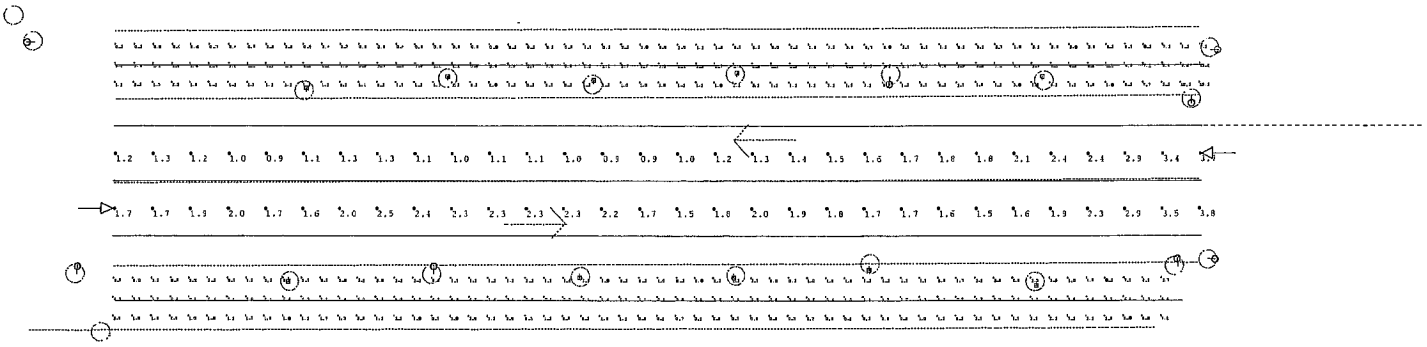
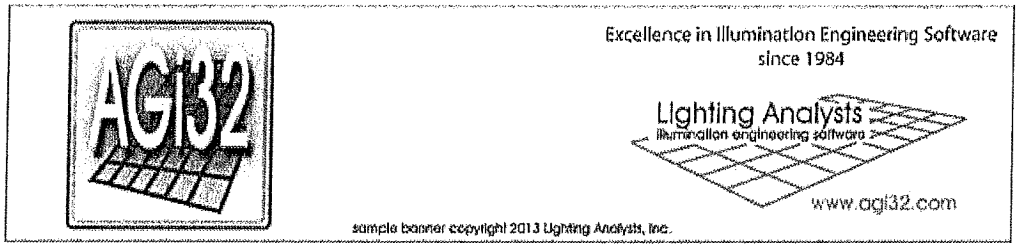
Appendix A – Lighting Analysis

4th Avenue





User and Job File Information

User Information

Voice Number :
Fax Number :
Email Address :

Job File Information

Filename :	4th Avenue Analysis.AGI
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Created By :	KELT150603
Created Date :	6/20/2016 11:43:35 AM
Created Version :	14.6.13
Modified By :	KELT150603
Modified Date :	6/21/2016 12:05:35 PM
Modified Version :	14.6.13
Total Time (Hrs) :	2.4
Description :	

Information :

Luminaire Definition(s)

AL3RP-400-3H
400W puck light

Filename	AL3RP-400-3H.ies
Lumens Per Lamp	40000
Number of Lamps	1
Total Lamp Lumens	40000
Arrangement Lamp Lumens	40000
Arrangement Luminaire Lumens	29232
Luminaire Lumens	29232
Luminaire Efficiency (%)	73
Lamp Lumen Depreciation (LLD)	0.850
Luminaire Dirt Depreciation (LDD)	0.850
Total Light Loss Factor	0.723
Luminaire Watts	458
Arrangement Watts	458
Arrangement	SINGLE
Arm Length	2
Offset	0
Pole Mounted	
Road Classification	Type III, Medium, Full Cutoff (deprecated)
Upward Waste Light Ratio	0.00

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	2661.7	6.7	9.1
LCS-FM	7996.0	20.0	27.4
LCS-FH	6175.7	15.4	21.1
LCS-FVH	56.7	0.1	0.2
LCS-BL	2625.9	6.6	9.0
LCS-BM	7037.6	17.6	24.1
LCS-BH	2620.9	6.6	9.0
LCS-BVH	57.2	0.1	0.2
LCS-UL	0.0	0.0	0.0
LCS-UH	0.0	0.0	0.0
Total	29231.7	73.1	100.0

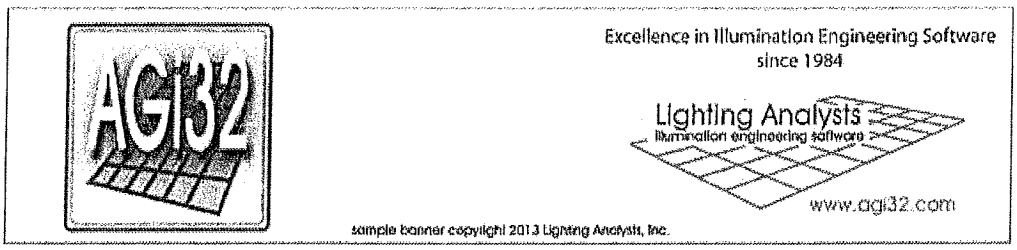
	B4-U0-G4
Indoor Classification	Direct
LER	64

CAND3-100HPS-C-RR3 (LU00
100W Acorn ped light

Filename	CAND3-100HPS-C-RR3 (LU000195).IES
Lumens Per Lamp	1000
Number of Lamps	1
Total Lamp Lumens	1000
Arrangement Lamp Lumens	1000
Arrangement Luminaire Lumens	665

Luminaire Definition(s) - Cont.

Luminaire Lumens	665
Luminaire Efficiency (%)	67
Lamp Lumen Depreciation (LLD)	0.850
Luminaire Dirt Depreciation (LDD)	0.850
Total Light Loss Factor	0.723
Luminaire Watts	100
Arrangement Watts	100
Arrangement	SINGLE
Arm Length	1
Offset	0
Pole Mounted	
Road Classification	Type IV, Long, Non-Cutoff (deprecated)
Indoor Classification	Direct
LER	7



Calculation Summary

4th ave N sidewalk

Project: Project_1
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	5
Point Spacing T-B	5
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal
Illuminance (Fc)	
Average	2.63
Maximum	10.9
Minimum	0.5
Avg/Min	5.26
Max/Min	21.80

4th ave S sidewalk

Project: Project_1
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	5
Point Spacing T-B	5
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal
Illuminance (Fc)	
Average	2.54
Maximum	9.7
Minimum	0.2
Avg/Min	12.70
Max/Min	48.50

4th Avenue Roadway_Illum

Project: Project_1
Roadway Standard: IES RP-8-2000_2-way traffic_calc zone across entire roadway
Coordinates in Feet

Point Spacing L-R	10
Point Spacing T-B	7.25
Grid Orient	180
Grid Tilt	0

Calculation Summary - Cont.

Meter Type	Horizontal
Illuminance (Fc)	
Average	3.33
Maximum	11.2
Minimum	1.1
Avg/Min	3.03
Max/Min	10.18
Max/Avg	3.36

4th Avenue Roadway_Luminance_Lane_1

Project: Project_1
Roadway Standard: IES RP-8-2000_2-way traffic_calc zone across entire roadway
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	10
Point Spacing T-B	14.5
Grid Orient	180
Grid Tilt	0
Luminance (Cd/SqM)	
Average	1.81
Maximum	3.8
Minimum	0.9
Avg/Min	2.01
Max/Min	4.22
Max/Avg	2.10

4th Avenue Roadway_Veil_Lum

Project: Project_1
Roadway Standard: IES RP-8-2000_2-way traffic_calc zone across entire roadway
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	10
Point Spacing T-B	7.25
Grid Orient	180
Grid Tilt	0
Veiling Luminance (Cd/SqM)	
Average	0.24
Maximum	0.6
Minimum	0.1
Avg/Min	2.40
Max/Min	6.00

Calculation Summary - Cont.

Max/Avg	2.50

4th Avenue SW N VERTICAL

Project: Project_1
Points along a line
Coordinates in Feet

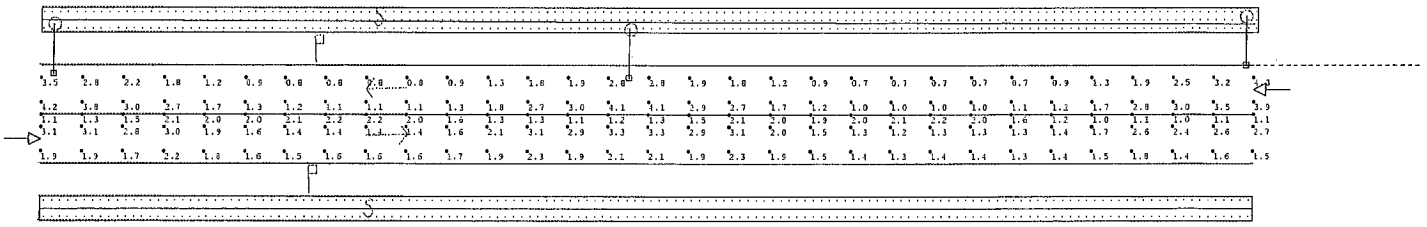
Point Spacing	1.6
Meter Type	Vertical - Along
Illuminance (Fc)	
Average	1.10
Maximum	2.1
Minimum	0.3
Avg/Min	3.67
Max/Min	7.00

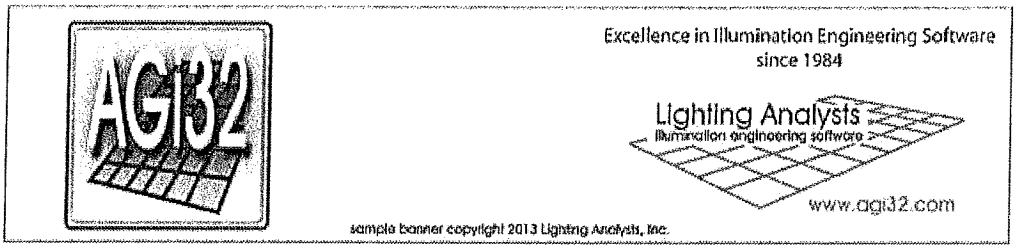
4th Avenue SW S VERTICAL

Project: Project_1
Points along a line
Coordinates in Feet

Point Spacing	1.6
Meter Type	Vertical - Along
Illuminance (Fc)	
Average	1.57
Maximum	3.9
Minimum	0.4
Avg/Min	3.93
Max/Min	9.75

8th Avenue





User and Job File Information

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Fax Number :
Email Address :

Job File Information

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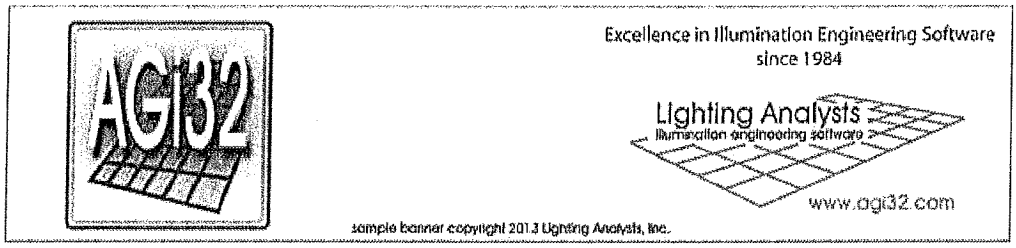


Luminaire Definition(s)

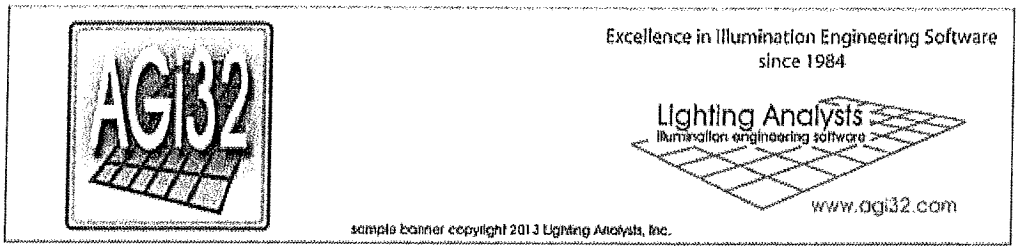
ge453242_tcm201-62465
GE 250W HPS

Filename	ge453242_tcm201-62465.ies
Lumens Per Lamp	28000
Number of Lamps	1
Total Lamp Lumens	28000
Arrangement Lamp Lumens	28000
Arrangement Luminaire Lumens	21367
Luminaire Lumens	21367
Luminaire Efficiency (%)	77
Lamp Lumen Depreciation (LLD)	0.850
Luminaire Dirt Depreciation (LDD)	0.850
Total Light Loss Factor	0.723
Luminaire Watts	305
Arrangement Watts	305
Arrangement	SINGLE
Arm Length	12
Offset	0
Pole Mounted	
Road Classification	Type III, Medium, Semi-Cutoff (deprecated)
Upward Waste Light Ratio	0.03

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	2060.2	7.4	9.6
LCS-FM	6264.4	22.4	29.3
LCS-FH	6398.2	22.9	29.9
LCS-FVH	468.3	1.7	2.2
LCS-BL	913.6	3.3	4.3
LCS-BM	2792.0	10.0	13.1
LCS-BH	1694.5	6.1	7.9
LCS-BVH	181.5	0.6	0.8
LCS-UL	288.6	1.0	1.4
LCS-UH	305.2	1.1	1.4
Total	21366.5	76.5	100.0

	B3-U3-G3
Indoor Classification	Direct
LER	70

Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.



Calculation Summary

8th Ave SW N

Project: Project_1
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	2
Point Spacing T-B	2
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	0.55
Maximum	1.3
Minimum	0.2
Avg/Min	2.75
Max/Min	6.50

8th Ave SW N VERTICAL

Project: Project_1
Points along a line
Coordinates in Feet

Point Spacing	1.6
Meter Type	Vertical - Along

Illuminance (Fc)	
Average	0.25
Maximum	0.6
Minimum	0.0
Avg/Min	N.A.
Max/Min	N.A.

8th Ave SW S

Project: Project_1
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	2
Point Spacing T-B	2
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)

Calculation Summary - Cont.

Average	0.91
Maximum	1.3
Minimum	0.5
Avg/Min	1.82
Max/Min	2.60

8th Ave SW S VERTICAL

Project: Project_1
Points along a line
Coordinates in Feet

Point Spacing	1.6
Meter Type	Vertical - Along

Illuminance (Fc)	
Average	0.77
Maximum	1.5
Minimum	0.0
Avg/Min	N.A.
Max/Min	N.A.

8th Avenue Roadway_Illum

Project: Project_1
Roadway Standard: IES RP-8-2000_2-way traffic_calc zone across entire roadway
Coordinates in Feet

Point Spacing L-R	10
Point Spacing T-B	6
Grid Orient	180
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	1.92
Maximum	4.3
Minimum	0.7
Avg/Min	2.74
Max/Min	6.14
Max/Avg	2.24

8th Avenue Roadway Luminance Lane 1

Project: Project_1
Roadway Standard: IES RP-8-2000_2-way traffic_calc zone across entire roadway
R3 (Slightly Specular), Q0 = 0.07

Calculation Summary - Cont.

Coordinates in Feet

Point Spacing L-R	10
Grid Orient	180
Grid Tilt	0

Luminance (Cd/SqM)	
Average	1.62
Maximum	2.2
Minimum	1.0
Avg/Min	1.62
Max/Min	2.20
Max/Avg	1.36

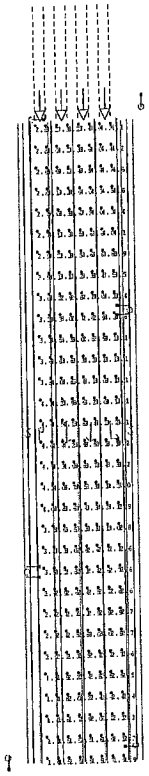
8th Avenue Roadway Veil Lum

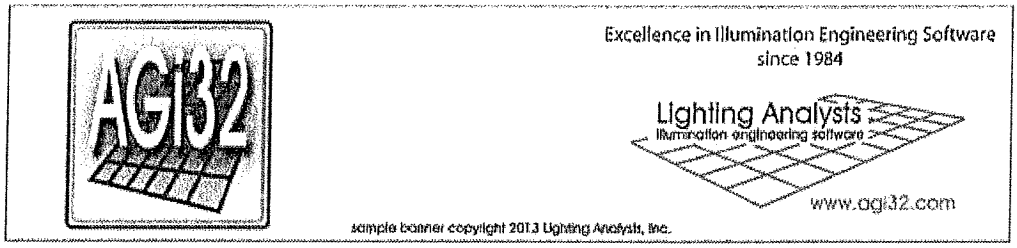
Project: Project_1
Roadway Standard: IES RP-8-2000_2-way traffic_calc zone across entire roadway
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	10
Point Spacing T-B	6
Grid Orient	180
Grid Tilt	0

Veiling Luminance (Cd/SqM)	
Average	0.12
Maximum	0.5
Minimum	0.0
Avg/Min	N.A.
Max/Min	N.A.
Max/Avg	4.17

L Street





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Job File Information

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Modified Version :	14.6.13
Total Time (Hrs) :	1.1
Description :	

Information :

Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Luminaire Definition(s)

ge451010_tcm201-62498
GE 400W HPS

Filename	ge451010_tcm201-62498.ies
Lumens Per Lamp	51000
Number of Lamps	1
Total Lamp Lumens	51000
Arrangement Lamp Lumens	51000
Arrangement Luminaire Lumens	37001
Luminaire Lumens	37001
Luminaire Efficiency (%)	73
Lamp Lumen Depreciation (LLD)	0.850
Luminaire Dirt Depreciation (LDD)	0.850
Total Light Loss Factor	0.723
Luminaire Watts	468
Arrangement Watts	468
Arrangement	SINGLE
Arm Length	6
Offset	0
Pole Mounted	
Road Classification	Type III, Medium, Cutoff (deprecated)
Upward Waste Light Ratio	0.02

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	2994.6	5.9	8.1
LCS-FM	10524.3	20.6	28.4
LCS-FH	8345.2	16.4	22.6
LCS-FVH	528.9	1.0	1.4
LCS-BL	2388.8	4.7	6.5
LCS-BM	7341.4	14.4	19.8
LCS-BH	3764.4	7.4	10.2
LCS-BVH	375.3	0.7	1.0
LCS-UL	394.8	0.8	1.1
LCS-UH	342.8	0.7	0.9
Total	37000.5	72.6	100.0

	B4-U3-G4
Indoor Classification	Direct
LER	79

Calculation Summary

L Street E Sidewalk 1

Project: Project_1
3 Pt. Grid
Coordinates in Feet

Point Spacing L-R	2
Point Spacing T-B	2
Grid Orient	271.89
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	3.68
Maximum	7.1
Minimum	2.2
Avg/Min	1.67
Max/Min	3.23

L Street Roadway_Illum

Project: Project_1
Roadway Standard: IES RP-8-2000
Coordinates in Feet

Point Spacing L-R	10
Point Spacing T-B	5.256
Grid Orient	272.072
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	4.60
Maximum	8.6
Minimum	2.6
Avg/Min	1.77
Max/Min	3.31
Max/Avg	1.87

L Street Roadway_Luminance

Project: Project_1
Roadway Standard: IES RP-8-2000
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	10
Point Spacing T-B	5.256

Calculation Summary - Cont.

Grid Orient	272.072
Grid Tilt	0

Luminance (Cd/SqM)	
Average	3.08
Maximum	4.7
Minimum	1.4
Avg/Min	2.20
Max/Min	3.36
Max/Avg	1.53

L Street Roadway_Veil Lum

Project: Project_1
Roadway Standard: IES RP-8-2000
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	10
Point Spacing T-B	5.256
Grid Orient	272.072
Grid Tilt	0

Veiling Luminance (Cd/SqM)	
Average	0.30
Maximum	0.6
Minimum	0.1
Avg/Min	3.00
Max/Min	6.00
Max/Avg	2.00

L Street SW E VERTICAL

Project: Project_1
Points along a line
Coordinates in Feet

Point Spacing	1.6
Meter Type	Vertical - Along

Illuminance (Fc)	
Average	1.86
Maximum	3.4
Minimum	0.1
Avg/Min	18.60
Max/Min	34.00

Job File: L Street Analysis.AGI
Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.

Calculation Summary - Cont.

L Street SW W VERTICAL

Project: Project_1
Points along a line
Coordinates in Feet

Point Spacing	1.6
Meter Type	Vertical - Along

Illuminance (Fc)	
Average	1.82
Maximum	3.7
Minimum	0.2
Avg/Min	9.10
Max/Min	18.50

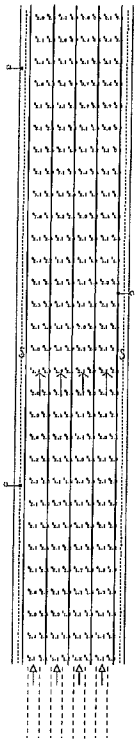
L Street W Sidewalk

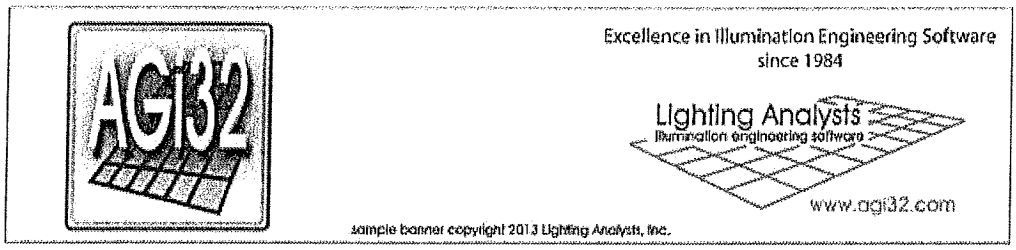
Project: Project_1
3 Pt. Grid
Coordinates in Feet

Point Spacing L-R	2
Point Spacing T-B	2
Grid Orient	271.878
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	3.73
Maximum	8.6
Minimum	2.2
Avg/Min	1.70
Max/Min	3.91

Ingra Street





User and Job File Information

User Information

Voice Number :
Fax Number :
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Job File Information

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Information :

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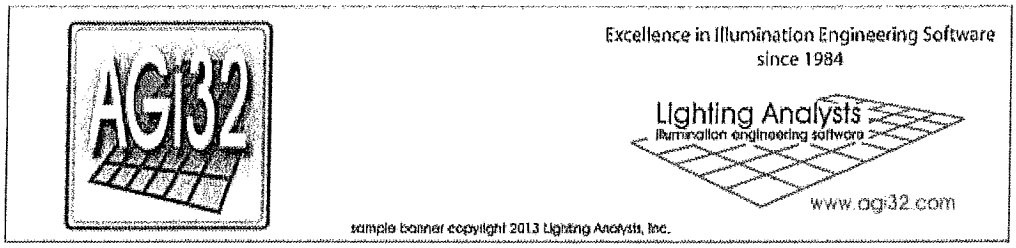
Results derived from content of manufacturers photometric file.



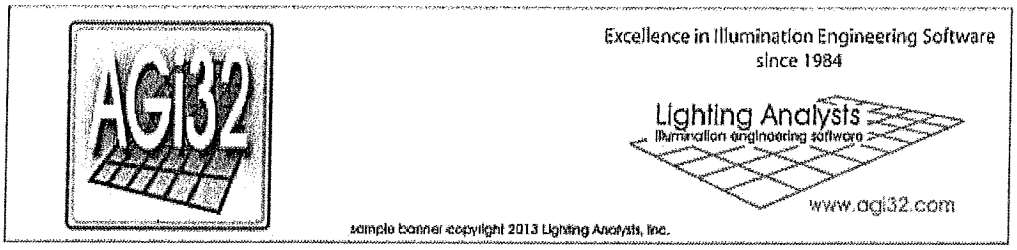
Luminaire Definition(s)

ge451010_tcm201-62498
GE 400W HPS

Filename	ge451010_tcm201-62498.ies
Lumens Per Lamp	51000
Number of Lamps	1
Total Lamp Lumens	51000
Arrangement Lamp Lumens	51000
Arrangement Luminaire Lumens	37001
Luminaire Lumens	37001
Luminaire Efficiency (%)	73
Lamp Lumen Depreciation (LLD)	0.850
Luminaire Dirt Depreciation (LDD)	0.850
Total Light Loss Factor	0.723
Luminaire Watts	468
Arrangement Watts	468
Arrangement	SINGLE
Arm Length	6
Offset	0
Pole Mounted	
Road Classification	Type III, Medium, Cutoff (deprecated)
Upward Waste Light Ratio	0.02

Luminaire Classification System (LCS)	Lumens	% Lamp	% Luminaire
LCS-FL	2994.6	5.9	8.1
LCS-FM	10524.3	20.6	28.4
LCS-FH	8345.2	16.4	22.6
LCS-FVH	528.9	1.0	1.4
LCS-BL	2388.8	4.7	6.5
LCS-BM	7341.4	14.4	19.8
LCS-BH	3764.4	7.4	10.2
LCS-BVH	375.3	0.7	1.0
LCS-UL	394.8	0.8	1.1
LCS-UH	342.8	0.7	0.9
Total	37000.5	72.6	100.0
BUG Rating	B4-U3-G4		
Indoor Classification	Direct		
LER	79		

Calculations based on published IES Methods and recommendations, values rounded for display purposes.
Results derived from content of manufacturers photometric file.



Calculation Summary

Ingra Roadway Illum

Project: Project_1
Roadway Standard: IES RP-8-2000
Coordinates in Feet

Point Spacing L-R	10
Point Spacing T-B	5.25
Grid Orient	90
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	2.68
Maximum	6.4
Minimum	0.5
Avg/Min	5.36
Max/Min	12.80
Max/Avg	2.39

Ingra Roadway Luminance

Project: Project_1
Roadway Standard: IES RP-8-2000
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	10
Point Spacing T-B	5.25
Grid Orient	90
Grid Tilt	0

Luminance (Cd/SqM)	
Average	1.86
Maximum	3.4
Minimum	0.4
Avg/Min	4.65
Max/Min	8.50
Max/Avg	1.83

Ingra Roadway Veil Lum

Project: Project_1
Roadway Standard: IES RP-8-2000
R3 (Slightly Specular), Q0 = 0.07
Coordinates in Feet

Point Spacing L-R	10

Calculation Summary - Cont.

Point Spacing T-B	5.25
Grid Orient	90
Grid Tilt	0

Veiling Luminance (Cd/SqM)	
Average	0.11
Maximum	0.4
Minimum	0.0
Avg/Min	N.A.
Max/Min	N.A.
Max/Avg	3.64

Ingra SW E

Project: Project_1
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	2
Point Spacing T-B	2
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	1.92
Maximum	6.6
Minimum	0.4
Avg/Min	4.80
Max/Min	16.50

Ingra SW E VERTICAL

Project: Project_1
Points along a line
Coordinates in Feet

Point Spacing	1.6
Meter Type	Vertical - Along

Illuminance (Fc)	
Average	1.11
Maximum	2.7
Minimum	0.0
Avg/Min	N.A.
Max/Min	N.A.

Calculation Summary - Cont.

Ingra SW W

Project: Project_1
2 Pt. Grid
Coordinates in Feet

Point Spacing L-R	2
Point Spacing T-B	2
Grid Orient	0
Grid Tilt	0
Meter Type	Horizontal

Illuminance (Fc)	
Average	2.82
Maximum	6.5
Minimum	0.4
Avg/Min	7.05
Max/Min	16.25

Ingra SW W VERTICAL

Project: Project_1
Points along a line
Coordinates in Feet

Point Spacing	1.6
Meter Type	Vertical - Along

Illuminance (Fc)	
Average	1.45
Maximum	3.0
Minimum	0.0
Avg/Min	N.A.
Max/Min	N.A.