



CITY OF BEVERLY HILLS STAFF REPORT

Meeting Date: November 16, 2010

To: Honorable Mayor & City Council

From: Ara Maloyan, Deputy City Engineer
Tristan Malabanan, Civil Engineer

Subject: LED STREET LIGHTS UPDATE

Attachments:

1. Specification for GE Evolve LED Series
2. Specification for BetaLED LEDway Streetlight
3. LED payback calculations for the GE Evolve (157 W) fixture

INTRODUCTION

Many agencies (Cities of Anchorage and Los Angeles, LADWP and PG&E) have started using LED street light fixtures to replace traditional higher wattage fixtures (such as high pressure sodium and metal halide). The benefits are energy cost savings, reduced maintenance, a better light distribution, and white light with high color rendering capability. In addition, with less energy consumption comes lower carbon dioxide emissions.

LED street light fixtures typically operate on a 120 to 277 volt system. In Beverly Hills, all of our residential street lights have been upgraded to a modern 240-volt system and by the end of 2011 (completion of the current Street Lighting Project – Phase III Commercial), all of our commercial streets (except for North Santa Monica Boulevard) will be upgraded to a 240-volt system. Therefore, the city will have the ability to change existing fixtures to LED fixtures at anytime.

In current and future budgets, there are no funds allocated for LED conversion projects or for expanded testing of LED street light fixtures. As a result, LED street lights are in limited use in Beverly Hills. In January 2010 the city purchased two Evolve LED cobra head fixtures from GE for evaluation. One is on a street light pole on the south side of Sunset Blvd. east of Alta Dr. and the second fixture is on a traffic signal pole on the northeast corner of Cañon Dr. and S. Santa Monica Blvd. In addition, 52 LED pedestrian fixtures from BetaLED are proposed for installation under the ongoing Street Lighting Project – Phase III Commercial on Robertson Blvd.

DISCUSSION

The two GE fixtures currently being evaluated by City staff since January 19, 2010, produce approximately the same amount of light as a typical 200W high pressure

sodium fixture, and are of excellent quality and provide sufficient white light for the roadway. The test LED on Sunset Boulevard is being evaluated against a 200W high pressure sodium (HPS) cobra head fixture, and the test LED on Cañon Drive is being evaluated against a 250W metal halide (MH) cobra head fixture.

Based on an initial purchase price of \$820 for a GE Evolve LED fixture, when compared to a GE 200W HPS fixture, a payback period will never be reached and when compared to a GE 250W MH fixture, payback is achieved after 10 years. However, after 12 years, LED fixtures may well have to be replaced due to their current rated lifespan of 50,000 hours. This evaluation followed the recommendations of the recently adopted Sustainable City Plan which asks for lifecycle costs to be included in decision making.

At this time, the City has no formal plan to replace the existing street light fixtures with LEDs. Based on the current purchase price of LEDs (\$500-\$600 for residential street fixtures and \$800-\$1200 for commercial fixtures) and the lengthy pay back periods (7 to 10 years for residential street lights and 10 years to never for commercial street lights), staff cannot recommend city-wide replacement of existing street light fixtures at this time.

Please note that in the above payback calculations LEDs are being compared to a \$200 cobra head fixture.

FISCAL IMPACT

None at this time.

RECOMMENDATION

The City of Beverly Hills does not have a formal plan for the replacement of existing street lights to LED's. Staff recommends to continue evaluating new LED street lights and to watch the market for significant price drops that would make conversions to LED's more attractive.

 _____
David Gustavson
Approved By

Attachment 1

GE EVOLVE™ LED SERIES

Roadway Medium Cobrahead (R150)



APPLICATIONS

- System that provides an advanced LED optical system providing high uniformity, glare control, improved vertical light distribution, and reduced light trespass for effective Roadway Lighting.

Housing: Die cast aluminum housing. Aesthetically inspired by a traditional roadway (Cobrahead) fixture, it incorporates a heat sink directly into the unit ensuring maximum heat transfer, long LED life and a reduced EPA. Meets ANSI 2G vibration standards. For 3G rating contact factory. Power door assembly with retention latch.

LED and Optical Assembly: Structured LED array for optimized roadway photometric distribution. Evolve™ Light Engine consisting of nested concentric directional reflectors designed to optimize application efficiency and minimize glare. Utilizes High Brightness LEDs, 70 CRI at 6000K typical. Photometric measurements in accordance with LM-79. Rated at -40° to 50°C.

Lumen Maintenance: System rating is 50,000 hours @ L80.

Ratings: UL/cUL listed, suitable for wet locations. IP 65 rated optical enclosure.

Mounting: 4-Bolt Slipfitter with + -5 degrees of adjustment for leveling. Cast end pipe stop. Wildlife intrusion protection at mounting arm. Adjustable for 1.25 in. or 2.0 in. pipe.

Finish: Corrosion resistant polyester powder paint. Standard color: Gray. For custom colors contact factory. Standard warranty applies.

Electrical: 120-277 volt universal electronic driver. 347-480 volt available. Drive current 467mA typical. System power factor is >90% and THD <20% full load. Class "A" sound rating. Integral Surge protection per IEEE/ANSI C62.41-1991.

- 277V Systems: Location Category B2
- 480V Systems: Location Category B3

PE available for all voltages.

Warranty: 5 year limited system warranty

Catalog Number:

ERMC - - - - -

ORDERING NUMBER LOGIC Sample Number - ERMCOXX60A1GRAYXXX BELOW - SUGGESTED ORDER LOGIC

ERMC	0	XX	60	A	1	GRAY	XXX
PROD. ID E = LED Product Platform R = Roadway M = Medium C = Cobrahead	VOLTAGE 0 = 120 - 277 H = 347 - 480	PHOTOMETRICS A1 = Asymmetric Wide 6000 lumens A2 = Asymmetric Wide 8700 lumens A3 = Asymmetric Wide 9600 lumens A4 = Asymmetric Short 5100 lumens A5 = Asymmetric Short 7000 lumens A6 = Asymmetric Short 7800 lumens	LED COLOR TEMP 60 = 6000K 41 = 4100K Contact factory for availability	LENS TYPE A = Acrylic	PE FUNCTION 1 = None 2 = PE Rec. 4 = PE Rec. with Shorting Cap 5 = PE Rec. with Control	COLOR GRAY = Gray	OPTIONS E = GE Level F = Fusing L = Tool-Less Entry S = Shield XXX = Special Options

Distribution	Typical Initial Lumens	Typical System Wattage 120-277V	Typical System Wattage 347-480V	Pole Spacing (2-4 lanes)	Photometric Curve Number
1.) Asymmetric Wide - Medium	6000	95	100	4-6:1	454237
2.) Asymmetric Wide - Medium	8700	142	149	4-6:1	454238
3.) Asymmetric Wide - Medium	9600	157	165	4-6:1	454239
4.) Asymmetric Short	5100	80	84	2-4:1	454240
5.) Asymmetric Short	7000	115	121	2-4:1	454241
6.) Asymmetric Short	7800	127	133	2-4:1	454242

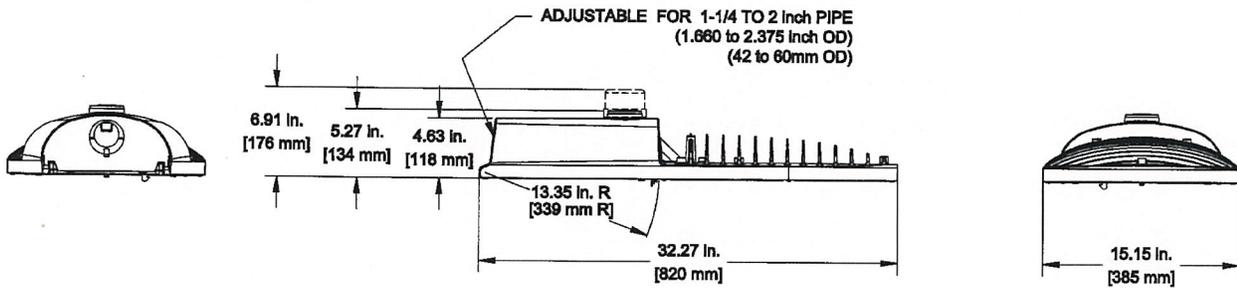
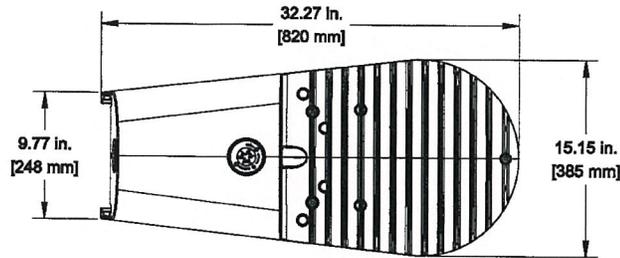
XX					
PHOTOMETRICS					
A7 = Asymmetric Wide 3100 lumens					
A8 = Asymmetric Wide 4100 lumens					
For A7 & A8 Contact factory for availability					
PHOTOMETRIC SELECTION TABLE					
Distribution	Typical Initial Lumens	Typical System Wattage 120-277V	Typical System Wattage 347-480V	Pole Spacing (2-4 lanes)	Photometric Curve Number
7.) Asymmetric Wide - Medium	3100	49	52	4-6:1	454243
8.) Asymmetric Wide - Medium	4100	64	67	4-6:1	454244

Note: Values supplied above may be subject to revision based on final LM-79 test results.

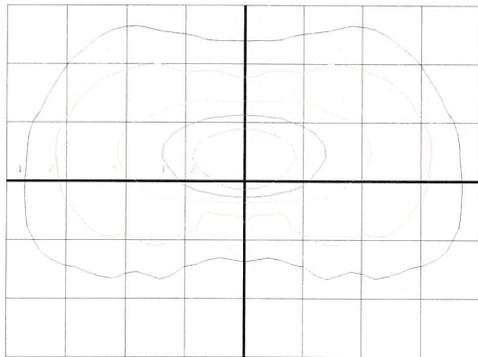
GE EVOLVE™ LED SERIES

Roadway Medium Cobrahead (R150)

FIXTURE DIMENSIONS

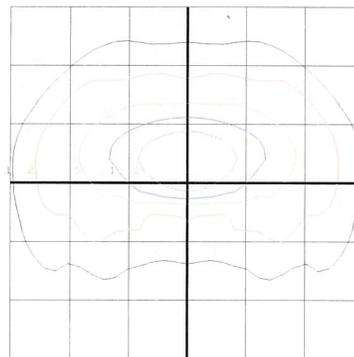


Iso - Illuminance Plot - A1, A2, A3



ASYMMETRIC WIDE

Iso - Illuminance Plot - A4, A5, A6



ASYMMETRIC SHORT

DATA

Approximate Net Weight
EPA with Slipfitter

35 lbs 16 kgs
1.1 sq ft max 0.10 sq M max

Information provided is subject to change without notice. All values are design or typical values when measured under laboratory conditions.

GE Lighting Systems, Inc.

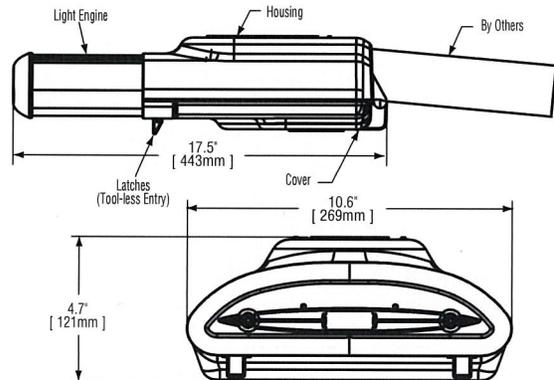
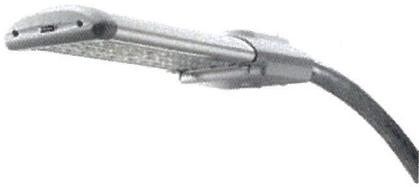
Attachment 2

STR-LWY-2M-HT

LEDway™ Streetlight – Type II Medium

Rev. Date: 02/15/10

BetaLED Catalog #: STR - LWY - 2M - HT - 03 - C - UL - SV - -



Notes:

Product	Family	Optic	Mounting	# of LEDs (x 10)	LED Series	Voltage	Color Options	Factory-Installed Options
STR	LWY	<input type="checkbox"/> 2M ¹ <input type="checkbox"/> 2MB ²	HT ³	<input type="checkbox"/> 02 <input type="checkbox"/> 03	C	<input type="checkbox"/> UL Universal 120-277V <input type="checkbox"/> UH Universal 347-480V	<input type="checkbox"/> SV Silver ⁴ <input type="checkbox"/> BK Black ⁴ <input type="checkbox"/> BZ Bronze ⁴ <input type="checkbox"/> PB Platinum Bronze ⁴ <input type="checkbox"/> WH White ⁴	Please type additional options in manually on the lines provided above. <input type="checkbox"/> 350 350mA Drive Current ⁵ <input type="checkbox"/> 43K 4300K Color Temperature ⁶ <input type="checkbox"/> 700 700mA Drive Current ⁷ <input type="checkbox"/> DIM 0-10V Dimming ^{8,9} <input type="checkbox"/> F Fuse ¹⁰ <input type="checkbox"/> HL Hi/Low (175/350/525, dual circuit input) ¹¹⁻¹³ <input type="checkbox"/> N No Quick Disconnect Harness or Leveling Bubble ¹⁴ <input type="checkbox"/> PD Power Door ^{15,16} <input type="checkbox"/> R NEMA Photozell Receptacle ¹⁰ <input type="checkbox"/> SC Door Safety Tether ¹⁷

[Click here for Utility option.](#)
For additional options, see [IP66 spec sheet.](#)

Footnotes

- IESNA Type II Medium distribution
- IESNA Type II Medium distribution with backlight control
- Horizontal tenon mount
- Light engine portion of extrusion is not painted and will remain natural aluminum regardless of color selection
- Driver operates at 350mA instead of the standard 525mA providing a lower lumen output and a longer life
- Color temperature per fixture; minimum 70 CRI
- Driver operates at 700mA instead of the standard 525mA providing a higher lumen output and a shorter life
- Control by others
- Please consult factory for availability
- Not available with HL option when UH voltage is selected
- Not available when UH voltage is selected
- Refer to [multi level spec sheet](#) for more information
- Sensor not included
- Standard product features unless N option is specified; door clips not included
- All connections between door and fixture are shipped unconnected from the factory; door release spring included to open door automatically when the latches are released
- Hinge retaining clips not included as part of this option
- Stainless steel aircraft cable

LED PERFORMANCE SPECS																								
# of LEDs	Initial Delivered Lumens – Type II Medium @ 6000K	B U G Rating***			Initial Delivered Lumens – Type II Medium w/ Backlight Control @ 6000K	B U G Rating***			Initial Delivered Lumens – Type II Medium @ 4300K	B U G Rating***			System Watts 120-277V	Total Current @ 120V	Total Current @ 230V	Total Current @ 277V	System Watts 347-480V	Total Current @ 347V	Total Current @ 480V	L ₇₀ Hours ** @ 25° C (77° F)				
		B	U	G		B	U	G		B	U	G												
350mA Fixture Operating at 25° C (77° F)																								
20	1,803 (02)	1	1	1	1,347 (02)	0	1	1	1,582 (02)	1	1	1	1,181 (02)	0	1	1	26	0.22	0.14	0.16	32	0.10	0.13	163,000
30	2,705 (03)	1	1	1	2,020 (03)	0	1	1	2,372 (03)	1	1	1	1,772 (03)	0	1	1	37	0.31	0.18	0.17	43	0.13	0.15	150,000
525mA (Standard) Fixture Operating at 25° C (77° F)																								
20	2,416 (02)	1	1	1	1,805 (02)	0	1	1	2,119 (02)	1	1	1	1,583 (02)	0	1	1	39	0.32	0.19	0.17	44	0.13	0.15	107,000
30	3,624 (03)	1	1	1	2,707 (03)	0	1	1	3,179 (03)	1	1	1	2,375 (03)	0	1	1	55	0.46	0.26	0.22	61	0.18	0.17	92,000
700mA Fixture Operating at 25° C (77° F)																								
20	2,957 (02)	1	1	1	2,209 (02)	0	1	1	2,594 (02)	1	1	1	1,937 (02)	0	1	1	54	0.45	0.25	0.22	59	0.17	0.17	73,000
30	4,436 (03)	1	1	1	3,313 (03)	1	1	1	3,891 (03)	1	1	1	2,906 (03)	0	1	1	77	0.65	0.35	0.30	83	0.24	0.21	61,000

* Utilizes magnetic step-down transformer ** For recommended lumen depreciation data see [ID-13](#) *** For more information on the IES BUG (Backlight-Uplight-Glare) Rating visit www.iesna.org/PDF/Erratas/TM-15-07/BugRatingsAddendum.pdf

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Made in the U.S.A. of U.S. and imported parts.
Meets Buy American requirements within the [ARRA](#).



STR-LWY-2M-HT

LEDway™ Streetlight – Type II Medium

Rev. Date: 02/15/10

General Description

Fixture housing is all aluminum construction. Standard fixture utilizes terminal block for power input suitable for #2-#14 AWG wire and operates at 525mA. Drive current is field switchable on 20 and 30 LED units. Fixture is designed to mount on 1.25" IP (1.675" O.D.) and/or 2" IP (2.375" O.D.) horizontal tenon and is adjustable +/- 5° to allow for fixture leveling (includes leveling bubble to aid in this process). Fixture carries a limited five year warranty.

Electrical

Modular design accommodates varied lighting output from high power, white, 6000K (+/- 500K per full fixture), minimum 70 CRI, long life LED sources. 120-277V 50/60 Hz, Class 1 LED drivers are standard. 347-480V 50/60 Hz option is available. LED drivers have power factor >90% and THD <20% at full load. Units provided with integral 9kV surge suppression protection standard. Quick disconnect harness suitable for mate and break under load provided on power feed to driver for ease of maintenance. Surge protection tested in accordance with IEEE C62.41.2 and ANSI standard 62.41.2.

Finish

Exclusive Colorfast DeltaGuard® finish features an E-Coat epoxy primer with an ultra-durable silver powder topcoat, providing excellent resistance to corrosion, ultraviolet degradation and abrasion. Bronze, black, white and platinum bronze powder topcoats are also available. The finish is covered by our 10 year limited warranty.

Fixture and finish are endurance tested to withstand 5,000 hours of elevated ambient salt fog conditions as defined in ASTM Standard B 117.

Testing & Compliance

UL listed in the U.S. and Canada for wet locations. Consult factory for CE Certified products. RoHS compliant. Meets CALTrans 611 Vibration Testing and GR-63-CORE Section 4.4.1/5.4.2 Earthquake Zone 4. International Dark-Sky Association approved.

Patents

U.S. and international patents granted and pending. BetaLED is a division of Ruud Lighting, Inc. For a listing of Ruud Lighting, Inc. patents, visit www.uspto.gov.

Field-Installed Accessories

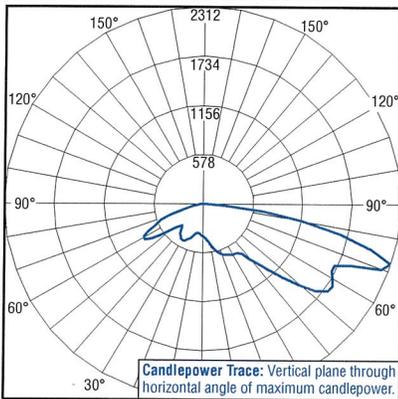


Bird Spikes for Light Engine
 XA-BRDSPK30



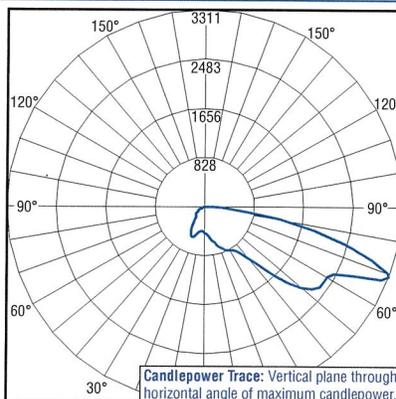
Bird Spikes Kit for Housing
 XA-BRDSPKHSG

Photometrics



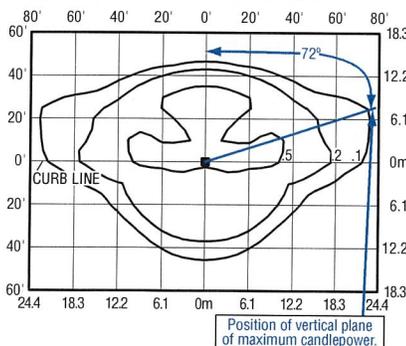
Candlepower Trace: Vertical plane through horizontal angle of maximum candlepower.

Independent Testing Laboratories certified test. Report No. ITL63655. Candlepower trace of 6000K, 30 LED Type II Medium streetlight luminaire with 3,604 initial delivered lumens operating at 525mA. All published luminaire photometric testing performed to IESNA LM-79-08 standards.



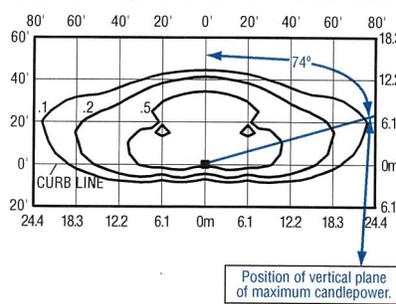
Candlepower Trace: Vertical plane through horizontal angle of maximum candlepower.

Independent Testing Laboratories certified test. Report No. ITL63996. Candlepower trace of 6000K, 40 LED Type II Medium streetlight luminaire with backlight control and 3,534 initial delivered lumens operating at 525mA. All published luminaire photometric testing performed to IESNA LM-79-08 standards.



Position of vertical plane of maximum candlepower.

Isofootcandle plot of 6000K, 30 LED Type II Medium streetlight luminaire at 25' A.F.G. Luminaire with 3,624 initial delivered lumens operating at 525mA. Initial FC at grade.



Position of vertical plane of maximum candlepower.

Isofootcandle plot of 6000K, 40 LED Type II Medium streetlight luminaire with backlight control at 25' A.F.G. Luminaire with 2,707 initial delivered lumens operating at 525mA. Initial FC at grade.

LEDway™ EPA & Weight Calculations

	Approximate Weight 120-277V*	
20-30 LED fixture	10.5 lbs.	
EPA		
Horizontal Tenon Mount		
1 fixture	0.565	
EPA		
Round External Mount / Square Internal Mount		
Horizontal Tenons with Fixture(s)		
PT/PD-1H	Single	0.785
PT/PD-2H(90)	90° Twin	1.019
PT/PD-2H(180)	180° Twin	1.350
PT/PD-3H(90)	90° Triple	1.534
PT/PD-3H(120)	120° Triple	1.383
PT/PD-4H(90)	90° Quad	1.938

*Add 5 lbs. for transformer in 347-480V fixtures



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Made in the U.S.A. of U.S. and imported parts.
 Meets Buy American requirements within the ARRA.

Attachment 3

GE Evolve LED (157 W) VS. GE HPS cobra head (210 WATT)

SCENARIO: The LED fixture remains maintenance free. A GE cobra head are used for comparison.

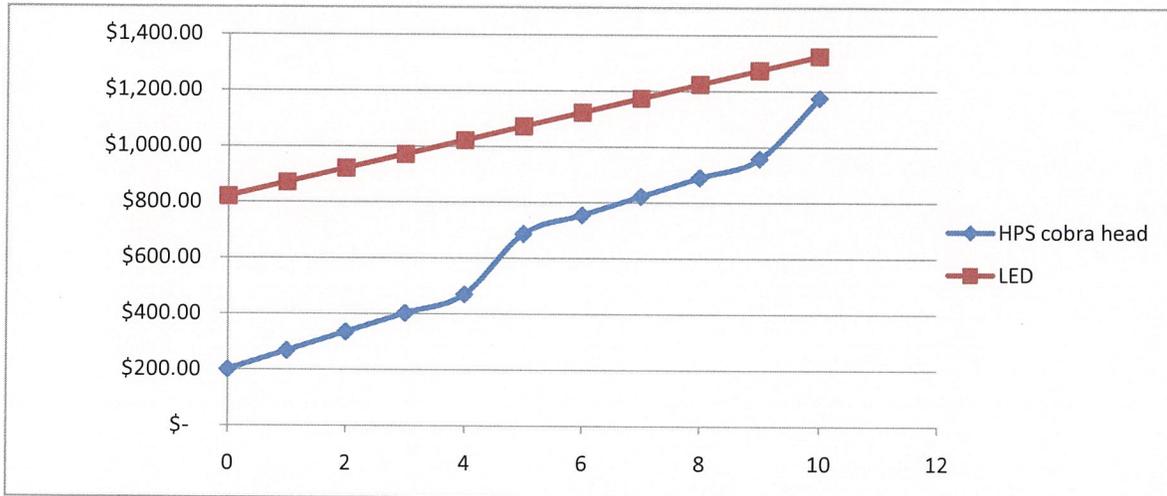
Test location: Sunset Blvd. east of Alta Dr.

- Assumptions:
- 1) A 200 watt G.E. HPS fixture uses about 210 watts for the entire fixture.
 - 2) Streets lights operate on average 11 hours a day.
 - 3) Based on recent energy bills, the average cost of energy is \$0.08 per kilowatt hour (kWh)

<u>200 W HPS cobra head (210 watts)</u>		<u>LED (157 watts)</u>	
Kilowatts per year	843.15		630.355
Cost per year \$	67.45	\$	50.43 (\$0.08/kWh)
Purchase price \$	200.00	\$	820.00
Cost to relamp at 5th and 10th year \$	150.00	No driver failure \$	-

year	HPS cobra head	LED
0	\$ 200.00	\$ 820.00
1	\$ 267.45	\$ 870.43
2	\$ 334.90	\$ 920.86
3	\$ 402.36	\$ 971.29
4	\$ 469.81	\$ 1,021.71
5	\$ 687.26	\$ 1,072.14
6	\$ 754.71	\$ 1,122.57
7	\$ 822.16	\$ 1,173.00
8	\$ 889.62	\$ 1,223.43
9	\$ 957.07	\$ 1,273.86
10	\$ 1,174.52	\$ 1,324.28

Annual carbon dioxide savings (in pounds) 349 based on 1.64 lb/kWh



*The payback will never occur since LED fixtures will need to be replaced after 12 years.

GE Evolve LED (157 W) VS. GE MH cobra head (265 WATT)

SCENARIO: The LED fixture remains maintenance free. GE cobra heads are used for comparison.

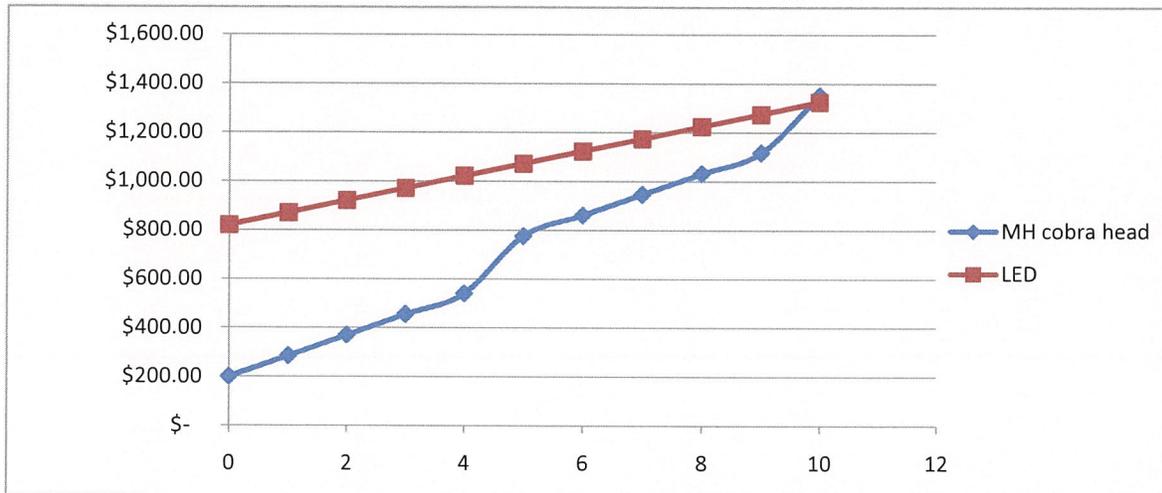
Test location: NE corner of Canon Dr. & S. Santa Monica Blvd.

- Assumptions:
- 1) A 250 watt G.E. MH fixture uses about 265 watts for the entire fixture.
 - 2) Streets lights operate on average 11 hours a day.
 - 3) Based on recent energy bills, the average cost of energy is \$0.08 per kilowatt hour (kWh)

<u>250 W MH Cobra head (265 watts)</u>		<u>LED (157 watts)</u>	
Kilowatts per year	1063.975		630.355
Cost per year \$	85.12	\$	50.43 (\$0.08/kWh)
Purchase price \$	200.00	\$	820.00
Cost to relamp at 5th and 10th year \$	150.00	No driver failure \$	-

year	MH cobra head	LED
0	\$ 200.00	\$ 820.00
1	\$ 285.12	\$ 870.43
2	\$ 370.24	\$ 920.86
3	\$ 455.35	\$ 971.29
4	\$ 540.47	\$ 1,021.71
5	\$ 775.59	\$ 1,072.14
6	\$ 860.71	\$ 1,122.57
7	\$ 945.83	\$ 1,173.00
8	\$ 1,030.94	\$ 1,223.43
9	\$ 1,116.06	\$ 1,273.86
10	\$ 1,351.18	\$ 1,324.28

Annual carbon dioxide savings (in pounds) 711 based on 1.64 lb/kWh



GE Evolve LED (157 W) VS. Aeris fixture (265 WATT)

SCENARIO: The LED fixture remains maintenance free. A decorative Aeris fixture is used for comparison.

- Assumptions:
- 1) A 250 watt Aeris MH fixture uses about 265 watts for the entire fixture.
 - 2) Streets lights operate on average 11 hours a day.
 - 3) Based on recent energy bills, the average cost of energy is \$0.08 per kilowatt hour (kWh)

	<u>250 W Aeris MH (265 watts)</u>		<u>LED (157 watts)</u>
Kilowatts per year	1063.975		630.355
Cost per year \$	85.12	\$	50.43 (\$0.08/kWh)
Purchase price \$	700.00	\$	820.00
Cost to relamp at 5th and 10th year \$	150.00	No driver failure \$	-

year	Aeris		LED	
0	\$	700.00	\$	820.00
1	\$	785.12	\$	870.43
2	\$	870.24	\$	920.86
3	\$	955.35	\$	971.29
4	\$	1,040.47	\$	1,021.71
5	\$	1,275.59	\$	1,072.14
6	\$	1,360.71	\$	1,122.57
7	\$	1,445.83	\$	1,173.00
8	\$	1,530.94	\$	1,223.43
9	\$	1,616.06	\$	1,273.86
10	\$	1,851.18	\$	1,324.28

Annual carbon dioxide savings (in pounds) 711 based on 1.64 lb/kWh

