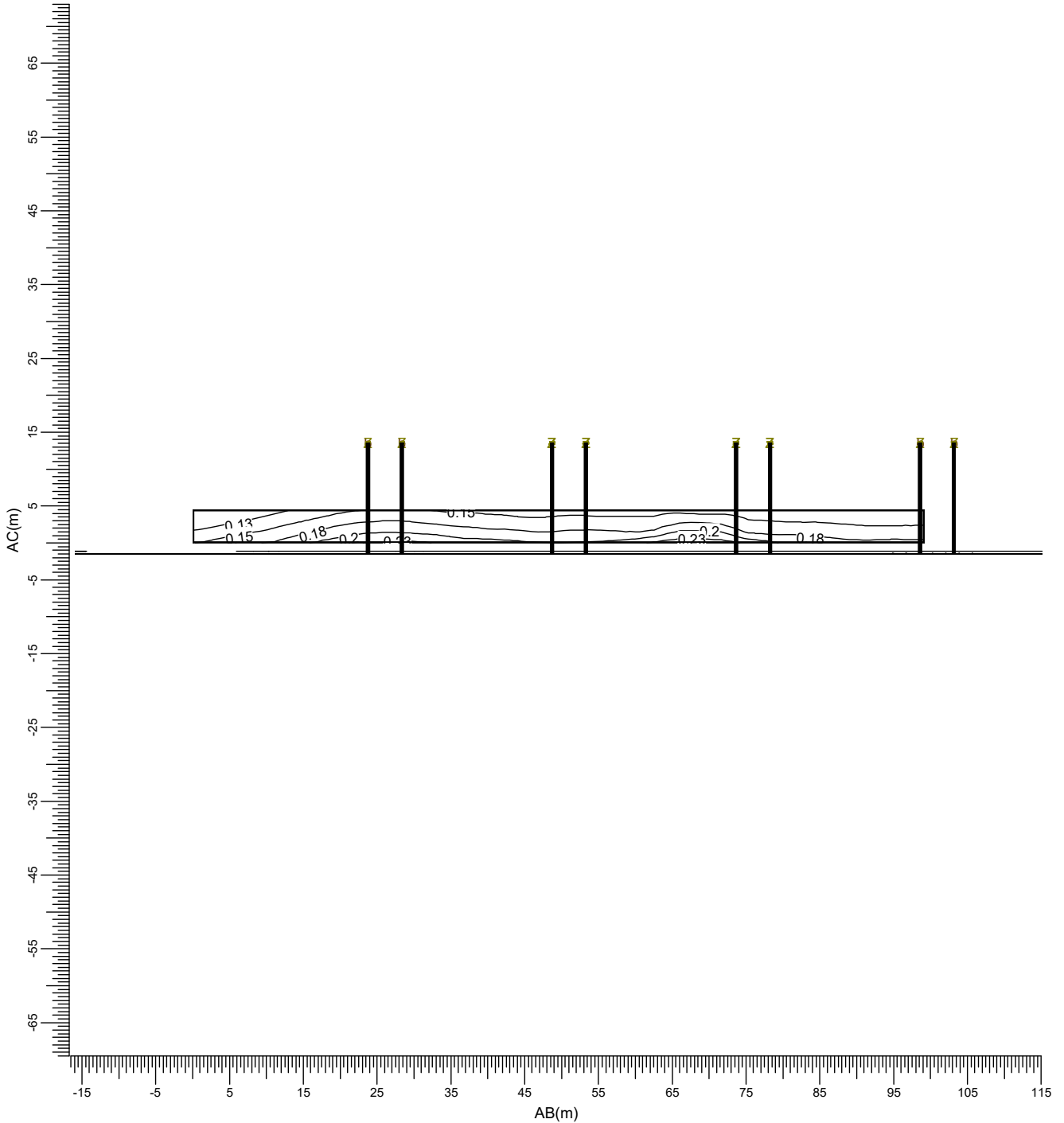
G : BVP525 OUT T15 100K A-VWB/30 N : BVP651 T25 DW10 BL1
 Z : BVP515 OUT T15 100K A-WB/30 +LO b : BVP515 OUT T15 100K A-NB/30 +LO

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
0.17	0.10	0.24	0.61	0.43	1.00	1:750

3.9 Ev West houses @1.5m-6m: Iso Contour

Spill Ltg

Grid : Ev West houses @1.5m-6m
 Calculation : Surface Illuminance (lux)



(-73.29, -68.50, 6.00) C-----D (-79.88, 30.44, 6.00)
 (-73.29, -68.50, 1.50) A-----B (-79.88, 30.44, 1.50)

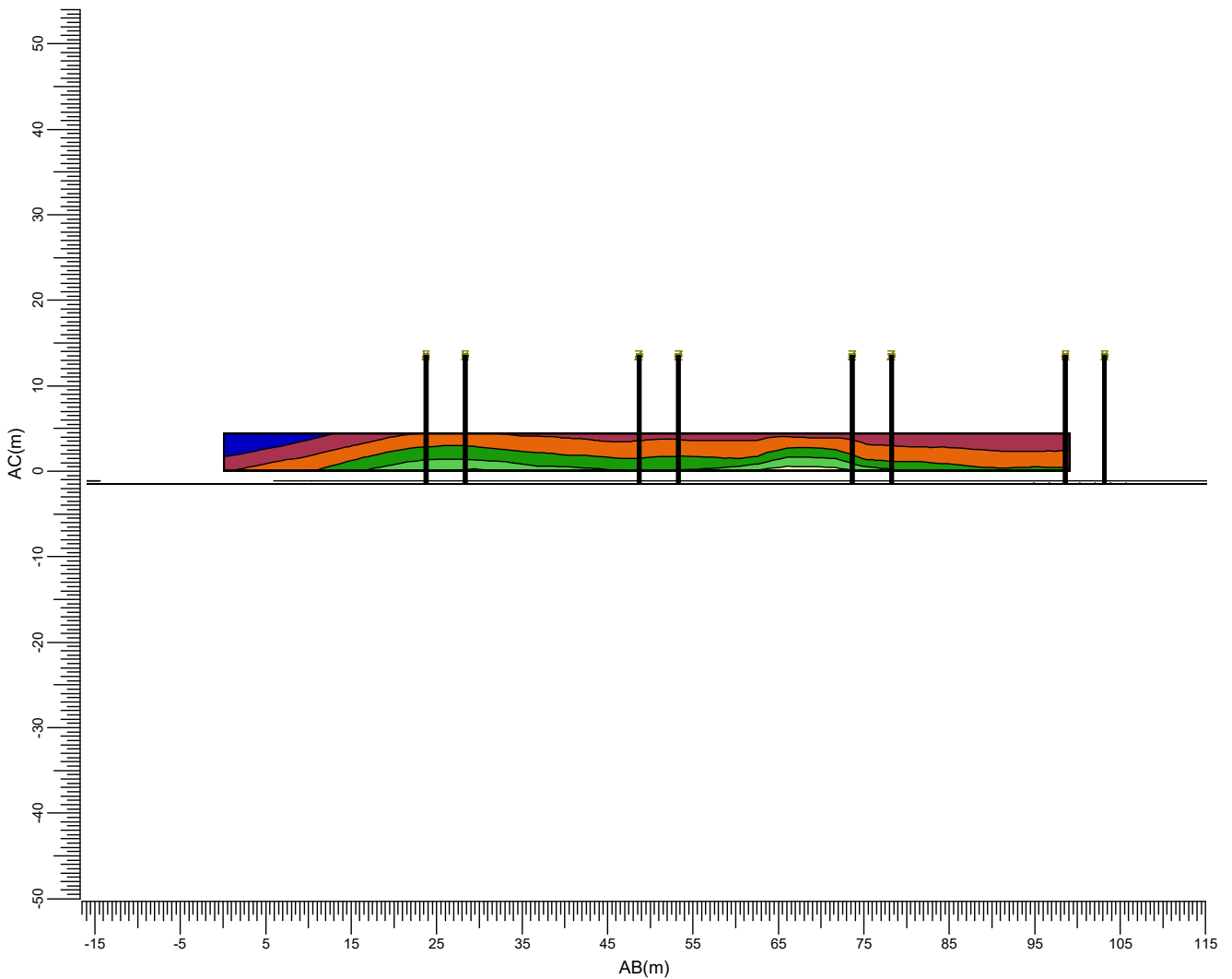
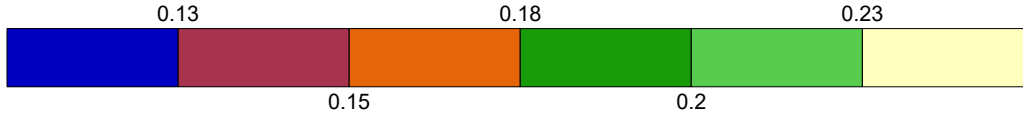
G : BVP525 OUT T15 100K A-VWB/30 N : BVP651 T25 DW10 BL1
 Z : BVP515 OUT T15 100K A-WB/30 +LO b : BVP515 OUT T15 100K A-NB/30 +LO

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
0.17	0.10	0.24	0.61	0.43	1.00	1:750

3.10 Ev West houses @1.5m-6m: Filled Iso Contour

Spill Ltg

Grid : Ev West houses @1.5m-6m
 Calculation : Surface Illuminance (lux)



(-73.29, -68.50, 6.00) C-----D (-79.88, 30.44, 6.00)
 (-73.29, -68.50, 1.50) A-----B (-79.88, 30.44, 1.50)

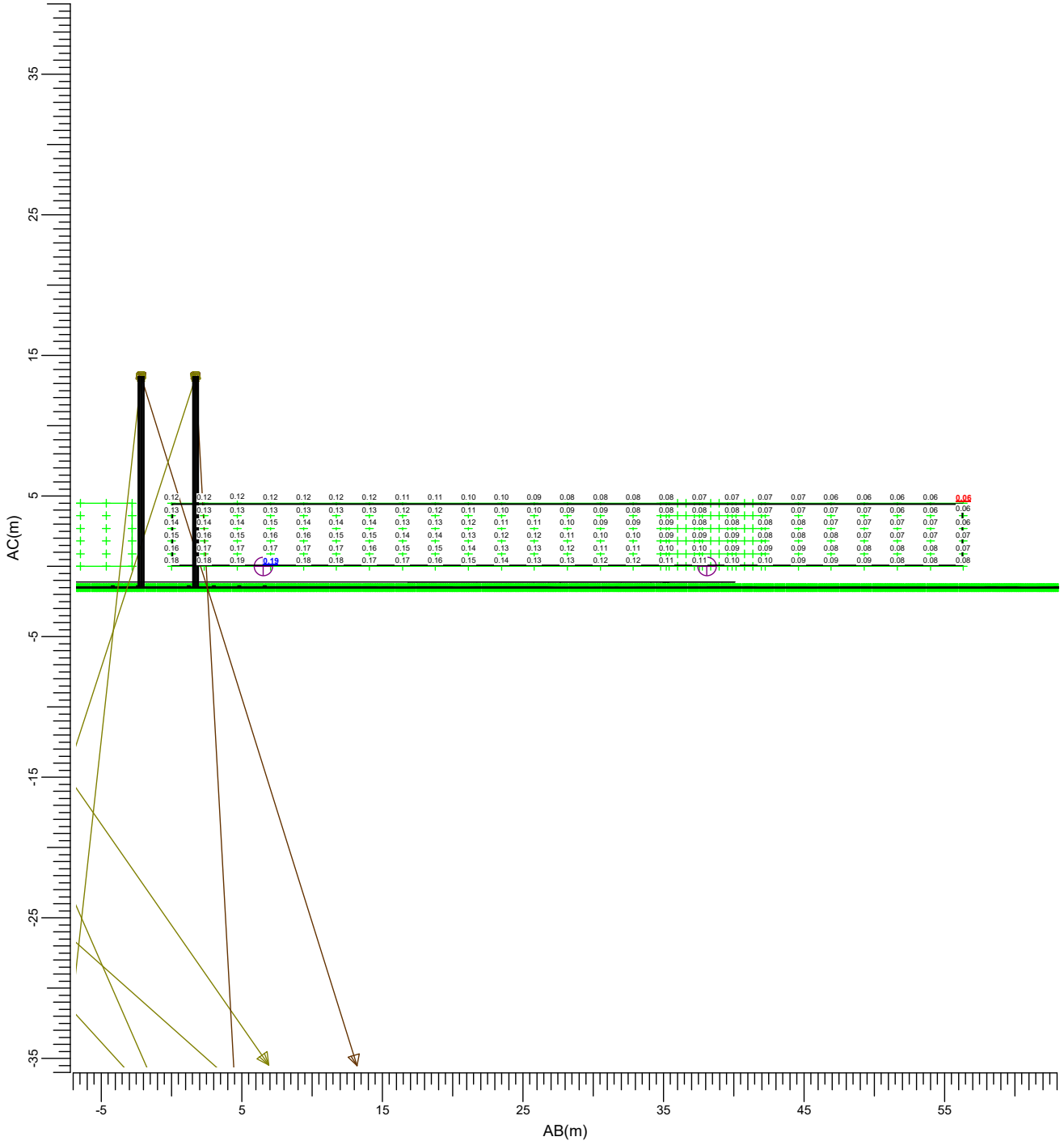
G : BVP525 OUT T15 100K A-VWB/30 N : BVP651 T25 DW10 BL1
 Z : BVP515 OUT T15 100K A-WB/30 +LO b : BVP515 OUT T15 100K A-NB/30 +LO

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
0.17	0.10	0.24	0.61	0.43	1.00	1:750

3.11 Ev NWest house @1.5m-6m: Graphical Table

Performance

Grid : Ev NWest house @1.5m-6m
 Calculation : Surface Illuminance (lux)



(-77.12, 33.38, 6.00) C-----D (-80.29, 89.63, 6.00)
 (-77.12, 33.38, 1.50) A-----B (-80.29, 89.63, 1.50)

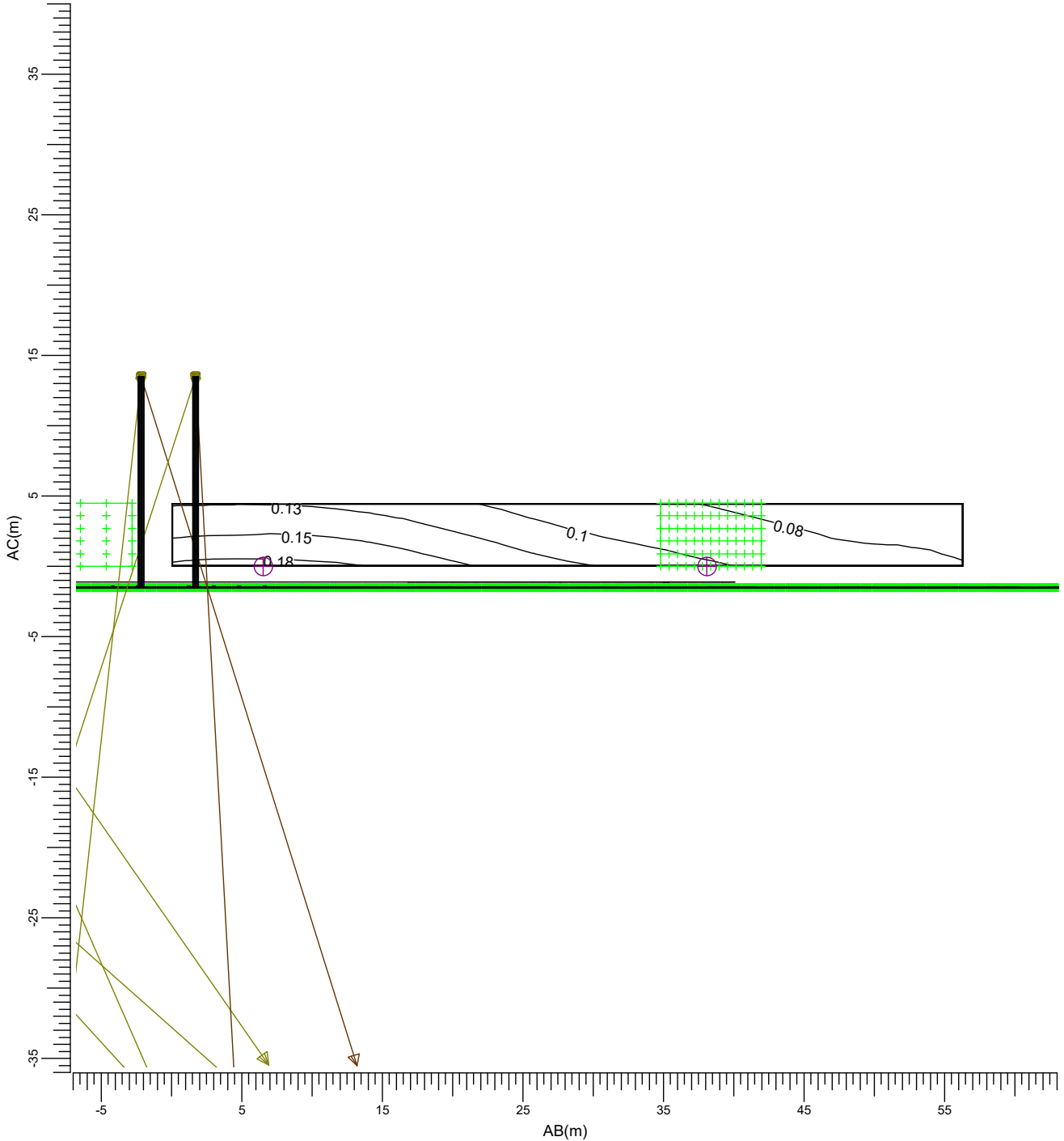
- G → BVP525 OUT T15 100K A-VWB/ N → BVP651 T25 DW10 BL1
- Z → BVP515 OUT T15 100K A-WB/3 b → BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.11	0.06	0.19	0.55	0.33	0.311	0.90	1:400

3.12 Ev NWest house @1.5m-6m: Iso Contour

Performance

Grid : Ev NWest house @1.5m-6m
 Calculation : Surface Illuminance (lux)



(-77.12, 33.38, 6.00) C-----D (-80.29, 89.63, 6.00)
 (-77.12, 33.38, 1.50) A-----B (-80.29, 89.63, 1.50)

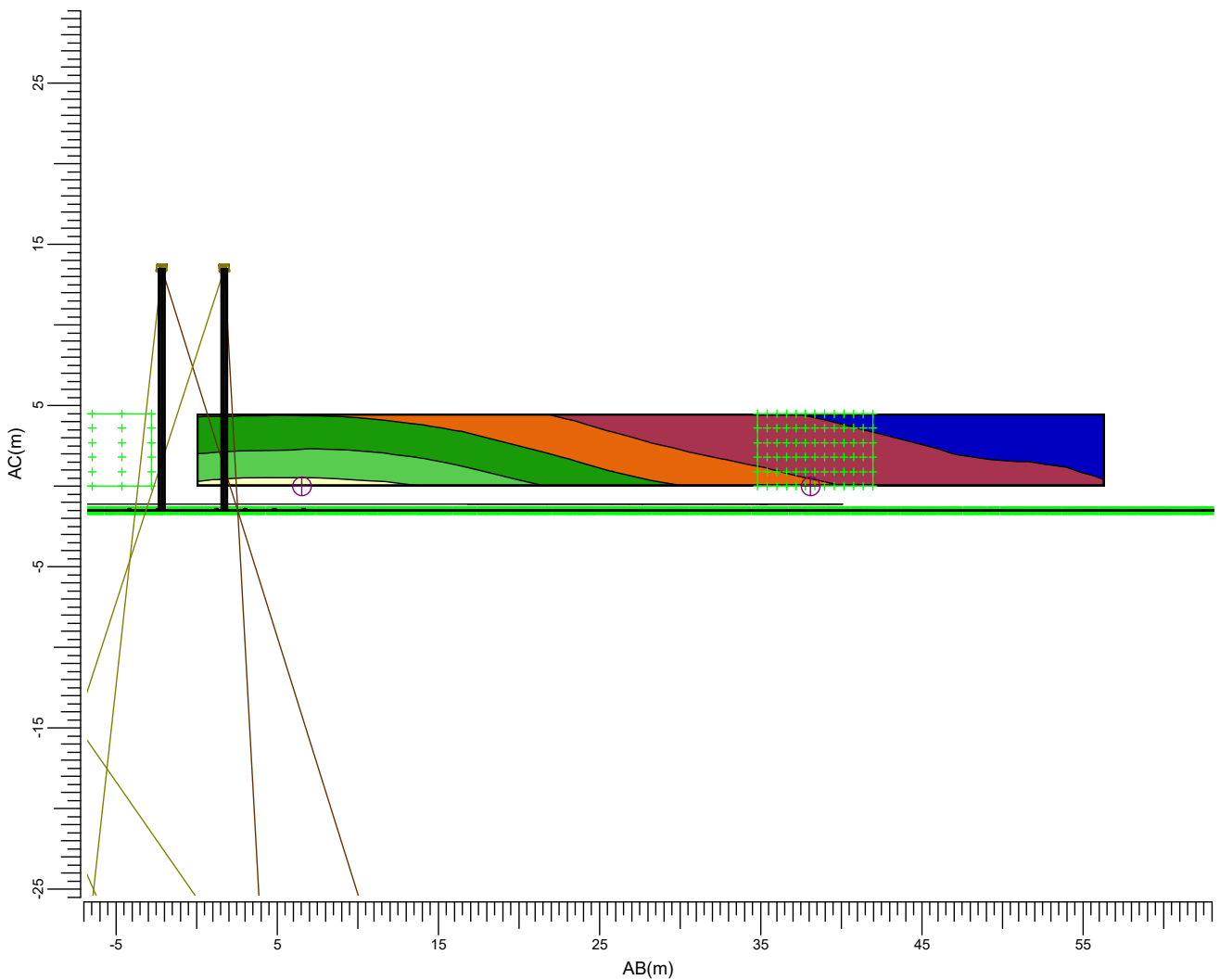
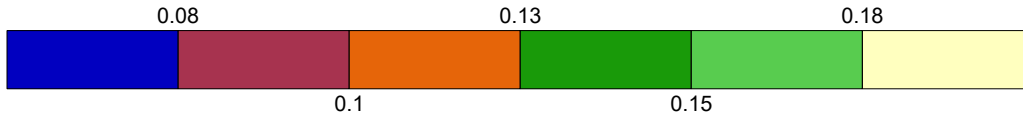
- G → BVP525 OUT T15 100K A-VWB/ N → BVP651 T25 DW10 BL1
- Z → BVP515 OUT T15 100K A-WB/3 b → BVP515 OUT T15 100K A-NB/30

Average 0.11	Minimum 0.06	Maximum 0.19	Min/Ave 0.55	Min/Max 0.33	CV 0.311	Project maintenance factor 0.90	Scale 1:400
-----------------	-----------------	-----------------	-----------------	-----------------	-------------	------------------------------------	----------------

3.13 Ev NWest house @1.5m-6m: Filled Iso Contour

Performance

Grid : Ev NWest house @1.5m-6m
 Calculation : Surface Illuminance (lux)



(-77.12, 33.38, 6.00) C-----D (-80.29, 89.63, 6.00)
 (-77.12, 33.38, 1.50) A-----B (-80.29, 89.63, 1.50)

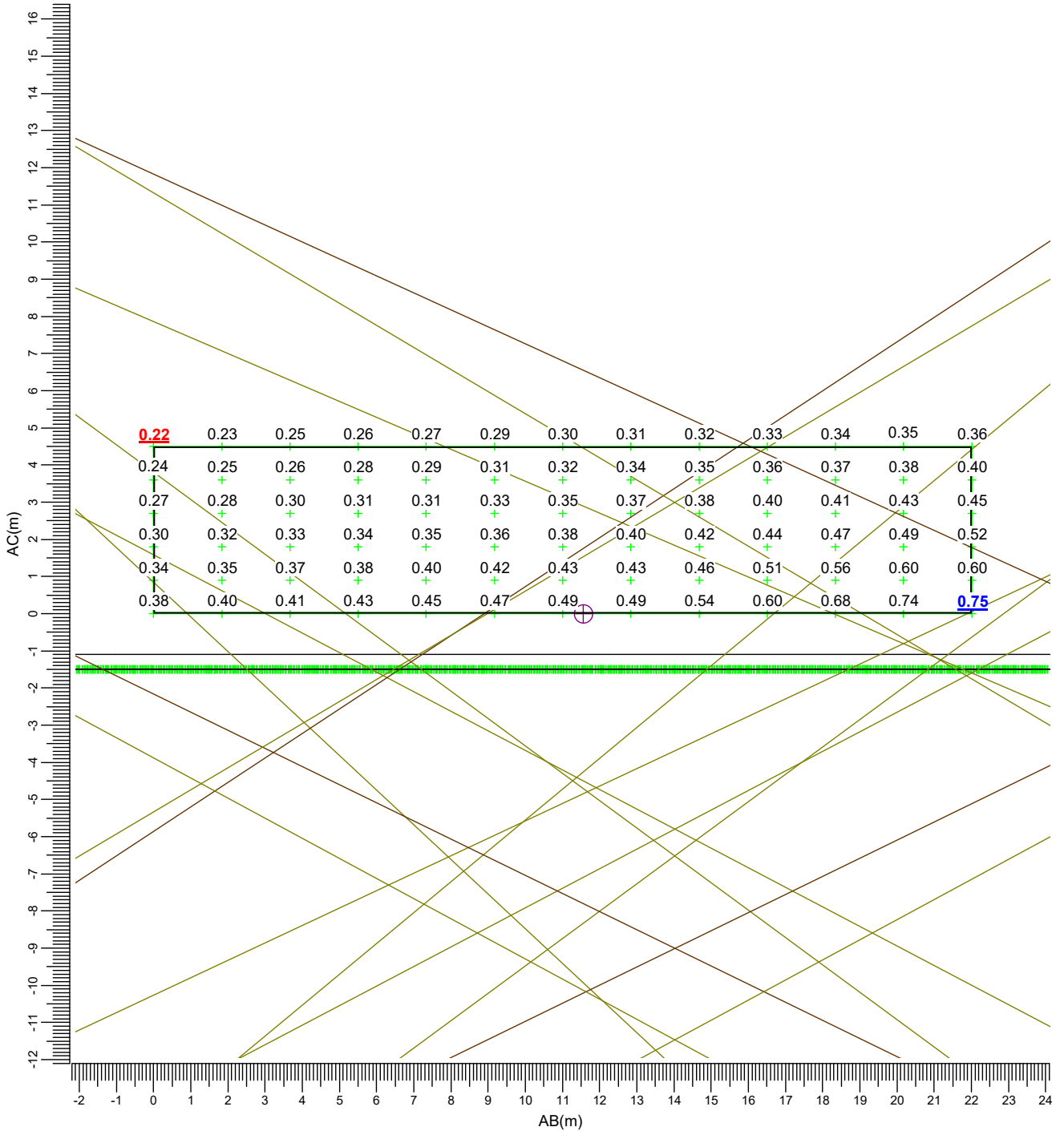
- G → BVP525 OUT T15 100K A-VWB/ N
- Z → BVP515 OUT T15 100K A-WB/3
- BVP651 T25 DW10 BL1
- BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.11	0.06	0.19	0.55	0.33	0.311	0.90	1:400

3.14 Ev Nth houses @1.5m-6m1: Graphical Table

Performance

Grid : Ev Nth houses @1.5m-6m1
Calculation : Surface Illuminance (lux)



(-43.90, 70.10, 6.00) C-----D (-23.54, 78.45, 6.00)
(-43.90, 70.10, 1.50) A-----B (-23.54, 78.45, 1.50)

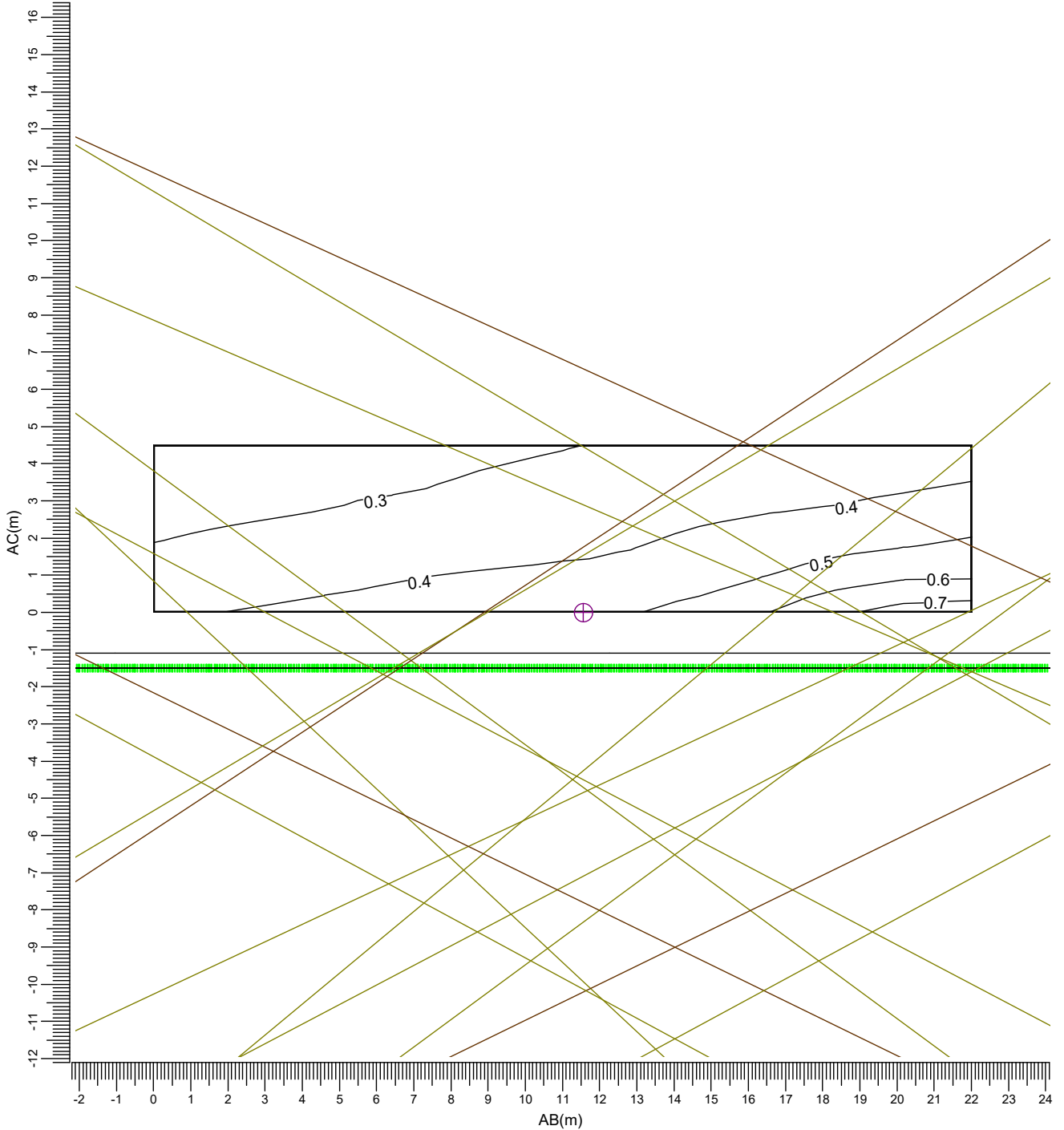
- G ▶ BVP525 OUT T15 100K A-VWB/ N
- Z ▶ BVP515 OUT T15 100K A-WB/3
- ▶ BVP651 T25 DW10 BL1
- ▶ BVP515 OUT T15 100K A-NB/30

Average 0.39 Minimum 0.22 Maximum 0.75 Min/Ave 0.55 Min/Max 0.29 CV 0.281 Project maintenance factor 0.90 Scale 1:150

3.15 Ev Nth houses @1.5m-6m1: Iso Contour

Performance

Grid : Ev Nth houses @1.5m-6m1
Calculation : Surface Illuminance (lux)



(-43.90, 70.10, 6.00) C-----D (-23.54, 78.45, 6.00)
(-43.90, 70.10, 1.50) A-----B (-23.54, 78.45, 1.50)

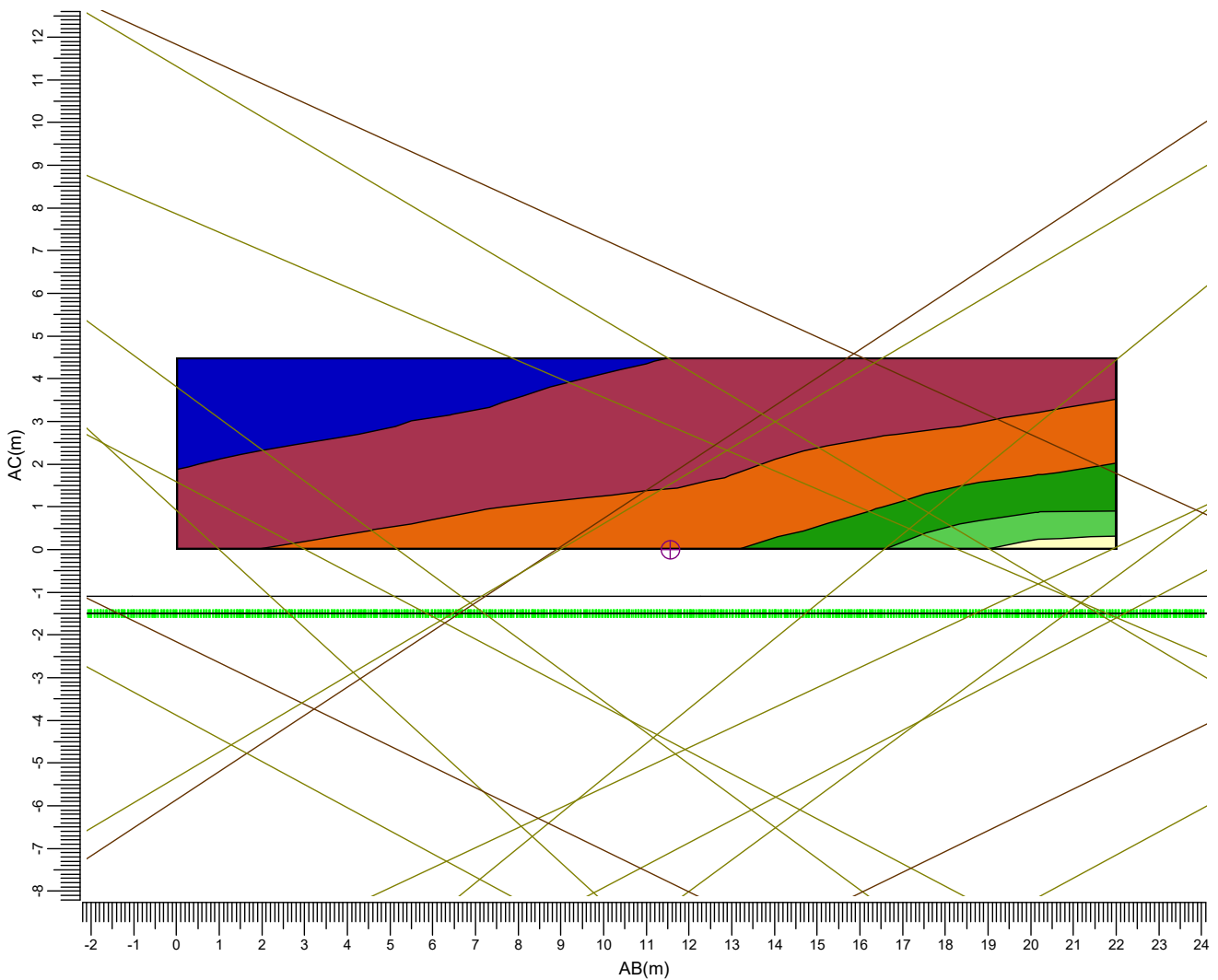
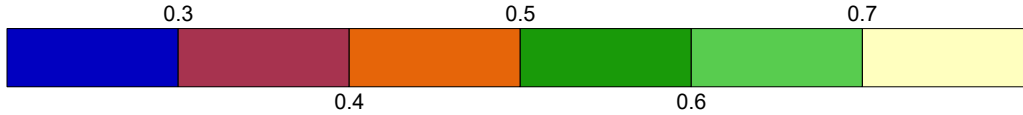
G ▶ BVP525 OUT T15 100K A-VWB/ N ▶ BVP651 T25 DW10 BL1
Z ▶ BVP515 OUT T15 100K A-WB/3 b ▶ BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.39	0.22	0.75	0.55	0.29	0.281	0.90	1:150

3.16 Ev Nth houses @1.5m-6m1: Filled Iso Contour

Performance

Grid : Ev Nth houses @1.5m-6m1
Calculation : Surface Illuminance (lux)



(-43.90, 70.10, 6.00) C-----D (-23.54, 78.45, 6.00)
(-43.90, 70.10, 1.50) A-----B (-23.54, 78.45, 1.50)

G ▶ BVP525 OUT T15 100K A-VWB/ N ▶ BVP651 T25 DW10 BL1
Z ▶ BVP515 OUT T15 100K A-WB/3 b ▶ BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.39	0.22	0.75	0.55	0.29	0.281	0.90	1:150

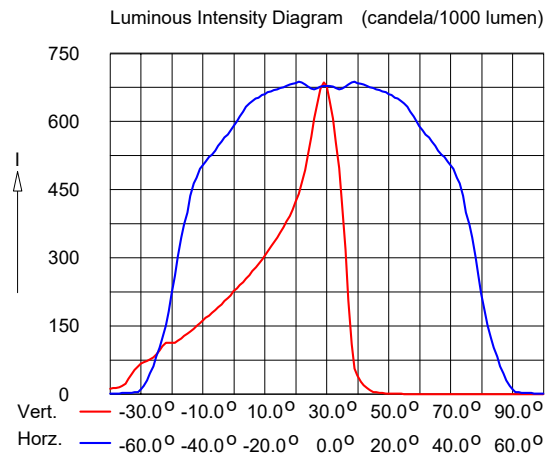
4. Luminaire Details

4.1 Project Luminaires

OptiVision LED
 BVP515 OUT T15 100K 1xLED1290/740 A-WB/30 +LO

Light output ratios
 DLOR : 0.65
 ULOR : 0.00
 TLOR : 0.65
 Ballast : N/A
 Lamp flux : 122450 lm
 Luminaire wattage : 917.2 W
 Measurement code : LVA1409005

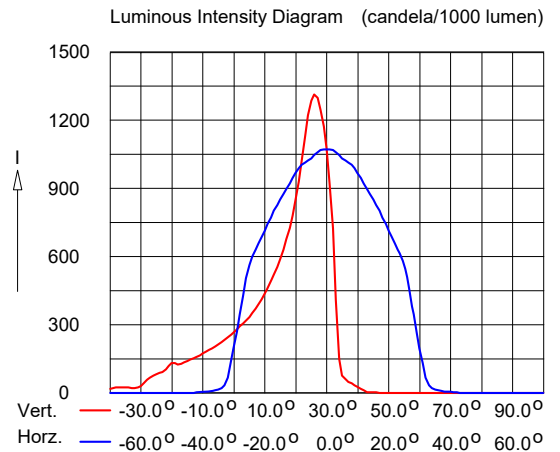
Note: Luminaire data not from database.



OptiVision LED
 BVP515 OUT T15 100K 1xLED1290/740 A-NB/30 +LO

Light output ratios
 DLOR : 0.53
 ULOR : 0.00
 TLOR : 0.53
 Ballast : N/A
 Lamp flux : 122450 lm
 Luminaire wattage : 917.2 W
 Measurement code : LVA1409003

Note: Luminaire data not from database.



5. Installation Data

5.1 Legends

Project Luminaires:

Code	Qty	Luminaire Type	Lamp Type	Flux (lm)
Z	12	BVP515 OUT T15 100K A-WB/30 +LO	1 * LED1290/740	1 * 122450
b	4	BVP515 OUT T15 100K A-NB/30 +LO	1 * LED1290/740	1 * 122450

Arrangements:

Code	Arrangement
1	End Columns
2	Centre Columns
3	Centre Columns plus 1m
4	End Columns plus 1m
5	Half way line 1
6	Half way line 2
7	Half way line 3
8	Half way line 4

Switching Modes:

Code	Switching Mode
1	Performance
2	Spill Ltg

5.2 Luminaire Positioning and Orientation

Including Aiming Points:

Qty and Code	Position			Aiming Points			ULR	Arr.	Switching Modes	
	X (m)	Y (m)	Z (m)	X (m)	Y (m)	Z (m)			1	2
1 * Z	-34.50	-37.50	15.00	-5.87	-34.24	-0.00	0.00	1	+	+
1 * b	-34.50	-37.50	15.00	-0.11	-40.27	0.00	0.00	1	+	+
1 * Z	-34.50	37.50	15.00	-5.87	34.24	-0.00	0.00	1	+	+
1 * b	-34.50	37.50	15.00	-0.11	40.27	0.00	0.00	1	+	+
1 * Z	34.50	-37.50	15.00	5.87	-34.24	-0.00	0.00	1	+	+
1 * b	34.50	-37.50	15.00	0.11	-40.27	0.00	0.00	1	+	+
1 * Z	34.50	37.50	15.00	5.87	34.24	-0.00	0.00	1	+	+
1 * b	34.50	37.50	15.00	0.11	40.27	0.00	0.00	1	+	+
1 * Z	-34.50	-12.50	15.00	-6.21	2.81	0.00	0.00	6	+	+
1 * Z	-34.50	-12.50	15.00	-0.20	-21.01	0.00	0.00	6	+	+
1 * Z	-34.50	12.50	15.00	-6.21	-2.81	0.00	0.00	6	+	+
1 * Z	-34.50	12.50	15.00	-0.20	21.01	0.00	0.00	6	+	+
1 * Z	34.50	-12.50	15.00	6.21	2.81	0.00	0.00	6	+	+
1 * Z	34.50	-12.50	15.00	0.20	-21.01	0.00	0.00	6	+	+
1 * Z	34.50	12.50	15.00	6.21	-2.81	0.00	0.00	6	+	+
1 * Z	34.50	12.50	15.00	0.20	21.01	0.00	0.00	6	+	+

Including Aiming Angles:

Qty and Code	Position			Aiming Angles			ULR	Arr.	Switching Modes	
	X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0			1	2
1 * Z	-34.50	-37.50	15.00	6.5	62.5	0.0	0.00	1	+	+

Qty and Code	Position			Aiming Angles			ULR	Arr.	Switching Modes	
	X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0			1	2
1 * b	-34.50	-37.50	15.00	-4.6	66.5	0.0	0.00	1	+	+
1 * Z	-34.50	37.50	15.00	-6.5	62.5	-0.0	0.00	1	+	+
1 * b	-34.50	37.50	15.00	4.6	66.5	-0.0	0.00	1	+	+
1 * Z	34.50	-37.50	15.00	173.5	62.5	-0.0	0.00	1	+	+
1 * b	34.50	-37.50	15.00	-175.4	66.5	-0.0	0.00	1	+	+
1 * Z	34.50	37.50	15.00	-173.5	62.5	0.0	0.00	1	+	+
1 * b	34.50	37.50	15.00	175.4	66.5	0.0	0.00	1	+	+
1 * Z	-34.50	-12.50	15.00	28.4	65.0	0.0	0.00	6	+	+
1 * Z	-34.50	-12.50	15.00	-13.9	67.0	0.0	0.00	6	+	+
1 * Z	-34.50	12.50	15.00	-28.4	65.0	-0.0	0.00	6	+	+
1 * Z	-34.50	12.50	15.00	13.9	67.0	-0.0	0.00	6	+	+
1 * Z	34.50	-12.50	15.00	151.6	65.0	-0.0	0.00	6	+	+
1 * Z	34.50	-12.50	15.00	-166.1	67.0	-0.0	0.00	6	+	+
1 * Z	34.50	12.50	15.00	-151.6	65.0	0.0	0.00	6	+	+
1 * Z	34.50	12.50	15.00	166.1	67.0	0.0	0.00	6	+	+

Mortlake Stage Brewery Development

F/ball Pitch LED Ltg15m 200 Lx 0.6 U0 LO

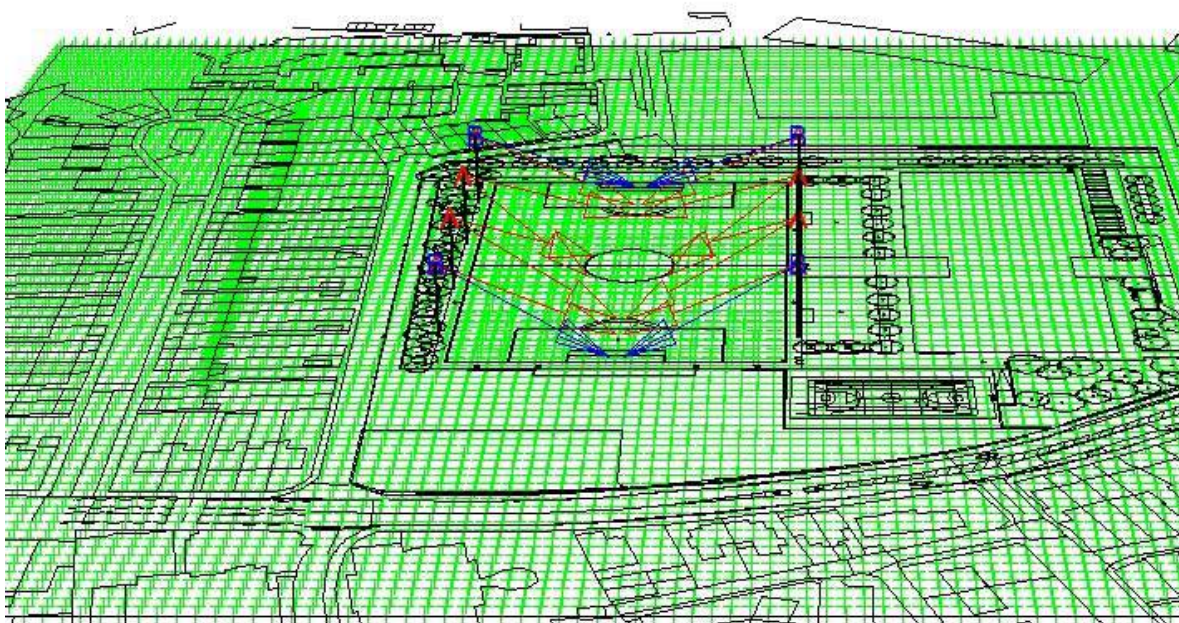
Project code: 0400061129, D-227389

Date: 31-01-2018

Customer: Michael Grubb Studios

Customer Representative: Alastair Aiken

Designer: Steve Johnston



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 7.7.2.0

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1. Project Description

1.1 Description

Designed to Sport England Outdoor Football Pitch Class II
FA Standard = 200 lux ave, 0.6 Uo
60 Ra

Pitch now rotated 90 degrees and new drawing layout included

MF for OptiVivision LED Sports Lighting = 0.9 MF

8 No 15m columns with 2 No luminaires on each

Luminaires are Philips OptiVision LED luminaires with Louvre
BVP525 OUT T15 100K 1xLED1940/740 A-NB/30 +LO = 4 No
BVP525 OUT T15 100K 1xLED1940/740 A-WB/30 +LO = 12 No

16 No fittings in total
GR Max claculation shown on Pitch grid

Grid points doubled to be within 5m spacing. Not placed on lines as helps
Calculation result and not required for Commissioning results.

Spill Light Isocontours are shown outside Pitch Area based upon the Spill Light
levels shown in Sport England Document and ILP Guidance Notes for Obtrusive
Light 2011. These are 2,5,10 & 25 lux levels.

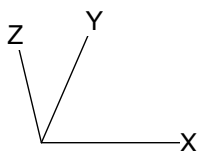
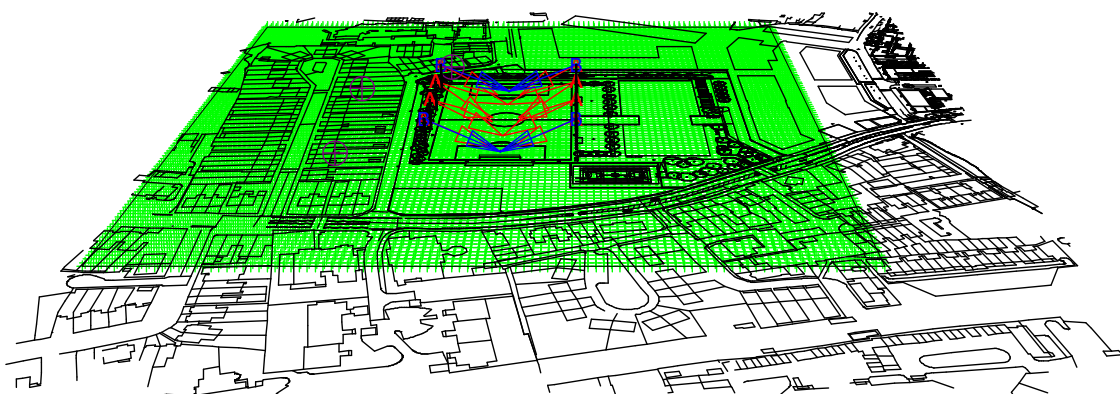
Spill lighting iso-contour results are shown with an MF of 1.0 which is worst
case when newly installed. Observers at houses added @ 1.5m for Ltg Intensity





Pre Curfew Spill light through windows are E1 = 2 lux, E2 = 5 lux, E3 = 10 lux,
calculation with internal louvre fitted is below 5 lux so conforms wit E2-E4
Zones

Tilt angles are no higher than 68 degree peak beam.
Peak beam angle included in Tilt 90 of calculation so
68 deg peak beam tilt (38 degree Physical housing tilt as 30 deg asymmetric)

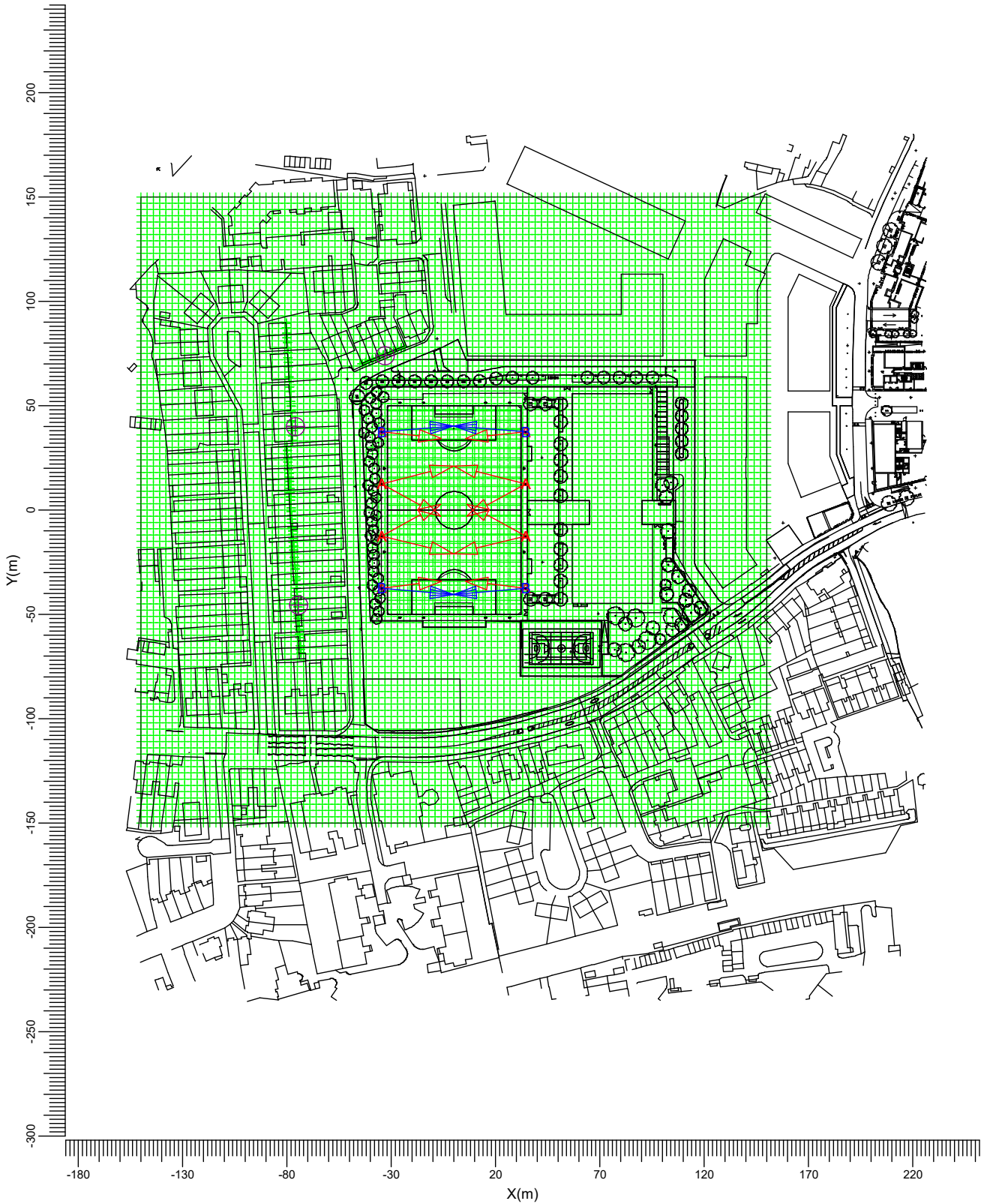
Louvres are fitted internally around each LED to reduce spill in all directions
Light intensity at angles and glare reduction.

1.2 3-D Project Overview



- | | | | | | |
|---|---|----------------------------|---|---|-----------------------------|
| A |  | BVP525 OUT T15 100K A-WB/3 | B |  | BVP525 OUT T15 100K A-NB/30 |
| H |  | BVP525 OUT T15 100K A-VWB/ | O |  | BVP651 T25 DW10 BL1 |

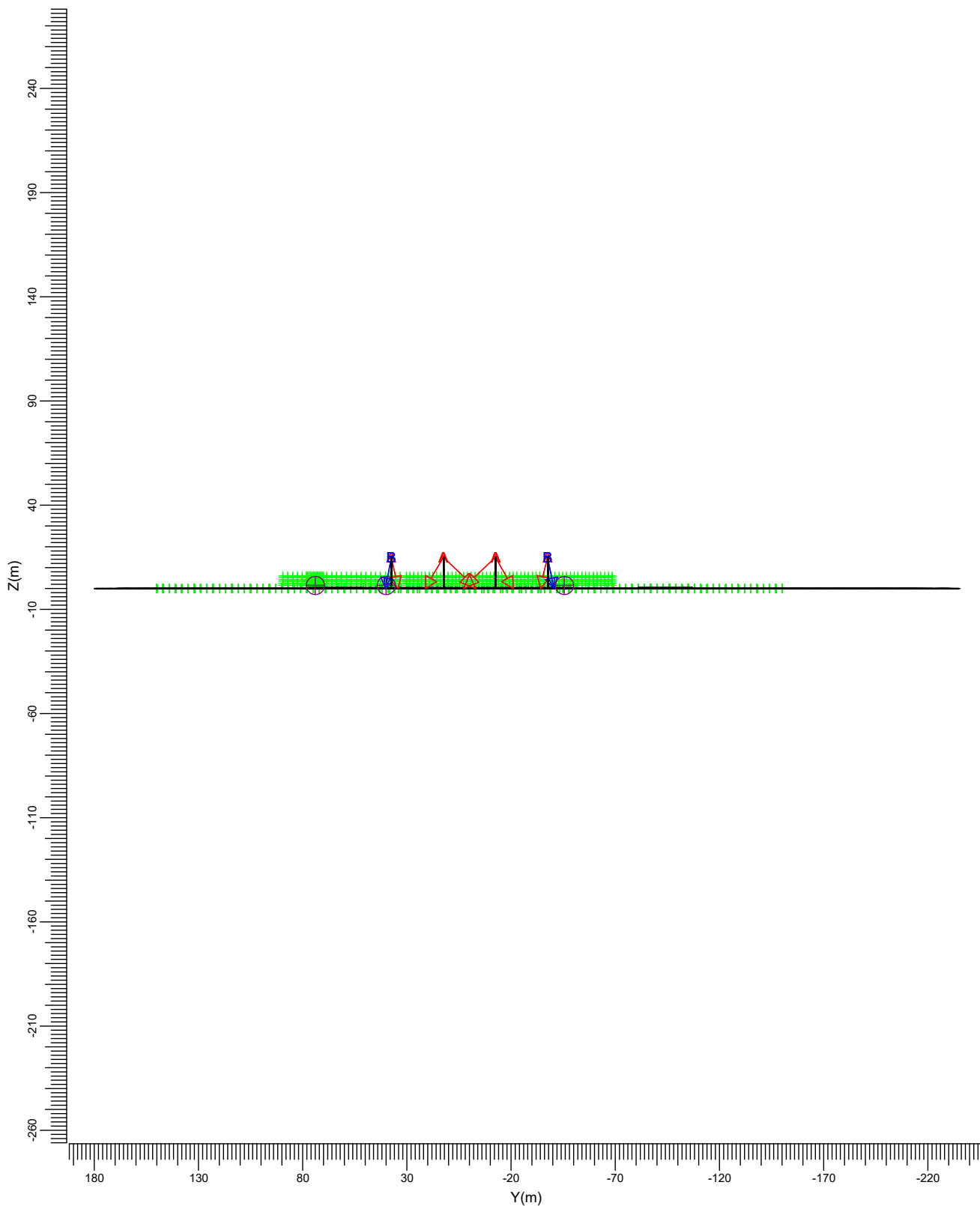
1.3 Top Project Overview



- | | | | | | |
|---|--|----------------------------|---|--|-----------------------------|
| A | | BVP525 OUT T15 100K A-WB/3 | B | | BVP525 OUT T15 100K A-NB/30 |
| H | | BVP525 OUT T15 100K A-VWB/ | O | | BVP651 T25 DW10 BL1 |

Scale
 1:2500

1.4 Left Project Overview



- | | | | | | |
|---|--|----------------------------|---|--|-----------------------------|
| A | | BVP525 OUT T15 100K A-WB/3 | B | | BVP525 OUT T15 100K A-NB/30 |
| H | | BVP525 OUT T15 100K A-VWB/ | O | | BVP651 T25 DW10 BL1 |

Scale
 1:2500

2. Summary

2.1 Observer Information

Code	Observer	Position		
		X (m)	Y (m)	Z (m)
Aa	North Houses	-33.00	74.00	1.50
Bb	North West Houses	-76.00	40.00	1.50
Cc	South West Houses	-74.50	-45.50	1.50

2.2 Obstacle Information

Obstacle	Transparency (%)	Position		
		X (m)	Y (m)	Z (m)
Corner Columns	0	-34.50	-37.50	0.00
		34.50	-37.50	0.00
		-34.50	37.50	0.00
		34.50	37.50	0.00
Centre Columns	0	-34.50	-12.50	0.00
		34.50	-12.50	0.00
		-34.50	12.50	0.00
		34.50	12.50	0.00

2.3 Project Luminaires

Code	Qty	Luminaire Type	Lamp Type	Power (W)	Flux (lm)
A	12	BVP525 OUT T15 100K A-WB/30 +LO	1 * LED1940/740	1375.4	1 * 183674
B	4	BVP525 OUT T15 100K A-NB/30 +LO	1 * LED1940/740	1375.4	1 * 183674

The total installed power: 22.01 (kWatt)

Number of Luminaires Per Switching Mode:

Switching Mode	Luminaire Code		Power (kWatt)
	A	B	
Performance	12	4	22.01
Spill Ltg	12	4	22.01

Number of Luminaires Per Arrangement:

Arrangement	Luminaire Code		Power (kWatt)
	A	B	
Centre Columns	0	0	0.00
Centre Columns plus 1m	0	0	0.00
End Columns	4	4	11.00
End Columns plus 1m	0	0	0.00
Half way line 1	0	0	0.00
Half way line 2	8	0	11.00
Half way line 3	0	0	0.00
Half way line 4	0	0	0.00

2.4 Calculation Results

Switching Modes:

Code	Switching Mode	Maintenance factor
1	Performance	0.90
2	Spill Ltg	1.00

(II) Luminance Calculations:

Calculation	Switching Mode	Type	Unit	Ave	Min	Max	Min/Ave	Min/Max	CV
Football	1	Surface Illuminance	lux	216	140	282	0.65	0.50	
Spill Ltg Grid	2	Surface Illuminance	lux						
Ev West houses @1.5m-6m	2	Surface Illuminance	lux	0.25	0.15	0.36	0.61	0.43	
Ev NWest house @1.5m-6m	1	Surface Illuminance	lux	0.17	0.09	0.28	0.55	0.33	0.311
Ev Nth houses @1.5m-6m1	1	Surface Illuminance	lux	0.58	0.32	1.13	0.55	0.29	0.281

Glare Rating for Grid of Observers:

Calculation	Switching Mode	Observer Grid	Reference Grid	Reflectance	GR-Max
GR Max for Pitch	1	Football	Football	0.25	44.3

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	Aa	A	34.50	12.50	15.00	166.07	67.00	0.00	1366
2	Bb	A	34.50	-12.50	15.00	-166.07	67.00	-0.00	965
2	Cc	A	34.50	12.50	15.00	166.07	67.00	0.00	1034

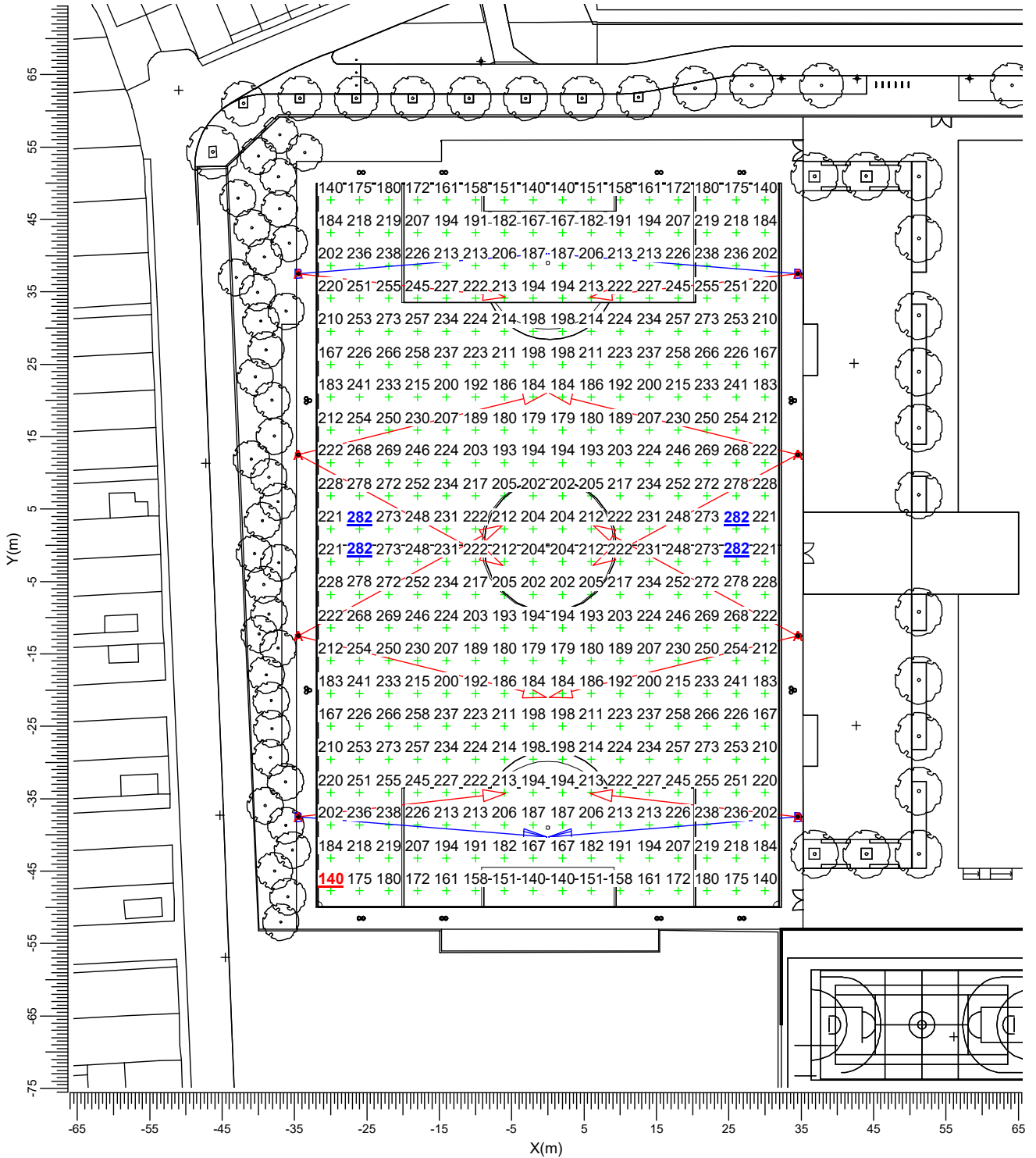
Switching Mode	ULR
1	0.00
2	0.00

3. Calculation Results

3.1 Football: Graphical Table

Performance

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



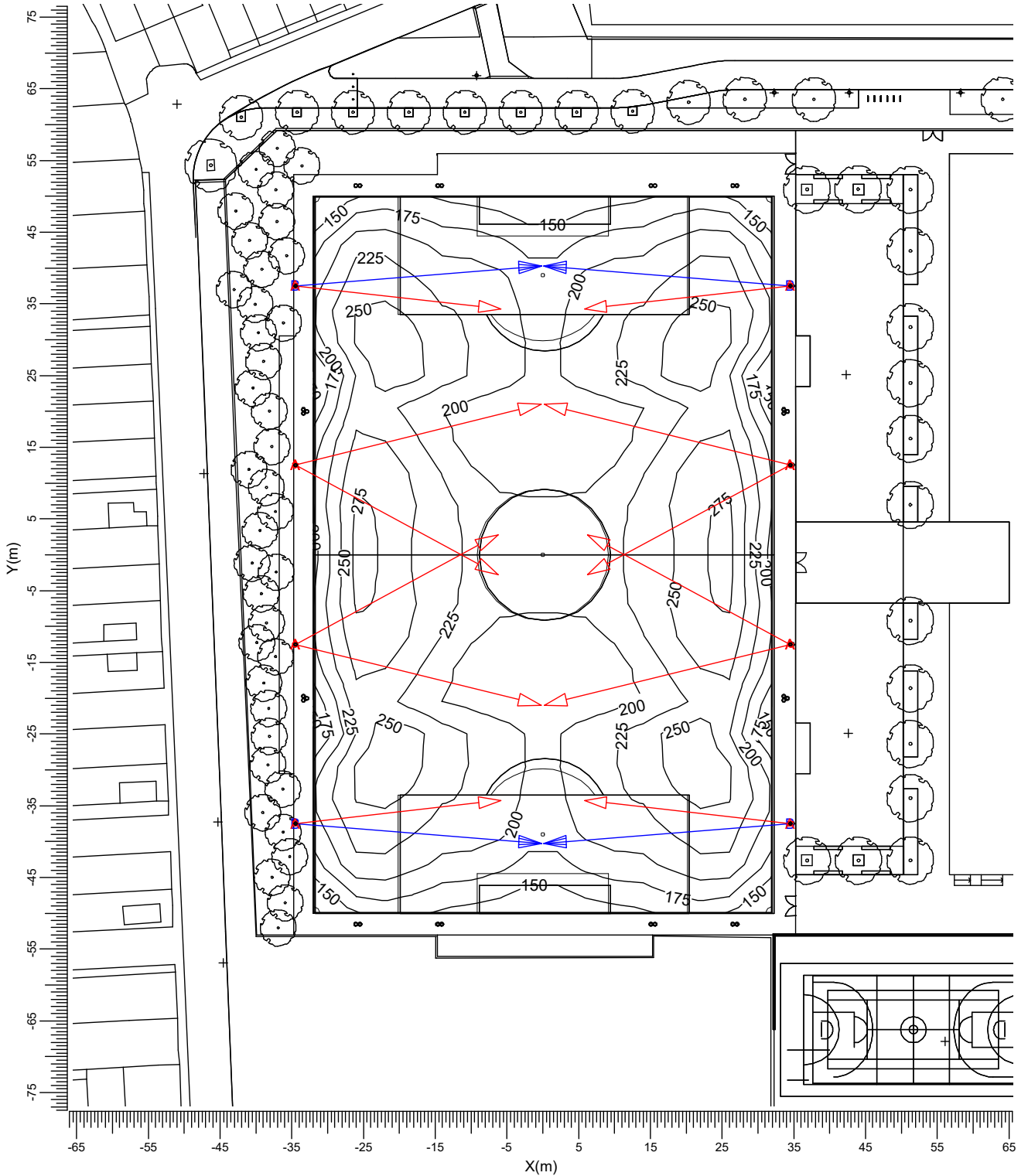
A → BVP525 OUT T15 100K A-WB/3 B → BVP525 OUT T15 100K A-NB/30
H → BVP525 OUT T15 100K A-VWB/ O → BVP651 T25 DW10 BL1

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
216	140	282	0.65	0.50	0.90	1:750

3.2 Football: Iso Contour

Performance

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



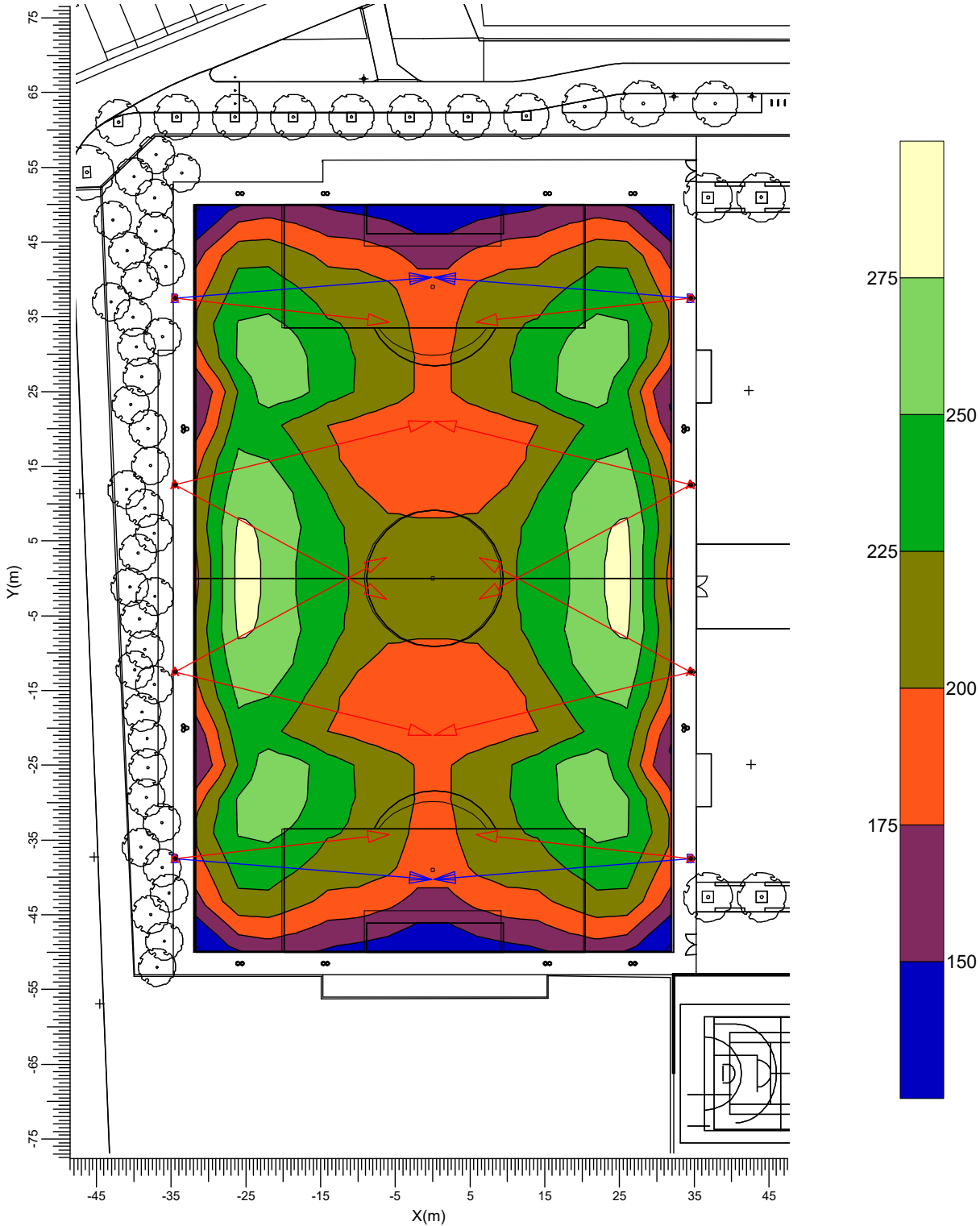
- | | | | | | |
|---|--|----------------------------|---|--|-----------------------------|
| A | | BVP525 OUT T15 100K A-WB/3 | B | | BVP525 OUT T15 100K A-NB/30 |
| H | | BVP525 OUT T15 100K A-VWB/ | O | | BVP651 T25 DW10 BL1 |

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
216	140	282	0.65	0.50	0.90	1:750

3.3 Football: Filled Iso Contour

Performance

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



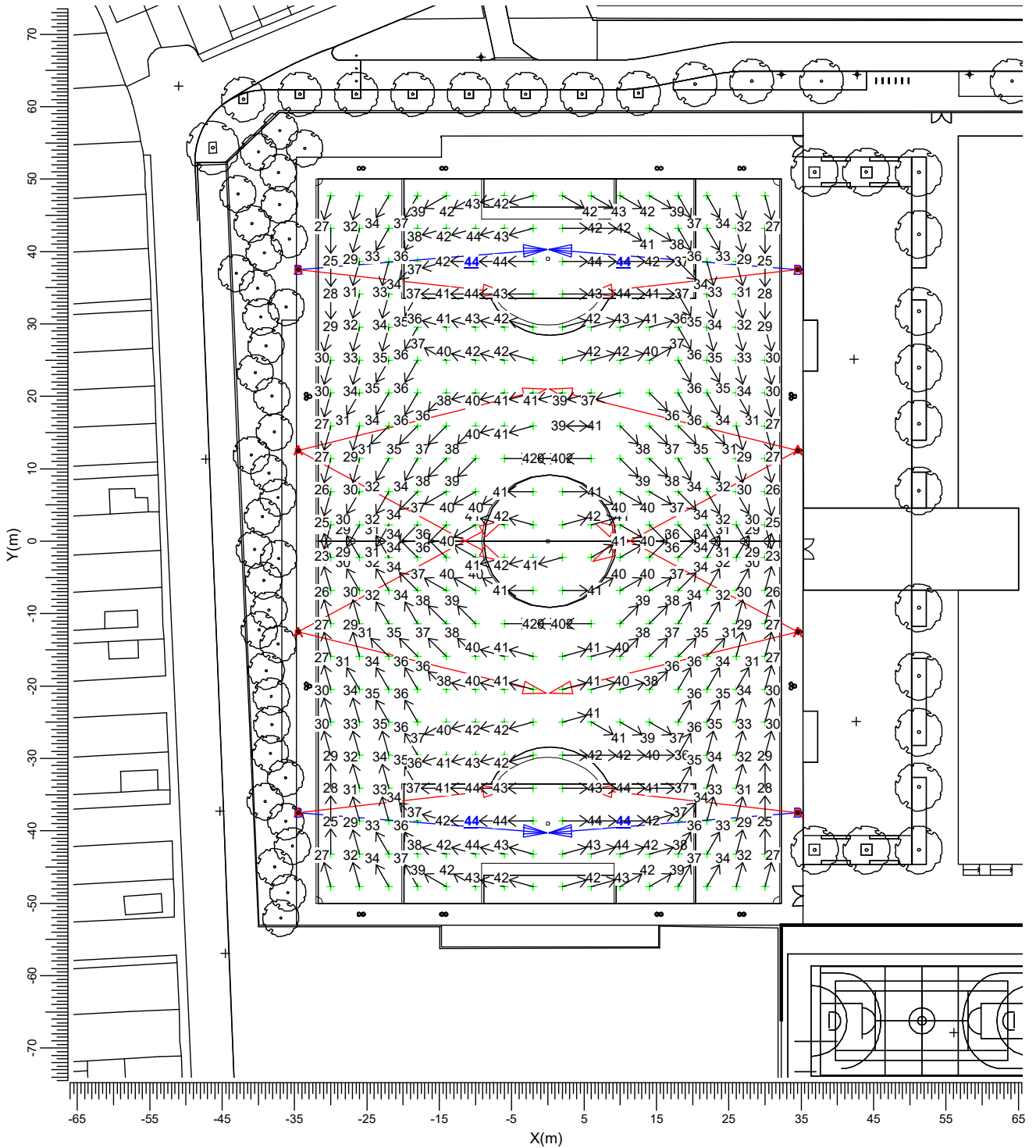
- | | | | | | |
|---|---|----------------------------|---|---|-----------------------------|
| A | → | BVP525 OUT T15 100K A-WB/3 | B | → | BVP525 OUT T15 100K A-NB/30 |
| H | → | BVP525 OUT T15 100K A-VWB/ | O | → | BVP651 T25 DW10 BL1 |

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
216	140	282	0.65	0.50	0.90	1:750

3.4 GR Max for Pitch: Graphical Table

Performance

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



A		BVP525 OUT T15 100K A-WB/3	B		BVP525 OUT T15 100K A-NB/30
H		BVP525 OUT T15 100K A-VWB/	O		BVP651 T25 DW10 BL1

Maximum
44.3

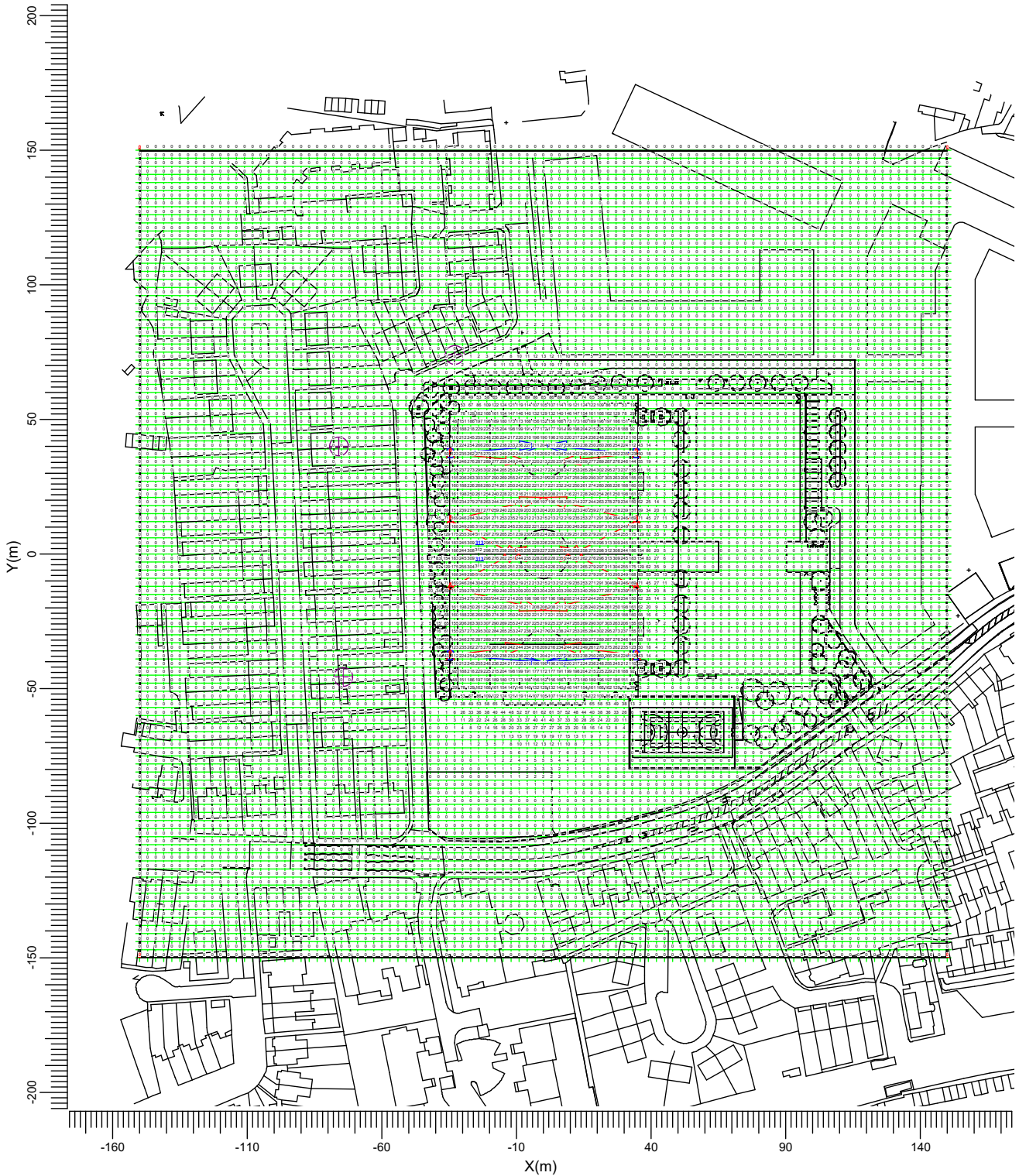
Project maintenance factor
0.90

Scale
1:750

3.5 Spill Ltg Grid: Graphical Table

Spill Ltg

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



- | | | | | | |
|---|--|----------------------------|---|--|-----------------------------|
| A | | BVP525 OUT T15 100K A-WB/3 | B | | BVP525 OUT T15 100K A-NB/30 |
| H | | BVP525 OUT T15 100K A-VWB/ | O | | BVP651 T25 DW10 BL1 |

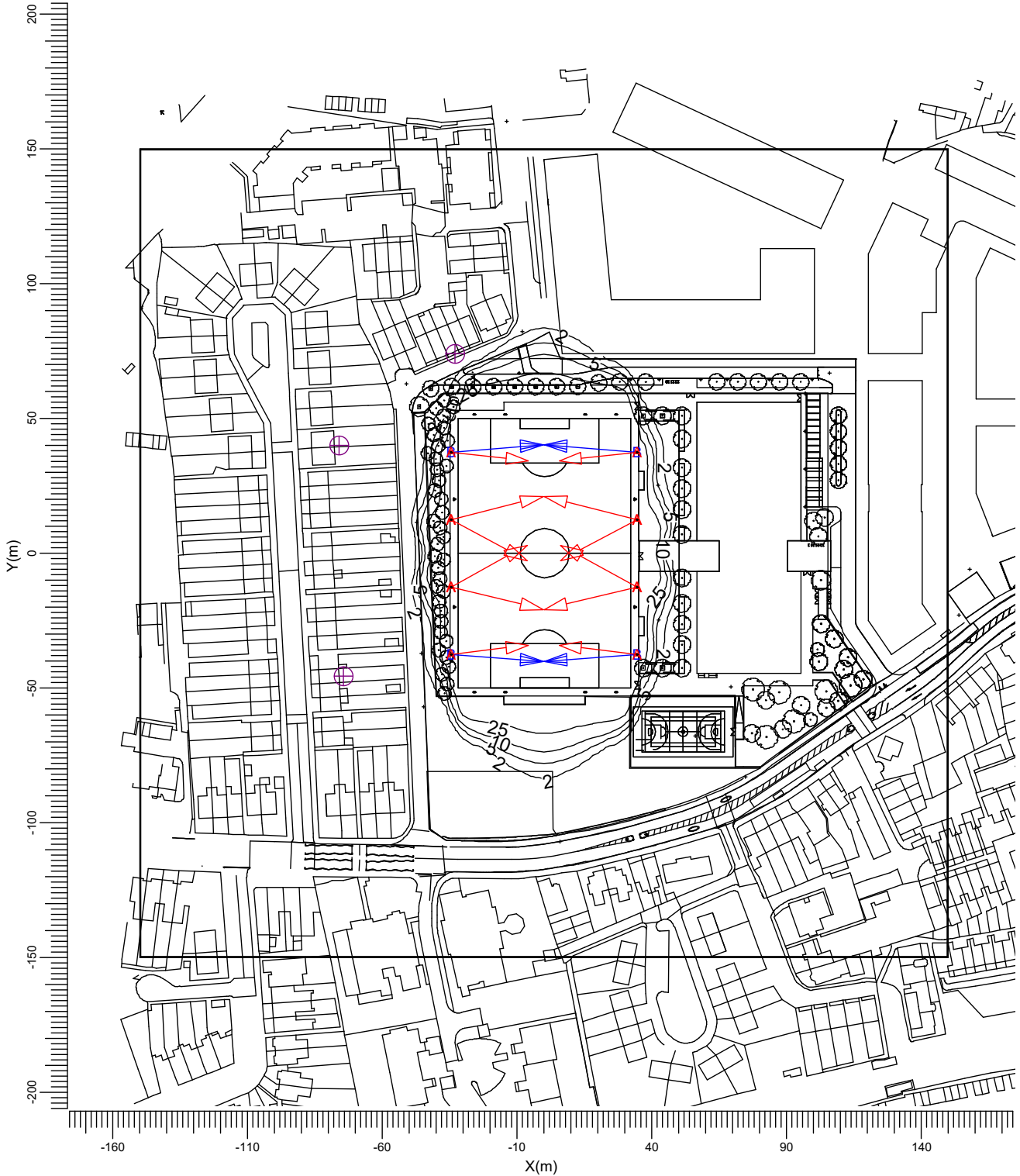
Project maintenance factor
 1.00

Scale
 1:2000

3.6 Spill Ltg Grid: Iso Contour

Spill Ltg

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



- | | | | | | |
|---|--|----------------------------|---|--|-----------------------------|
| A | | BVP525 OUT T15 100K A-WB/3 | B | | BVP525 OUT T15 100K A-NB/30 |
| H | | BVP525 OUT T15 100K A-VWB/ | O | | BVP651 T25 DW10 BL1 |

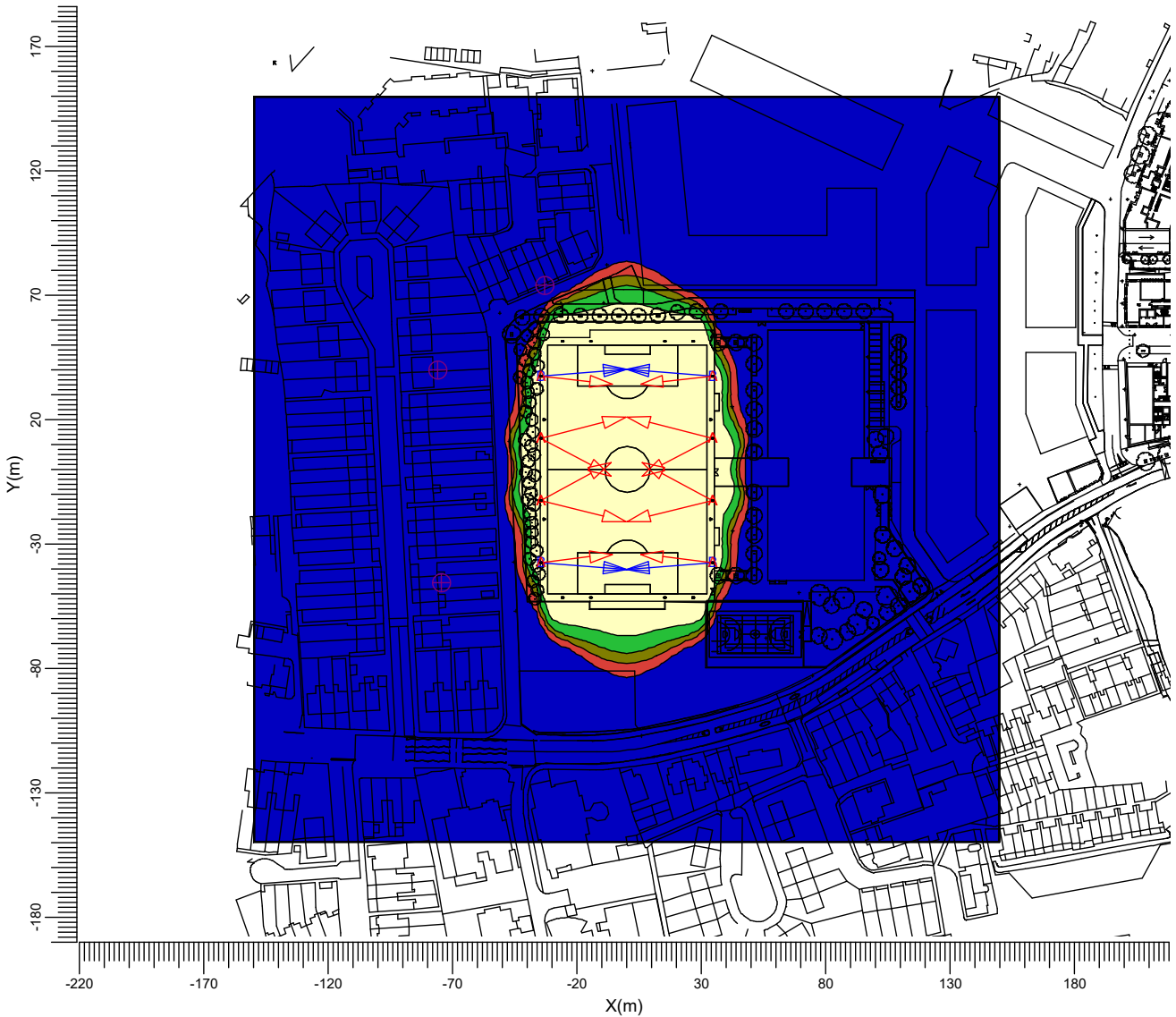
Project maintenance factor
 1.00

Scale
 1:2000

3.7 Spill Ltg Grid: Filled Iso Contour

Spill Ltg

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



- | | | | | | |
|---|--|----------------------------|---|--|-----------------------------|
| A | | BVP525 OUT T15 100K A-WB/3 | B | | BVP525 OUT T15 100K A-NB/30 |
| H | | BVP525 OUT T15 100K A-VWB/ | O | | BVP651 T25 DW10 BL1 |

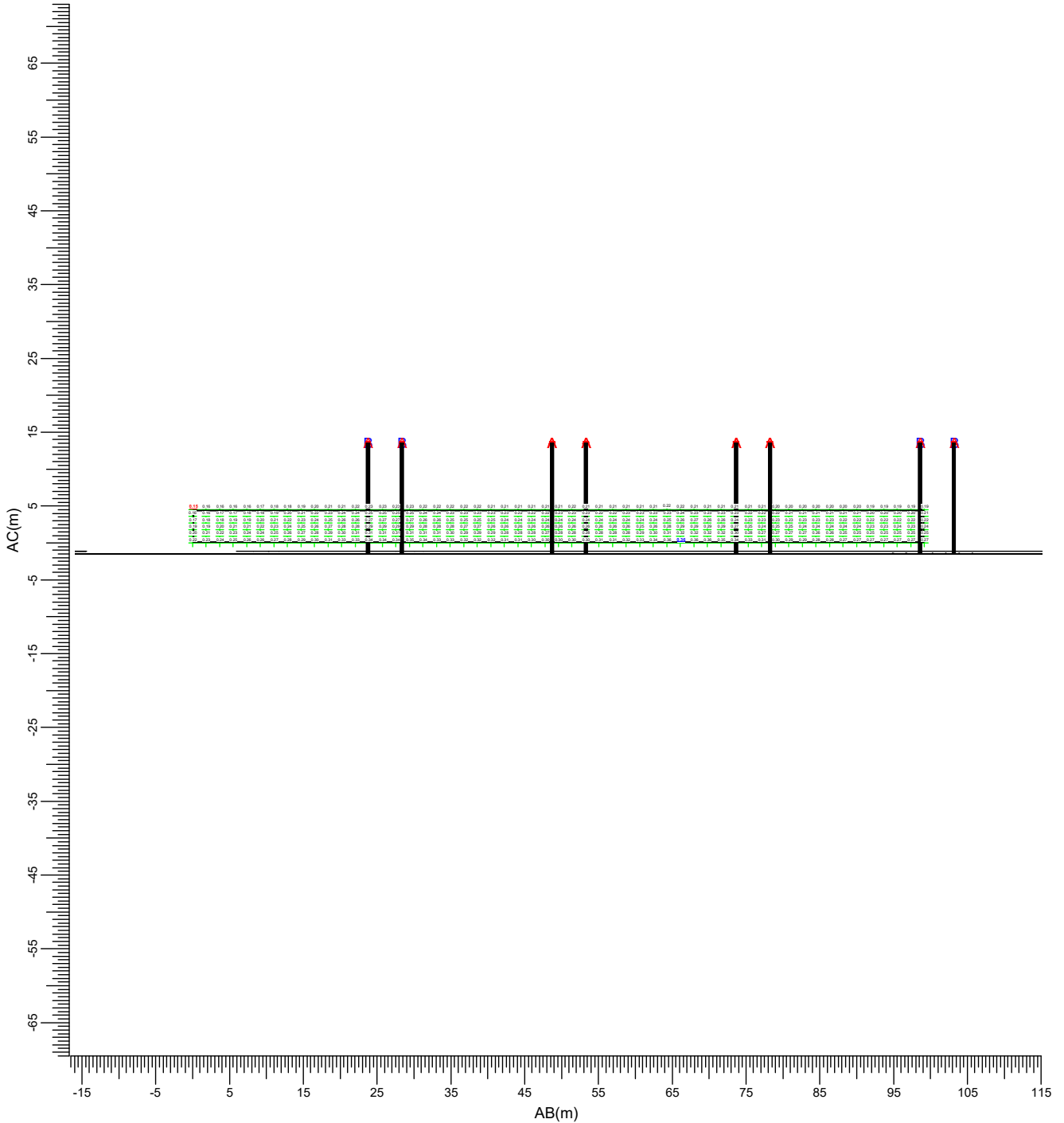
Project maintenance factor
 1.00

Scale
 1:2500

3.8 Ev West houses @1.5m-6m: Graphical Table

Spill Ltg

Grid : Ev West houses @1.5m-6m
 Calculation : Surface Illuminance (lux)



(-73.29, -68.50, 6.00) C-----D (-79.88, 30.44, 6.00)
 (-73.29, -68.50, 1.50) A-----B (-79.88, 30.44, 1.50)

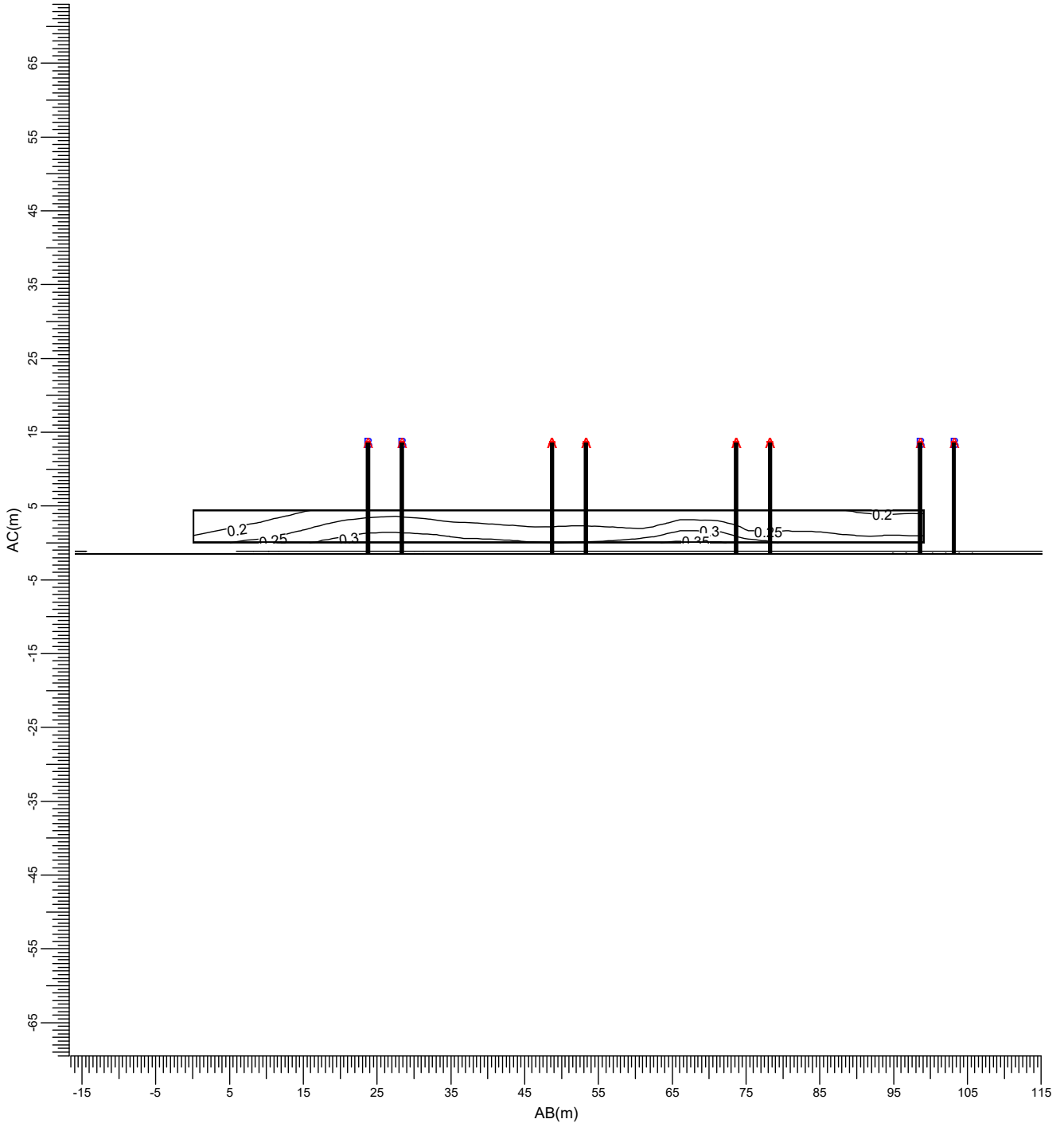
A : BVP525 OUT T15 100K A-WB/30 +LO B : BVP525 OUT T15 100K A-NB/30 +LO
 H : BVP525 OUT T15 100K A-VWB/30 O : BVP651 T25 DW10 BL1

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
0.25	0.15	0.36	0.61	0.43	1.00	1:750

3.9 Ev West houses @1.5m-6m: Iso Contour

Spill Ltg

Grid : Ev West houses @1.5m-6m
 Calculation : Surface Illuminance (lux)



(-73.29, -68.50, 6.00) C-----D (-79.88, 30.44, 6.00)
 (-73.29, -68.50, 1.50) A-----B (-79.88, 30.44, 1.50)

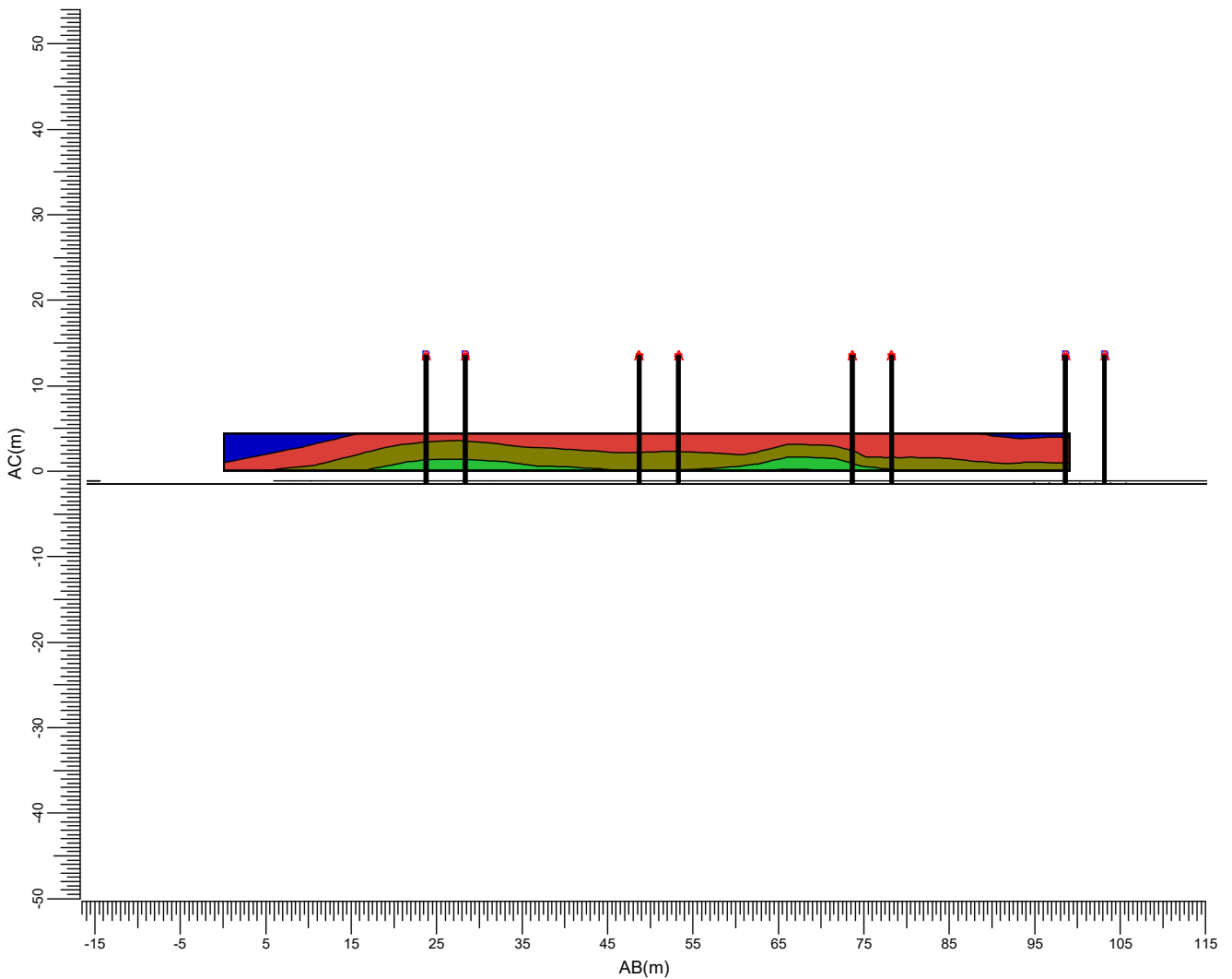
A : BVP525 OUT T15 100K A-WB/30 +LO B : BVP525 OUT T15 100K A-NB/30 +LO
 H : BVP525 OUT T15 100K A-VWB/30 O : BVP651 T25 DW10 BL1

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
0.25	0.15	0.36	0.61	0.43	1.00	1:750

3.10 Ev West houses @1.5m-6m: Filled Iso Contour

Spill Ltg

Grid : Ev West houses @1.5m-6m
Calculation : Surface Illuminance (lux)



(-73.29, -68.50, 6.00) C-----D (-79.88, 30.44, 6.00)
(-73.29, -68.50, 1.50) A-----B (-79.88, 30.44, 1.50)

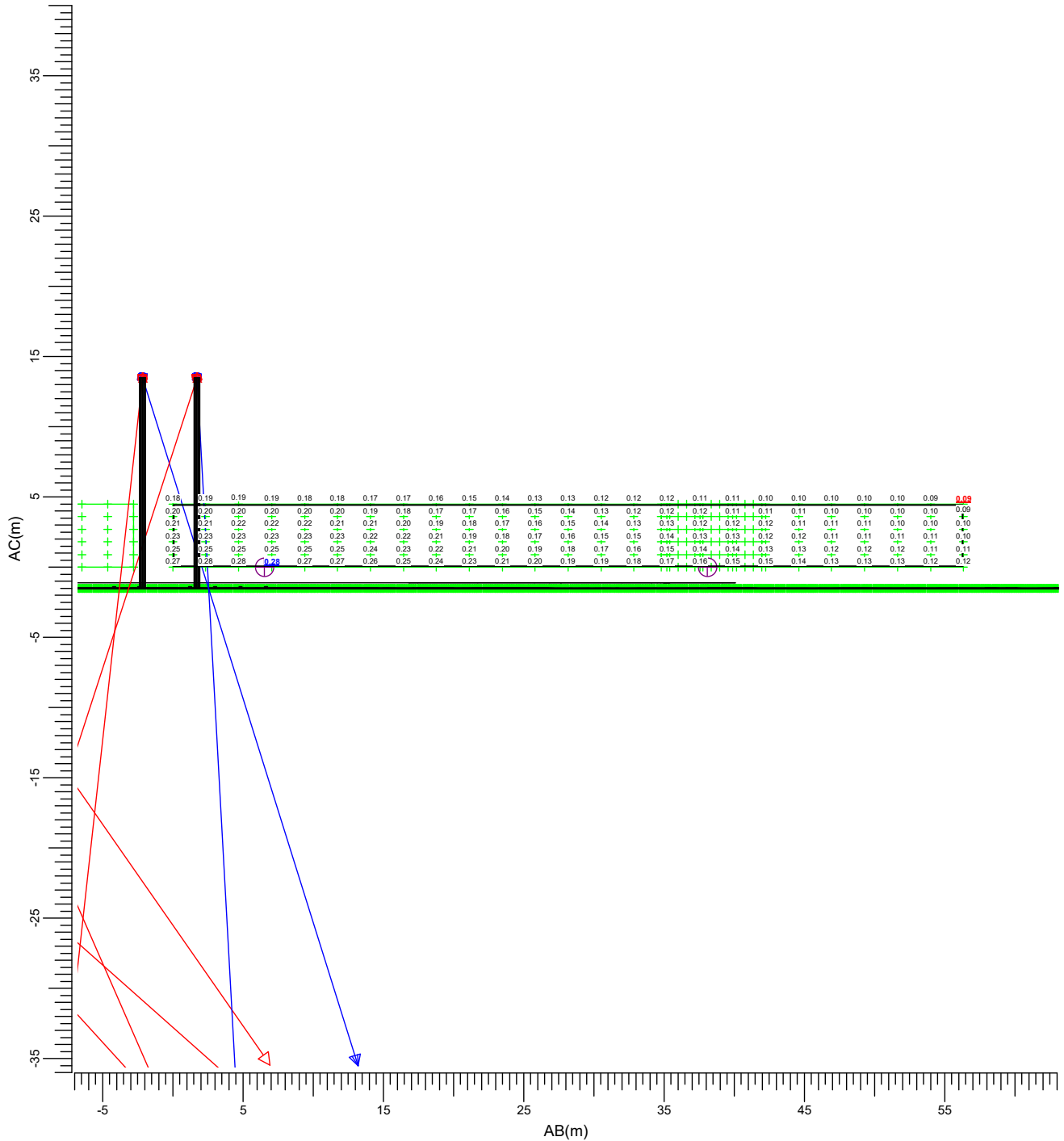
A : BVP525 OUT T15 100K A-WB/30 +LO B : BVP525 OUT T15 100K A-NB/30 +LO
H : BVP525 OUT T15 100K A-VWB/30 O : BVP651 T25 DW10 BL1

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
0.25	0.15	0.36	0.61	0.43	1.00	1:750

3.11 Ev NWest house @1.5m-6m: Graphical Table

Performance

Grid : Ev NWest house @1.5m-6m
 Calculation : Surface Illuminance (lux)



(-77.12, 33.38, 6.00) C-----D (-80.29, 89.63, 6.00)
 (-77.12, 33.38, 1.50) A-----B (-80.29, 89.63, 1.50)

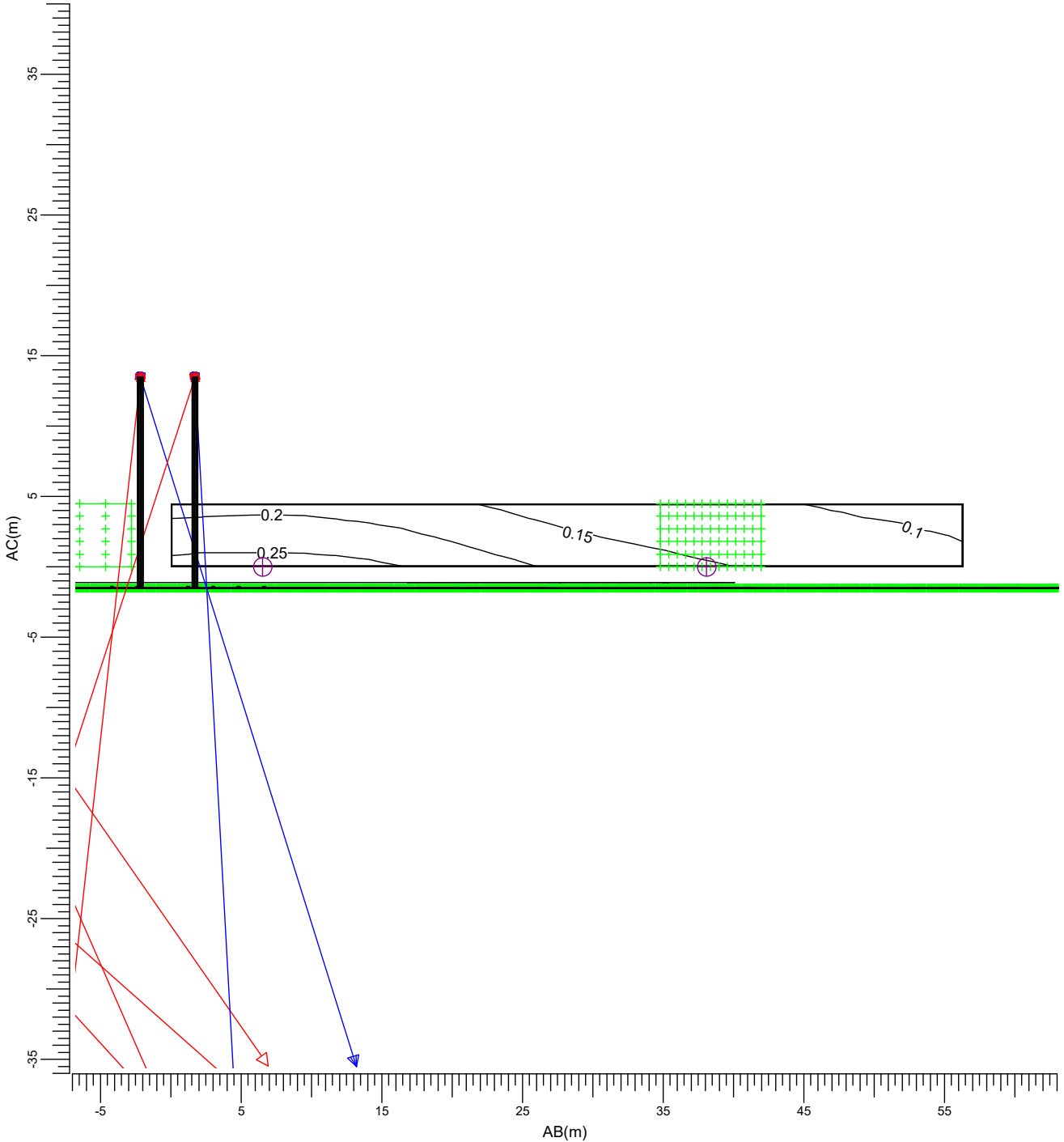
A → BVP525 OUT T15 100K A-WB/3 B → BVP525 OUT T15 100K A-NB/30
 H → BVP525 OUT T15 100K A-VWB/ O → BVP651 T25 DW10 BL1

Average 0.17 Minimum 0.09 Maximum 0.28 Min/Ave 0.55 Min/Max 0.33 CV 0.311 Project maintenance factor 0.90 Scale 1:400

3.12 Ev NWest house @1.5m-6m: Iso Contour

Performance

Grid : Ev NWest house @1.5m-6m
 Calculation : Surface Illuminance (lux)



(-77.12, 33.38, 6.00) C-----D (-80.29, 89.63, 6.00)
 (-77.12, 33.38, 1.50) A-----B (-80.29, 89.63, 1.50)

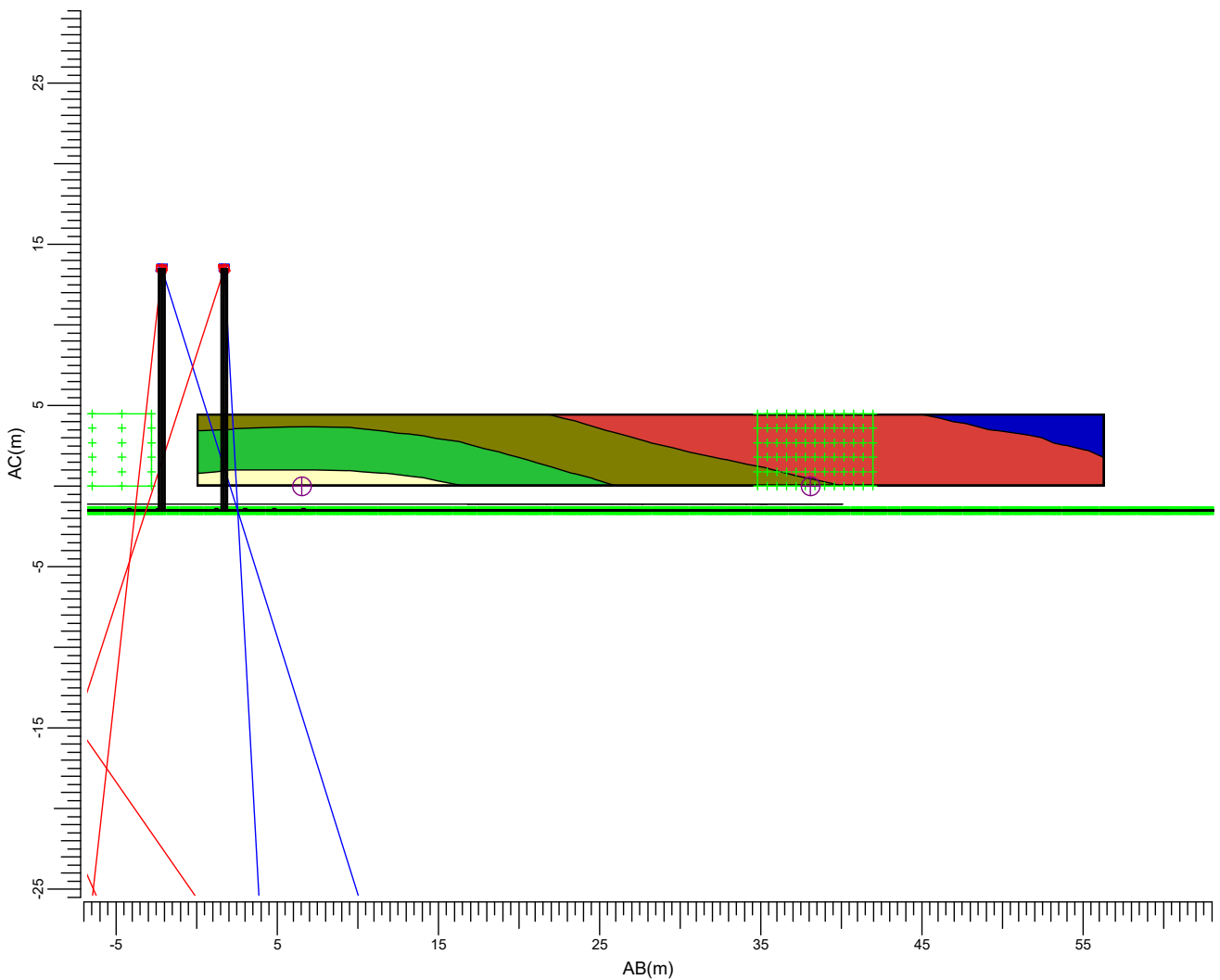
A → BVP525 OUT T15 100K A-WB/3 B → BVP525 OUT T15 100K A-NB/30
 H → BVP525 OUT T15 100K A-VWB/ O → BVP651 T25 DW10 BL1

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.17	0.09	0.28	0.55	0.33	0.311	0.90	1:400

3.13 Ev NWest house @1.5m-6m: Filled Iso Contour

Performance

Grid : Ev NWest house @1.5m-6m
Calculation : Surface Illuminance (lux)



(-77.12, 33.38, 6.00) C-----D (-80.29, 89.63, 6.00)
(-77.12, 33.38, 1.50) A-----B (-80.29, 89.63, 1.50)

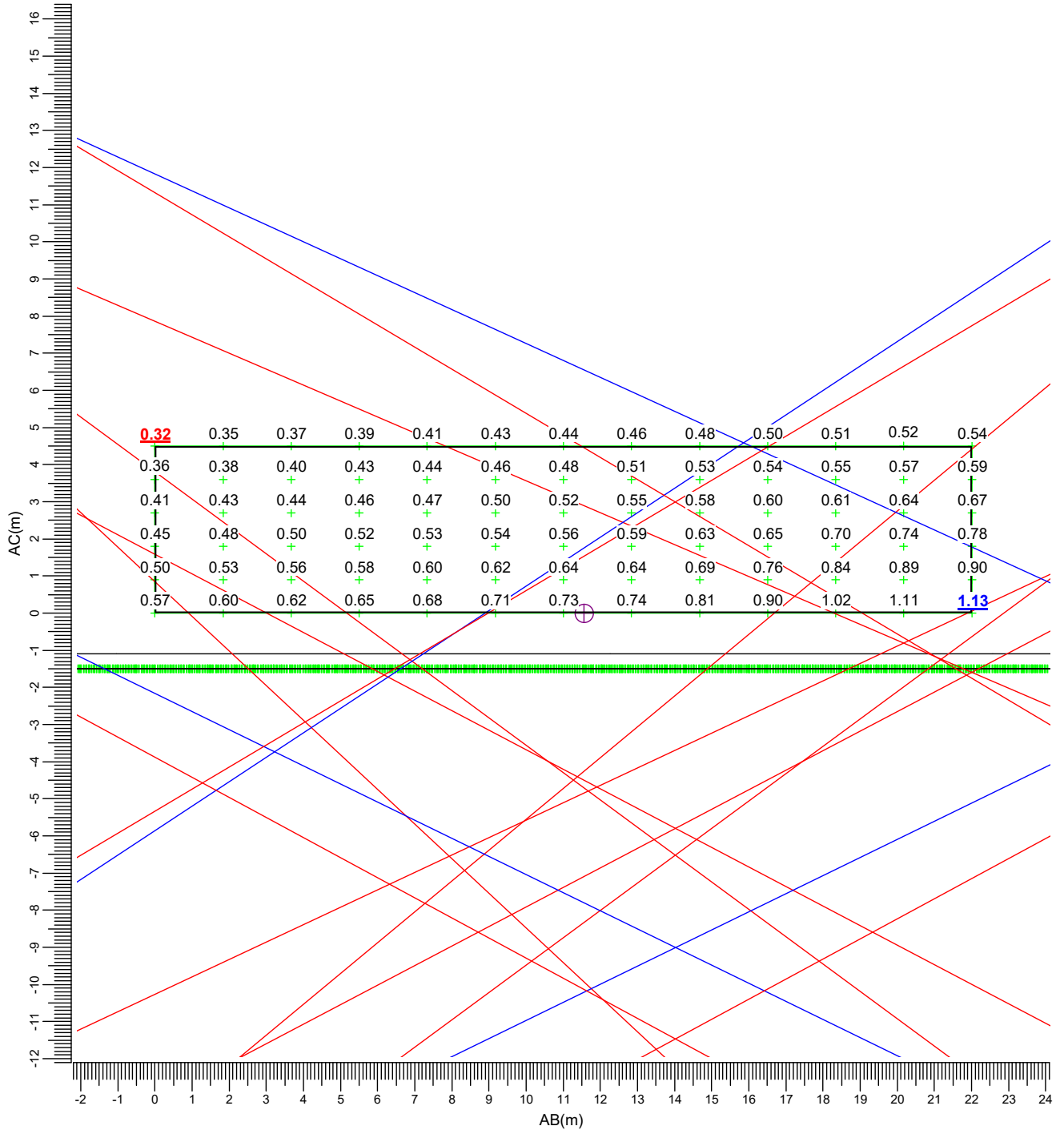
A → BVP525 OUT T15 100K A-WB/3 B → BVP525 OUT T15 100K A-NB/30
H → BVP525 OUT T15 100K A-VWB/ O → BVP651 T25 DW10 BL1

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.17	0.09	0.28	0.55	0.33	0.311	0.90	1:400

3.14 Ev Nth houses @1.5m-6m1: Graphical Table

Performance

Grid : Ev Nth houses @1.5m-6m1
Calculation : Surface Illuminance (lux)



(-43.90, 70.10, 6.00) C-----D (-23.54, 78.45, 6.00)
(-43.90, 70.10, 1.50) A-----B (-23.54, 78.45, 1.50)

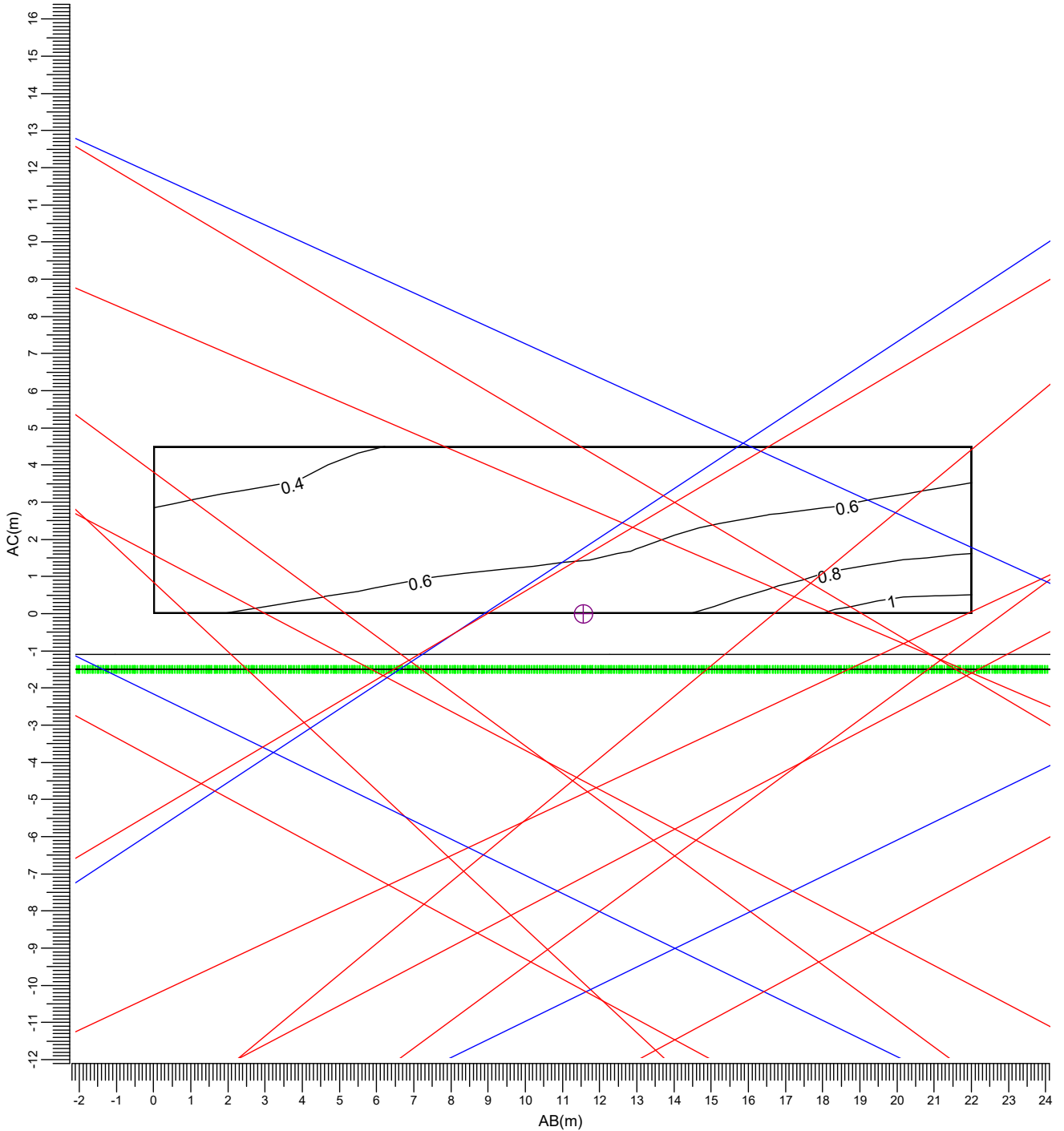
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

Average 0.58 Minimum 0.32 Maximum 1.13 Min/Ave 0.55 Min/Max 0.29 CV 0.281 Project maintenance factor 0.90 Scale 1:150

3.15 Ev Nth houses @1.5m-6m1: Iso Contour

Performance

Grid : Ev Nth houses @1.5m-6m1
Calculation : Surface Illuminance (lux)



(-43.90, 70.10, 6.00) C-----D (-23.54, 78.45, 6.00)
(-43.90, 70.10, 1.50) A-----B (-23.54, 78.45, 1.50)

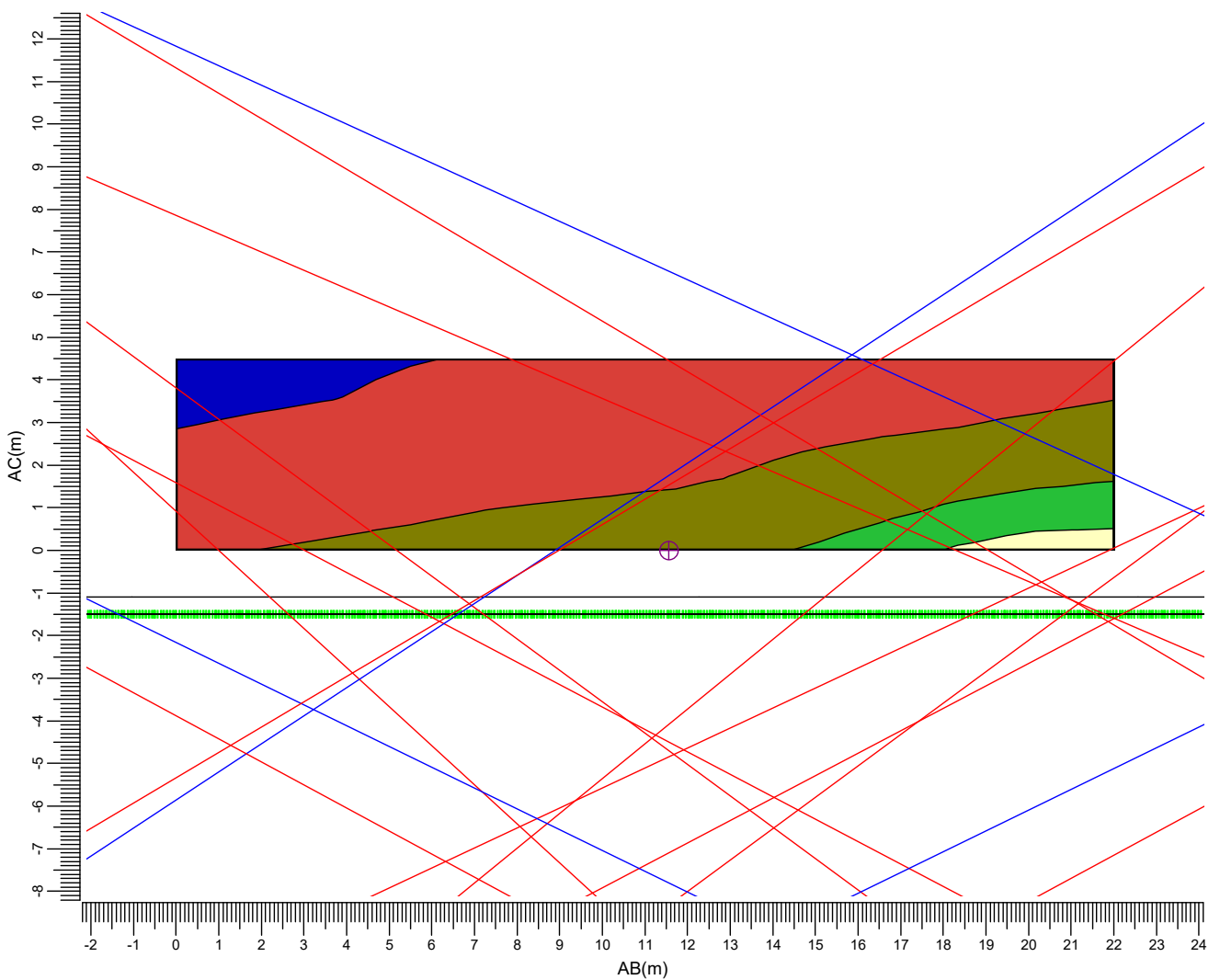
A ▶ BVP525 OUT T15 100K A-WB/3 B ▶ BVP525 OUT T15 100K A-NB/30
H ▶ BVP525 OUT T15 100K A-VWB/ O ▶ BVP651 T25 DW10 BL1

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.58	0.32	1.13	0.55	0.29	0.281	0.90	1:150

3.16 Ev Nth houses @1.5m-6m1: Filled Iso Contour

Performance

Grid : Ev Nth houses @1.5m-6m1
Calculation : Surface Illuminance (lux)



(-43.90, 70.10, 6.00) C-----D (-23.54, 78.45, 6.00)
(-43.90, 70.10, 1.50) A-----B (-23.54, 78.45, 1.50)

- A → BVP525 OUT T15 100K A-WB/3
- H → BVP525 OUT T15 100K A-VWB/
- B → BVP525 OUT T15 100K A-NB/30
- O → BVP651 T25 DW10 BL1

Average 0.58	Minimum 0.32	Maximum 1.13	Min/Ave 0.55	Min/Max 0.29	CV 0.281	Project maintenance factor 0.90	Scale 1:150
-----------------	-----------------	-----------------	-----------------	-----------------	-------------	------------------------------------	----------------

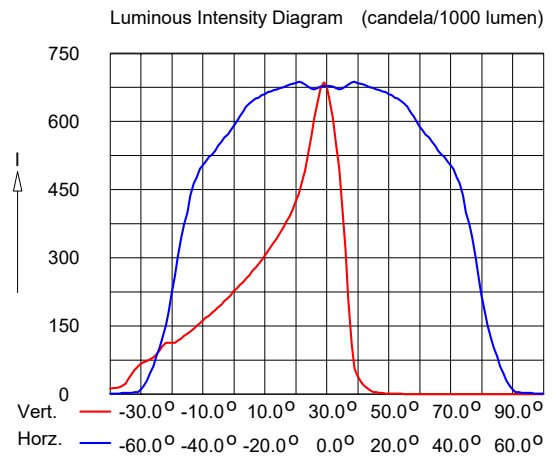
4. Luminaire Details

4.1 Project Luminaires

OptiVision LED
 BVP525 OUT T15 100K 1xLED1940/740 A-WB/30 +LO

Light output ratios
 DLOR : 0.65
 ULOR : 0.00
 TLOR : 0.65
 Ballast : N/A
 Lamp flux : 183674 lm
 Luminaire wattage : 1375.4 W
 Measurement code : LVA1409005

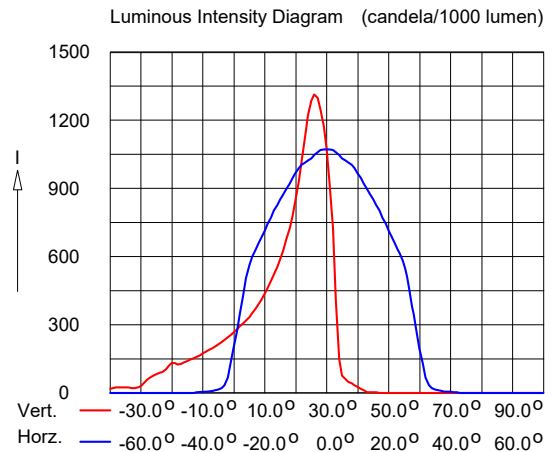
Note: Luminaire data not from database.



OptiVision LED
 BVP525 OUT T15 100K 1xLED1940/740 A-NB/30 +LO

Light output ratios
 DLOR : 0.53
 ULOR : 0.00
 TLOR : 0.53
 Ballast : N/A
 Lamp flux : 183674 lm
 Luminaire wattage : 1375.4 W
 Measurement code : LVA1409003

Note: Luminaire data not from database.



5. Installation Data

5.1 Legends

Project Luminaires:

Code	Qty	Luminaire Type	Lamp Type	Flux (lm)
A	12	BVP525 OUT T15 100K A-WB/30 +LO	1 * LED1940/740	1 * 183674
B	4	BVP525 OUT T15 100K A-NB/30 +LO	1 * LED1940/740	1 * 183674

Arrangements:

Code	Arrangement
1	End Columns
2	Centre Columns
3	Centre Columns plus 1m
4	End Columns plus 1m
5	Half way line 1
6	Half way line 2
7	Half way line 3
8	Half way line 4

Switching Modes:

Code	Switching Mode
1	Performance
2	Spill Ltg

5.2 Luminaire Positioning and Orientation

Including Aiming Points:

Qty and Code	Position			Aiming Points			ULR	Arr.	Switching Modes	
	X (m)	Y (m)	Z (m)	X (m)	Y (m)	Z (m)			1	2
1 * A	-34.50	-37.50	15.00	-5.87	-34.24	-0.00	0.00	1	+	+
1 * B	-34.50	-37.50	15.00	-0.11	-40.27	0.00	0.00	1	+	+
1 * A	-34.50	37.50	15.00	-5.87	34.24	-0.00	0.00	1	+	+
1 * B	-34.50	37.50	15.00	-0.11	40.27	0.00	0.00	1	+	+
1 * A	34.50	-37.50	15.00	5.87	-34.24	-0.00	0.00	1	+	+
1 * B	34.50	-37.50	15.00	0.11	-40.27	0.00	0.00	1	+	+
1 * A	34.50	37.50	15.00	5.87	34.24	-0.00	0.00	1	+	+
1 * B	34.50	37.50	15.00	0.11	40.27	0.00	0.00	1	+	+
1 * A	-34.50	-12.50	15.00	-6.21	2.81	0.00	0.00	6	+	+
1 * A	-34.50	-12.50	15.00	-0.20	-21.01	0.00	0.00	6	+	+
1 * A	-34.50	12.50	15.00	-6.21	-2.81	0.00	0.00	6	+	+
1 * A	-34.50	12.50	15.00	-0.20	21.01	0.00	0.00	6	+	+
1 * A	34.50	-12.50	15.00	6.21	2.81	0.00	0.00	6	+	+
1 * A	34.50	-12.50	15.00	0.20	-21.01	0.00	0.00	6	+	+
1 * A	34.50	12.50	15.00	6.21	-2.81	0.00	0.00	6	+	+
1 * A	34.50	12.50	15.00	0.20	21.01	0.00	0.00	6	+	+

Including Aiming Angles:

Qty and Code	Position			Aiming Angles			ULR	Arr.	Switching Modes	
	X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0			1	2
1 * A	-34.50	-37.50	15.00	6.5	62.5	0.0	0.00	1	+	+

Qty and Code	Position			Aiming Angles			ULR	Arr.	Switching Modes	
	X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0			1	2
1 * B	-34.50	-37.50	15.00	-4.6	66.5	0.0	0.00	1	+	+
1 * A	-34.50	37.50	15.00	-6.5	62.5	-0.0	0.00	1	+	+
1 * B	-34.50	37.50	15.00	4.6	66.5	-0.0	0.00	1	+	+
1 * A	34.50	-37.50	15.00	173.5	62.5	-0.0	0.00	1	+	+
1 * B	34.50	-37.50	15.00	-175.4	66.5	-0.0	0.00	1	+	+
1 * A	34.50	37.50	15.00	-173.5	62.5	0.0	0.00	1	+	+
1 * B	34.50	37.50	15.00	175.4	66.5	0.0	0.00	1	+	+
1 * A	-34.50	-12.50	15.00	28.4	65.0	0.0	0.00	6	+	+
1 * A	-34.50	-12.50	15.00	-13.9	67.0	0.0	0.00	6	+	+
1 * A	-34.50	12.50	15.00	-28.4	65.0	-0.0	0.00	6	+	+
1 * A	-34.50	12.50	15.00	13.9	67.0	-0.0	0.00	6	+	+
1 * A	34.50	-12.50	15.00	151.6	65.0	-0.0	0.00	6	+	+
1 * A	34.50	-12.50	15.00	-166.1	67.0	-0.0	0.00	6	+	+
1 * A	34.50	12.50	15.00	-151.6	65.0	0.0	0.00	6	+	+
1 * A	34.50	12.50	15.00	166.1	67.0	0.0	0.00	6	+	+