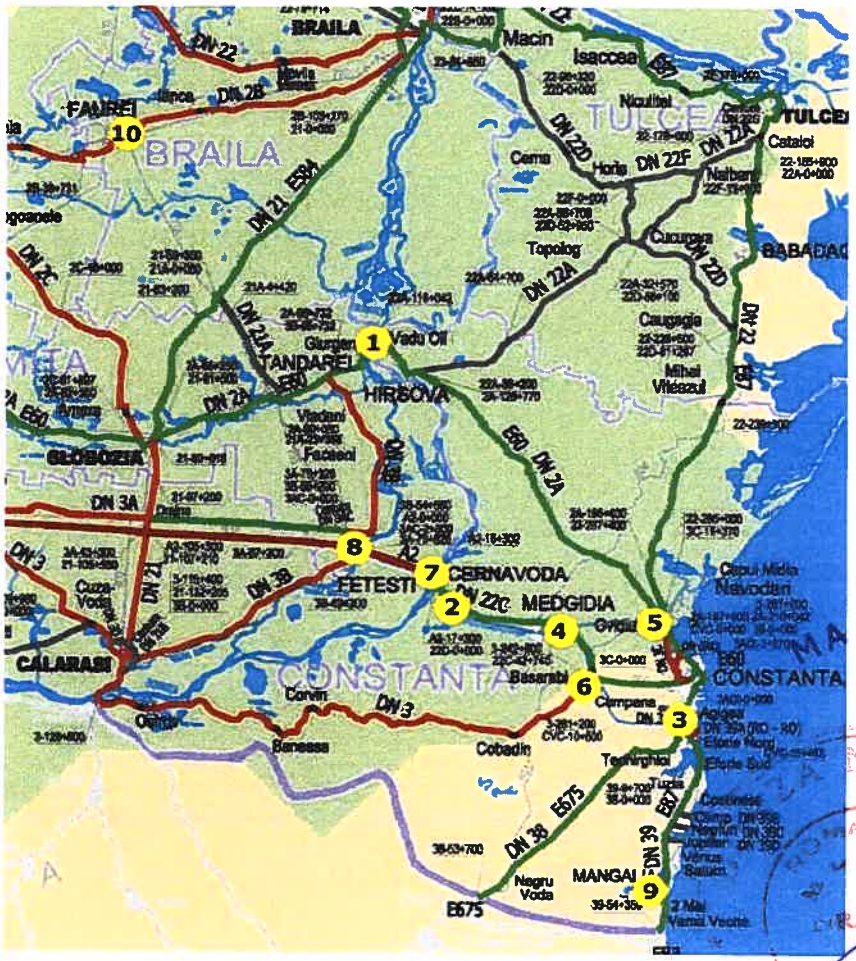
RNCMNR – ROMANIAN NATIONAL COMPANY OF MOTORWAYS AND NATIONAL ROADS

CONSULTING SERVICES FOR DESIGN AND WORKS SUPERVISION OF 10 BRIDGES IN DOBROGEA AREA



Detailed Design

Volumes series 3 – Electrical works

Volume 3.2 – Illuminotechnics Calculation

October 2008

Louis Berger Group, Inc.

INVESTOR/INVESTITOR

ROMANIAN NATIONAL COMPANY OF MOTORWAYS AND NATIONAL ROADS

COMPANIA NATIONALA DE AUTOSTRAZI SI DRUMURI NATIONALE DIN ROMANIA

DESIGNER/PROIECTANT

LOUIS BERGER GROUP inc.

CONSULTING SERVICES FOR DESIGN AND WORKS SUPERVISION OF 10 BRIDGES IN DOBROGEA AREA

DETAILED DESIGN

GENERAL DOCUMENTS

DD - GD - 10

DESIGN TEAM LEADER

Vittorio Ascoli Marcheggiani

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ILLUMINOTECHNICS CALCOLATION

CONSULTANTS

SOLIDUS s.r.l. - Roma Italia
Francesco Del Tosto
Romano Tucci

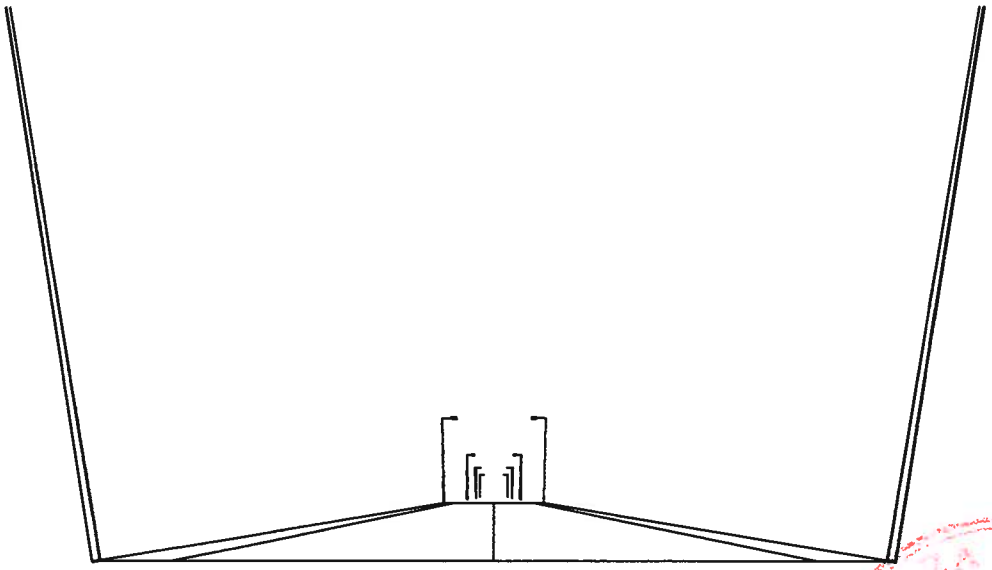
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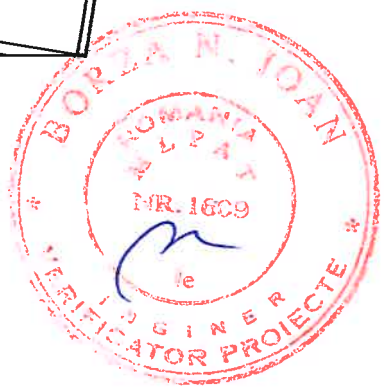
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08 sept 2008	0	issue	SOLIDUS	ASCOLI		

BRIDGE N.1

Installation Notes: ROMANIAN NATIONAL COMPANY OF MOTORWEYS AND NATIONAL ROADS
Customer:
Project Code:
Date: 07/08/2008

Notes:





DESIGNER NAME: LOUIS BERGER GROUP inc.
Address:
Tel.-Fax:

Remarks:

1.1 Area Information

Surface	Dimensions [m]	Angle[°]	Color	Coefficient Reflectance	Average Illum. [lux]	Ave.Luminance [cd/m²]
Marc_A	46.00x1.60	Plane	RGB=168,168,168	55%	24	4.2
Carregg_A	46.00x6.90	Plane	RGB=126,126,126	C2 7.01%	36	2.3
Carregg_B	46.00x6.90	Plane	RGB=126,126,126	C2 7.01%	36	2.3
Marc_B	46.00x1.60	Plane	RGB=168,168,168	55%	24	4.2

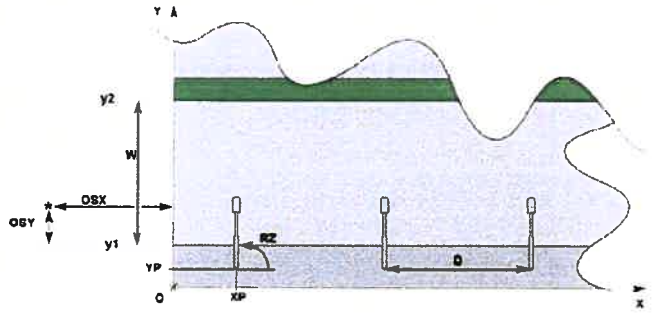
Dimensions of Area Bounding Box [m]: 46.00x17.00x0.00

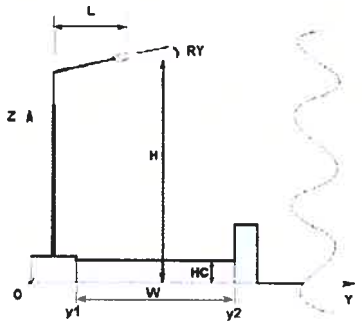
Roads Data

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	h Lane [m] (HC)	color	R Table	Refl. Coeff. q0 Factor	Observer x [m](OSX)	Observer y [m](OSY)
Marc_A	1.60	0.00	1.60	1	0.00	RGB=168,168,168		55.00		
Carregg_A	6.90	1.60	8.50	6	0.00	RGB=126,126,126	C2	7.01	-60.00	1.73
Carregg_B	6.90	8.50	15.40	6	0.00	RGB=126,126,126	C2	7.01	60.00	5.18
Marc_B	1.60	15.40	17.00	1	0.00	RGB=168,168,168		55.00		

Installation Data (Luminaires File)

File Name	1° Pole x [m] (XP)	1° Pole y [m] (YP)	Lum. Height [m] (H)	No. Poles	Interd. [m] (D)	Bracket [m] (L)	Lum.Incl. [°] (RY)	Bracket Rot. [°] (RZ)	Lateral Incl. [°] (RX)	Maint.Coeff. [%]	Code Luminaire	Flux [lm]	Refer.
Fila A	0.00	0.00	14.00	---	46.00	2.00	0	90	0	80.00	LUMADAVPHPST25033000		A
Fila B	0.00	17.00	14.00	---	46.00	2.00	0	270	0	80.00	LUMADAVPHPST25033000		A





1.2 Uniformity Installation Parameters

Surface	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
Working Plane (h=0.00 m)	Horizontal Illuminance (E)	34 lux	17 lux	71 lux	0.49	0.23	0.47
Marc_A	Horizontal Illuminance (E)	24 lux	17 lux	36 lux	0.71	0.47	0.67
Carregg_A	Horizontal Illuminance (E)	36 lux	19 lux	71 lux	0.55	0.28	0.50
Carregg_B	Horizontal Illuminance (E)	36 lux	19 lux	71 lux	0.55	0.28	0.50
Marc_B	Horizontal Illuminance (E)	24 lux	17 lux	36 lux	0.71	0.47	0.67
Marc_A	Luminance (L)	4.2 cd/m²	3.0 cd/m²	6.3 cd/m²	0.71	0.47	0.67
Carregg_A	Luminance (L)	2.3 cd/m²	1.8 cd/m²	3.0 cd/m²	0.78	0.58	0.74
Carregg_B	Luminance (L)	2.3 cd/m²	1.8 cd/m²	3.0 cd/m²	0.78	0.58	0.74
Marc_B	Luminance (L)	4.2 cd/m²	3.0 cd/m²	6.3 cd/m²	0.71	0.47	0.67

Calculation Type: Only Dir. + Furnit.

Visual Comfort

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Marc_A	1.60	0.00	1.60	1		55.00					
Carregg_A	6.90	1.60	8.50	6	C2	7.01	-60.00	3.33	0.24	6.75	0.80
Carregg_B	6.90	8.50	15.40	6	C2	7.01	106.00	13.68	0.24	6.75	0.80
Marc_B	1.60	15.40	17.00	1		55.00					

Light Pollution

Average Ratio - Rn -	Maximum Intensity
0.00 %	399 cd/klm

2.1 Luminaire/Measurements Info

Ref.	Line	Luminaire Name (Measur. Name)	Luminaire Code (Measur. Code)	Luminaires N.	Ref.Lamps	Lamps N.
A	GRECHI Lumada VP	LUMADA VP 250W HPST/SAP (LUMADA VP 250W HPST/SAPT)	LUMADAVPHPST250 (020250LUMADAVPHPST)	16	LMP-A	1

2.2 Lamps Info

Ref.Lamps	Type	Code	Flux [lm]	Wattage [W]	Color [°K]	N.
LMP-A	ST 250	NAVT250SUPER	33000	250	2000	16

2.3 Luminaire Table

Ref.	Lum.	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Luminaire Code	Coeff. Mant.	Lamp Code	Flux [lm]
A	1	X	-138.00;2.00;14.00	0;0;-90	LUMADAVPHPST250	0.80	NAVT250SUPER	1*33000
	2	X	-92.00;2.00;14.00	0;0;-90		0.80		
	3	X	-46.00;2.00;14.00	0;0;-90		0.80		
	4	X	0.00;2.00;14.00	0;0;-90		0.80		
	5	X	46.00;2.00;14.00	0;0;-90		0.80		
	6	X	92.00;2.00;14.00	0;0;-90		0.80		
	7	X	138.00;2.00;14.00	0;0;-90		0.80		
	8	X	184.00;2.00;14.00	0;0;-90		0.80		
	9	X	-138.00;15.00;14.00	0;0;90		0.80		
	10	X	-92.00;15.00;14.00	0;0;90		0.80		
	11	X	-46.00;15.00;14.00	0;0;90		0.80		
	12	X	0.00;15.00;14.00	0;0;90		0.80		
	13	X	46.00;15.00;14.00	0;0;90		0.80		
	14	X	92.00;15.00;14.00	0;0;90		0.80		
	15	X	138.00;15.00;14.00	0;0;90		0.80		
	16	X	184.00;15.00;14.00	0;0;90		0.80		

2.4 Aiming Summary Table

Mast	Row	Culumn	Ref. 2D	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Aiming X[m] Y[m] Z[m]	R.Axis [°]	Coeff. Mant.	Ref.
			L-1	X	-138.00;2.00;14.00	0;0;-90	-138.00;2.00;0.00	-90	0.80	A
			L-2	X	-92.00;2.00;14.00	0;0;-90	-92.00;2.00;0.00	-90	0.80	A
			L-3	X	-46.00;2.00;14.00	0;0;-90	-46.00;2.00;0.00	-90	0.80	A
			L-4	X	0.00;2.00;14.00	0;0;-90	0.00;2.00;0.00	-90	0.80	A
			L-5	X	46.00;2.00;14.00	0;0;-90	46.00;2.00;0.00	-90	0.80	A
			L-6	X	92.00;2.00;14.00	0;0;-90	92.00;2.00;0.00	-90	0.80	A
			L-7	X	138.00;2.00;14.00	0;0;-90	138.00;2.00;0.00	-90	0.80	A
			L-8	X	184.00;2.00;14.00	0;0;-90	184.00;2.00;0.00	-90	0.80	A
			L-9	X	-138.00;15.00;14.00	0;0;90	-138.00;15.00;0.00	90	0.80	A
			L-10	X	-92.00;15.00;14.00	0;0;90	-92.00;15.00;0.00	90	0.80	A
			L-11	X	-46.00;15.00;14.00	0;0;90	-46.00;15.00;0.00	90	0.80	A
			L-12	X	0.00;15.00;14.00	0;0;90	0.00;15.00;0.00	90	0.80	A
			L-13	X	46.00;15.00;14.00	0;0;90	46.00;15.00;0.00	90	0.80	A
			L-14	X	92.00;15.00;14.00	0;0;90	92.00;15.00;0.00	90	0.80	A
			L-15	X	138.00;15.00;14.00	0;0;90	138.00;15.00;0.00	90	0.80	A
			L-16	X	184.00;15.00;14.00	0;0;90	184.00;15.00;0.00	90	0.80	A

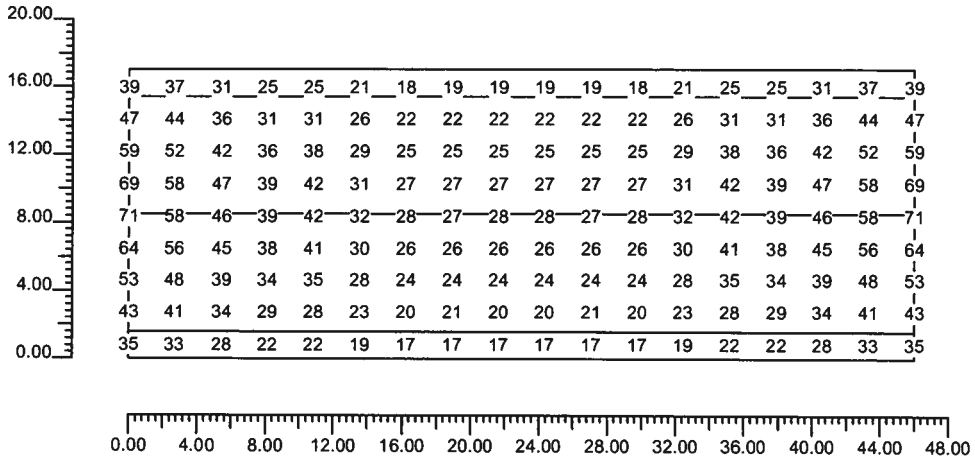
3.1 Horizontal Illuminance Values on the Working Plane

O (x:0.00 y:0.00 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:2.71 DY:0.94	Horizontal Illuminance (E)	34 lux	17 lux	71 lux	0.49	0.23	0.47

Calculation Type: Only Dir. + Furnit.

Scale 1/400

Not all the calculated points are visible



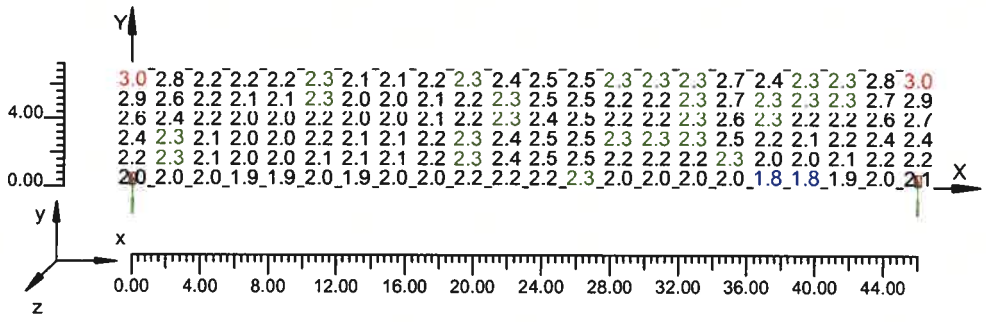
3.2 Luminance Values on:Carregg_A

O (x:0.00 y:1.60 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:2.19 DY:1.15	Luminance (L)	2.3 cd/m²	1.8 cd/m²	3.0 cd/m²	0.78	0.58	0.74

Calculation Type: Only Dir. + Furnit.

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Carregg_A	6.90	1.60	8.50	6	C2	7.01	-60.00	3.33	0.24	6.75	0.80

Scale 1/400



General Info 1

1. Project Data

1.1 Area Information 2
1.2 Uniformity Installation Parameters 2

2. Luminaire Data

2.1 Luminaire/Measurements Info 4
2.2 Lamps Info 4
2.3 Luminaire Table 4
2.4 Aiming Summary Table 4

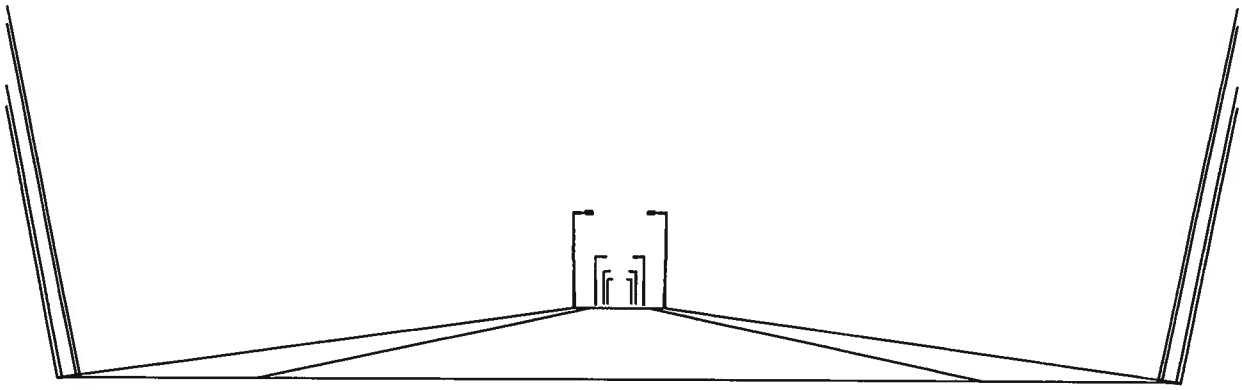
3. Results Table

3.1 Horizontal Illuminance Values on the Working Plane 5
3.2 Luminance Values on:Carregg_A 6

BRIDGE N.2

Installation Notes: ROMANIAN NATIONAL COMPANY OF MOTORWEYS AND NATIONAL ROADS
Customer:
Project Code:
Date: 02/07/2008

Notes:



DESIGNER NAME: LOUIS BERGER GROUP inc.
Address:
Tel.-Fax:

Remarks:

1.1 Area Information

Surface	Dimensions [m]	Angle[°]	Color	Coefficient Reflectance	Average Illum. [lux]	Ave.Luminance [cd/m²]
Marc_A	41.00x2.10	Plane	RGB=168,168,168	55%	28	5.0
Carregg_A	41.00x7.80	Plane	RGB=126,126,126	C2 7.01%	36	2.5
Marc_B	41.00x2.10	Plane	RGB=168,168,168	55%	28	5.0

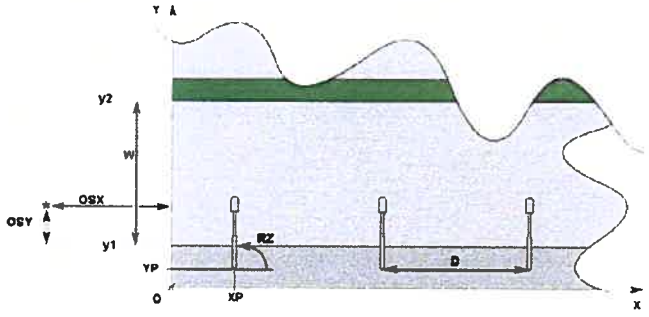
Dimensions of Area Bounding Box [m]: 41.00x12.00x0.00

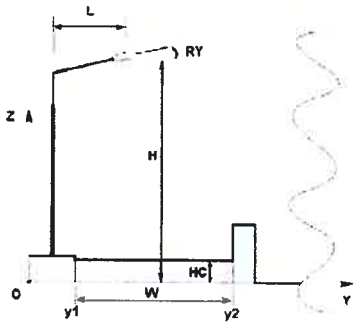
Roads Data

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	h Lane [m] (HC)	color	R Table	Refl. Coeff. q0 Factor	Observer x [m](OSX)	Observer y [m](OSY)
Marc_A	2.10	0.00	2.10	1	0.00	RGB=168,168,168		55.00		
Carregg_A	7.80	2.10	9.90	12	0.00	RGB=126,126,126	C2	7.01	-60.00	1.95
Marc_B	2.10	9.90	12.00	1	0.00	RGB=168,168,168		55.00		

Installation Data (Luminaires File)

File Name	1° Pole x [m] (XP)	1° Pole y [m] (YP)	Lum. Height [m] (H)	No. Poles	Interd. [m] (D)	Bracket [m] (L)	Lum.Incl. [°] (RY)	Bracket Rot. [°] (RZ)	Lateral Incl. [°] (RX)	Maint.Coeff. [%]	Code Luminaire	Flux [lm]	Refer.
Fila A	0.00	0.10	12.00	---	41.00	2.00	0	90	0	80.00	ORIGIA800250HPST27000		A
Fila B	0.00	11.90	12.00	---	41.00	2.00	0	270	0	80.00	ORIGIA800250HPST27000		A





1.2 Uniformity Installation Parameters

Surface	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
Working Plane (h=0.00 m)	Horizontal Illuminance (E)	33 lux	16 lux	61 lux	0.47	0.25	0.54
Marc_A	Horizontal Illuminance (E)	28 lux	17 lux	45 lux	0.58	0.37	0.63
Carregg_A	Horizontal Illuminance (E)	36 lux	19 lux	61 lux	0.53	0.31	0.58
Marc_B	Horizontal Illuminance (E)	28 lux	17 lux	45 lux	0.58	0.37	0.63
Marc_A	Luminance (L)	5.0 cd/m²	2.9 cd/m²	7.9 cd/m²	0.58	0.37	0.63
Carregg_A	Luminance (L)	2.5 cd/m²	2.1 cd/m²	2.8 cd/m²	0.83	0.74	0.89
Marc_B	Luminance (L)	5.0 cd/m²	2.9 cd/m²	7.9 cd/m²	0.58	0.37	0.63

Calculation Type: Only Dir. + Furnit.

Visual Comfort

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Marc_A	2.10	0.00	2.10	1		55.00					
Carregg_A	7.80	2.10	9.90	12	C2	7.01	-60.00	4.05	0.37	9.65	0.82
Marc_B	2.10	9.90	12.00	1		55.00					

Light Pollution

Average Ratio - Rn -	Maximum Intensity
0.16 %	382 cd/klm

2.1 Luminaire/Measurements Info

Ref.	Line	Luminaire Name (Measur. Name)	Luminaire Code (Measur. Code)	Luminaires N.	Ref.Lamps	Lamps N.
A	GRECHI Origia 800	ORIGIA 800 250W HPST/SAPT (ORIGIA 800 250W HPST/SAPT)	ORIGIA800250HPST (010250ORIGIA80HPST)	12	LMP-A	1

2.2 Lamps Info

Ref.Lamps	Type	Code	Flux [lm]	Wattage [W]	Color [°K]	N.
LMP-A	ST 250	NAVT250	27000	250	2000	12

2.3 Luminaire Table

Ref.	Lum.	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Luminaire Code	Coeff. Mant.	Lamp Code	Flux [lm]
A	1	X	-41.00;2.10;12.00	0;0;-90	ORIGIA800250HPST	0.80	NAVT250	1*27000
	2	X	0.00;2.10;12.00	0;0;-90		0.80		
	3	X	41.00;2.10;12.00	0;0;-90		0.80		
	4	X	82.00;2.10;12.00	0;0;-90		0.80		
	5	X	123.00;2.10;12.00	0;0;-90		0.80		
	6	X	164.00;2.10;12.00	0;0;-90		0.80		
	7	X	-41.00;9.90;12.00	0;0;90		0.80		
	8	X	0.00;9.90;12.00	0;0;90		0.80		
	9	X	41.00;9.90;12.00	0;0;90		0.80		
	10	X	82.00;9.90;12.00	0;0;90		0.80		
	11	X	123.00;9.90;12.00	0;0;90		0.80		
	12	X	164.00;9.90;12.00	0;0;90		0.80		

2.4 Aiming Summary Table

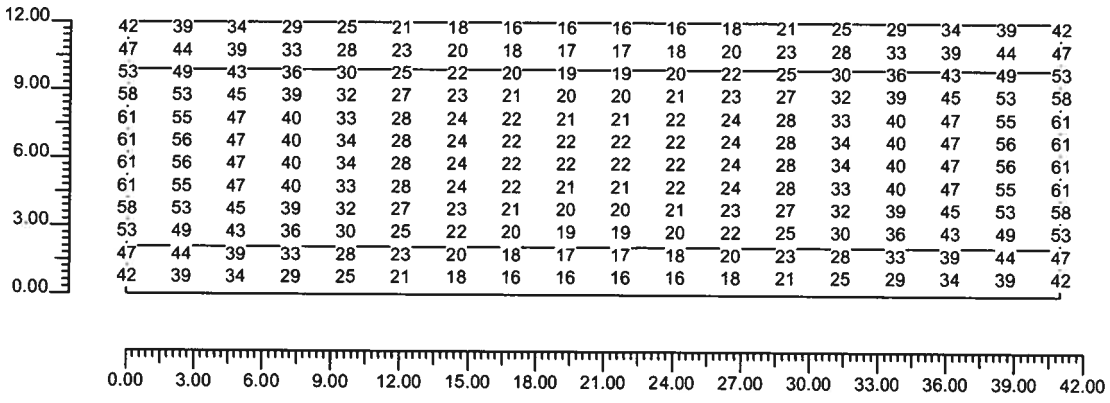
Mast	Row	Culumn	Ref. 2D	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Aiming X[m] Y[m] Z[m]	R.Axis [°]	Coeff. Mant.	Ref.
			L-1	X	-41.00;2.10;12.00	0;0;-90	-41.00;2.10;0.00	-176	0.80	A
			L-2	X	0.00;2.10;12.00	0;0;-90	0.00;2.10;0.00	-90	0.80	A
			L-3	X	41.00;2.10;12.00	0;0;-90	41.00;2.10;0.00	-90	0.80	A
			L-4	X	82.00;2.10;12.00	0;0;-90	82.00;2.10;0.00	-2	0.80	A
			L-5	X	123.00;2.10;12.00	0;0;-90	123.00;2.10;0.00	-2	0.80	A
			L-6	X	164.00;2.10;12.00	0;0;-90	164.00;2.10;0.00	-1	0.80	A
			L-7	X	-41.00;9.90;12.00	0;0;90	-41.00;9.90;0.00	14	0.80	A
			L-8	X	0.00;9.90;12.00	0;0;90	0.00;9.90;0.00	90	0.80	A
			L-9	X	41.00;9.90;12.00	0;0;90	41.00;9.90;0.00	90	0.80	A
			L-10	X	82.00;9.90;12.00	0;0;90	82.00;9.90;0.00	173	0.80	A
			L-11	X	123.00;9.90;12.00	0;0;90	123.00;9.90;0.00	173	0.80	A
			L-12	X	164.00;9.90;12.00	0;0;90	164.00;9.90;0.00	176	0.80	A

3.1 Horizontal Illuminance Values on the Working Plane

O (x:0.00 y:0.00 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:2.41 DY:1.00	Horizontal Illuminance (E)	33 lux	16 lux	61 lux	0.47	0.25	0.54

Calculation Type: Only Dir. + Furnit.

Scale 1/300



3.2 Luminance Values on:Carregg_A

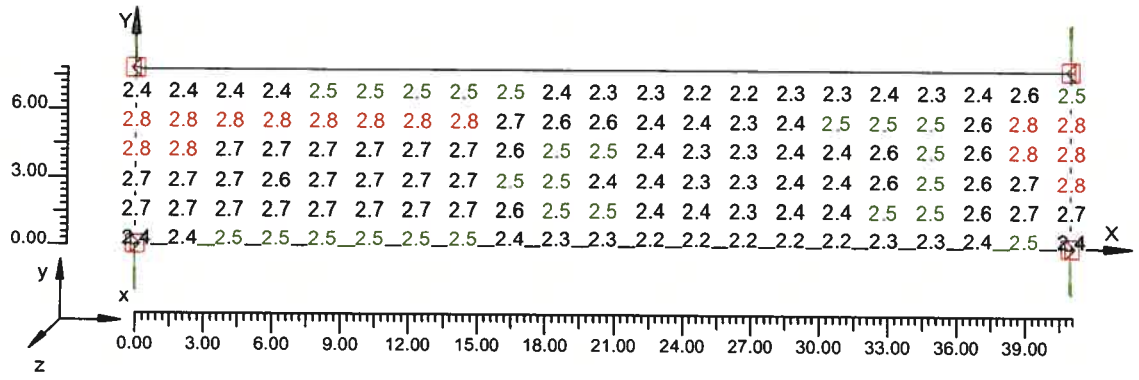
O (x:0.00 y:2.10 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:2.05 DY:0.65	Luminance (L)	2.5 cd/m²	2.1 cd/m²	2.8 cd/m²	0.83	0.74	0.89

Calculation Type: Only Dir. + Furnit.

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Carregg_A	7.80	2.10	9.90	12	C2	7.01	-60.00	4.05	0.37	9.65	0.82

Scale 1/300

Not all the calculated points are visible



General Info 1

1. Project Data

1.1 Area Information 2
1.2 Uniformity Installation Parameters 2

2. Luminaire Data

2.1 Luminaire/Measurements Info 4
2.2 Lamps Info 4
2.3 Luminaire Table 4
2.4 Aiming Summary Table 4

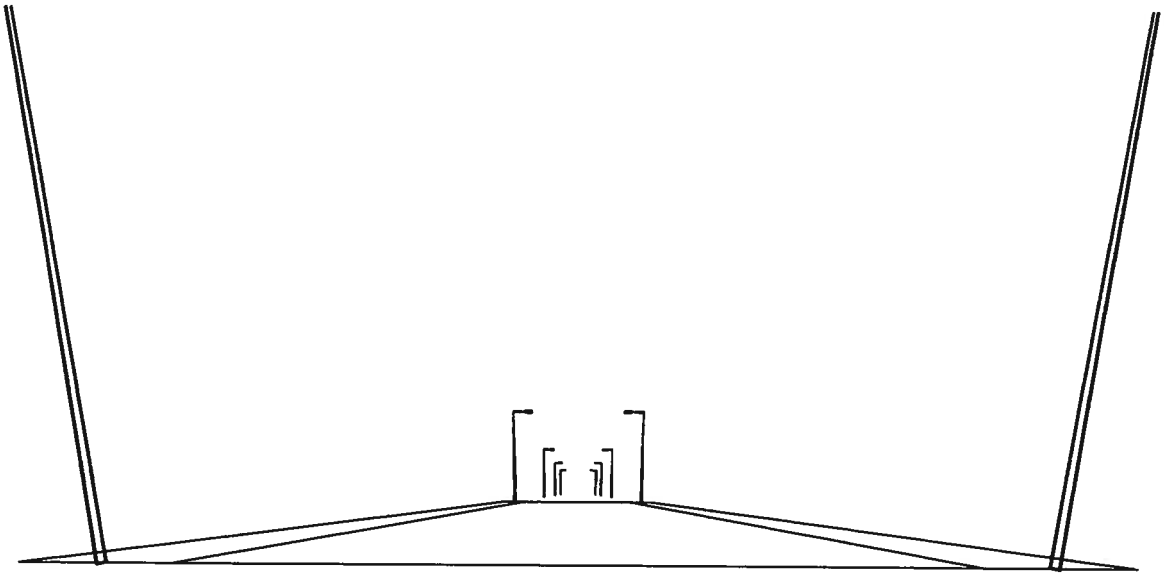
3. Results Table

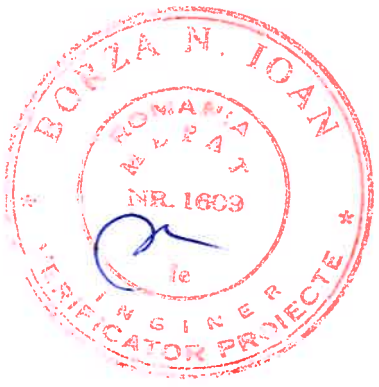
3.1 Horizontal Illuminance Values on the Working Plane 5
3.2 Luminance Values on:Carregg_A 6

BRIDGE N.3

Installation Notes:
Customer: ROMANIAN NATIONAL COMPANY OF MOTORWEYS AND NATIONAL ROADS
Project Code:
Date: 07/08/2008

Notes:





DESIGNER NAME: LOUIS BERGER GROUP inc.
Address:
Tel.-Fax:

Remarks:

1.1 Area Information

Surface	Dimensions [m]	Angle[°]	Color	Coefficient Reflectance	Average Illum. [lux]	Ave.Luminance [cd/m²]
Marc_A	41.00x2.80	Plane	RGB=168,168,168	55%	23	4.0
Carregg_A	41.00x14.80	Plane	RGB=126,126,126	C2 7.01%	34	2.3
Marc_B	41.00x2.80	Plane	RGB=168,168,168	55%	23	4.0

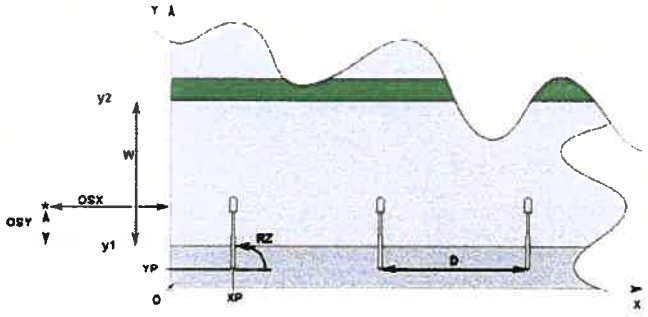
Dimensions of Area Bounding Box [m]: 41.00x20.40x0.00

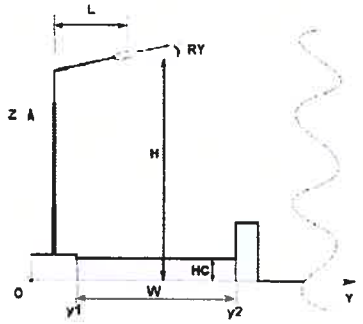
Roads Data

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	h Lane [m] (HC)	color	R Table	Refl. Coeff. q0 Factor	Observer x [m](OSX)	Observer y [m](OSY)
Marc_A	2.80	0.00	2.80	1	0.00	RGB=168,168,168		55.00		
Carregg_A	14.80	2.80	17.60	12	0.00	RGB=126,126,126	C2	7.01	-60.00	3.70
Marc_B	2.80	17.60	20.40	1	0.00	RGB=168,168,168		55.00		

Installation Data (Luminaires File)

File Name	1° Pole x [m] (XP)	1° Pole y [m] (YP)	Lum. Height [m] (H)	No. Poles	Interd. [m] (D)	Bracket [m] (L)	Lum.Incl. [°] (RY)	Bracket Rot. [°] (RZ)	Lateral Incl. [°] (RX)	Maint.Coeff. [%]	Code Luminaire	Flux [lm]	Refer.
Fila A	0.00	1.50	12.00	---	41.00	2.00	0	90	0	80.00	ORIGIA800250HPST33000		A
Fila B	0.00	18.90	12.00	---	41.00	2.00	0	270	0	80.00	ORIGIA800250HPST33000		A





1.2 Uniformity Installation Parameters

Surface	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
Working Plane (h=0.00 m)	Horizontal Illuminance (E)	31 lux	12 lux	62 lux	0.40	0.20	0.50
Marc_A	Horizontal Illuminance (E)	23 lux	14 lux	35 lux	0.60	0.38	0.64
Carregg_A	Horizontal Illuminance (E)	34 lux	17 lux	62 lux	0.50	0.27	0.55
Marc_B	Horizontal Illuminance (E)	23 lux	14 lux	35 lux	0.60	0.38	0.64
Marc_A	Luminance (L)	4.0 cd/m²	2.4 cd/m²	6.2 cd/m²	0.60	0.38	0.64
Carregg_A	Luminance (L)	2.3 cd/m²	1.6 cd/m²	2.9 cd/m²	0.69	0.54	0.78
Marc_B	Luminance (L)	4.0 cd/m²	2.4 cd/m²	6.2 cd/m²	0.60	0.38	0.64

Calculation Type: Only Dir. + Furnit.

BRIDGE N.3
LOUIS BERGER GROUP inc.

07/08/2008

Visual Comfort

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Marc_A	2.80	0.00	2.80	1		55.00					
Carregg_A	14.80	2.80	17.60	12	C2	7.01	-60.00	6.50	0.35	9.93	0.71
Marc_B	2.80	17.60	20.40	1		55.00					

Light Pollution

Average Ratio - Rn -	Maximum Intensity
0.16 %	382 cd/klm

2.1 Luminaire/Measurements Info

Ref.	Line	Luminaire Name (Measur. Name)	Luminaire Code (Measur. Code)	Luminaires N.	Ref.Lamps	Lamps N.
A	GRECHI Origia 800	ORIGIA 800 250W HPST/SAPT (ORIGIA 800 250W HPST/SAPT)	ORIGIA800250HPST (010250ORIGIA80HPST)	12	LMP-A	1

2.2 Lamps Info

Ref.Lamps	Type	Code	Flux [lm]	Wattage [W]	Color [°K]	N.
LMP-A	ST 250	NAVT250SUPER	33000	250	2000	12

2.3 Luminaire Table

Ref.	Lum.	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Luminaire Code	Coeff. Mant.	Lamp Code	Flux [lm]
A	1	X	-41.00;3.50;12.00	0;0;-90	ORIGIA800250HPST	0.80	NAVT250SUPER	1*33000
	2	X	0.00;3.50;12.00	0;0;-90		0.80		
	3	X	41.00;3.50;12.00	0;0;-90		0.80		
	4	X	82.00;3.50;12.00	0;0;-90		0.80		
	5	X	123.00;3.50;12.00	0;0;-90		0.80		
	6	X	164.00;3.50;12.00	0;0;-90		0.80		
	7	X	-41.00;16.90;12.00	0;0;90		0.80		
	8	X	0.00;16.90;12.00	0;0;90		0.80		
	9	X	41.00;16.90;12.00	0;0;90		0.80		
	10	X	82.00;16.90;12.00	0;0;90		0.80		
	11	X	123.00;16.90;12.00	0;0;90		0.80		
	12	X	164.00;16.90;12.00	0;0;90		0.80		

2.4 Aiming Summary Table

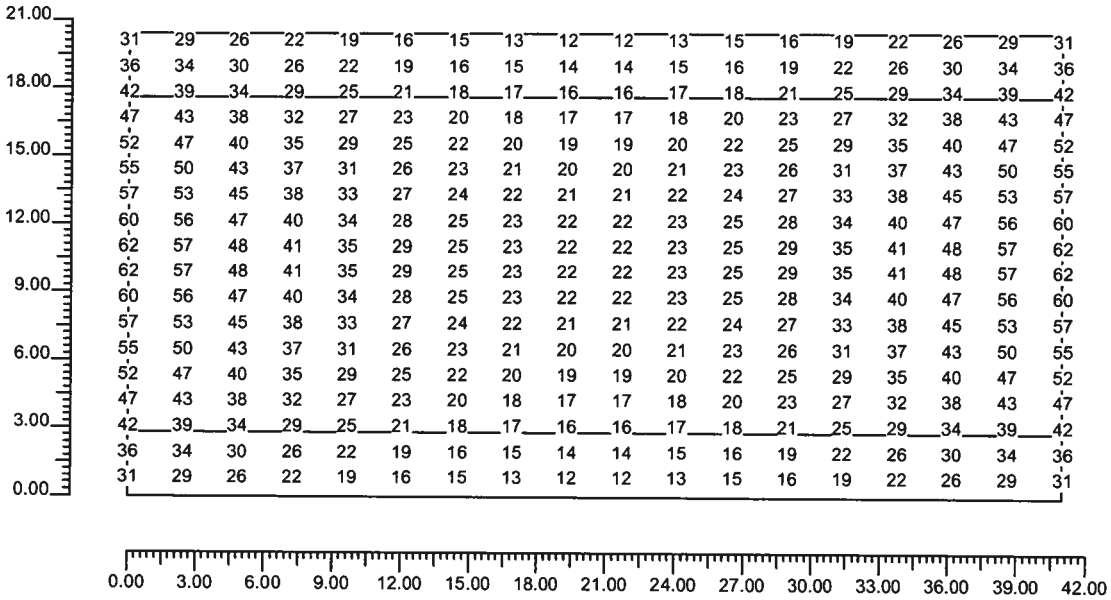
Mast	Row	Column	Ref. 2D	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Aiming X[m] Y[m] Z[m]	R.Axis [°]	Coeff. Mant.	Ref.
			L-1	X	-41.00;3.50;12.00	0;0;-90	-41.00;3.50;0.00	-180	0.80	A
			L-2	X	0.00;3.50;12.00	0;0;-90	0.00;3.50;0.00	-90	0.80	A
			L-3	X	41.00;3.50;12.00	0;0;-90	41.00;3.50;0.00	-90	0.80	A
			L-4	X	82.00;3.50;12.00	0;0;-90	82.00;3.50;0.00	0	0.80	A
			L-5	X	123.00;3.50;12.00	0;0;-90	123.00;3.50;0.00	0	0.80	A
			L-6	X	164.00;3.50;12.00	0;0;-90	164.00;3.50;0.00	0	0.80	A
			L-7	X	-41.00;16.90;12.00	0;0;90	-41.00;16.90;0.00	0	0.80	A
			L-8	X	0.00;16.90;12.00	0;0;90	0.00;16.90;0.00	90	0.80	A
			L-9	X	41.00;16.90;12.00	0;0;90	41.00;16.90;0.00	90	0.80	A
			L-10	X	82.00;16.90;12.00	0;0;90	82.00;16.90;0.00	180	0.80	A
			L-11	X	123.00;16.90;12.00	0;0;90	123.00;16.90;0.00	180	0.80	A
			L-12	X	164.00;16.90;12.00	0;0;90	164.00;16.90;0.00	180	0.80	A

3.1 Horizontal Illuminance Values on the Working Plane

O (x:0.00 y:0.00 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:2.41 DY:1.13	Horizontal Illuminance (E)	31 lux	12 lux	62 lux	0.40	0.20	0.50

Calculation Type: Only Dir. + Furnit.

Scale 1/300



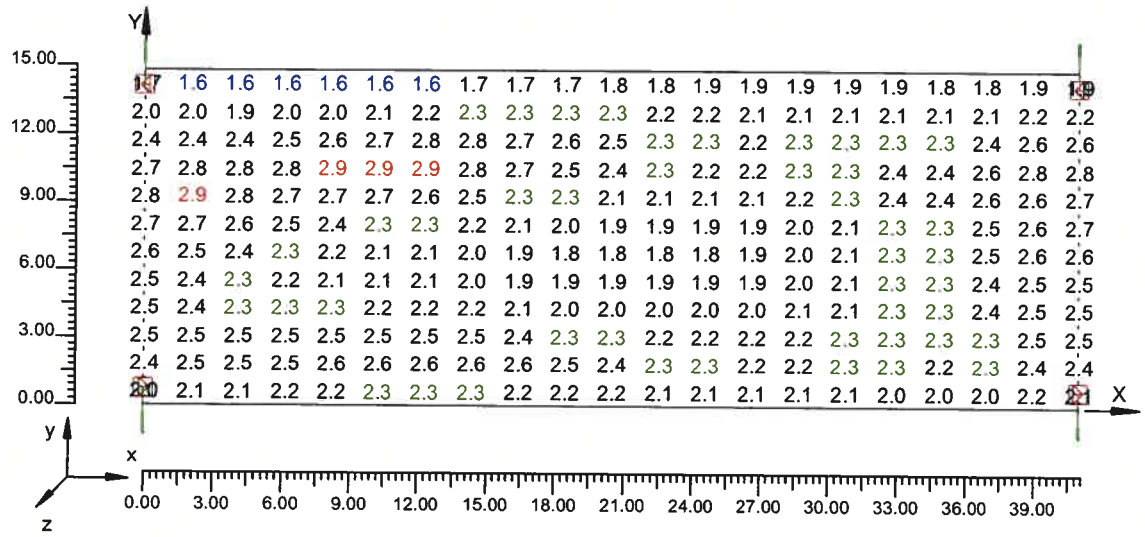
3.2 Luminance Values on:Carregg_A

O (x:0.00 y:2.80 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:2.05 DY:1.23	Luminance (L)	2.3 cd/m²	1.6 cd/m²	2.9 cd/m²	0.69	0.54	0.78

Calculation Type: Only Dir. + Furnit.

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Carregg_A	14.80	2.80	17.60	12	C2	7.01	-60.00	6.50	0.35	9.93	0.71

Scale 1/300



General Info 1

1. Project Data

1.1 Area Information 2
1.2 Uniformity Installation Parameters 2

2. Luminaire Data

2.1 Luminaire/Measurements Info 4
2.2 Lamps Info 4
2.3 Luminaire Table 4
2.4 Aiming Summary Table 4

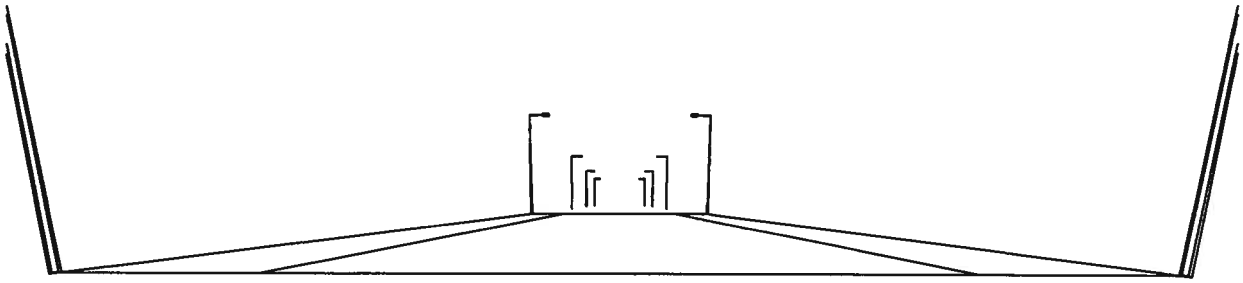
3. Results Table

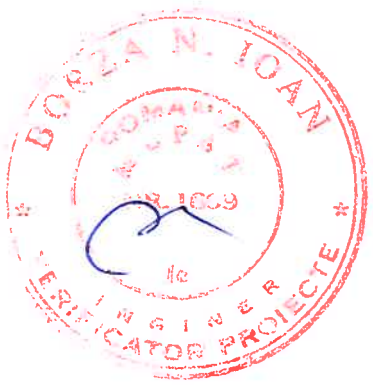
3.1 Horizontal Illuminance Values on the Working Plane 5
3.2 Luminance Values on:Carregg_A 6

BRIDGE N.4

Installation Notes:
Customer: ROMANIAN NATIONAL COMPANY OF MOTORWEYS AND NATIONAL ROADS
Project Code:
Date: 07/08/2008

Notes:





DESIGNER NAME: LOUIS BERGER GROUP inc.
Address:
Tel.-Fax:

Remarks:

1.1 Area Information

Surface	Dimensions [m]	Angle[°]	Color	Coefficient Reflectance	Average Illum. [lux]	Ave.Luminance [cd/m²]
Marc_A	36.50x3.90	Plane	RGB=168,168,168	55%	31	5.4
Carregg_A	36.50x14.00	Plane	RGB=126,126,126	C2 7.01%	41	2.5
Marc_B	36.50x3.90	Plane	RGB=168,168,168	55%	31	5.4

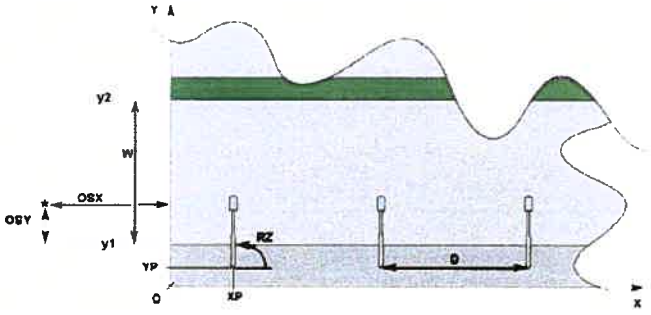
Dimensions of Area Bounding Box [m]: 36.50x21.80x0.00

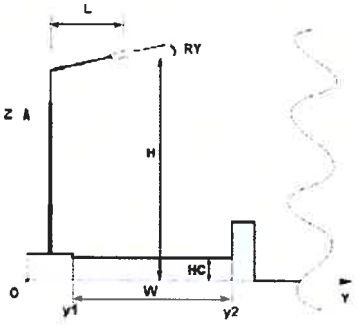
Roads Data

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	h Lane [m] (HC)	color	R Table	Refl. Coeff. q0 Factor	Observer x [m](OSX)	Observer y [m](OSY)
Marc_A	3.90	0.00	3.90	1	0.00	RGB=168,168,168		55.00		
Carregg_A	14.00	3.90	17.90	6	0.00	RGB=126,126,126	C2	7.01	-60.00	3.50
Marc_B	3.90	17.90	21.80	1	0.00	RGB=168,168,168		55.00		

Installation Data (Luminaires File)

File Name	1° Pole x [m] (XP)	1° Pole y [m] (YP)	Lum. Height [m] (H)	No. Poles	Interd. [m] (D)	Bracket [m] (L)	Lum.Incl. [°] (RY)	Bracket Rot. [°] (RZ)	Lateral Incl. [°] (RX)	Maint.Coeff. [%]	Code Luminaire	Flux [lm]	Refer.
Fila A	0.00	-0.10	12.00	---	36.50	2.00	0	90	0	80.00	LUMADAVPHPST25033000		A
Fila B	0.00	21.90	12.00	---	36.50	2.00	0	270	0	80.00	LUMADAVPHPST25033000		A





1.2 Uniformity Installation Parameters

Surface	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
Working Plane (h=0.00 m)	Horizontal Illuminance (E)	37 lux	19 lux	66 lux	0.50	0.29	0.57
Marc_A	Horizontal Illuminance (E)	31 lux	22 lux	44 lux	0.71	0.50	0.71
Carregg_A	Horizontal Illuminance (E)	41 lux	28 lux	65 lux	0.68	0.43	0.63
Marc_B	Horizontal Illuminance (E)	31 lux	22 lux	44 lux	0.71	0.50	0.71
Marc_A	Luminance (L)	5.4 cd/m²	3.8 cd/m²	7.6 cd/m²	0.71	0.50	0.71
Carregg_A	Luminance (L)	2.5 cd/m²	1.8 cd/m²	3.4 cd/m²	0.73	0.54	0.75
Marc_B	Luminance (L)	5.4 cd/m²	3.8 cd/m²	7.6 cd/m²	0.71	0.50	0.71

Calculation Type: Only Dir. + Furnit.

BRIDGE N.4
LOUIS BERGER GROUP inc.

07/08/2008

Visual Comfort

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Marc_A	3.90	0.00	3.90	1		55.00					
Carregg_A	14.00	3.90	17.90	6	C2	7.01	-60.00	7.40	0.29	7.36	0.71
Marc_B	3.90	17.90	21.80	1		55.00					

Light Pollution

Average Ratio - Rn -	Maximum Intensity
0.00 %	399 cd/klm

2.1 Luminaire/Measurements Info

Ref.	Line	Luminaire Name (Measur. Name)	Luminaire Code (Measur. Code)	Luminaires N.	Ref.Lamps	Lamps N.
A	GRECHI Lumada VP	LUMADA VP 250W HPST/SAP (LUMADA VP 250W HPST/SAPT)	LUMADAVPHPST250 (020250LUMADAVPHPST)	12	LMP-A	1

2.2 Lamps Info

Ref.Lamps	Type	Code	Flux [lm]	Wattage [W]	Color [°K]	N.
LMP-A	ST 250	NAVT250SUPER	33000	250	2000	12

2.3 Luminaire Table

Ref.	Lum.	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Luminaire Code	Coeff. Mant.	Lamp Code	Flux [lm]
A	1	X	-36.50;1.90;12.00	0;0;-90	LUMADAVPHPST250	0.80	NAVT250SUPER	1*33000
	2	X	0.00;1.90;12.00	0;0;-90		0.80		
	3	X	36.50;1.90;12.00	0;0;-90		0.80		
	4	X	73.00;1.90;12.00	0;0;-90		0.80		
	5	X	109.50;1.90;12.00	0;0;-90		0.80		
	6	X	146.00;1.90;12.00	0;0;-90		0.80		
	7	X	-36.50;19.90;12.00	0;0;90		0.80		
	8	X	0.00;19.90;12.00	0;0;90		0.80		
	9	X	36.50;19.90;12.00	0;0;90		0.80		
	10	X	73.00;19.90;12.00	0;0;90		0.80		
	11	X	109.50;19.90;12.00	0;0;90		0.80		
	12	X	146.00;19.90;12.00	0;0;90		0.80		

2.4 Aiming Summary Table

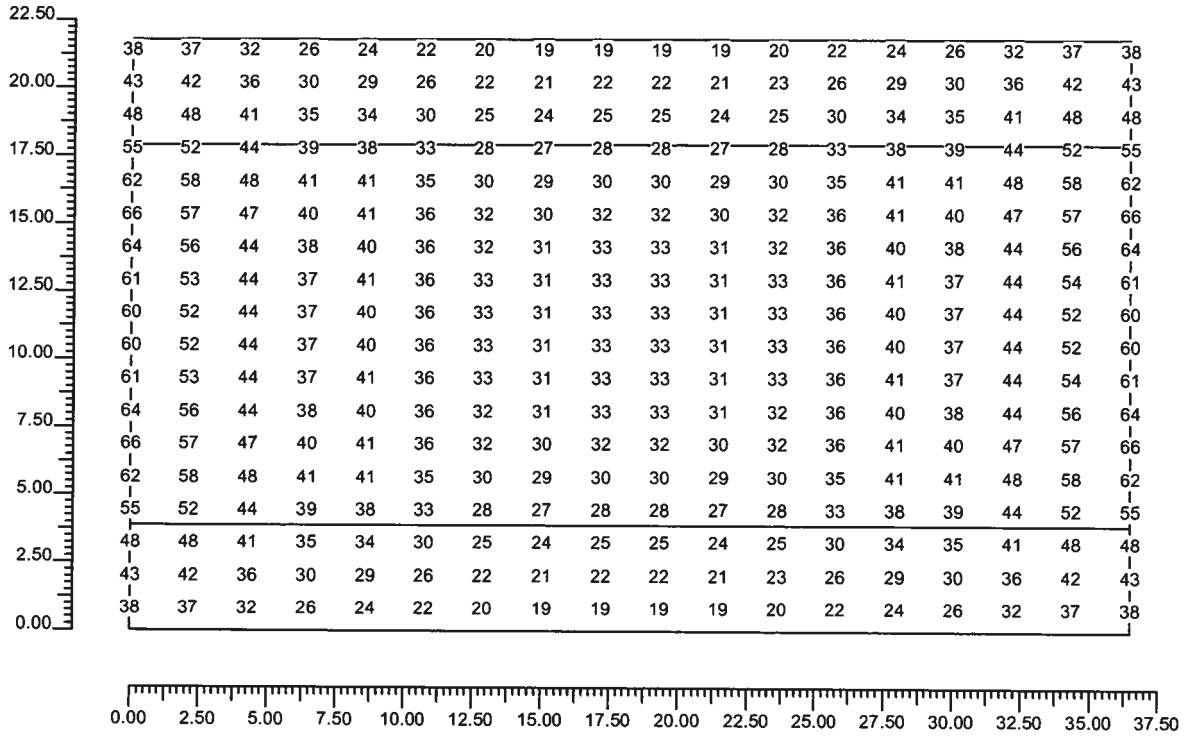
Mast	Row	Culumn	Ref. 2D	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Aiming X[m] Y[m] Z[m]	R.Axis [°]	Coeff. Mant.	Ref.
			L-1	X	-36.50;1.90;12.00	0;0;-90	-36.50;1.90;0.00	-178	0.80	A
			L-2	X	0.00;1.90;12.00	0;0;-90	0.00;1.90;0.00	-90	0.80	A
			L-3	X	36.50;1.90;12.00	0;0;-90	36.50;1.90;0.00	-90	0.80	A
			L-4	X	73.00;1.90;12.00	0;0;-90	73.00;1.90;0.00	-1	0.80	A
			L-5	X	109.50;1.90;12.00	0;0;-90	109.50;1.90;0.00	-1	0.80	A
			L-6	X	146.00;1.90;12.00	0;0;-90	146.00;1.90;0.00	-0	0.80	A
			L-7	X	-36.50;19.90;12.00	0;0;90	-36.50;19.90;0.00	27	0.80	A
			L-8	X	0.00;19.90;12.00	0;0;90	0.00;19.90;0.00	90	0.80	A
			L-9	X	36.50;19.90;12.00	0;0;90	36.50;19.90;0.00	90	0.80	A
			L-10	X	73.00;19.90;12.00	0;0;90	73.00;19.90;0.00	166	0.80	A
			L-11	X	109.50;19.90;12.00	0;0;90	109.50;19.90;0.00	166	0.80	A
			L-12	X	146.00;19.90;12.00	0;0;90	146.00;19.90;0.00	173	0.80	A

3.1 Horizontal Illuminance Values on the Working Plane

O (x:0.00 y:0.00 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:2.15 DY:1.21	Horizontal Illuminance (E)	37 lux	19 lux	66 lux	0.50	0.29	0.57

Calculation Type: Only Dir. + Furnit.

Scale 1/250



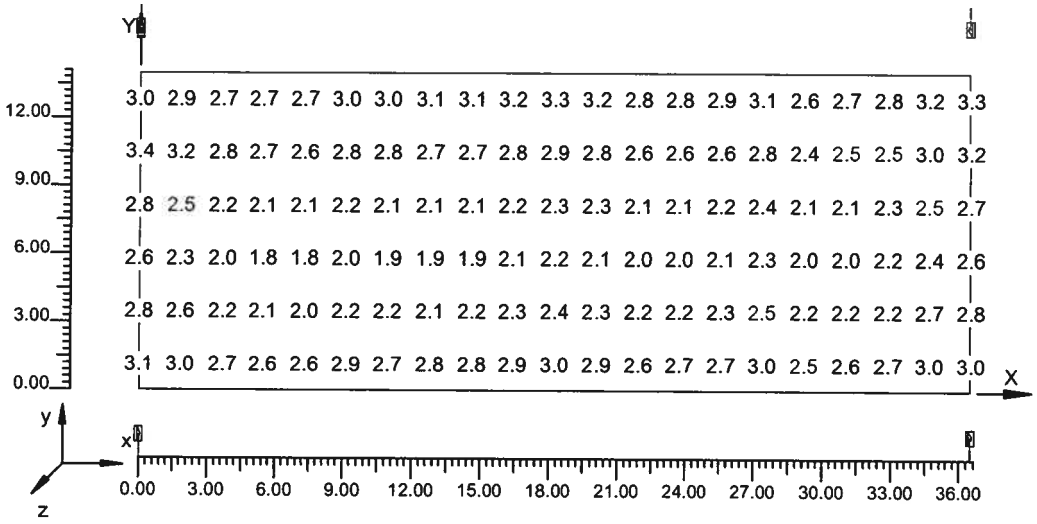
3.2 Luminance Values on:Carregg_A

O (x:0.00 y:3.90 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:1.83 DY:2.33	Luminance (L)	2.5 cd/m²	1.8 cd/m²	3.4 cd/m²	0.73	0.54	0.75

Calculation Type: Only Dir. + Furnit.

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Carregg_A	14.00	3.90	17.90	6	C2	7.01	-60.00	7.40	0.29	7.36	0.71

Scale 1/300



General Info 1

1. Project Data

1.1 Area Information 2
1.2 Uniformity Installation Parameters 2

2. Luminaire Data

2.1 Luminaire/Measurements Info 4
2.2 Lamps Info 4
2.3 Luminaire Table 4
2.4 Aiming Summary Table 4

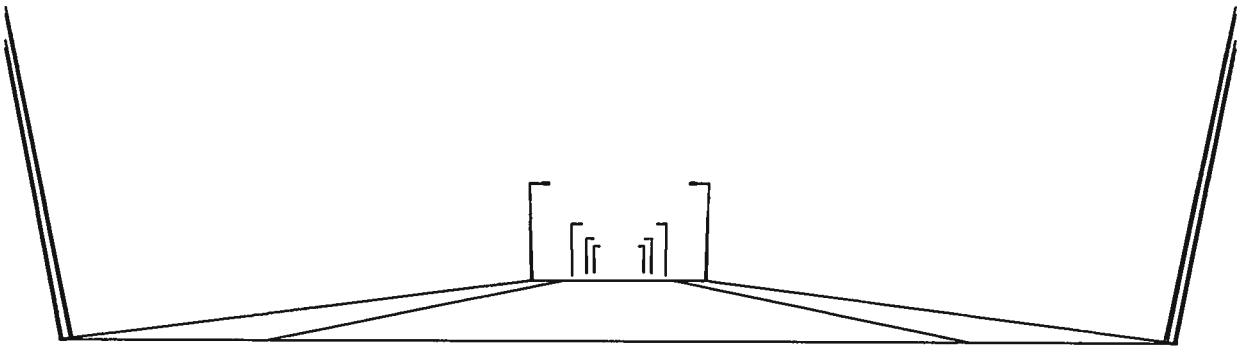
3. Results Table

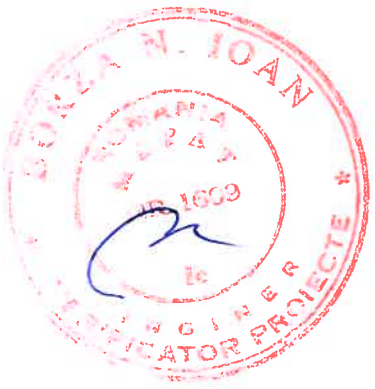
3.1 Horizontal Illuminance Values on the Working Plane 5
3.2 Luminance Values on:Carregg_A 6

BRIDGE N.5

Installation Notes:
Customer: ROMANIAN NATIONAL COMPANY OF MOTORWEYS AND NATIONAL ROADS
Project Code:
Date: 07/08/2008

Notes:





DESIGNER NAME: LOUIS BERGER GROUP inc.
Address:
Tel.-Fax:

Remarks:

1.1 Area Information

Surface	Dimensions [m]	Angle[°]	Color	Coefficient Reflectance	Average Illum. [lux]	Ave.Luminance [cd/m²]
Marc_A	37.00x4.15	Plane	RGB=168,168,168	55%	30	5.2
Carregg_A	37.00x14.00	Plane	RGB=126,126,126	C2 7.01%	40	2.5
Marc_B	37.00x4.15	Plane	RGB=168,168,168	55%	30	5.2

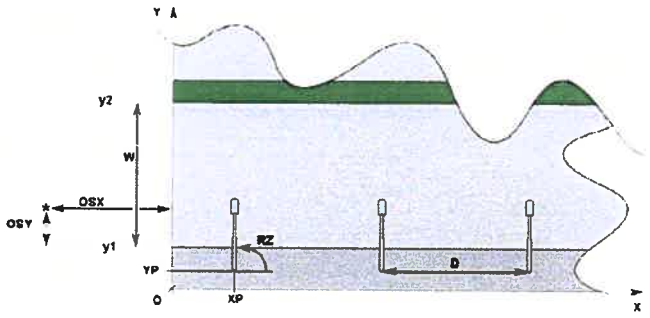
Dimensions of Area Bounding Box [m]: 37.00x22.30x0.00

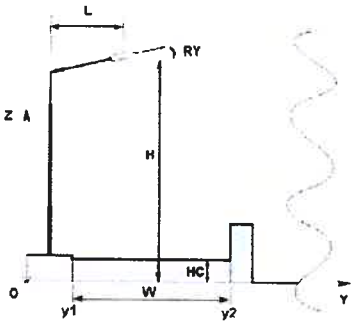
Roads Data

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	h Lane [m] (HC)	color	R Table	Refl. Coeff. q0 Factor	Observer x [m](OSX)	Observer y [m](OSY)
Marc_A	4.15	0.00	4.15	1	0.00	RGB=168,168,168		55.00		
Carregg_A	14.00	4.15	18.15	12	0.00	RGB=126,126,126	C2	7.01	-60.00	3.50
Marc_B	4.15	18.15	22.30	1	0.00	RGB=168,168,168		55.00		

Installation Data (Luminaires File)

File Name	1° Pole x [m] (XP)	1° Pole y [m] (YP)	Lum. Height [m] (H)	No. Poles	Interd. [m] (D)	Bracket [m] (L)	Lum.Incl. [°] (RY)	Bracket Rot. [°] (RZ)	Lateral Incl. [°] (RX)	Maint.Coeff. [%]	Code Luminaire	Flux [lm]	Refer.
Fila A	0.00	0.15	12.00	---	37.00	2.00	0	90	0	80.00	LUMADAVPHPST25033000		A
Fila B	0.00	22.15	12.00	---	37.00	2.00	0	270	0	80.00	LUMADAVPHPST25033000		A





1.2 Uniformity Installation Parameters

Surface	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
Working Plane (h=0.00 m)	Horizontal Illuminance (E)	37 lux	18 lux	65 lux	0.50	0.28	0.56
Marc_A	Horizontal Illuminance (E)	30 lux	21 lux	43 lux	0.70	0.49	0.69
Carregg_A	Horizontal Illuminance (E)	40 lux	26 lux	66 lux	0.65	0.40	0.62
Marc_B	Horizontal Illuminance (E)	30 lux	21 lux	43 lux	0.70	0.49	0.69
Marc_A	Luminance (L)	5.2 cd/m²	3.7 cd/m²	7.6 cd/m²	0.70	0.49	0.69
Carregg_A	Luminance (L)	2.5 cd/m²	1.8 cd/m²	3.5 cd/m²	0.72	0.52	0.72
Marc_B	Luminance (L)	5.2 cd/m²	3.7 cd/m²	7.6 cd/m²	0.70	0.49	0.69

Calculation Type: Only Dir. + Furnit.

Visual Comfort

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Marc_A	4.15	0.00	4.15	1		55.00					
Carregg_A	14.00	4.15	18.15	12	C2	7.01	-60.00	7.65	0.28	7.42	0.73
Marc_B	4.15	18.15	22.30	1		55.00					

Light Pollution

Average Ratio - Rn -	Maximum Intensity
0.00 %	399 cd/klm

2.1 Luminaire/Measurements Info

Ref.	Line	Luminaire Name (Measur. Name)	Luminaire Code (Measur. Code)	Luminaires N.	Ref.Lamps	Lamps N.
A	GRECHI Lumada VP	LUMADA VP 250W HPST/SAP (LUMADA VP 250W HPST/SAPT)	LUMADAVPHPST250 (020250LUMADAVPHPST)	12	LMP-A	1

2.2 Lamps Info

Ref.Lamps	Type	Code	Flux [lm]	Wattage [W]	Color [°K]	N.
LMP-A	ST 250	NAVT250SUPER	33000	250	2000	12

2.3 Luminaire Table

Ref.	Lum.	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Luminaire Code	Coeff. Mant.	Lamp Code	Flux [lm]
A	1	X	-37.00;2.15;12.00	0;0;-90	LUMADAVPHPST250	0.80	NAVT250SUPER	1*33000
	2	X	0.00;2.15;12.00	0;0;-90		0.80		
	3	X	37.00;2.15;12.00	0;0;-90		0.80		
	4	X	74.00;2.15;12.00	0;0;-90		0.80		
	5	X	111.00;2.15;12.00	0;0;-90		0.80		
	6	X	148.00;2.15;12.00	0;0;-90		0.80		
	7	X	-37.00;20.15;12.00	0;0;90		0.80		
	8	X	0.00;20.15;12.00	0;0;90		0.80		
	9	X	37.00;20.15;12.00	0;0;90		0.80		
	10	X	74.00;20.15;12.00	0;0;90		0.80		
	11	X	111.00;20.15;12.00	0;0;90		0.80		
	12	X	148.00;20.15;12.00	0;0;90		0.80		

2.4 Aiming Summary Table

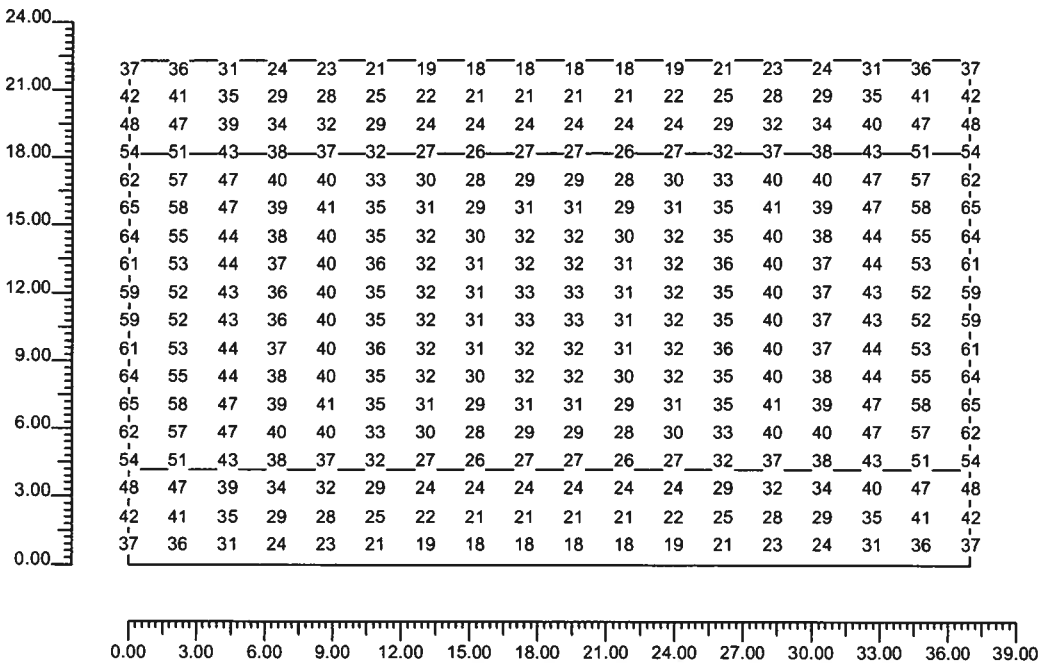
Mast	Row	Culumn	Ref. 2D	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Aiming X[m] Y[m] Z[m]	R.Axis [°]	Coeff. Mant.	Ref.
			L-1	X	-37.00;2.15;12.00	0;0;-90	-37.00;2.15;0.00	-176	0.80	A
			L-2	X	0.00;2.15;12.00	0;0;-90	0.00;2.15;0.00	-90	0.80	A
			L-3	X	37.00;2.15;12.00	0;0;-90	37.00;2.15;0.00	-90	0.80	A
			L-4	X	74.00;2.15;12.00	0;0;-90	74.00;2.15;0.00	-2	0.80	A
			L-5	X	111.00;2.15;12.00	0;0;-90	111.00;2.15;0.00	-2	0.80	A
			L-6	X	148.00;2.15;12.00	0;0;-90	148.00;2.15;0.00	-1	0.80	A
			L-7	X	-37.00;20.15;12.00	0;0;90	-37.00;20.15;0.00	27	0.80	A
			L-8	X	0.00;20.15;12.00	0;0;90	0.00;20.15;0.00	90	0.80	A
			L-9	X	37.00;20.15;12.00	0;0;90	37.00;20.15;0.00	90	0.80	A
			L-10	X	74.00;20.15;12.00	0;0;90	74.00;20.15;0.00	166	0.80	A
			L-11	X	111.00;20.15;12.00	0;0;90	111.00;20.15;0.00	166	0.80	A
			L-12	X	148.00;20.15;12.00	0;0;90	148.00;20.15;0.00	173	0.80	A

3.1 Horizontal Illuminance Values on the Working Plane

O (x:0.00 y:0.00 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:2.18 DY:1.24	Horizontal Illuminance (E)	37 lux	18 lux	65 lux	0.50	0.28	0.56

Calculation Type Only Dir. + Furnit.

Scale 1/300



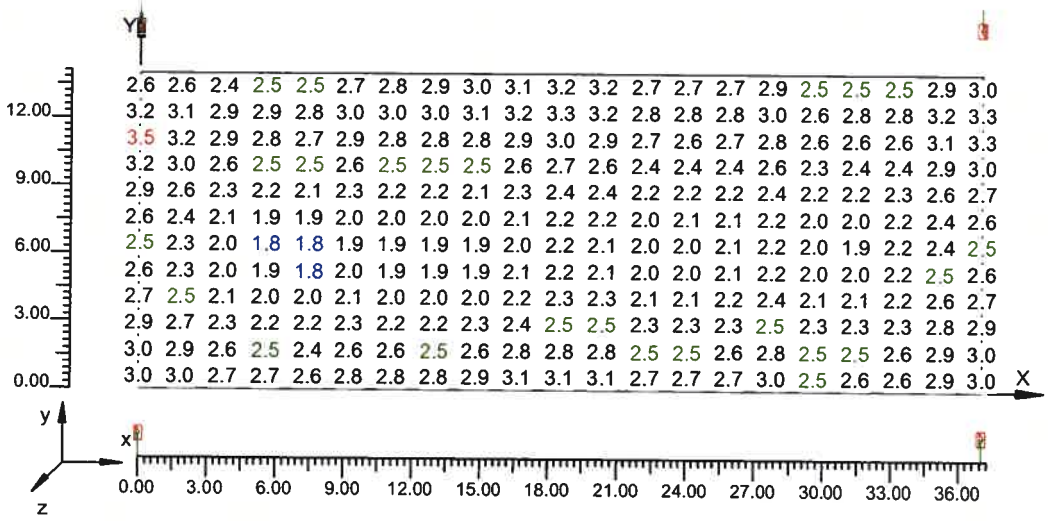
3.2 Luminance Values on:Carregg_A

O (x:0.00 y:4.15 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:1.85 DY:1.17	Luminance (L)	2.5 cd/m²	1.8 cd/m²	3.5 cd/m²	0.72	0.52	0.72

Calculation Type: Only Dir. + Furnit.

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Carregg_A	14.00	4.15	18.15	12	C2	7.01	-60.00	7.65	0.28	7.42	0.73

Scale 1/300



General Info 1

1. Project Data

1.1 Area Information 2
1.2 Uniformity Installation Parameters 2

2. Luminaire Data

2.1 Luminaire/Measurements Info 4
2.2 Lamps Info 4
2.3 Luminaire Table 4
2.4 Aiming Summary Table 4

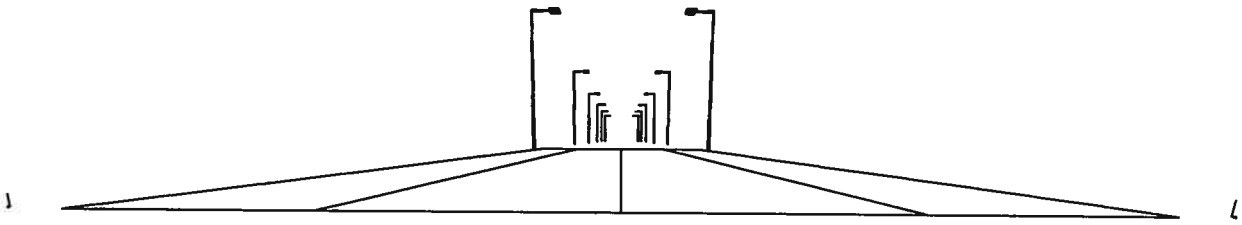
3. Results Table

3.1 Horizontal Illuminance Values on the Working Plane 5
3.2 Luminance Values on:Carregg_A 6

BRIDGE N.6

Installation Notes: ROMANIAN NATIONAL COMPANY OF MOTORWEYS AND NATIONAL ROADS
Customer:
Project Code:
Date: 07/08/2008

Notes:



DESIGNER NAME: LOUIS BERGER GROUP inc.
Address:
Tel.-Fax:

Remarks:

1.1 Area Information

Surface	Dimensions [m]	Angle[°]	Color	Coefficient Reflectance	Average Illum. [lux]	Ave.Luminance [cd/m²]
Marc_A	27.00x3.20	Plane	RGB=168,168,168	55%	39	6.8
Carregg_A	27.00x3.90	Plane	RGB=126,126,126	C2 7.01%	48	3.1
Carregg_B	27.00x3.90	Plane	RGB=126,126,126	C2 7.01%	48	3.1
Marc_B	27.00x3.20	Plane	RGB=168,168,168	55%	39	6.8

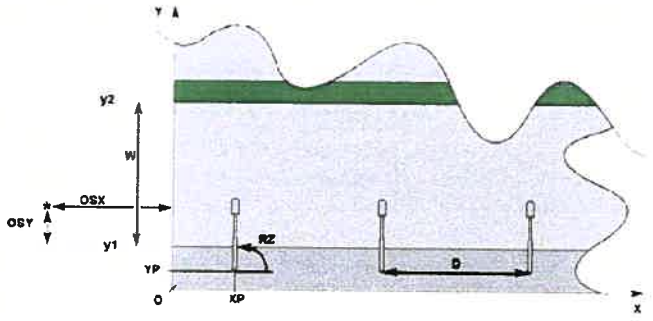
Dimensions of Area Bounding Box [m]: 27.00x14.20x0.00

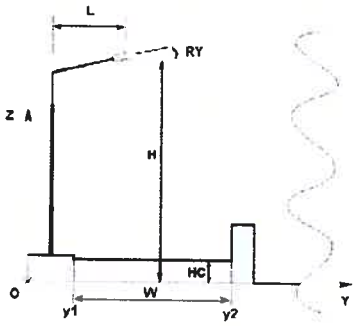
Roads Data

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	h Lane [m] (HC)	color	R Table	Refl. Coeff. q0 Factor	Observer x [m](OSX)	Observer y [m](OSY)
Marc_A	3.20	0.00	3.20	1	0.00	RGB=168,168,168		55.00		
Carregg_A	3.90	3.20	7.10	6	0.00	RGB=126,126,126	C2	7.01	-60.00	0.97
Carregg_B	3.90	7.10	11.00	6	0.00	RGB=126,126,126	C2	7.01	60.00	2.92
Marc_B	3.20	11.00	14.20	1	0.00	RGB=168,168,168		55.00		

Installation Data (Luminaires File)

File Name	1° Pole x [m] (XP)	1° Pole y [m] (YP)	Lum. Height [m] (H)	No. Poles	Interd. [m] (D)	Bracket [m] (L)	Lum.Incl. [°] (RY)	Bracket Rot. [°] (RZ)	Lateral Incl. [°] (RX)	Maint.Coeff. [%]	Code Luminaire	Flux [lm]	Refer.
Fila A	0.00	-0.80	12.00	---	27.00	2.00	0	90	0	80.00	ORIGIA800250HPST27000		A
Fila B	0.00	15.00	12.00	---	27.00	2.00	0	270	0	80.00	ORIGIA800250HPST27000		A





1.2 Uniformity Installation Parameters

Surface	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
Working Plane (h=0.00 m)	Horizontal Illuminance (E)	44 lux	27 lux	66 lux	0.62	0.41	0.66
Marc_A	Horizontal Illuminance (E)	39 lux	29 lux	49 lux	0.76	0.59	0.78
Carregg_A	Horizontal Illuminance (E)	48 lux	32 lux	66 lux	0.68	0.49	0.72
Carregg_B	Horizontal Illuminance (E)	48 lux	32 lux	66 lux	0.68	0.49	0.72
Marc_B	Horizontal Illuminance (E)	39 lux	29 lux	49 lux	0.76	0.59	0.78
Marc_A	Luminance (L)	6.8 cd/m²	5.1 cd/m²	8.7 cd/m²	0.76	0.59	0.78
Carregg_A	Luminance (L)	3.1 cd/m²	2.4 cd/m²	3.7 cd/m²	0.80	0.67	0.83
Carregg_B	Luminance (L)	3.1 cd/m²	2.4 cd/m²	3.7 cd/m²	0.80	0.67	0.83
Marc_B	Luminance (L)	6.8 cd/m²	5.1 cd/m²	8.7 cd/m²	0.76	0.59	0.78

Calculation Type: Only Dir. + Furnit.

Visual Comfort

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Marc_A	3.20	0.00	3.20	1		55.00					
Carregg_A	3.90	3.20	7.10	6	C2	7.01	-60.00	4.17	0.35	7.80	0.72
Carregg_B	3.90	7.10	11.00	6	C2	7.01	87.00	10.02	0.35	7.80	0.72
Marc_B	3.20	11.00	14.20	1		55.00					

Light Pollution

Average Ratio - Rn -	Maximum Intensity
0.16 %	382 cd/klm

2.1 Luminaire/Measurements Info

Ref.	Line	Luminaire Name (Measur. Name)	Luminaire Code (Measur. Code)	Luminaires N.	Ref.Lamps	Lamps N.
A	GRECHI Origia 800	ORIGIA 800 250W HPST/SAPT (ORIGIA 800 250W HPST/SAPT)	ORIGIA800250HPST (010250ORIGIA80HPST)	24	LMP-A	1

2.2 Lamps Info

Ref.Lamps	Type	Code	Flux [lm]	Wattage [W]	Color [°K]	N.
LMP-A	ST 250	NAVT250	27000	250	2000	24

2.3 Luminaire Table

Ref.	Lum.	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Luminaire Code	Coeff. Mant.	Lamp Code	Flux [lm]
A	1	X	-135.00;1.20;12.00	0;0;-90	ORIGIA800250HPST	0.80	NAVT250	1*27000
	2	X	-108.00;1.20;12.00	0;0;-90		0.80		
	3	X	-81.00;1.20;12.00	0;0;-90		0.80		
	4	X	-54.00;1.20;12.00	0;0;-90		0.80		
	5	X	-27.00;1.20;12.00	0;0;-90		0.80		
	6	X	0.00;1.20;12.00	0;0;-90		0.80		
	7	X	27.00;1.20;12.00	0;0;-90		0.80		
	8	X	54.00;1.20;12.00	0;0;-90		0.80		
	9	X	81.00;1.20;12.00	0;0;-90		0.80		
	10	X	108.00;1.20;12.00	0;0;-90		0.80		
	11	X	135.00;1.20;12.00	0;0;-90		0.80		
	12	X	162.00;1.20;12.00	0;0;-90		0.80		
	13	X	-135.00;13.00;12.00	0;-0;90		0.80		
	14	X	-108.00;13.00;12.00	0;-0;90		0.80		
	15	X	-81.00;13.00;12.00	0;-0;90		0.80		
	16	X	-54.00;13.00;12.00	0;-0;90		0.80		
	17	X	-27.00;13.00;12.00	0;-0;90		0.80		
	18	X	0.00;13.00;12.00	0;-0;90		0.80		
	19	X	27.00;13.00;12.00	0;-0;90		0.80		
	20	X	54.00;13.00;12.00	0;-0;90		0.80		
	21	X	81.00;13.00;12.00	0;-0;90		0.80		
	22	X	108.00;13.00;12.00	0;-0;90		0.80		
	23	X	135.00;13.00;12.00	0;-0;90		0.80		
	24	X	162.00;13.00;12.00	0;-0;90		0.80		

2.4 Aiming Summary Table

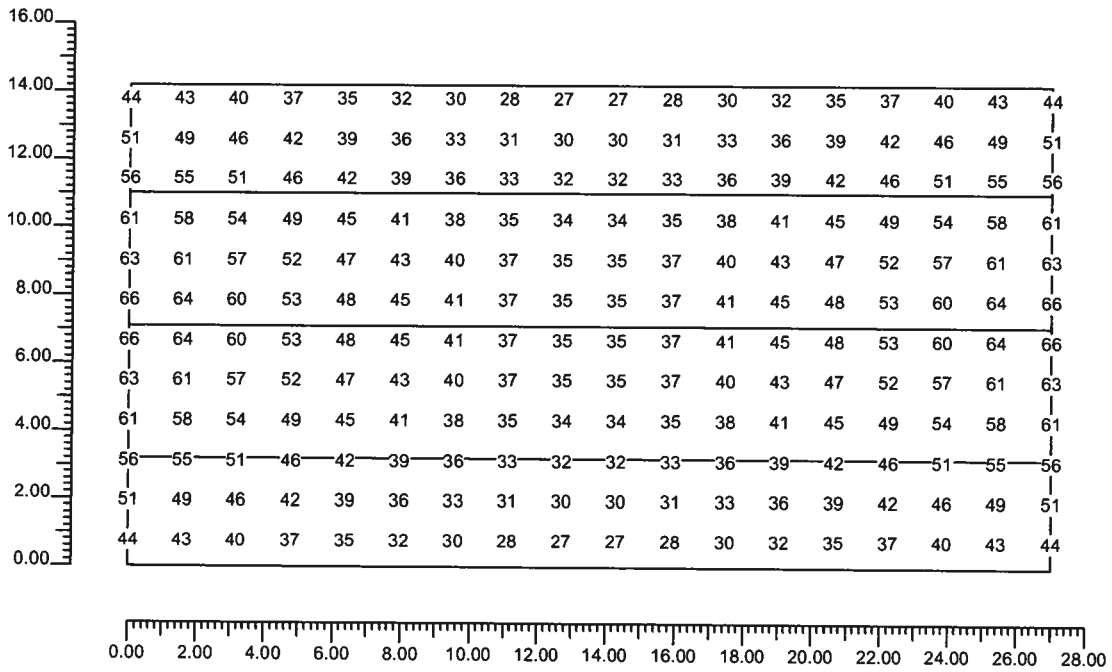
Mast	Row	Culumn	Ref. 2D	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Aiming X[m] Y[m] Z[m]	R.Axis [°]	Coeff. Mant.	Ref.
			L-1	X	-135.00;1.20;12.00	0;0;-90	-135.00;1.20;0.00	-90	0.80	A
			L-2	X	-108.00;1.20;12.00	0;0;-90	-108.00;1.20;0.00	-178	0.80	A
			L-3	X	-81.00;1.20;12.00	0;0;-90	-81.00;1.20;0.00	-90	0.80	A
			L-4	X	-54.00;1.20;12.00	0;0;-90	-54.00;1.20;0.00	-176	0.80	A
			L-5	X	-27.00;1.20;12.00	0;0;-90	-27.00;1.20;0.00	-173	0.80	A
			L-6	X	0.00;1.20;12.00	0;0;-90	-0.00;1.20;0.00	-90	0.80	A
			L-7	X	27.00;1.20;12.00	0;0;-90	27.00;1.20;0.00	-90	0.80	A
			L-8	X	54.00;1.20;12.00	0;0;-90	54.00;1.20;0.00	-4	0.80	A
			L-9	X	81.00;1.20;12.00	0;0;-90	81.00;1.20;0.00	-90	0.80	A
			L-10	X	108.00;1.20;12.00	0;0;-90	108.00;1.20;0.00	-2	0.80	A
			L-11	X	135.00;1.20;12.00	0;0;-90	135.00;1.20;0.00	-90	0.80	A
			L-12	X	162.00;1.20;12.00	0;0;-90	162.00;1.20;0.00	-90	0.80	A
			L-13	X	-135.00;13.00;12.00	0;-0;90	-135.00;13.00;0.00	90	0.80	A
			L-14	X	-108.00;13.00;12.00	0;-0;90	-108.00;13.00;0.00	14	0.80	A
			L-15	X	-81.00;13.00;12.00	0;-0;90	-81.00;13.00;0.00	90	0.80	A
			L-16	X	-54.00;13.00;12.00	0;-0;90	-54.00;13.00;0.00	27	0.80	A
			L-17	X	-27.00;13.00;12.00	0;-0;90	-27.00;13.00;0.00	45	0.80	A
			L-18	X	0.00;13.00;12.00	0;-0;90	0.00;13.00;0.00	90	0.80	A
			L-19	X	27.00;13.00;12.00	0;-0;90	27.00;13.00;0.00	90	0.80	A
			L-20	X	54.00;13.00;12.00	0;-0;90	54.00;13.00;0.00	153	0.80	A
			L-21	X	81.00;13.00;12.00	0;-0;90	81.00;13.00;0.00	90	0.80	A
			L-22	X	108.00;13.00;12.00	0;-0;90	108.00;13.00;0.00	166	0.80	A
			L-23	X	135.00;13.00;12.00	0;-0;90	135.00;13.00;0.00	90	0.80	A
			L-24	X	162.00;13.00;12.00	0;-0;90	162.00;13.00;0.00	90	0.80	A

3.1 Horizontal Illuminance Values on the Working Plane

O (x:0.00 y:0.00 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:1.59 DY:1.18	Horizontal Illuminance (E)	44 lux	27 lux	66 lux	0.62	0.41	0.66

Calculation Type: Only Dir. + Furnit.

Scale 1/200



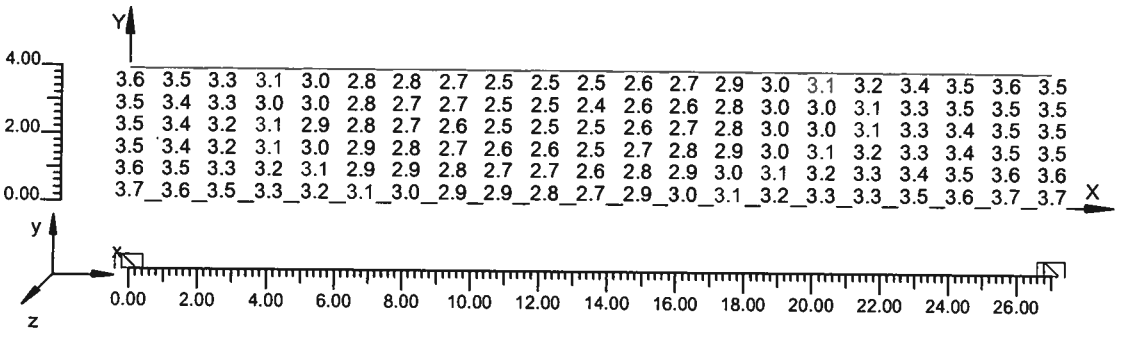
3.2 Luminance Values on:Carregg_A

O (x:0.00 y:3.20 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:1.35 DY:0.65	Luminance (L)	3.1 cd/m²	2.4 cd/m²	3.7 cd/m²	0.80	0.67	0.83

Calculation Type: Only Dir. + Furnit.

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Carregg_A	3.90	3.20	7.10	6	C2	7.01	-60.00	4.17	0.35	7.80	0.72

Scale 1/200



General Info 1

1. Project Data

1.1 Area Information 2
1.2 Uniformity Installation Parameters 2

2. Luminaire Data

2.1 Luminaire/Measurements Info 4
2.2 Lamps Info 4
2.3 Luminaire Table 4
2.4 Aiming Summary Table 4

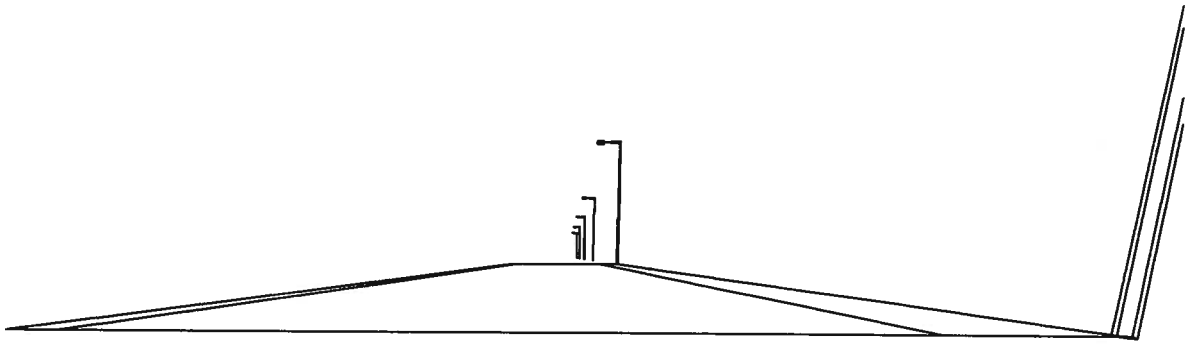
3. Results Table

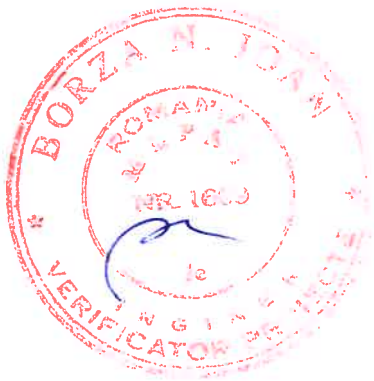
3.1 Horizontal Illuminance Values on the Working Plane 6
3.2 Luminance Values on:Carregg_A 7

BRIDGE N.7

Installation Notes: ROMANIAN NATIONAL COMPANY OF MOTORWEYS AND NATIONAL ROADS
Customer:
Project Code:
Date: 07/08/2008

Notes:





DESIGNER NAME: LOUIS BERGER GROUP inc.
Address:
Tel.-Fax:

Remarks:

1.1 Area Information

Surface	Dimensions [m]	Angle[°]	Color	Coefficient Reflectance	Average Illum. [lux]	Ave.Luminance [cd/m²]
Marc_A	32.00x1.75	Plane	RGB=168,168,168	55%	26	4.6
Carregg_A	32.00x8.50	Plane	RGB=126,126,126	C2 7.01%	33	2.1
Marc_B	32.00x0.50	Plane	RGB=168,168,168	55%	25	4.3

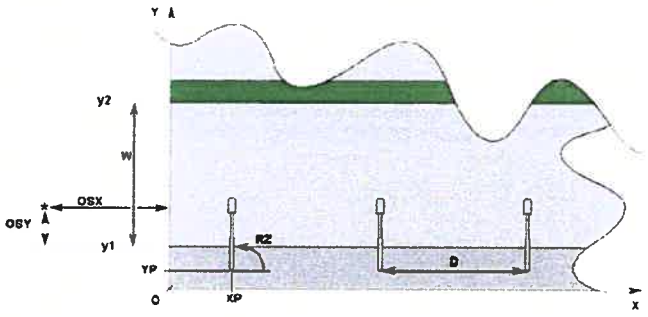
Dimensions of Area Bounding Box [m]: 32.00x10.75x0.00

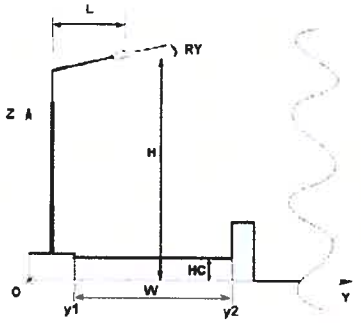
Roads Data

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	h Lane [m] (HC)	color	R Table	Refl. Coeff. q0 Factor	Observer x [m](OSX)	Observer y [m](OSY)
Marc_A	1.75	0.00	1.75	1	0.00	RGB=168,168,168		55.00		
Carregg_A	8.50	1.75	10.25	6	0.00	RGB=126,126,126	C2	7.01	-60.00	2.13
Marc_B	0.50	10.25	10.75	1	0.00	RGB=168,168,168		55.00		

Installation Data (Luminaires File)

File Name	1° Pole x [m] (XP)	1° Pole y [m] (YP)	Lum. Height [m] (H)	No. Poles	Interd. [m] (D)	Bracket [m] (L)	Lum.Incl. [°] (RY)	Bracket Rot. [°] (RZ)	Lateral Incl. [°] (RX)	Maint.Coeff. [%]	Code Luminaire	Flux [lm]	Refer.
Fila A	0.00	0.00	12.00	---	32.00	2.00	0	90	0	80.00	LUMADAVPHPST25033000		A





1.2 Uniformity Installation Parameters

Surface	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
Working Plane (h=0.00 m)	Horizontal Illuminance (E)	32 lux	18 lux	55 lux	0.58	0.33	0.57
Marc_A	Horizontal Illuminance (E)	26 lux	19 lux	36 lux	0.73	0.53	0.73
Carregg_A	Horizontal Illuminance (E)	33 lux	22 lux	54 lux	0.67	0.41	0.61
Marc_B	Horizontal Illuminance (E)	25 lux	20 lux	34 lux	0.82	0.59	0.73
Marc_A	Luminance (L)	4.6 cd/m²	3.3 cd/m²	6.2 cd/m²	0.73	0.53	0.73
Carregg_A	Luminance (L)	2.1 cd/m²	1.2 cd/m²	2.8 cd/m²	0.56	0.41	0.74
Marc_B	Luminance (L)	4.3 cd/m²	3.5 cd/m²	6.0 cd/m²	0.82	0.59	0.73

Calculation Type: Only Dir. + Furnit.

BRIDGE N.7
LOUIS BERGER GROUP inc.

07/08/2008

Visual Comfort

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Marc_A	1.75	0.00	1.75	1		55.00					
Carregg_A	8.50	1.75	10.25	6	C2	7.01	-60.00	3.88	0.23	6.92	0.83
Marc_B	0.50	10.25	10.75	1		55.00					

Light Pollution

Average Ratio - Rn -	Maximum Intensity
0.00 %	399 cd/klm

2.1 Luminaire/Measurements Info

Ref.	Line	Luminaire Name (Measur. Name)	Luminaire Code (Measur. Code)	Luminaires N.	Ref.Lamps	Lamps N.
A	GRECHI Lumada VP	LUMADA VP 250W HPST/SAP (LUMADA VP 250W HPST/SAPT)	LUMADAVPHPST250 (020250LUMADAVPHPST)	7	LMP-A	1

2.2 Lamps Info

Ref.Lamps	Type	Code	Flux [lm]	Wattage [W]	Color [°K]	N.
LMP-A	ST 250	NAVT250SUPER	33000	250	2000	7

2.3 Luminaire Table

Ref.	Lum.	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Luminaire Code	Coeff. Mant.	Lamp Code	Flux [lm]
A	1	X	-32.00;2.00;12.00	0;0;-90	LUMADAVPHPST250	0.80	NAVT250SUPER	1*33000
	2	X	0.00;2.00;12.00	0;0;-90		0.80		
	3	X	32.00;2.00;12.00	0;0;-90		0.80		
	4	X	64.00;2.00;12.00	0;0;-90		0.80		
	5	X	96.00;2.00;12.00	0;0;-90		0.80		
	6	X	128.00;2.00;12.00	0;0;-90		0.80		
	7	X	160.00;2.00;12.00	0;0;-90		0.80		

2.4 Aiming Summary Table

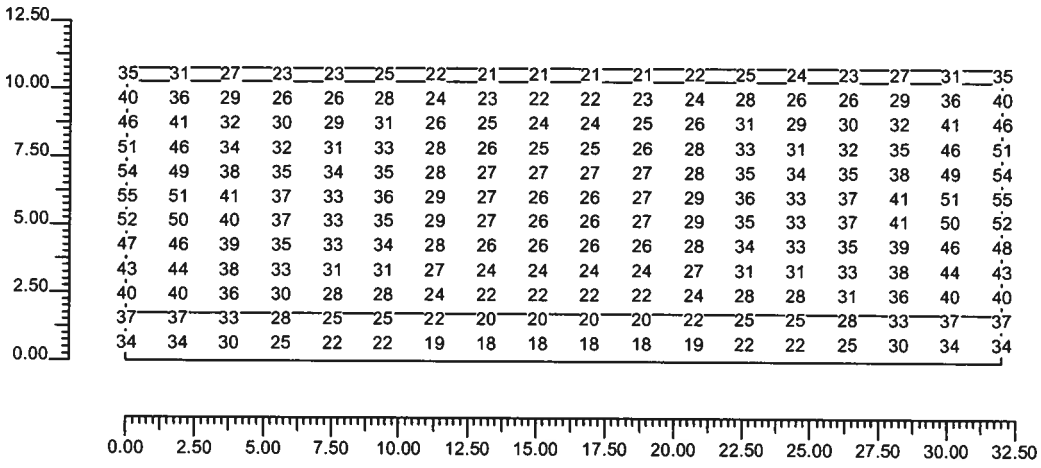
Mast	Row	Culumn	Ref. 2D	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Aiming X[m] Y[m] Z[m]	R.Axis [°]	Coeff. Mant.	Ref.
			L-1	X	-32.00;2.00;12.00	0;0;-90	-32.00;2.00;0.00	-90	0.80	A
			L-2	X	0.00;2.00;12.00	0;0;-90	0.00;2.00;0.00	-90	0.80	A
			L-3	X	32.00;2.00;12.00	0;0;-90	32.00;2.00;0.00	-90	0.80	A
			L-4	X	64.00;2.00;12.00	0;0;-90	64.00;2.00;0.00	-90	0.80	A
			L-5	X	96.00;2.00;12.00	0;0;-90	96.00;2.00;0.00	0	0.80	A
			L-6	X	128.00;2.00;12.00	0;0;-90	128.00;2.00;0.00	-90	0.80	A
			L-7	X	160.00;2.00;12.00	0;0;-90	160.00;2.00;0.00	-90	0.80	A

3.1 Horizontal Illuminance Values on the Working Plane

O (x:0.00 y:0.00 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:1.88 DY:0.90	Horizontal Illuminance (E)	32 lux	18 lux	55 lux	0.58	0.33	0.57

Calculation Type: Only Dir. + Furnit.

Scale 1/250



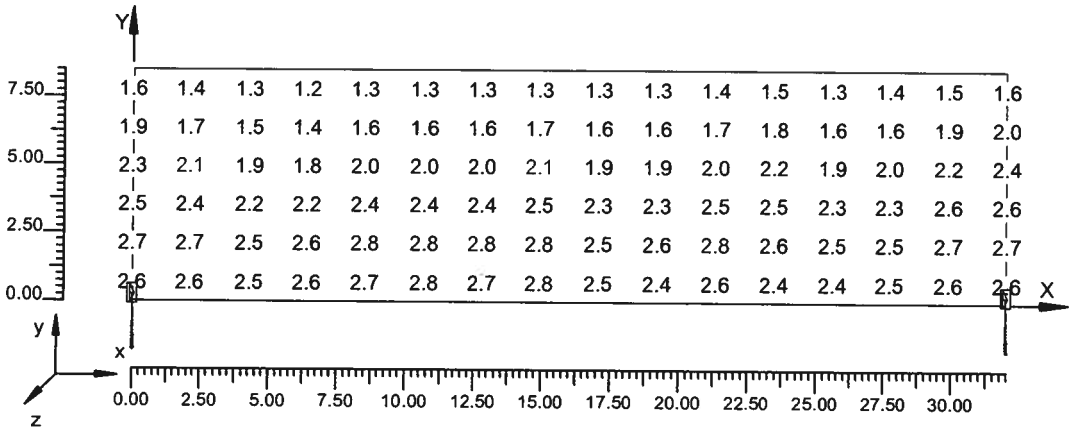
3.2 Luminance Values on:Carregg_A

O (x:0.00 y:1.75 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:2.13 DY:1.42	Luminance (L)	2.1 cd/m²	1.2 cd/m²	2.8 cd/m²	0.56	0.41	0.74

Calculation Type: Only Dir. + Furnit.

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Carregg_A	8.50	1.75	10.25	6	C2	7.01	-60.00	3.88	0.23	6.92	0.83

Scale 1/250



General Info 1

1. Project Data

1.1 Area Information 2
1.2 Uniformity Installation Parameters 2

2. Luminaire Data

2.1 Luminaire/Measurements Info 4
2.2 Lamps Info 4
2.3 Luminaire Table 4
2.4 Aiming Summary Table 4

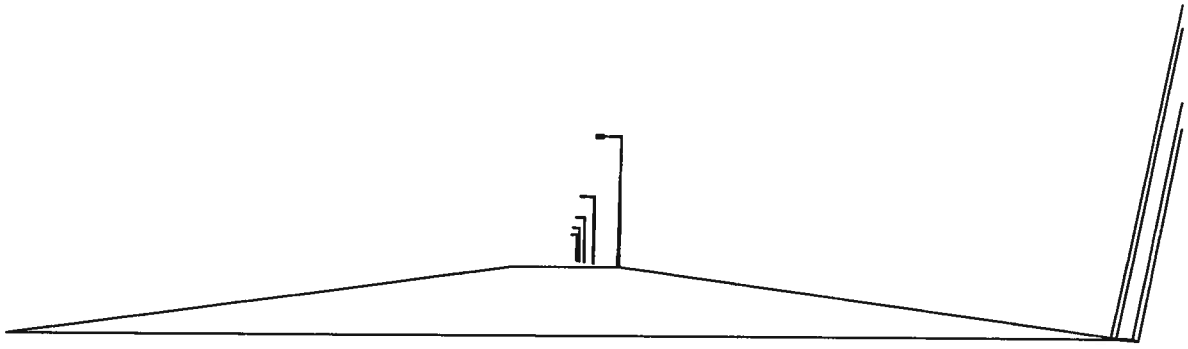
3. Results Table

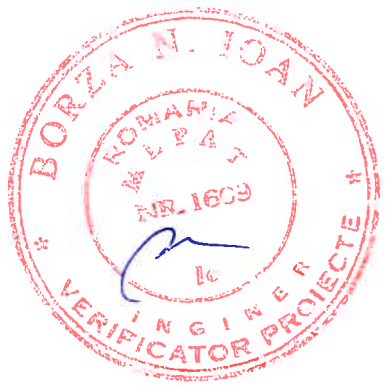
3.1 Horizontal Illuminance Values on the Working Plane 5
3.2 Luminance Values on:Carregg_A 6

BRIDGE N.8

Installation Notes:
Customer: ROMANIAN NATIONAL COMPANY OF MOTORWEYS AND NATIONAL ROADS
Project Code:
Date: 07/08/2008

Notes:





DESIGNER NAME: LOUIS BERGER GROUP inc.
Address:
Tel.-Fax:

Remarks:

1.1 Area Information

Surface	Dimensions [m]	Angle[°]	Color	Coefficient Reflectance	Average Illum. [lux]	Ave.Luminance [cd/m²]
Carregg_A	30.00x10.27	Plane	RGB=126,126,126	C2 7.01%	34	2.2

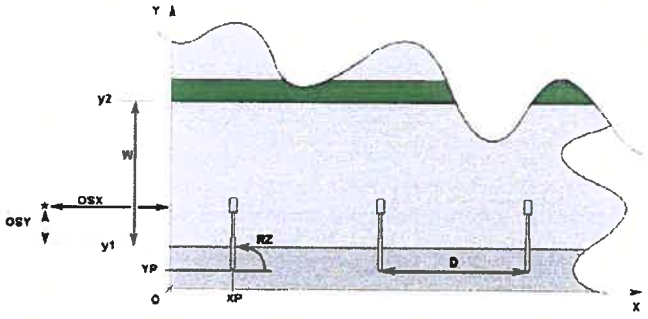
Dimensions of Area Bounding Box [m]: 30.00x10.27x0.00

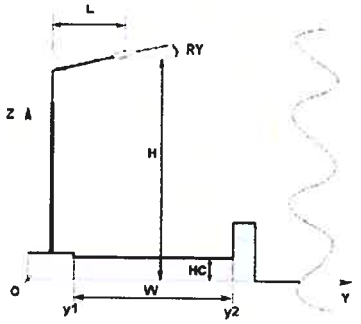
Roads Data

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	h Lane [m] (HC)	color	R Table	Refl. Coeff. q0 Factor	Observer x [m](OSX)	Observer y [m](OSY)
Carregg_A	10.27	0.00	10.27	6	0.00	RGB=126,126,126	C2	7.01	-60.00	2.57

Installation Data (Luminaires File)

File Name	1° Pole x [m] (XP)	1° Pole y [m] (YP)	Lum. Height [m] (H)	No. Poles	Interd. [m] (D)	Bracket [m] (L)	Lum.Incl. [°] (RY)	Bracket Rot. [°] (RZ)	Lateral Incl. [°] (RX)	Maint.Coeff. [%]	Code Luminaire	Flux [lm]	Refer.
Fila A	0.00	0.00	12.00	---	30.00	2.00	0	90	0	80.00	LUMADAVPHPST25033000		A





1.2 Uniformity Installation Parameters

Surface	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
Working Plane (h=0.00 m)	Horizontal Illuminance (E)	34 lux	20 lux	56 lux	0.57	0.35	0.61
Carregg_A	Horizontal Illuminance (E)	34 lux	20 lux	56 lux	0.59	0.36	0.61
Carregg_A	Luminance (L)	2.2 cd/m²	1.3 cd/m²	3.0 cd/m²	0.60	0.44	0.74

Calculation Type: Only Dir. + Furnit.

BRIDGE N.8
LOUIS BERGER GROUP inc.

07/08/2008

Visual Comfort

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Carregg_A	10.27	0.00	10.27	6	C2	7.01	-60.00	2.57	0.23	6.51	0.85

Light Pollution

Average Ratio - Rn -	Maximum Intensity
0.00 %	399 cd/klm

2.1 Luminaire/Measurements Info

Ref.	Line	Luminaire Name (Measur. Name)	Luminaire Code (Measur. Code)	Luminaires N.	Ref.Lamps	Lamps N.
A	GRECHI Lumada VP	LUMADA VP 250W HPST/SAP (LUMADA VP 250W HPST/SAPT)	LUMADAVPHPST250 (020250LUMADAVPHPST)	8	LMP-A	1

2.2 Lamps Info

Ref.Lamps	Type	Code	Flux [lm]	Wattage [W]	Color [°K]	N.
LMP-A	ST 250	NAVT250SUPER	33000	250	2000	8

2.3 Luminaire Table

Ref.	Lum.	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Luminaire Code	Coeff. Mant.	Lamp Code	Flux [lm]
A	1	X	-60.00;2.00;12.00	0;0;-90	LUMADAVPHPST250	0.80	NAVT250SUPER	1*33000
	2	X	-30.00;2.00;12.00	0;0;-90		0.80		
	3	X	0.00;2.00;12.00	0;0;-90		0.80		
	4	X	30.00;2.00;12.00	0;0;-90		0.80		
	5	X	60.00;2.00;12.00	0;0;-90		0.80		
	6	X	90.00;2.00;12.00	0;0;-90		0.80		
	7	X	120.00;2.00;12.00	0;0;-90		0.80		
	8	X	150.00;2.00;12.00	0;0;-90		0.80		

2.4 Aiming Summary Table

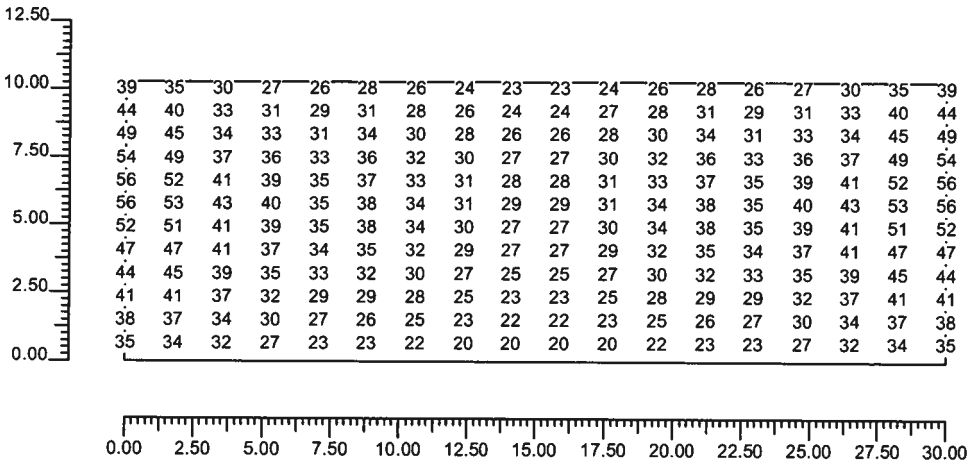
Mast	Row	Culumn	Ref. 2D	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Aiming X[m] Y[m] Z[m]	R.Axis [°]	Coeff. Mant.	Ref.
			L-1	X	-60.00;2.00;12.00	0;0;-90	-60.00;2.00;0.00	-180	0.80	A
			L-2	X	-30.00;2.00;12.00	0;0;-90	-30.00;2.00;0.00	-180	0.80	A
			L-3	X	0.00;2.00;12.00	0;0;-90	0.00;2.00;0.00	-90	0.80	A
			L-4	X	30.00;2.00;12.00	0;0;-90	30.00;2.00;0.00	-90	0.80	A
			L-5	X	60.00;2.00;12.00	0;0;-90	60.00;2.00;0.00	0	0.80	A
			L-6	X	90.00;2.00;12.00	0;0;-90	90.00;2.00;0.00	0	0.80	A
			L-7	X	120.00;2.00;12.00	0;0;-90	120.00;2.00;0.00	0	0.80	A
			L-8	X	150.00;2.00;12.00	0;0;-90	150.00;2.00;0.00	-90	0.80	A

3.1 Horizontal Illuminance Values on the Working Plane

O (x:0.00 y:0.00 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:1.76 DY:0.86	Horizontal Illuminance (E)	34 lux	20 lux	56 lux	0.57	0.35	0.61

Calculation Type: Only Dir. + Furnit.

Scale 1/250



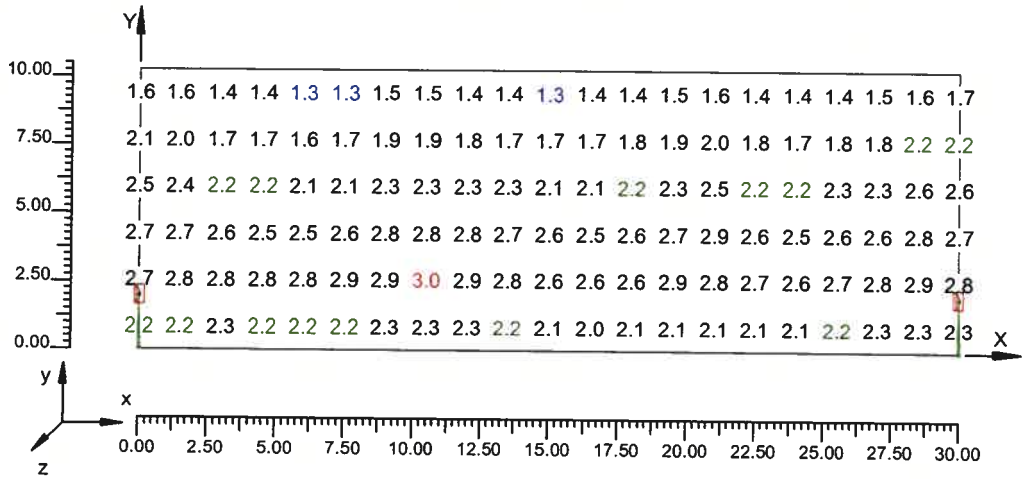
3.2 Luminance Values on:Carregg_A

O (x:0.00 y:0.00 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:1.50 DY:1.71	Luminance (L)	2.2 cd/m²	1.3 cd/m²	3.0 cd/m²	0.60	0.44	0.74

Calculation Type: Only Dir. + Furnit.

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Carregg_A	10.27	0.00	10.27	6	C2	7.01	-60.00	2.57	0.23	6.51	0.85

Scale 1/250



General Info 1

1. Project Data

1.1 Area Information 2
1.2 Uniformity Installation Parameters 2

2. Luminaire Data

2.1 Luminaire/Measurements Info 4
2.2 Lamps Info 4
2.3 Luminaire Table 4
2.4 Aiming Summary Table 4

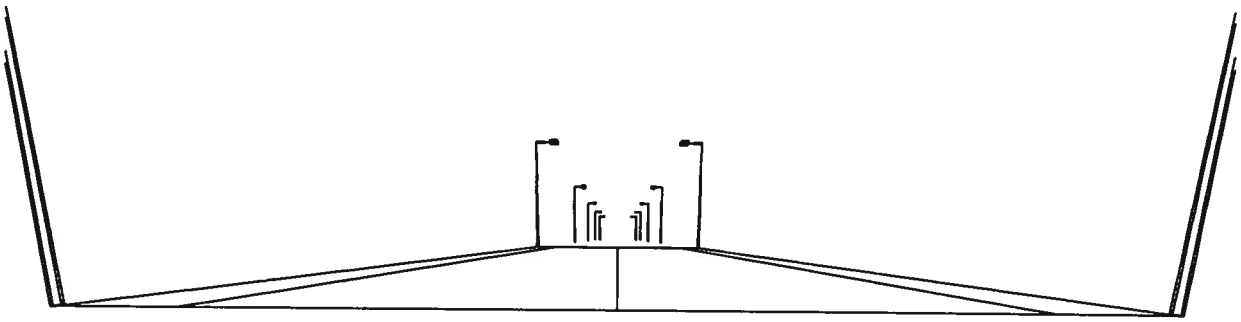
3. Results Table

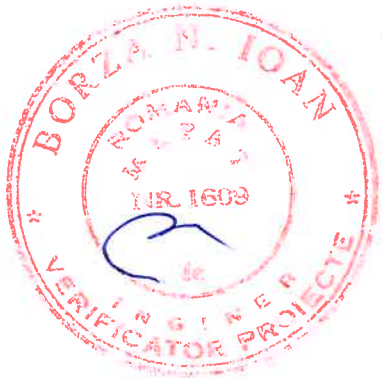
3.1 Horizontal Illuminance Values on the Working Plane 5
3.2 Luminance Values on:Carregg_A 6

BRIDGE N.9

Installation Notes:
Customer: ROMANIAN NATIONAL COMPANY OF MOTORWEYS AND NATIONAL ROADS
Project Code:
Date: 07/08/2008

Notes:





DESIGNER NAME: LOUIS BERGER GROUP inc.
Address:
Tel.-Fax:

Remarks:

1.1 Area Information

Surface	Dimensions [m]	Angle[°]	Color	Coefficient Reflectance	Average Illum. [lux]	Ave.Luminance [cd/m²]
Marc_A	35.00x2.00	Plane	RGB=168,168,168	55%	29	5.0
Carregg_A	35.00x7.40	Plane	RGB=126,126,126	C2 7.01%	37	2.4
Carregg_B	35.00x7.40	Plane	RGB=126,126,126	C2 7.01%	37	2.4
Marc_B	35.00x2.00	Plane	RGB=168,168,168	55%	29	5.0

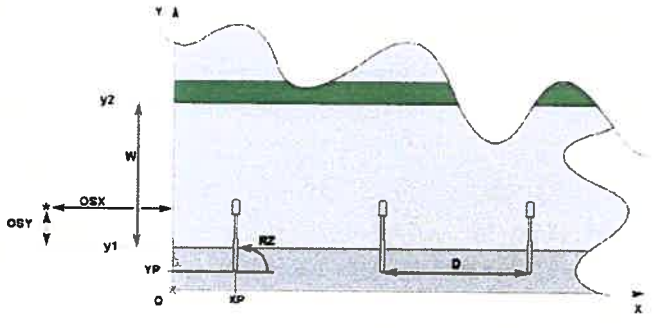
Dimensions of Area Bounding Box [m]: 35.00x18.80x0.00

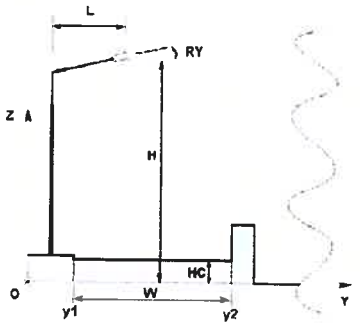
Roads Data

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	h Lane [m] (HC)	color	R Table	Refl. Coeff. q0 Factor	Observer x [m](OSX)	Observer y [m](OSY)
Marc_A	2.00	0.00	2.00	1	0.00	RGB=168,168,168		55.00		
Carregg_A	7.40	2.00	9.40	12	0.00	RGB=126,126,126	C2	7.01	-60.00	1.85
Carregg_B	7.40	9.40	16.80	12	0.00	RGB=126,126,126	C2	7.01	60.00	5.55
Marc_B	2.00	16.80	18.80	1	0.00	RGB=168,168,168		55.00		

Installation Data (Luminaires File)

File Name	1° Pole x [m] (XP)	1° Pole y [m] (YP)	Lum. Height [m] (H)	No. Poles	Interd. [m] (D)	Bracket [m] (L)	Lum.Incl. [°] (RY)	Bracket Rot. [°] (RZ)	Lateral Incl. [°] (RX)	Maint.Coeff. [%]	Code Luminaire	Flux [lm]	Refer.
Fila A	0.00	0.00	12.00	---	35.00	2.00	0	90	0	80.00	ORIGIA800250HPST33000		A
Fila B	0.00	18.80	12.00	---	35.00	2.00	0	270	0	80.00	ORIGIA800250HPST33000		A





1.2 Uniformity Installation Parameters

Surface	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
Working Plane (h=0.00 m)	Horizontal Illuminance (E)	36 lux	18 lux	61 lux	0.51	0.30	0.59
Marc_A	Horizontal Illuminance (E)	29 lux	19 lux	41 lux	0.66	0.46	0.70
Carregg_A	Horizontal Illuminance (E)	37 lux	21 lux	61 lux	0.55	0.34	0.62
Carregg_B	Horizontal Illuminance (E)	37 lux	21 lux	61 lux	0.55	0.34	0.62
Marc_B	Horizontal Illuminance (E)	29 lux	19 lux	41 lux	0.66	0.46	0.70
Marc_A	Luminance (L)	5.0 cd/m²	3.3 cd/m²	7.2 cd/m²	0.66	0.46	0.70
Carregg_A	Luminance (L)	2.4 cd/m²	1.7 cd/m²	3.1 cd/m²	0.72	0.56	0.78
Carregg_B	Luminance (L)	2.4 cd/m²	1.7 cd/m²	3.1 cd/m²	0.72	0.56	0.78
Marc_B	Luminance (L)	5.0 cd/m²	3.3 cd/m²	7.2 cd/m²	0.66	0.46	0.70

Calculation Type: Only Dir. + Furnit.

Visual Comfort

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Marc_A	2.00	0.00	2.00	1		55.00					
Carregg_A	7.40	2.00	9.40	12	C2	7.01	-60.00	3.85	0.32	8.46	0.70
Carregg_B	7.40	9.40	16.80	12	C2	7.01	95.00	14.95	0.32	8.46	0.70
Marc_B	2.00	16.80	18.80	1		55.00					

Light Pollution

Average Ratio - Rn -	Maximum Intensity
0.16 %	382 cd/klm

2.1 Luminaire/Measurements Info

Ref.	Line	Luminaire Name (Measur. Name)	Luminaire Code (Measur. Code)	Luminaires N.	Ref.Lamps	Lamps N.
A	GRECHI Origia 800	ORIGIA 800 250W HPST/SAPT (ORIGIA 800 250W HPST/SAPT)	ORIGIA800250HPST (010250ORIGIA80HPST)	20	LMP-A	1

2.2 Lamps Info

Ref.Lamps	Type	Code	Flux [lm]	Wattage [W]	Color [°K]	N.
LMP-A	ST 250	NAVT250SUPER	33000	250	2000	20

2.3 Luminaire Table

Ref.	Lum.	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Luminaire Code	Coeff. Mant.	Lamp Code	Flux [lm]
A	1	X	-140.00;2.00;12.00	-0;0;-90	ORIGIA800250HPST	0.80	NAVT250SUPER	1*33000
	2	X	-105.00;2.00;12.00	-0;0;-90		0.80		
	3	X	-70.00;2.00;12.00	-0;0;-90		0.80		
	4	X	-35.00;2.00;12.00	-0;0;-90		0.80		
	5	X	0.00;2.00;12.00	-0;0;-90		0.80		
	6	X	35.00;2.00;12.00	-0;0;-90		0.80		
	7	X	70.00;2.00;12.00	-0;0;-90		0.80		
	8	X	105.00;2.00;12.00	-0;0;-90		0.80		
	9	X	140.00;2.00;12.00	-0;0;-90		0.80		
	10	X	175.00;2.00;12.00	-0;0;-90		0.80		
	11	X	-140.00;16.80;12.00	0;-0;90		0.80		
	12	X	-105.00;16.80;12.00	0;-0;90		0.80		
	13	X	-70.00;16.80;12.00	0;-0;90		0.80		
	14	X	-35.00;16.80;12.00	0;-0;90		0.80		
	15	X	0.00;16.80;12.00	0;-0;90		0.80		
	16	X	35.00;16.80;12.00	0;-0;90		0.80		
	17	X	70.00;16.80;12.00	0;-0;90		0.80		
	18	X	105.00;16.80;12.00	0;-0;90		0.80		
	19	X	140.00;16.80;12.00	0;-0;90		0.80		
	20	X	175.00;16.80;12.00	0;-0;90		0.80		

2.4 Aiming Summary Table

Mast	Row	Culumn	Ref. 2D	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Aiming X[m] Y[m] Z[m]	R.Axis [°]	Coeff. Mant.	Ref.
			L-1	X	-140.00;2.00;12.00	-0;0;-90	-140.00;2.00;0.00	-180	0.80	A
			L-2	X	-105.00;2.00;12.00	-0;0;-90	-105.00;2.00;0.00	-180	0.80	A
			L-3	X	-70.00;2.00;12.00	-0;0;-90	-70.00;2.00;0.00	-180	0.80	A
			L-4	X	-35.00;2.00;12.00	-0;0;-90	-35.00;2.00;0.00	-180	0.80	A
			L-5	X	0.00;2.00;12.00	-0;0;-90	-0.00;2.00;0.00	-180	0.80	A
			L-6	X	35.00;2.00;12.00	-0;0;-90	35.00;2.00;0.00	-180	0.80	A
			L-7	X	70.00;2.00;12.00	-0;0;-90	70.00;2.00;0.00	-180	0.80	A
			L-8	X	105.00;2.00;12.00	-0;0;-90	105.00;2.00;0.00	-180	0.80	A
			L-9	X	140.00;2.00;12.00	-0;0;-90	140.00;2.00;0.00	-90	0.80	A
			L-10	X	175.00;2.00;12.00	-0;0;-90	175.00;2.00;0.00	-180	0.80	A
			L-11	X	-140.00;16.80;12.00	0;-0;90	-140.00;16.80;0.00	7	0.80	A
			L-12	X	-105.00;16.80;12.00	0;-0;90	-105.00;16.80;0.00	9	0.80	A

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Mast	Row	Culumn	Ref. 2D	On	Luminaire Position X[m] Y[m] Z[m]	Luminaire Rotation X[°] Y[°] Z[°]	Aiming X[m] Y[m] Z[m]	R.Axis [°]	Coeff. Mant.	Ref.
			L-13	X	-70.00;16.80;12.00	0;-0;90	-70.00;16.80;0.00	9	0.80	A
			L-14	X	-35.00;16.80;12.00	0;-0;90	-35.00;16.80;0.00	11	0.80	A
			L-15	X	0.00;16.80;12.00	0;-0;90	-0.00;16.80;0.00	14	0.80	A
			L-16	X	35.00;16.80;12.00	0;-0;90	35.00;16.80;0.00	7	0.80	A
			L-17	X	70.00;16.80;12.00	0;-0;90	70.00;16.80;0.00	27	0.80	A
			L-18	X	105.00;16.80;12.00	0;-0;90	105.00;16.80;0.00	27	0.80	A
			L-19	X	140.00;16.80;12.00	0;-0;90	140.00;16.80;0.00	90	0.80	A
			L-20	X	175.00;16.80;12.00	0;-0;90	175.00;16.80;0.00	14	0.80	A

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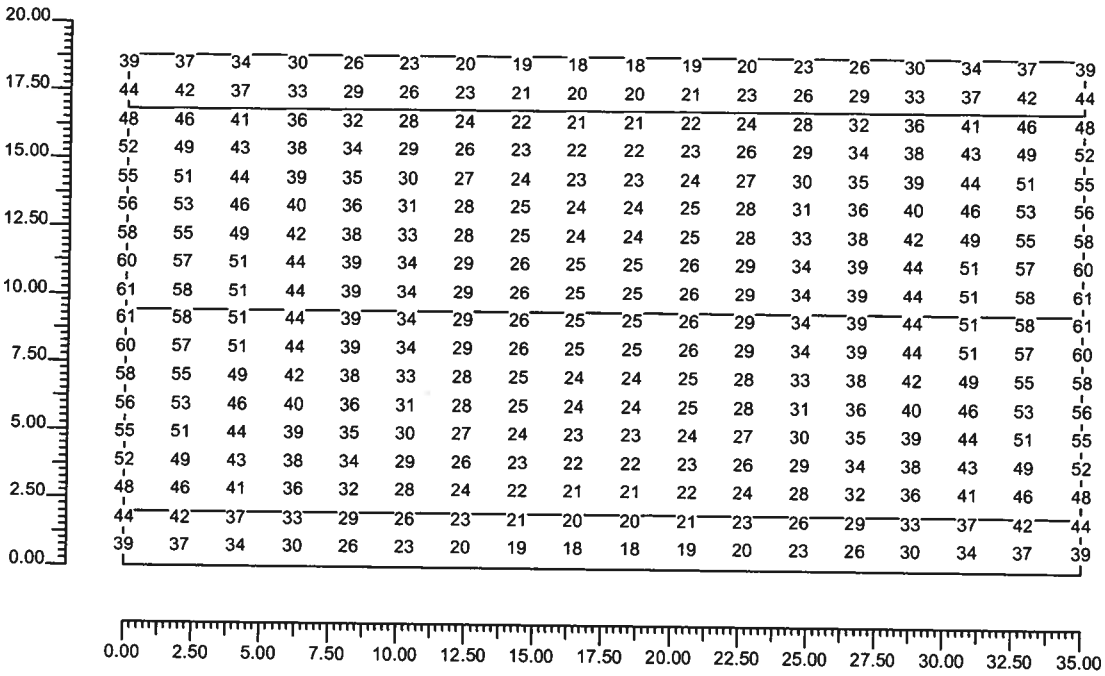
07/08/2008

3.1 Horizontal Illuminance Values on the Working Plane

O (x:0.00 y:0.00 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:2.06 DY:1.04	Horizontal Illuminance (E)	36 lux	18 lux	61 lux	0.51	0.30	0.59

Calculation Type: Only Dir. + Furnit.

Scale 1/250



3.2 Luminance Values on:Carregg_A

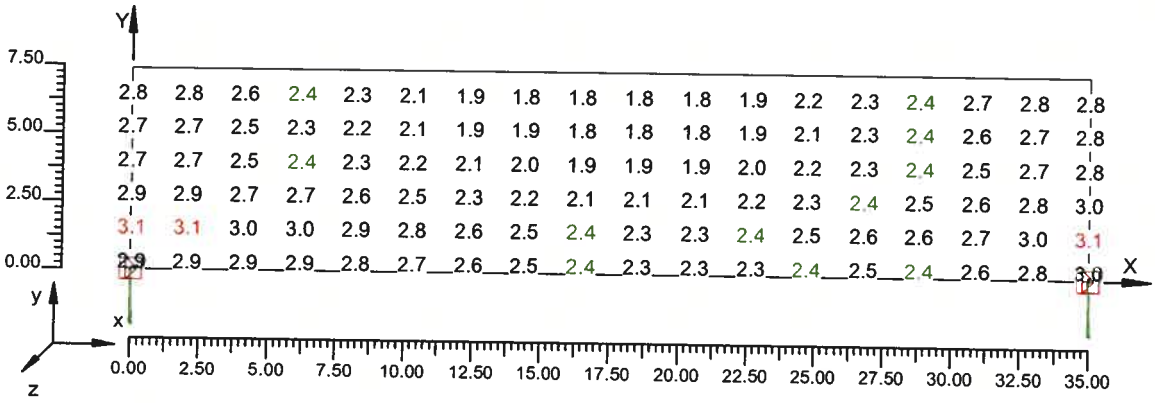
O (x:0.00 y:2.00 z:0.00)	Results	Average	Minimum	Maximum	Min/Ave	Min/Max	Ave/Max
DX:2.06 DY:0.62	Luminance (L)	2.4 cd/m²	1.7 cd/m²	3.1 cd/m²	0.72	0.56	0.78

Calculation Type: Only Dir. + Furnit.

Lane Name	Lane Width [m] (W)	y1 [m]	y2 [m]	Calc. Pt. Y	R Table	Refl. Coeff. q0 Factor	Absolute x Observer [m]	Absolute y Observer [m]	Veiling Luminance [cd/m²]	Threshold Increment [%]	Longitudinal Uniformity
Carregg_A	7.40	2.00	9.40	12	C2	7.01	-60.00	3.85	0.32	8.46	0.70

Scale 1/250

Not all the calculated points are visible



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