

LAVORI DI RICONFIGURAZIONE IN AMBITO  
LOGISTICO/INDUSTRIALE E RETROPORTUALE NELL'AREA  
COMPRESA NELLO STABILIMENTO WARSTILA S.P.A. SITO NEL C.C.  
DI BAGNOLI DELLA ROSANDRA

**Documentazione tecnica per l'ottenimento della VIA**

**RELAZIONE GENERALE**

**Allegato 3 – Studio illuminotecnico**

## Wartsila Trieste - Ferneti

### MIDSTREAM LED PROPOSAL

REV07 - Fase 1 - Area Esterna - 20 Lux

4 x Nuove Torrifaro di altezza 30m

4 x Nuovi Pali stradali di altezza 11m equipaggiati con 1 x Titan 320 ciascuno

Totale Proiettori:

37 x Titan 420 FH 4000k T42FHBTDAT02 installate sulle Torrifaro

78 x Titan 320 FH 4000k T32FHBTDAT02, di cui:

6 montate a palo e 71 montate a facciata dei due edifici B1 e B2

Totale Potenza Installata: 41.688 kW

Fattore di Manutenzione: 0.70

Normativa di Riferimento :

UNI EN 12464-2

Siti industriali e aree di stoccaggio

5.7.1

"Manipolazione su brevi periodi di grandi unità e di materie prime, carico e scarico di merci solide di grosse dimensioni "

Requisito : 20lux - 0.25U0 - 55GR - 20Ra

i Proiettori sono predisposti per la riduzione del flusso tramite comunicazione DALI.

Date: 11.12.2019

Operator: MIDSTREAM LIGHTING LIMITED

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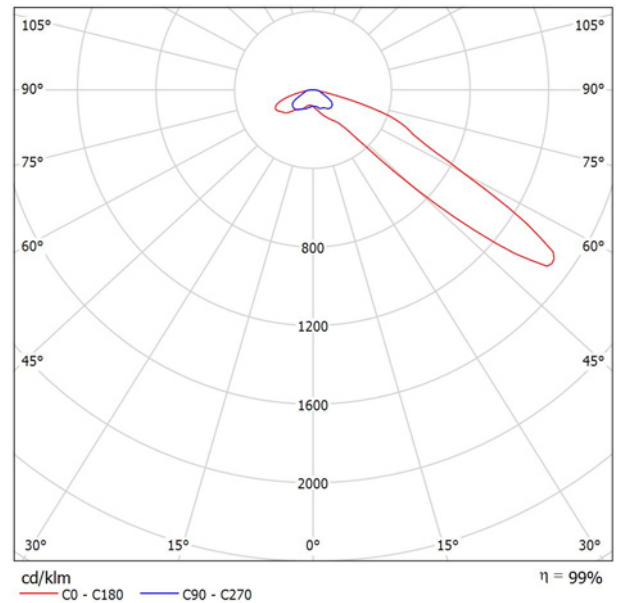
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## MIDSTREAM - Titan 420 FH / Luminaire Data Sheet

Luminous emittance 1:

See our luminaire catalog for an image of the luminaire.



Luminaire classification according to CIE: 100  
CIE flux code: 21 65 93 100 99

Due to missing symmetry properties, no UGR table can be displayed for this luminaire.

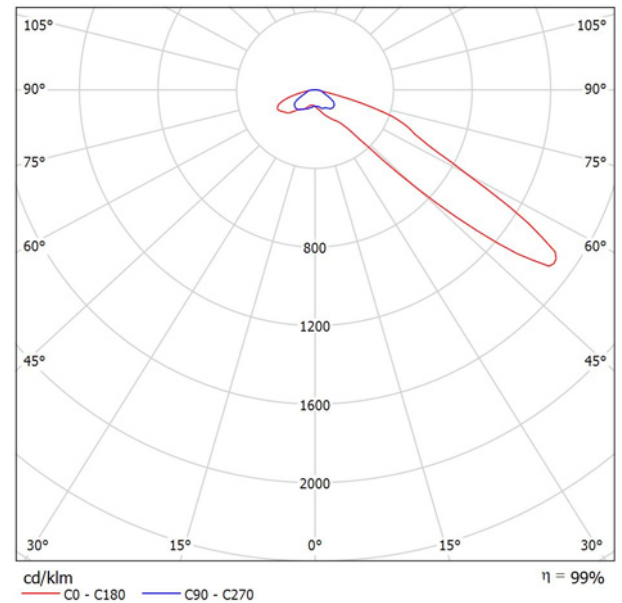
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## MIDSTREAM - Titan 320 FH / Luminaire Data Sheet

Luminous emittance 1:

See our luminaire catalog for an image of the luminaire.



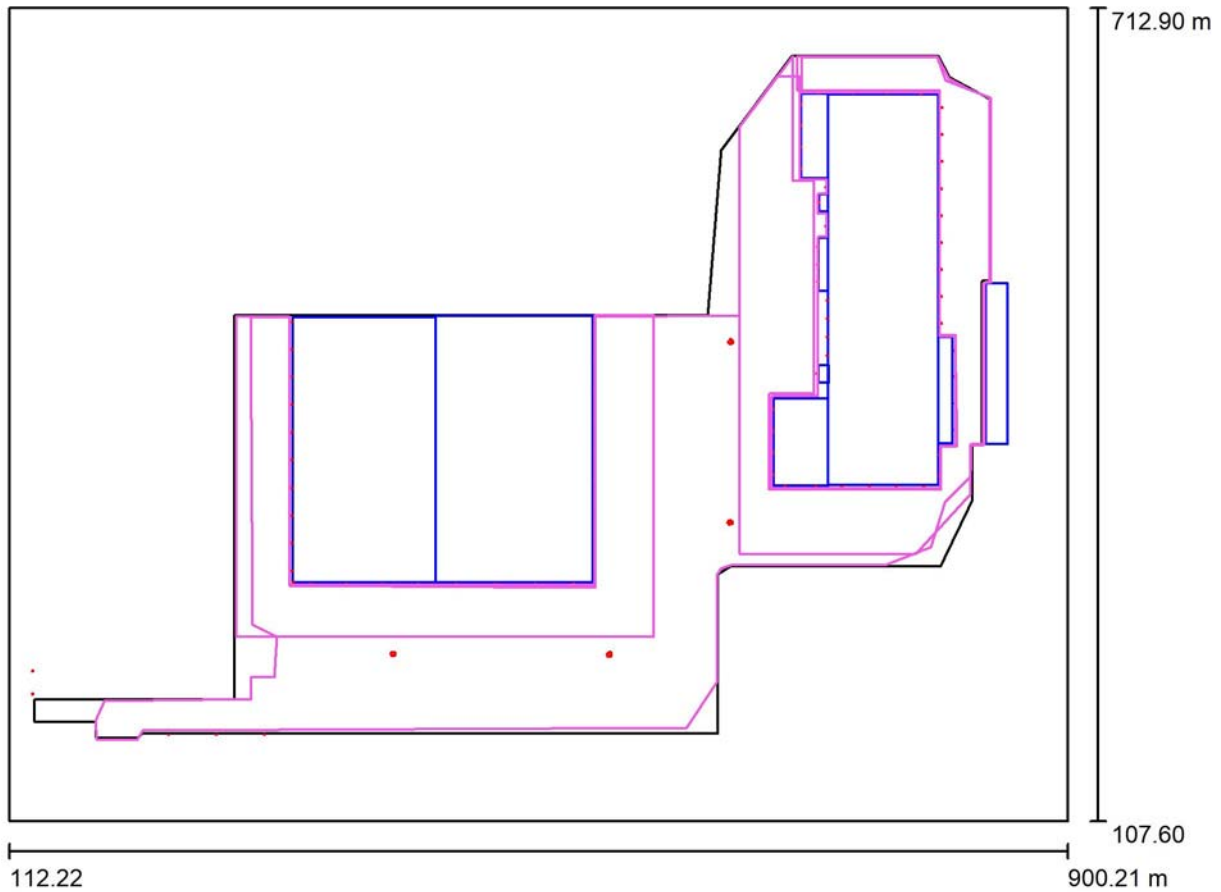
Luminaire classification according to CIE: 100  
CIE flux code: 21 65 93 100 99

Due to missing symmetry properties, no UGR table can be displayed for this luminaire.

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### Exterior Scene 1 / Planning data



Maintenance factor: 0.70, ULR (Upward Light Ratio): 1.5%

Scale 1:5634

#### Luminaire Parts List

No.	Pieces	Designation (Correction Factor)	Φ (Luminaire) [lm]	Φ (Lamps) [lm]	P [W]
1	78	MIDSTREAM - Titan 320 FH (1.000)	37006	37236	321.0
2	37	MIDSTREAM - Titan 420 FH (1.000)	51878	52200	450.0
Total:			4805986	Total: 4835808	41688.0

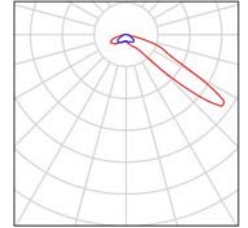
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## Exterior Scene 1 / Luminaire parts list

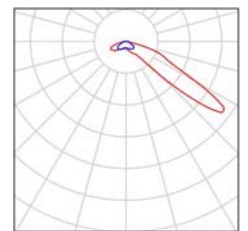
78 Pieces MIDSTREAM - Titan 320 FH  
Article No.:  
Luminous flux (Luminaire): 37006 lm  
Luminous flux (Lamps): 37236 lm  
Luminaire Wattage: 321.0 W  
Luminaire classification according to CIE: 100  
CIE flux code: 21 65 93 100 99  
Fitting: 1 x Led (Correction Factor 1.000).

See our luminaire  
catalog for an image of  
the luminaire.



37 Pieces MIDSTREAM - Titan 420 FH  
Article No.:  
Luminous flux (Luminaire): 51878 lm  
Luminous flux (Lamps): 52200 lm  
Luminaire Wattage: 450.0 W  
Luminaire classification according to CIE: 100  
CIE flux code: 21 65 93 100 99  
Fitting: 1 x Led (Correction Factor 1.000).

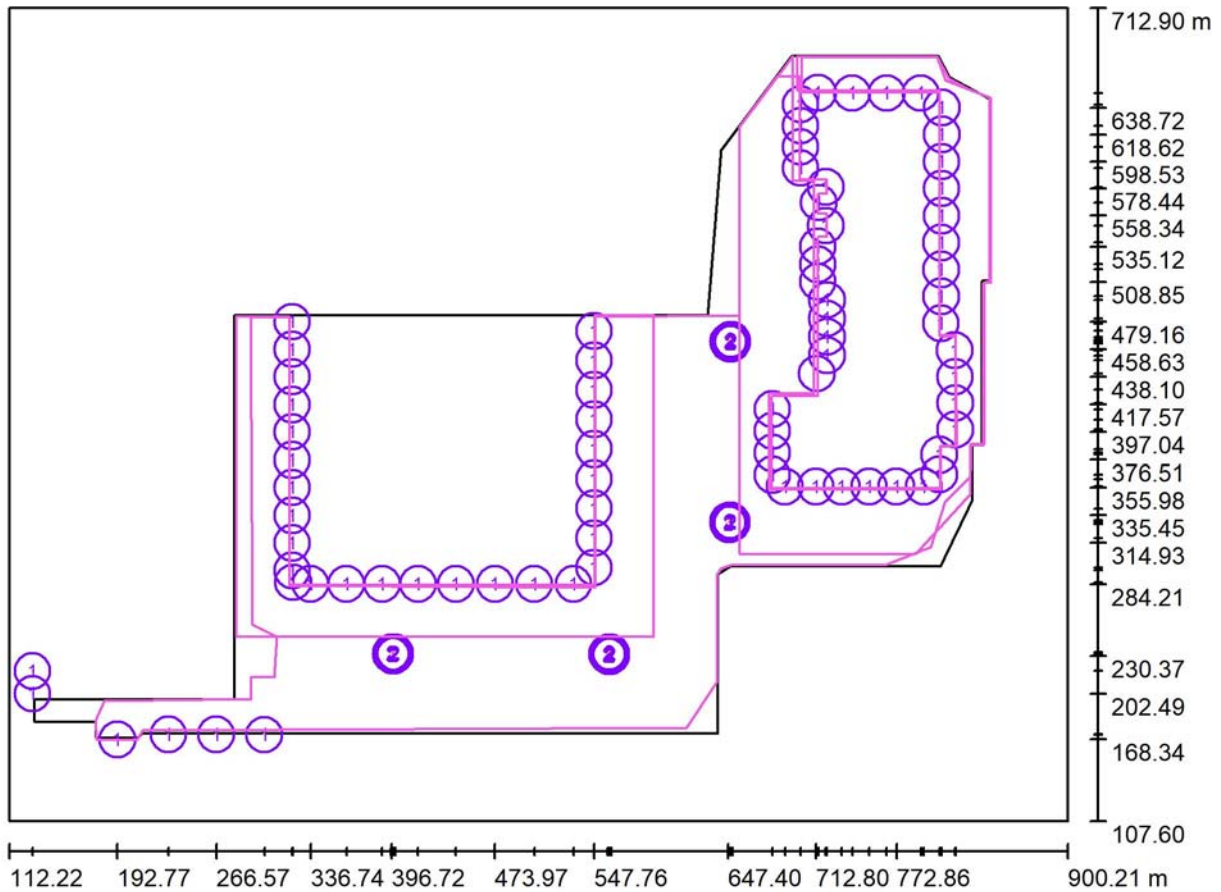
See our luminaire  
catalog for an image of  
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### Exterior Scene 1 / Luminaires (layout plan)



Scale 1 : 5634

#### Luminaire Parts List

No.	Pieces	Designation
1	78	MIDSTREAM - Titan 320 FH
2	37	MIDSTREAM - Titan 420 FH



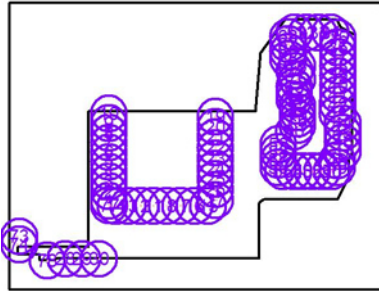
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## Exterior Scene 1 / Luminaires (coordinates list)

### MIDSTREAM - Titan 320 FH

37006 lm, 321.0 W, 1 x 1 x Led (Correction Factor 1.000).



No.	Position [m]			Rotation [°]		
	X	Y	Z	X	Y	Z
1	322.915	294.397	10.000	0.0	-10.0	180.0
2	322.915	314.926	10.000	0.0	-10.0	180.0
3	322.915	335.455	10.000	0.0	-10.0	180.0
4	322.915	355.983	10.000	0.0	-10.0	180.0
5	322.915	376.512	10.000	0.0	-10.0	180.0
6	322.915	397.041	10.000	0.0	-10.0	180.0
7	322.915	417.569	10.000	0.0	-10.0	180.0
8	322.915	438.098	10.000	0.0	-10.0	180.0
9	322.915	458.627	10.000	0.0	-10.0	180.0
10	322.915	479.155	10.000	0.0	-10.0	180.0
11	416.617	284.211	10.000	0.0	-10.0	-90.0
12	389.992	284.211	10.000	0.0	-10.0	-90.0
13	363.367	284.211	10.000	0.0	-10.0	-90.0
14	336.742	284.211	10.000	0.0	-10.0	-90.0
15	532.448	284.320	14.000	0.0	-10.0	-90.0
16	503.209	284.320	14.000	0.0	-10.0	-90.0
17	473.970	284.320	14.000	0.0	-10.0	-90.0
18	444.730	284.320	14.000	0.0	-10.0	-90.0
19	547.759	472.381	14.000	0.0	-10.0	0.0
20	547.759	450.394	14.000	0.0	-10.0	0.0
21	547.759	428.407	14.000	0.0	-10.0	0.0
22	547.759	406.420	14.000	0.0	-10.0	0.0
23	547.759	384.433	14.000	0.0	-10.0	0.0
24	547.759	362.445	14.000	0.0	-10.0	0.0
25	547.759	340.458	14.000	0.0	-10.0	0.0
26	547.759	318.471	14.000	0.0	-10.0	0.0
27	547.759	296.484	14.000	0.0	-10.0	0.0
28	230.862	172.131	11.000	0.0	-15.0	89.9

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### Exterior Scene 1 / Luminaires (coordinates list)

No.	Position [m]			Rotation [°]		
	X	Y	Z	X	Y	Z
29	266.566	172.044	11.000	0.0	-15.0	89.9
30	302.269	171.957	11.000	0.0	-15.0	89.9
31	714.487	649.723	14.000	0.0	5.0	89.8
32	739.979	649.655	14.000	0.0	5.0	89.8
33	765.471	649.587	14.000	0.0	5.0	89.8
34	790.962	649.519	14.000	0.0	5.0	89.8
35	806.619	638.716	14.000	0.0	-15.0	-0.2
36	806.537	618.623	14.000	0.0	-15.0	-0.2
37	806.456	598.530	14.000	0.0	-15.0	-0.2
38	806.374	578.436	14.000	0.0	-15.0	-0.2
39	806.292	558.343	14.000	0.0	-15.0	-0.2
40	806.210	538.250	14.000	0.0	-15.0	-0.2
41	806.128	518.157	14.000	0.0	-15.0	-0.2
42	806.046	498.063	14.000	0.0	-15.0	-0.2
43	805.964	477.970	14.000	0.0	-15.0	-0.2
44	816.267	457.901	10.000	0.0	-10.0	0.5
45	816.437	438.209	10.000	0.0	-10.0	0.5
46	816.608	418.518	10.000	0.0	-10.0	0.5
47	816.778	398.826	10.000	0.0	-10.0	0.5
48	804.739	380.323	10.000	0.0	-10.0	0.0
49	804.739	365.557	10.000	0.0	-10.0	0.0
50	793.222	356.868	14.000	0.0	-15.0	-90.0
51	772.856	356.868	14.000	0.0	-15.0	-90.0
52	752.490	356.868	14.000	0.0	-15.0	-90.0
53	732.123	356.868	14.000	0.0	-15.0	-90.0
54	712.798	356.766	18.000	0.0	-12.0	-80.0
55	689.825	356.766	18.000	0.0	-12.0	-80.0
56	680.397	365.433	18.000	0.0	-10.0	180.0
57	680.397	381.627	18.000	0.0	-10.0	180.0
58	680.397	397.821	18.000	0.0	-10.0	180.0
59	680.397	414.015	18.000	0.0	-10.0	180.0
60	713.712	440.595	18.000	0.0	-10.0	180.0
61	714.296	508.850	18.000	0.0	-10.0	180.0
62	714.296	521.984	18.000	0.0	-10.0	180.0
63	714.296	535.118	18.000	0.0	-10.0	180.0
64	714.856	568.023	18.000	0.0	-15.0	180.0
65	701.389	593.674	18.000	0.0	-10.0	180.0
66	701.389	609.481	18.000	0.0	-10.0	180.0

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### Exterior Scene 1 / Luminaires (coordinates list)

No.	Position [m]			Rotation [°]		
	X	Y	Z	X	Y	Z
67	701.389	625.289	18.000	0.0	-10.0	180.0
68	701.389	641.097	18.000	0.0	-10.0	180.0
69	721.166	454.176	14.000	0.0	-10.0	180.0
70	721.166	467.911	14.000	0.0	-10.0	180.0
71	721.166	481.646	14.000	0.0	-10.0	180.0
72	721.166	495.381	14.000	0.0	-10.0	180.0
73	129.625	219.465	11.000	0.0	-10.0	-40.0
74	129.625	202.489	11.000	0.0	-10.0	-40.0
75	720.180	550.693	14.000	0.0	15.0	180.0
76	720.180	579.602	14.000	0.0	15.0	180.0
77	323.540	285.441	10.000	0.0	-20.0	-131.8
78	192.773	168.335	11.000	0.0	-15.0	90.0

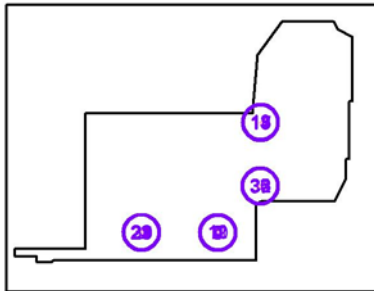
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## Exterior Scene 1 / Luminaires (coordinates list)

### MIDSTREAM - Titan 420 FH

51878 lm, 450.0 W, 1 x 1 x Led (Correction Factor 1.000).



No.	Position [m]			Rotation [°]		
	X	Y	Z	X	Y	Z
1	557.666	232.380	30.000	0.0	-10.0	160.0
2	557.585	231.701	30.000	0.0	-10.0	-173.6
3	557.814	231.056	30.000	0.0	-10.0	-147.3
4	558.305	230.580	30.000	0.0	-10.0	-120.9
5	558.957	230.372	30.000	0.0	-10.0	-94.5
6	559.633	230.474	30.000	0.0	-10.0	-68.2
7	560.194	230.867	30.000	0.0	-10.0	-41.8
8	560.522	231.467	30.000	0.0	-10.0	-15.5
9	560.549	232.151	30.000	0.0	-10.0	10.9
10	560.270	232.775	30.000	0.0	-10.0	37.3
11	559.742	233.211	30.000	0.0	-10.0	63.6
12	559.076	233.367	30.000	0.0	-10.0	90.0
13	647.846	464.354	30.000	0.0	-12.0	180.0
14	648.285	463.293	30.000	0.0	-12.0	-135.0
15	649.346	462.854	30.000	0.0	-12.0	-90.0
16	650.407	463.293	30.000	0.0	-12.0	-45.0
17	650.846	464.354	30.000	0.0	-12.0	0.0
18	650.407	465.415	30.000	0.0	-12.0	45.0
19	649.346	465.854	30.000	0.0	-12.0	90.0
20	397.013	233.228	30.000	0.0	-10.0	140.0
21	396.723	232.687	30.000	0.0	-10.0	163.6
22	396.674	232.074	30.000	0.0	-10.0	-172.7
23	396.875	231.493	30.000	0.0	-10.0	-149.1
24	397.292	231.042	30.000	0.0	-10.0	-125.5
25	397.855	230.796	30.000	0.0	-10.0	-101.8
26	398.469	230.796	30.000	0.0	-10.0	-78.2
27	399.032	231.042	30.000	0.0	-10.0	-54.5
28	399.449	231.493	30.000	0.0	-10.0	-30.9

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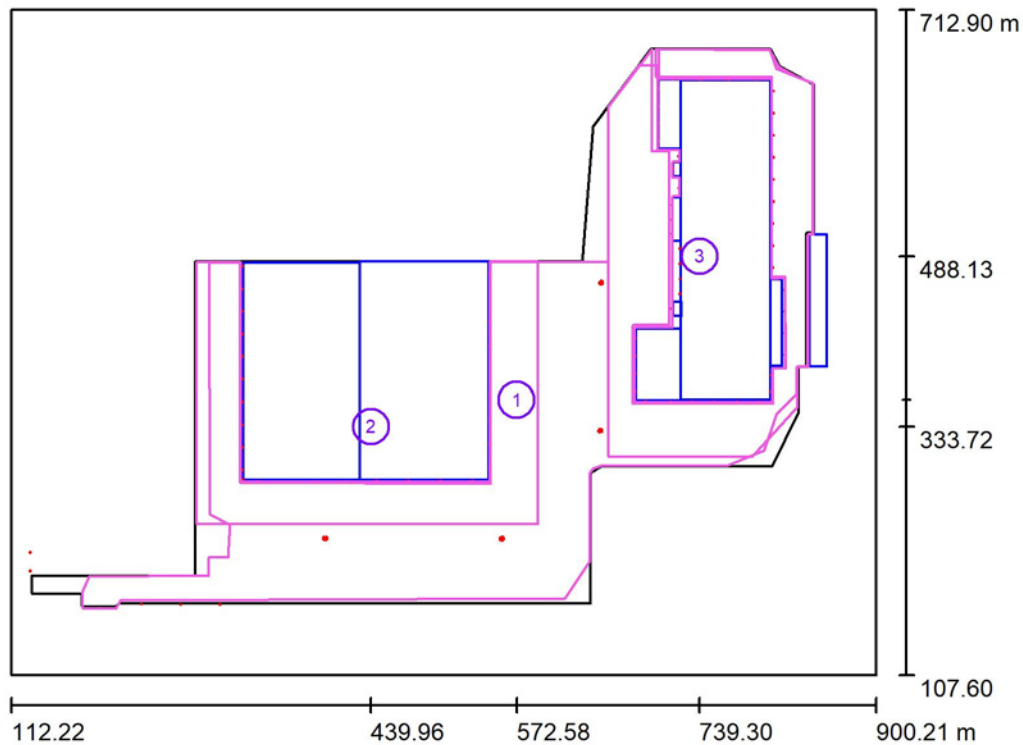
### Exterior Scene 1 / Luminaires (coordinates list)

No.	Position [m]			Rotation [°]		
	X	Y	Z	X	Y	Z
29	399.650	232.074	30.000	0.0	-10.0	-7.3
30	399.601	232.687	30.000	0.0	-10.0	16.4
31	399.311	233.228	30.000	0.0	-10.0	40.0
32	650.243	329.478	30.000	0.0	-10.0	-25.0
33	650.208	330.816	30.000	0.0	-10.0	28.0
34	649.119	331.594	30.000	0.0	-10.0	81.0
35	647.842	331.191	30.000	0.0	-10.0	134.0
36	647.395	329.929	30.000	0.0	-10.0	-173.0
37	648.134	328.813	30.000	0.0	-10.0	-120.0

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## Exterior Scene 1 / Calculation surfaces (results overview)



Scale 1 : 6888

### Calculation Surface List

No.	Designation	Type	Grid	$E_{av}$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	$u_0$	$E_{min} / E_{max}$
1	Horizontal Value - Area Totale Esterna	horizontal	37 x 27	22	6.47	67	0.295	0.097
2	Horizontal Value - Area Esterna Edificio B2	horizontal	10 x 8	23	9.70	48	0.413	0.204
3	Horizontal Value - Area Esterna Edificio B1	horizontal	12 x 6	23	8.32	49	0.357	0.171

### Summary of Results

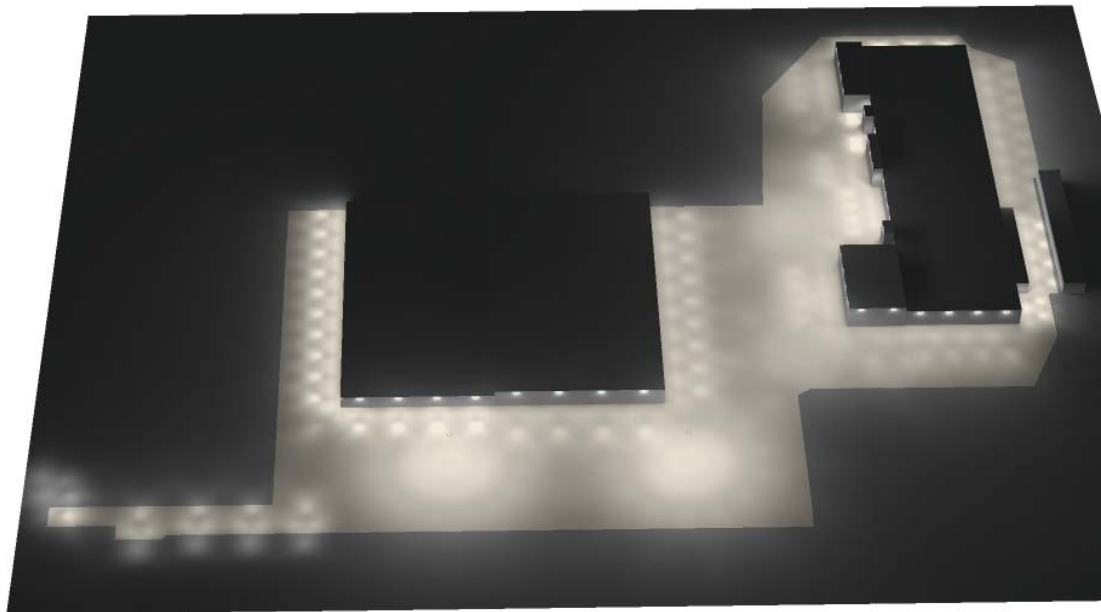
Type	Quantity	Average [lx]	Min [lx]	Max [lx]	$u_0$	$E_{min} / E_{max}$
horizontal	3	23	6.47	67	0.29	0.10



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## Exterior Scene 1 / 3D Rendering

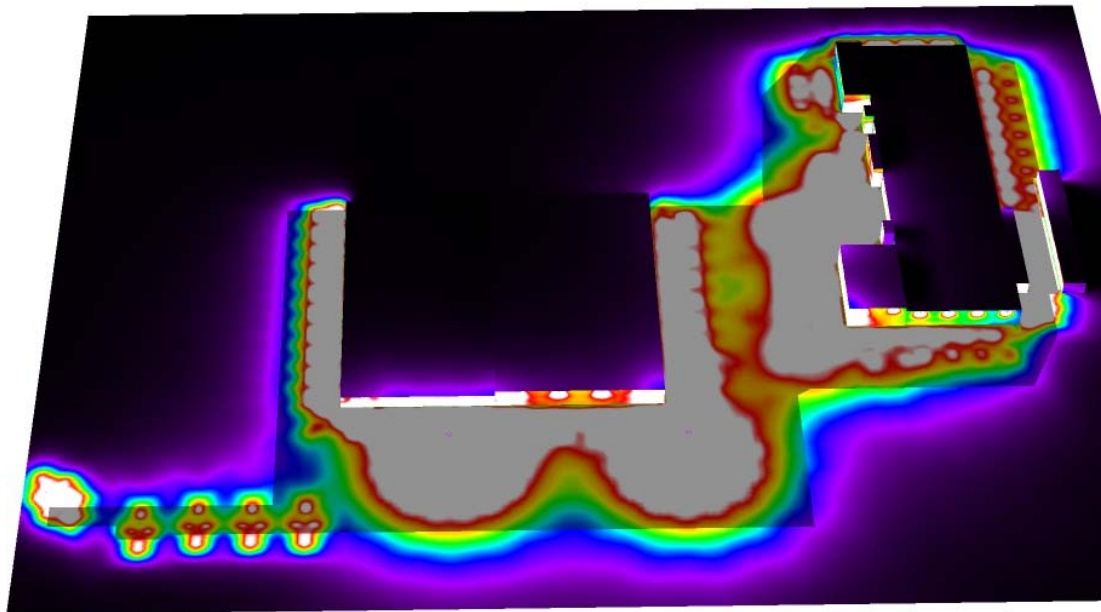




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### Exterior Scene 1 / False Colour Rendering



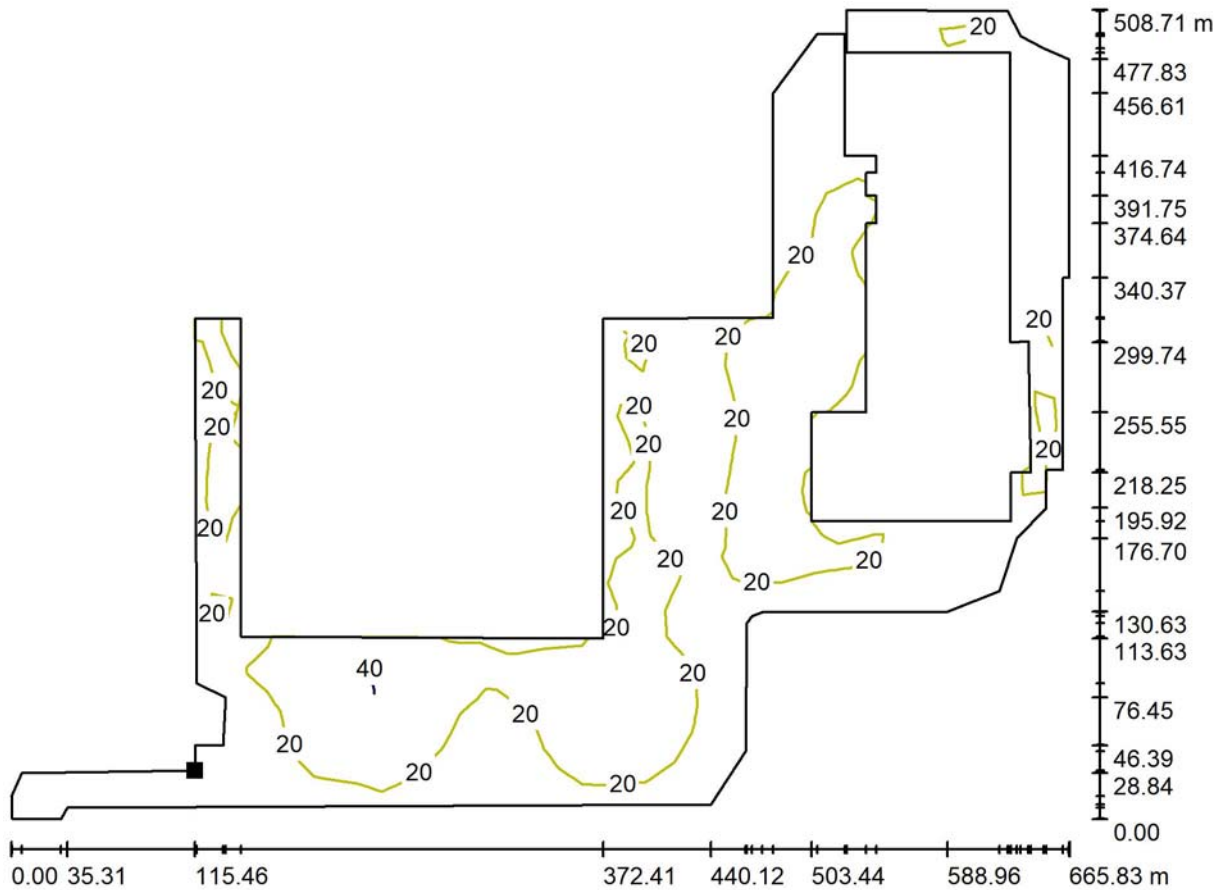
0      2.50      5      7.50      10      12.50      15      17.50      20      lx



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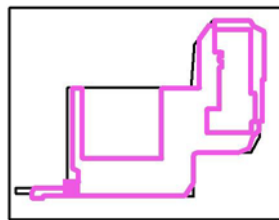
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### Exterior Scene 1 / Horizontal Value - Area Totale Esterna / Isolines (E, Horizontal)



Values in Lux, Scale 1 : 4761

Position of surface in external scene:  
 Marked point:  
 (292.362 m, 198.630 m, 0.000 m)



Grid: 37 x 27 Points

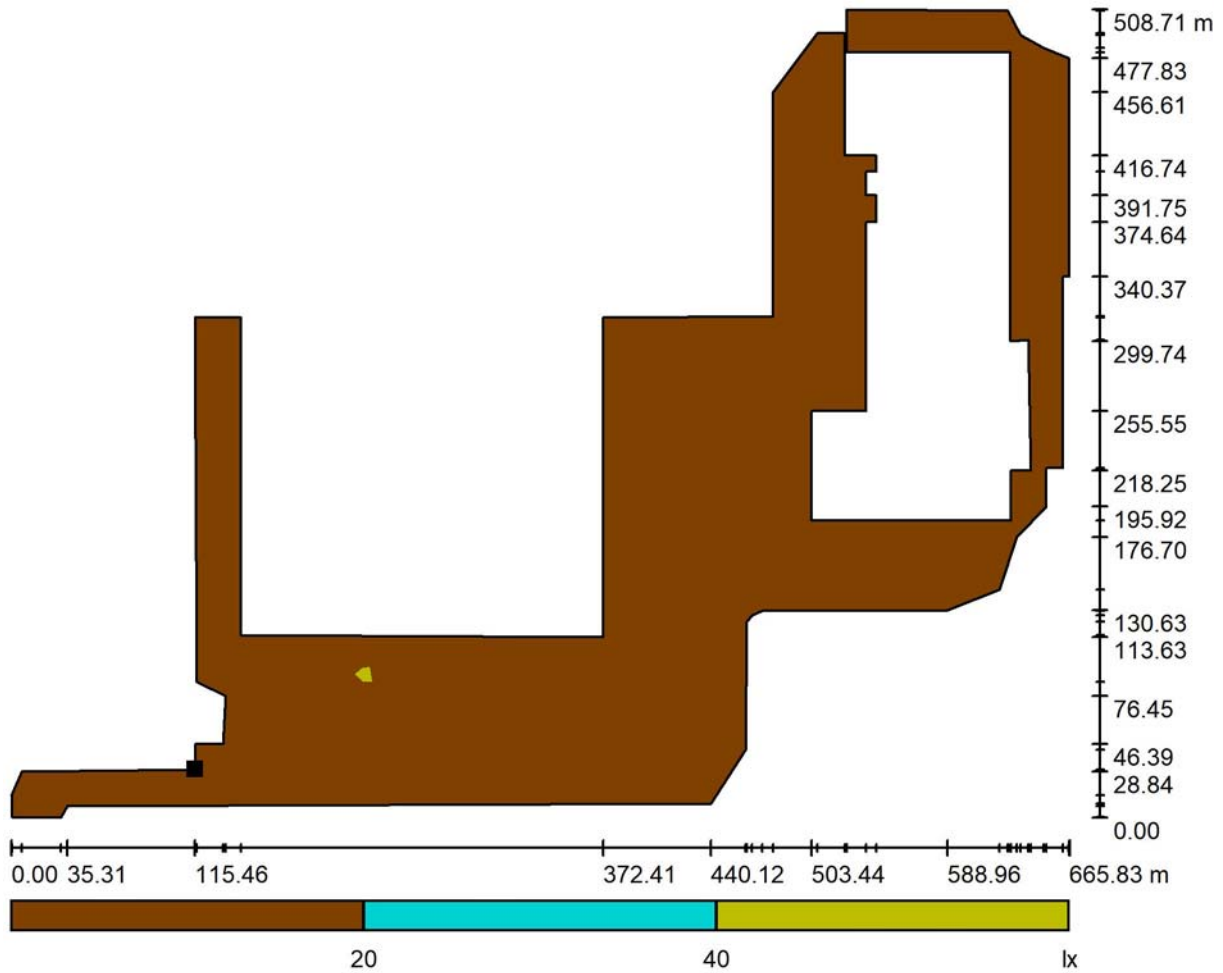
$E_{av}$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	u0	$E_{min} / E_{max}$
22	6.47	67	0.295	0.097



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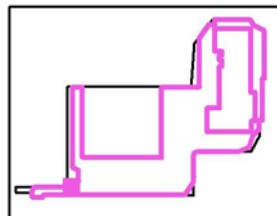
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**Exterior Scene 1 / Horizontal Value - Area Totale Esterna / Greyscale (E, Horizontal)**



Scale 1 : 4761

Position of surface in external scene:  
 Marked point:  
 (292.362 m, 198.630 m, 0.000 m)



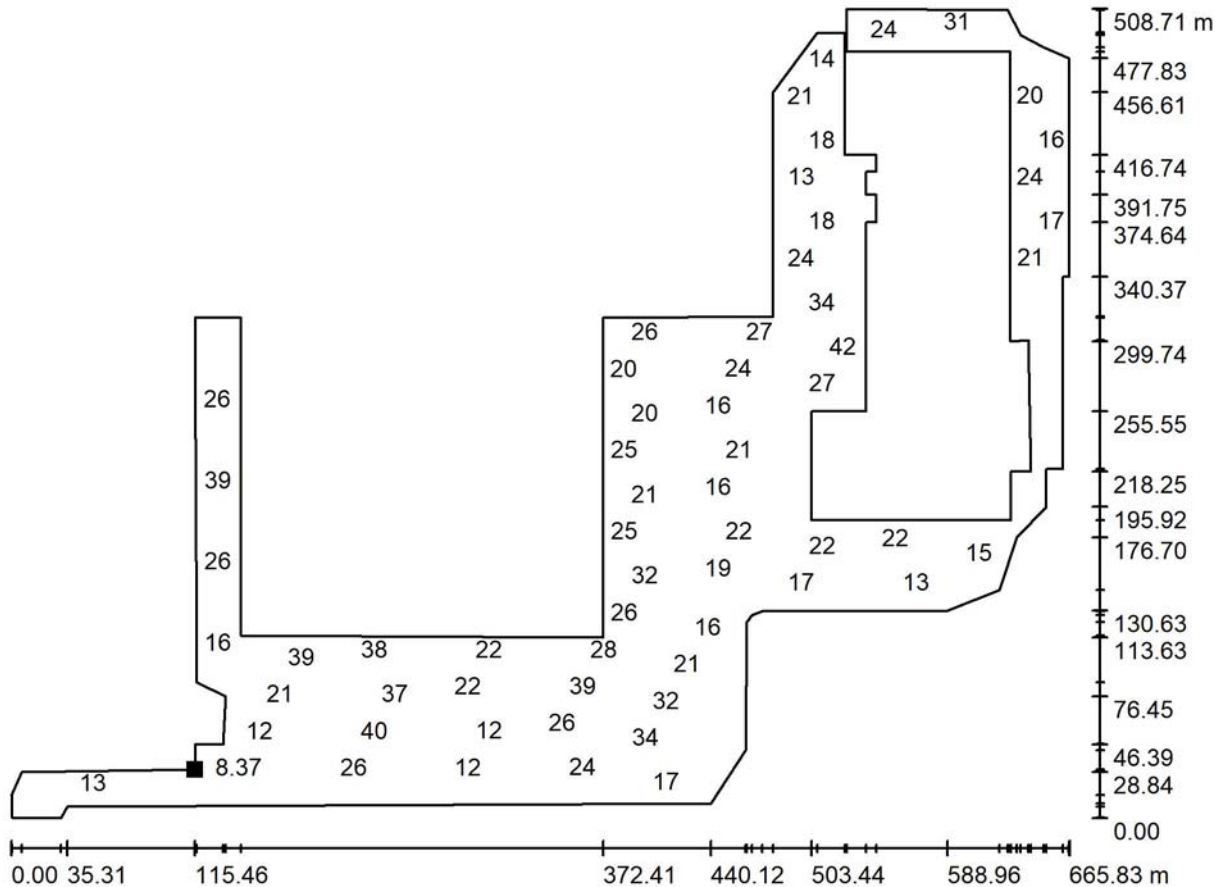
Grid: 37 x 27 Points

$E_{av}$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	$u_0$	$E_{min} / E_{max}$
22	6.47	67	0.295	0.097

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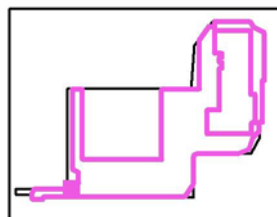
### Exterior Scene 1 / Horizontal Value - Area Totale Esterna / Value Chart (E, Horizontal)



Values in Lux, Scale 1 : 4761

Not all calculated values could be displayed.

Position of surface in external scene:  
 Marked point:  
 (292.362 m, 198.630 m, 0.000 m)



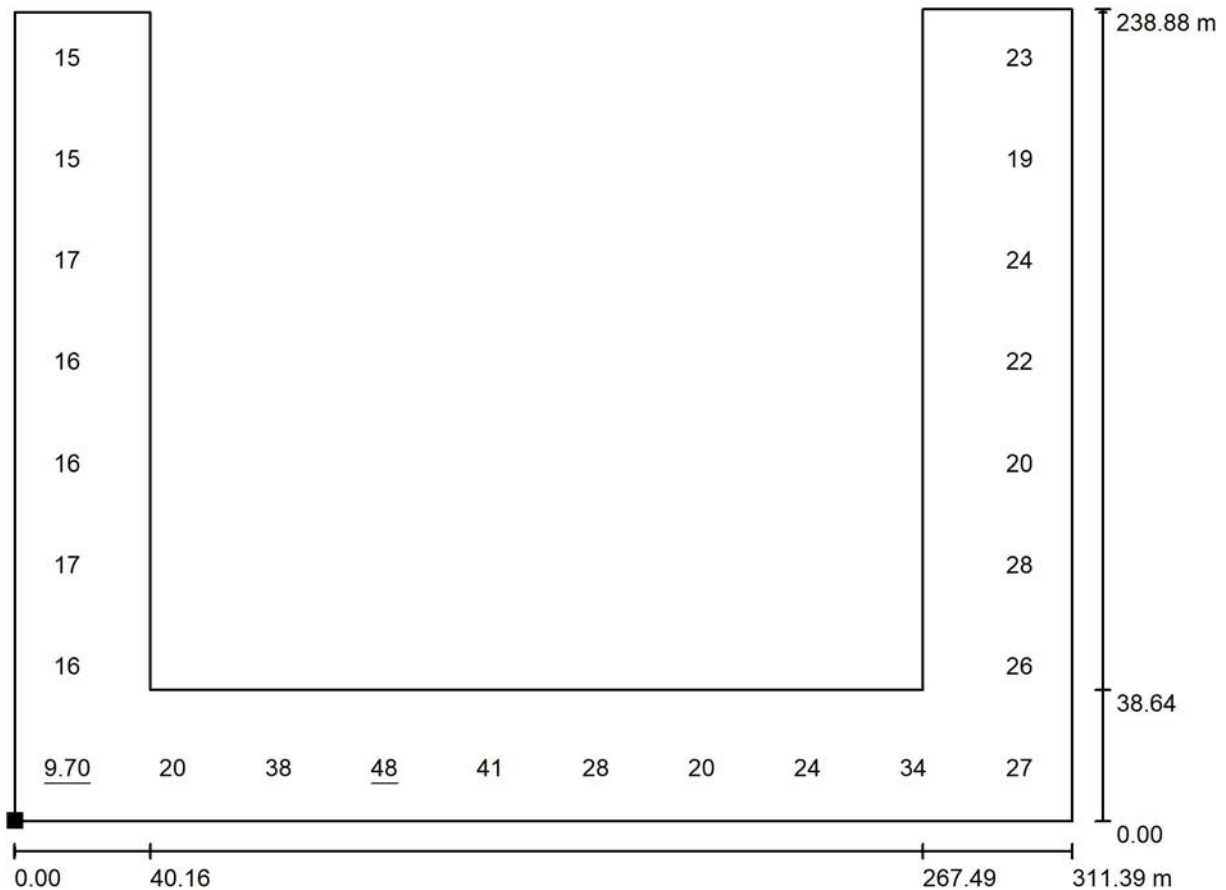
Grid: 37 x 27 Points

$E_{av}$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	u0	$E_{min} / E_{max}$
22	6.47	67	0.295	0.097

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### Exterior Scene 1 / Horizontal Value - Area Esterna Edificio B2 / Value Chart (E, Horizontal)

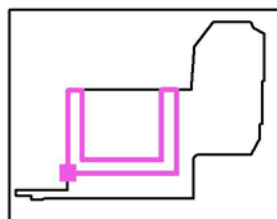


Values in Lux, Scale 1 : 2227

Not all calculated values could be displayed.

Position of surface in external scene:

Marked point:  
 (281.282 m, 244.910 m, 0.000 m)



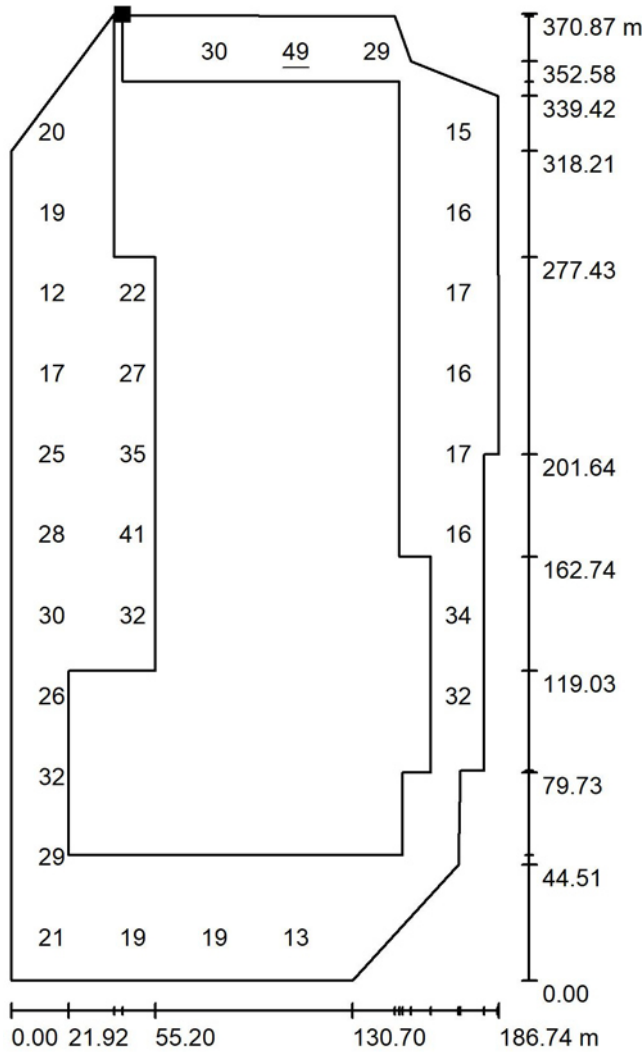
Grid: 10 x 8 Points

$E_{av}$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	$u_0$	$E_{min} / E_{max}$
23	9.70	48	0.413	0.204

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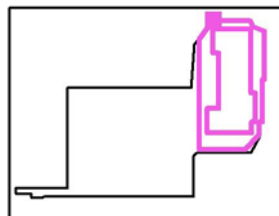
### Exterior Scene 1 / Horizontal Value - Area Esterna Edificio B1 / Value Chart (E, Horizontal)



Values in Lux, Scale 1 : 2901

Not all calculated values could be displayed.

Position of surface in external scene:  
 Marked point:  
 (699.060 m, 677.063 m, 0.000 m)



Grid: 12 x 6 Points

$E_{av}$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	u0	$E_{min} / E_{max}$
23	8.32	49	0.357	0.171