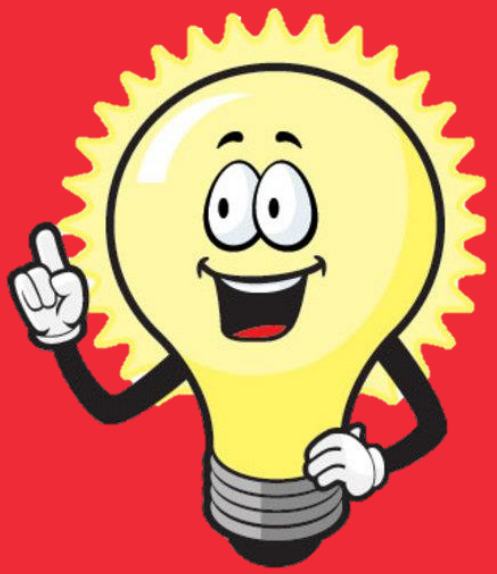
Streetlight Advisory Panel

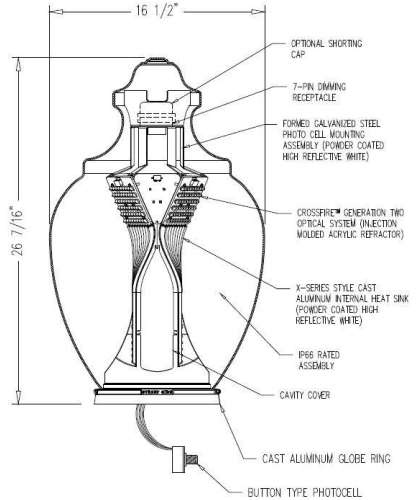


LED Technology and Lighting Design

Technological Advantages of LED lights

LEDs are directional lights.

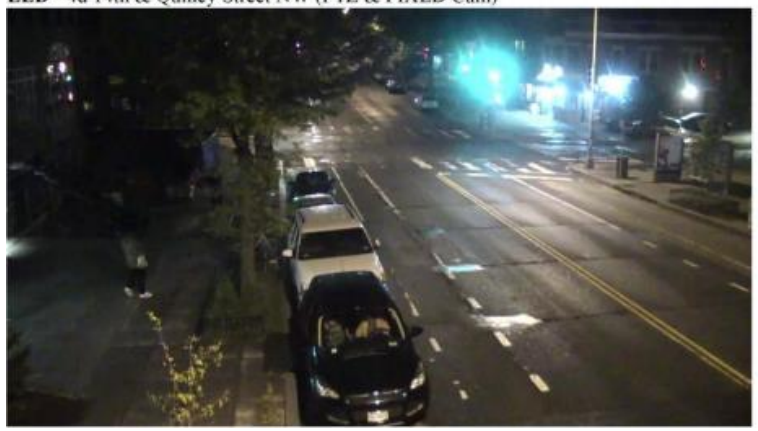
- Their light can be focused on a target. This means fewer lumens from the light to achieve the same foot-candles on the ground as HPS.



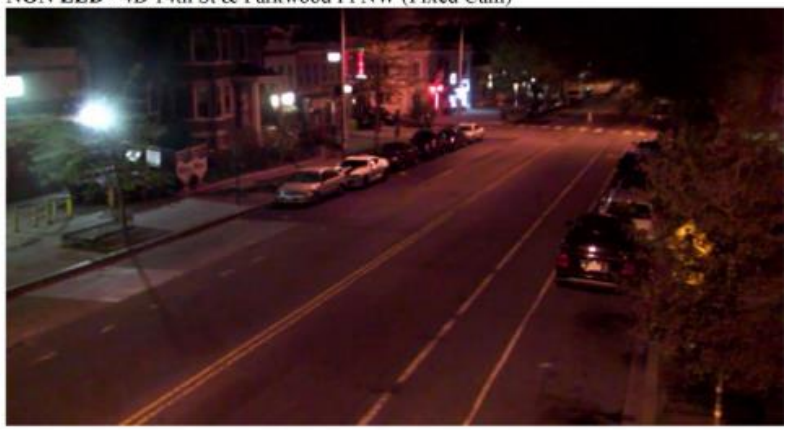
LEDs have optimal color rendering.

- Better light quality means that objects will be easier to identify.

LED - 4d 14th & Quincy Street NW (PTZ & FIXED Cam)



NON LED - 4D 14th St & Parkwood Pl NW (Fixed Cam)



Determining the Right Fixture

How new lighting levels are determined:

- Existing conditions
- Stakeholder feedback (resident, ANC, BID)
- Engineering recommendations (lighting designer for every new construction)
- AASHTO standards (last thing to be considered)

Why we're choosing higher wattage replacements:

When combined with dimming technology, we're able to achieve

- Extended longevity
- Light loss correction
- Resident requests for more light

Case Studies

Example 1

- Road Classification: **Principal Arterial**
- Land Use: **Commercial**
- Most typical…
  - Pole height: 40 feet
  - Configuration: Twin arms, center island
  - Distance between poles: 200 feet
  - Lanes of traffic: 6
- Case: New York Ave NE

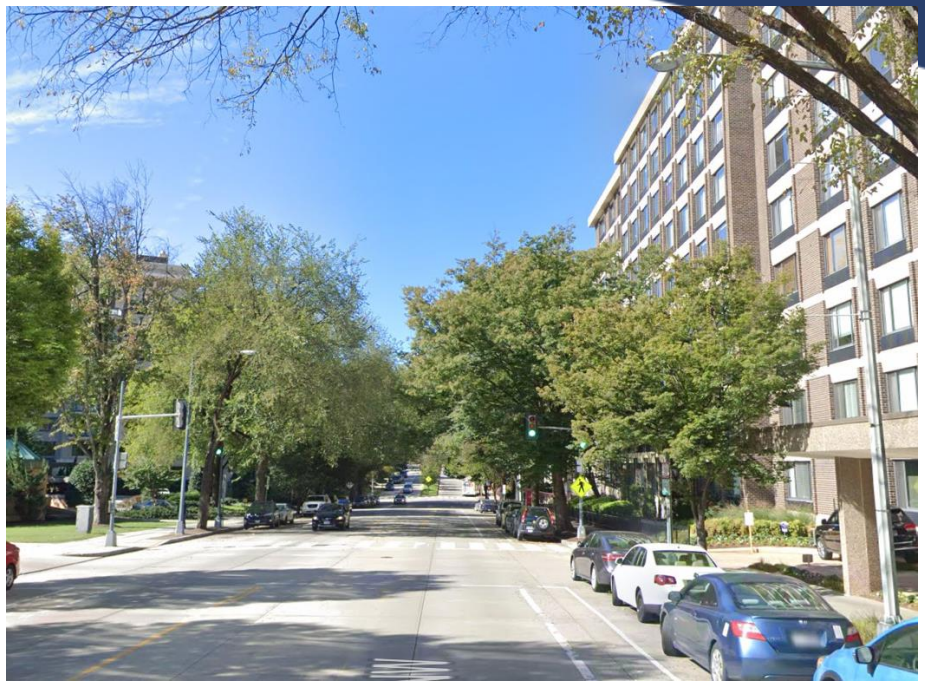
Commercial Principal Arterial Breakdown

AASHTO Standards		Cobrahead Results									
		Current HPS				Proposed LED					
Avg. Min. Maintained Luminance	Luminance Uniformity Ratio (Max/Min)	Wattage	Lumens	Avg. Min. Maintained Luminance	Luminance Uniformity Ratio	Installed Wattage	Dimmed Wattage	Lumens	Avg. Min. Maintained Luminance	Luminance Uniformity Ratio
1.2	5	400	37,193	2.29	3.64	215	215	24,416	1.50	3.03

- In this scenario, the LED emit 12,777 fewer lumens than the current HPS fixture.

Example 2

- Road Classification: **Minor Arterial**
- Land Use: **Intermediate**
- Most typical…
  - Pole height: 28 feet
  - Configuration: Staggered
  - Distance between poles: 100 feet
  - Lanes of traffic: 5
- Case: Calvert St NW



Intermediate Minor Arterial Breakdown

AASHTO Standards		Cobrahead Results								
		Current HPS				Proposed LED				
Avg. Min. Maintained Luminance	Luminance Uniformity Ratio (Max/Min)	Wattage	Lumens	Avg. Min. Maintained Luminance	Luminance Uniformity Ratio	Installed Wattage	Dimmed Wattage	Lumens	Avg. Min. Maintained Luminance	Luminance Uniformity Ratio
0.9	3	400	37,193	2.69	3.04	215	215	24,416	2.22	2.54

- In this scenario, the LED will an HPS that is failing its uniformity standards.

Example 3

- Road Classification: **Collector**
- Land Use: **Residential**
- Most typical…
  - Pole height: 28 feet
  - Configuration: Staggered
  - Distance between poles: 100 feet
  - Lanes of traffic: 5
- Case: East Capitol St

Residential Collector Breakdown

AASHTO Standards		Cobrahead Results								
		Current HPS				Proposed LED				
Avg. Min. Maintained Luminance	Luminance Uniformity Ratio (Max/Min)	Wattage	Lumens	Avg. Min. Maintained Luminance	Luminance Uniformity Ratio	Installed Wattage	Dimmed Wattage	Lumens	Avg. Min. Maintained Luminance	Luminance Uniformity Ratio
0.4	8	250	20,552	1.78	3.64	110	110	10,141	0.78	5.31

- In this scenario, the LED will emit half as many lumens as HPS.

Example 4

- Road Classification: **Local**
- Land Use: **Residential**
- Most typical…
  - Pole height: 28 feet
  - Configuration: Single
  - Distance between poles: 100 feet
  - Lanes of traffic: 4
- Case: Hamlin Street NE

Residential Local Breakdown

AASHTO Standards		Cobrahead Results								
		Current HPS				Proposed LED				
Avg. Min. Maintained Luminance	Luminance Uniformity Ratio (Max/Min)	Wattage	Lumens	Avg. Min. Maintained Luminance	Luminance Uniformity Ratio	Installed Wattage	Dimmed Wattage	Lumens	Avg. Min. Maintained Luminance	Luminance Uniformity Ratio
0.3	10	100	6,350	0.60	3.64	110	60	6,669	0.80	2.78

- In this scenario, the LED achieves lighting levels comparable to existing conditions.

Roadway Lighting Performance

Road Classification	Land Use	AASHTO Standards		HPS Performance		LED Performance	
		Avg. Minimum Maintained Luminance	Luminance Uniformity Ratio (Max/Min)	Avg. Minimum Maintained Luminance	Luminance Uniformity Ratio (Max/Min)	Avg. Minimum Maintained Luminance	Luminance Uniformity Ratio (Max/Min)
Interstate & Other Freeways	Commercial	1	6	1.23	3.29	1.02	1.7
	Intermediate	0.8	6	1.39	2.84	1.14	2.53
Other Principal Arterials/ (Major)	Commercial	1.2	5	2.29	3.64	1.5	3.03
	Intermediate	0.9	5	3.21	2.51	2.59	2.14
	Residential	0.6	6	2.13	7.54	0.91	3.18
Minor Arterials/ (Major)	Commercial	1.2	5	2.58	5.33	2.03	3.27
	Intermediate	0.9	5	2.69	3.04	2.22	2.54
	Residential	0.6	6	1.52	3.83	0.69	7.88
Collectors	Commercial	0.8	5	3.21	6.74	2.07	4.57
	Intermediate	0.6	6	2.13	7.54	0.89	3.21
	Residential	0.4	8	1.78	3.64	0.78	5.31
Local	Commercial	0.6	10	1.78	3.64	0.78	5.31
	Intermediate	0.5	10	2.66	6.95	1.12	3.2
	Residential	0.3	10	2.13	7.54	0.89	3.21
Alley	Commercial	0.4	10	1.01	3.47	0.68	3.67
	Intermediate	0.3	10	0.6	3.64	0.8	2.78
	Residential	0.2	10	0.36	2.85	0.44	2.03

In almost every scenario, our proposed LED specifications will be closer to AASHTO minimum standards than equivalent HPS fixtures.

LEDs are also more likely to achieve better uniformity ratios, meaning more consistent lighting.

Note: LED technology is always improving!

d. delivers

district department of transportation