

San Juan County

Prune Alley

Illumination Design Report

60% Design

(April 2020)

A. Illumination Design Standards

The target illumination level and uniformity ratio applied to the Intersections of the San Juan County’s Prune Alley Project were adopted from the IES RP-8-18 ‘Recommended Practice for Design and Maintenance of Roadway and Parking Facility Lighting’. The following values were used for this project:

Intersection

| | |
|---|--|
| Collector/Local Medium Pedestrian Conflict | 1.5 fc Average Illuminance 4:1 Uniformity |
|---|--|

A light loss factor (LLF) of 0.81 was used for LED layout design based on LED’s consistently high lumen output produced over the lifespan of the LEDs. This means that over time, the performance of the luminaires diminishes to approximately 81% of the total lumen output before the design area would no longer meet the design standards outlined above.

B. Definitions:

Illuminance is a method of lighting design that determines the amount of light landed on the roadway surface from the roadway lighting system. The illuminance design approach has been shown to be of benefit in improving visibility level, in reducing pedestrian accidents, reducing fear of crime, and promoting business and use of public roads at night.

A footcandle (fc) is a unit of measurement for illuminance. The RP-8-18 (2018), a national lighting standard by the Illuminating Engineering Society of North America, defines footcandle as “the illuminance on a surface one square foot in area on which there is a uniformly distributed flux of one lumen, or the illuminance produced on a surface all points of which are at a distance of one foot from a directionally uniform point source of one candela”.

Uniformity is a ratio of the average level of illuminance of a calculation area to the minimum illuminance point in the same area. 4:1 minimum uniformity ratio means that the average illuminance of a calculation area is four times more intense than the minimum footcandle in the same calculation area.

C. Photometrics

The following table summarizes the luminaire definitions used on this project.

Table 1: Luminaires used for the San Juan County’s Prune Alley Project

| Manufacturer | Model | Lamp (Initial Lumens) | Classification | Typical Mounting Height (ft) |
|---|-----------------|---------------------------------------|------------------------------|------------------------------------|
| Kim Lighting (Decorative Pedestrian Luminaire) | BNS1H2E35-60L3K | 66 Watts, 60LED, 3000K (~5,044) | Type III, Medium B2-U0-G2 | 16’ |

LED fixtures were chosen for the project because of the energy and maintenance savings over the life of the fixture as compared to a traditional HPS fixture also for the increased level of perceived safety provided by the “white” light.

D. Analysis Tools

AGI32 software program was used to conduct the lighting operational analysis. AGI32 is a computational program that performs numerical point-by-point calculations of indirect, direct or reflected light on any real surface or imaginary plane. Within this scope, it is used to predict or quantify the distribution of artificial light in a predetermined environment.

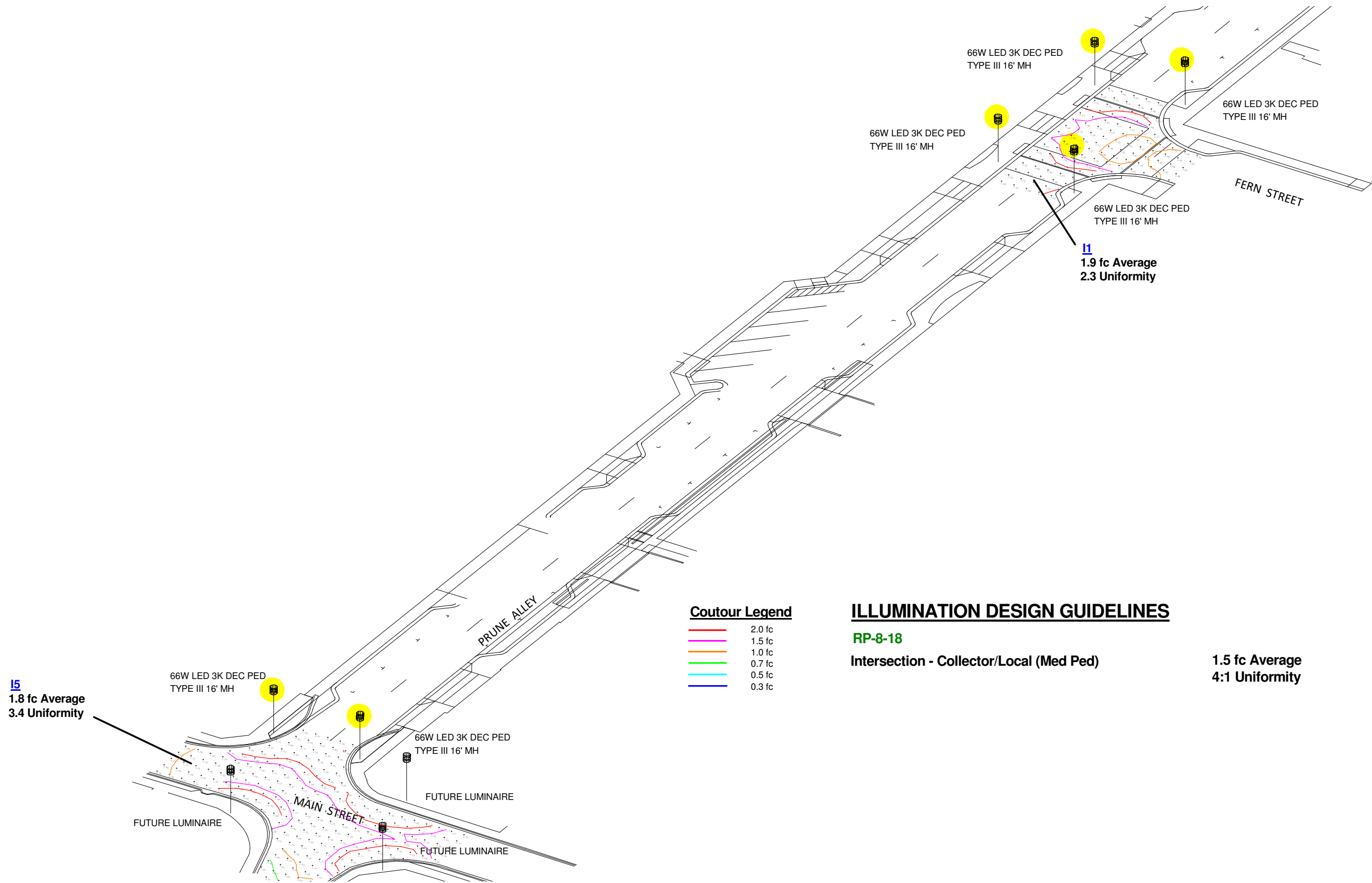
- AGI32 Illumination Layout
- AGI32 Area Numerical Summaries
- Photometric Reports
 - BNS1H2E35-60L3K.IES
- Luminaire Cut Sheet

E. Results

The lighting levels for this project are summarized in the following table:

Table 2: Lighting Levels (Illuminance) per Design Area

| | | |
|----|---------------------------|----------------------------------|
| I1 | Prune Alley & Fern Street | 1.9 fc Average 2.3 Uniformity |
| I2 | Prune Alley & A Street | 1.8 fc Average 1.9 Uniformity |
| I3 | Prune Alley & Rose Street | 1.6 fc Average 2.7 Uniformity |
| I4 | Prune Alley & School Road | 1.5 fc Average 2.8 Uniformity |
| I5 | Prune & Main St | 1.8 fc Average 3.4 Uniformity |



Coutour Legend

| | |
|---------|--------|
| Red | 2.0 fc |
| Magenta | 1.5 fc |
| Orange | 1.0 fc |
| Green | 0.7 fc |
| Cyan | 0.5 fc |
| Blue | 0.3 fc |

ILLUMINATION DESIGN GUIDELINES

RP-8-18
Intersection - Collector/Local (Med Ped)

1.5 fc Average
4:1 Uniformity

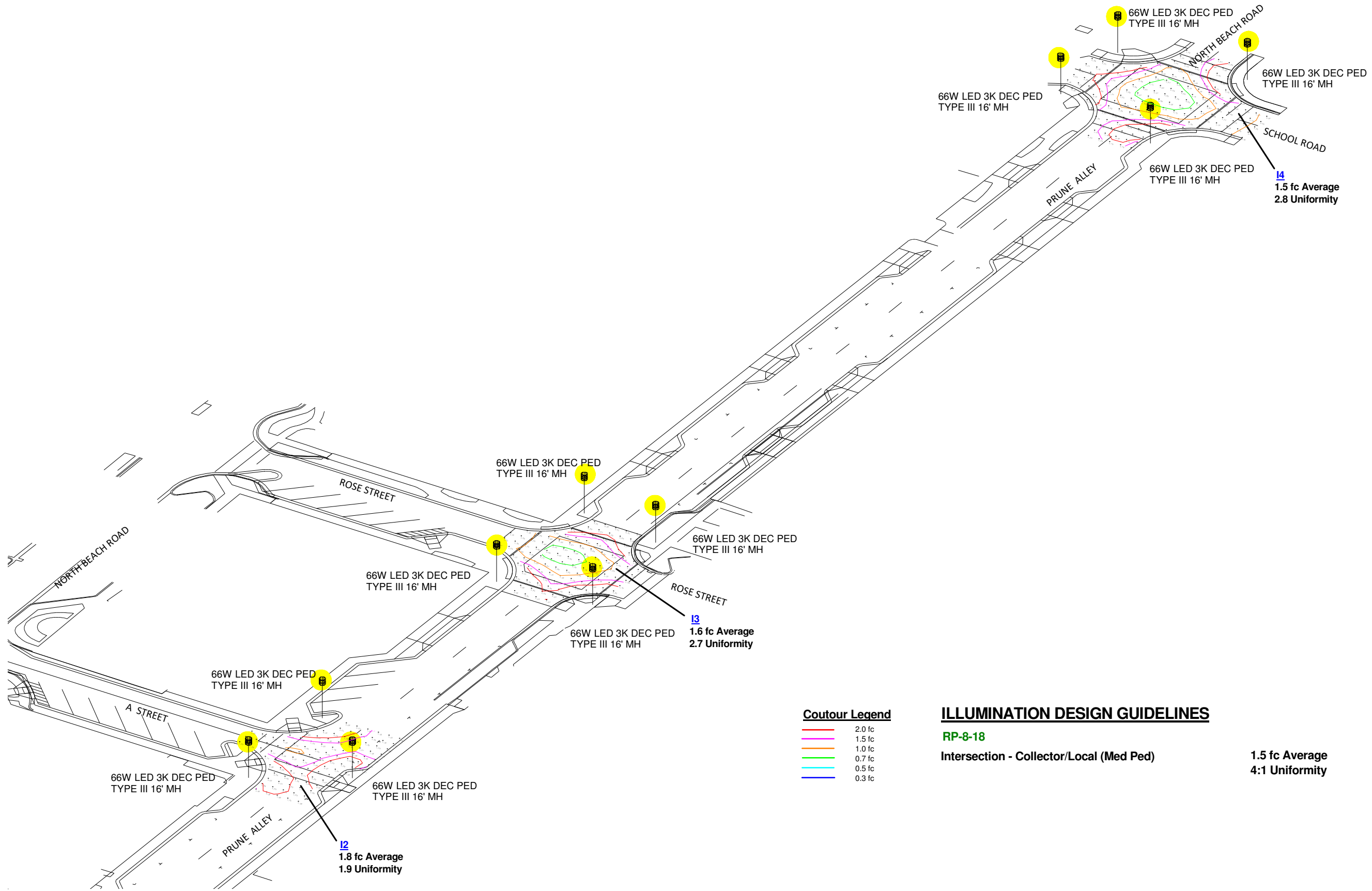
15
1.8 fc Average
3.4 Uniformity

1
1.9 fc Average
2.3 Uniformity



Prune Alley Project - Illumination Layout
60% Design, April 2020





Contour Legend

| | |
|--------|--------|
| Red | 2.0 fc |
| Pink | 1.5 fc |
| Orange | 1.0 fc |
| Green | 0.7 fc |
| Cyan | 0.5 fc |
| Blue | 0.3 fc |

ILLUMINATION DESIGN GUIDELINES

RP-8-18

Intersection - Collector/Local (Med Ped)

1.5 fc Average
4:1 Uniformity



Prune Alley Project - Illumination Layout

60% Design, April 2020





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Calculation Summary

I1

Project: AGI 32 2007 Training
Polygon
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 | 1.86 |
| Maximum | 4.16 |
| Minimum | 0.81 |
| Avg/Min | 2.30 |

I2

Project: AGI 32 2007 Training
Polygon
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 | 1.80 |
| Maximum | 4.16 |
| Minimum | 0.96 |
| Avg/Min | 1.88 |

I3

Project: AGI 32 2007 Training
Polygon
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 | 1.64 |



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Calculation Summary – Cont.

| | |
|---------|------|
| Maximum | 4.25 |
| Minimum | 0.61 |
| Avg/Min | 2.69 |

I4

Project: AGI 32 2007 Training
 Polygon
 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 | 1.52 |
| Maximum | 4.14 |
| Minimum | 0.55 |
| Avg/Min | 2.76 |

I5

Project: AGI 32 2007 Training
 Polygon
 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 | 1.75 |
| Maximum | 4.10 |
| Minimum | 0.52 |
| Avg/Min | 3.37 |
| Max/Min | 7.88 |



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Photometric Report (Type C)

Filename: bns1h2e35-6013k.ies
[TESTLAB] HUBBELL LIGHTING, CA
[ISSUEDATE] 5/25/2018
[MANUFAC] KIM LIGHTING
[LUMCAT] BNS1H2E35-60L3K
[LUMINAIRE] BOUNCE LED PICO-EMITTER
[LAMP] C-70-CRI DATA SHOWN IS ABSOLUTE.

Maximum Candela = 3289 at 76.5 H 67 V

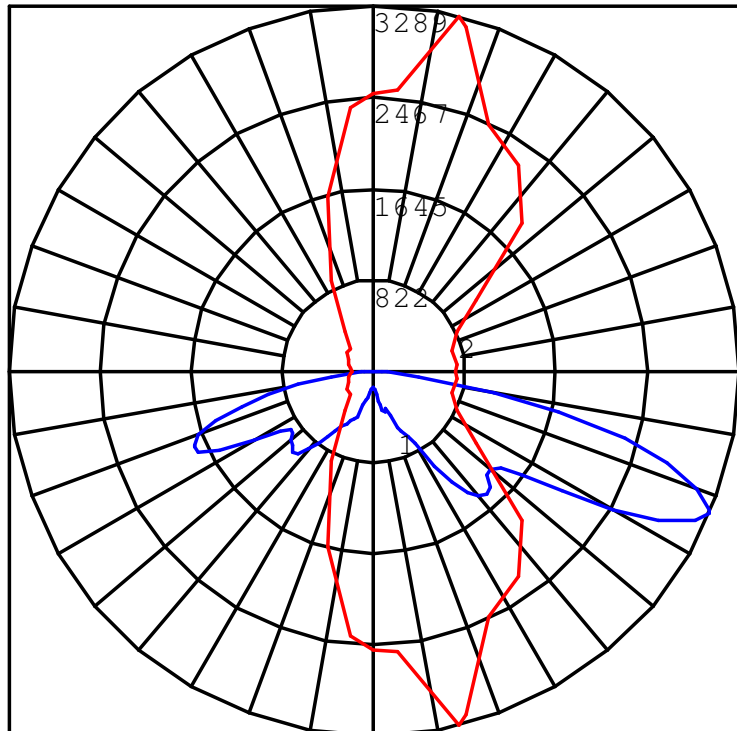
Classification:

Road Classification: Type III, Medium, N.A. (deprecated)
Upward Wast Light Ratio: 0.00
Luminaire Efficacy Rating (LER): 79
Indoor Classification: Direct
BUG Rating : B2-U0-G2

Polar Candela Curves:

Vertical Plane Through:
1) 76.5 - 256.5 Horizontal

Horizontal Cone Through:
2) 67 Vertical





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Filename: bns1h2e35-6013k.ies
[TESTLAB] HUBBELL LIGHTING, CA
[ISSUEDATE] 5/25/2018
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[LUMINAIRE] BOUNCE LED PICO-EMITTER
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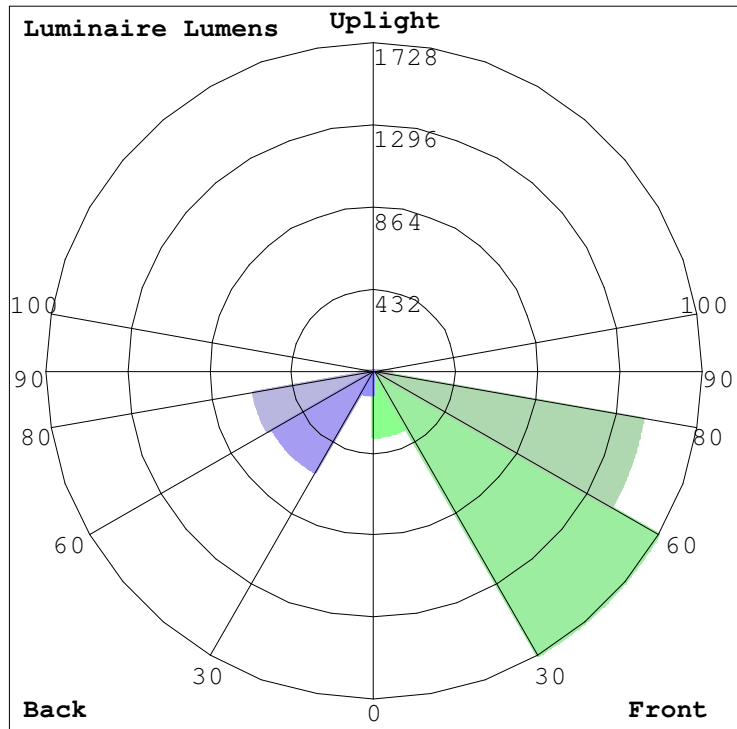
Maximum Candela = 3289 at 76.5 H 67 V

Classification:

Road Classification: Type III, Medium, N.A. (deprecated)
Upward Waste Light Ratio: 0.00
Luminaire Efficacy Rating (LER): 79
Indoor Classification: Direct
BUG Rating : B2-U0-G2

LCS Summary:

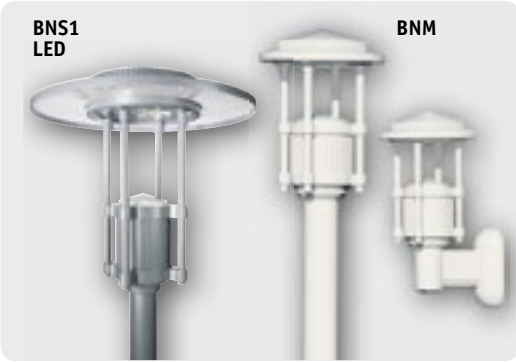
| LCS Zone | Lumens | %Lamp | %Lum |
|--------------|----------|-------|-------|
| FL (0-30) | 341.4 | N.A. | 6.8 |
| FM (30-60) | 1727.6 | N.A. | 34.2 |
| FH (60-80) | 1438.2 | N.A. | 28.5 |
| FVH (80-90) | 87.0 | N.A. | 1.7 |
| BL (0-30) | 127.1 | N.A. | 2.5 |
| BM (30-60) | 612.5 | N.A. | 12.1 |
| BH (60-80) | 639.3 | N.A. | 12.7 |
| BVH (80-90) | 71.3 | N.A. | 1.4 |
| UL (90-100) | 0.0 | N.A. | 0.0 |
| UH (100-180) | 0.0 | N.A. | 0.0 |
| Total | 5044.4 | N.A. | 100.0 |
| BUG Rating | B2-U0-G2 | | |



BNS/BNM

Bounce & MiniBounce LED with PicoEmitter®

SITE / AREA



FEATURES

- LED PicoEmitter technology on BNS1 only
- Ideal for traditional or contemporary architecture requiring a European accent
- MiniBounce is a smaller version of the popular Bounce Series for pole or wall mounting at lower mounting heights
- Sealed optical chamber, IP-66 rated



3000K and warmer CCTs only

ORDERING INFORMATION (Example)

| FM | BNS1H5E35 | 60L5K120 | BL | A-30 | PRA12-5125FM/BL |
|-------------------------------|------------------------------------|--------------------------------------|-------------------|------------------------|--|
| MOUNTING | | ELECTRICAL MODULE⁵ | | FIXTURE FINISH | |
| EPA | | Bounce | | BL Black | |
| Bounce | | Mini-Bounce | | DB Dark Bronze | |
| • FM | Flush Mnt. 4" O.D. Poles only | 1.2 | Source | Color Temperature | Voltages |
| • PT | Pole Tenon Mnt. 2" Pipe-size Tenon | 1.2 | 60L 60 LEDs, 66W | 2K 580nm 580nm | 120 120V |
| • 2SB | Twin Mnt. 4" or 5" O.D. Poles only | 3.6 | | 3K 3000K | 208 208V |
| • 1W | Single Wall Mt. | n/a | | 4K 4000K | 240 240V |
| Mini-Bounce | | | | 5K 5000K | 277 277V |
| • FM | Flush Mount | 1.0 | | | 347 347 ¹ |
| • PT | Pole Tenon Mt. | 1.0 | | | 480 480V ¹ |
| • 2B | Twin Mount | 3.0 | | | |
| • 4C | Quad Mount | 4.5 | | | |
| • 1W | Single Wall Mt. | n/a | | | |
| NOTE: EPA is for Fixture only | | | | | |
| FIXTURE | | FIXTURE OPTIONS | | FIXTURE OPTIONS | |
| Bounce | | Current | | Bounce | |
| BNS1H1 | Type I | E35 | 350mA PicoEmitter | A-30 | 120 Volt photocell |
| BNS1H2 | Type II | | | A-30 | 120 Volt photocell |
| BNS1H3 | Type III | | | A-31 | 208 Volt photocell |
| BNS1H4 | Type IV Forward Throw | | | A-32 | 240 Volt photocell |
| BNS1H5 | Type V Square | | | A-33 | 277 Volt photocell |
| Mini-Bounce | | | | A-34 | 480 Volt photocell |
| BNM | Round Type V | E35 | 350mA | A-35 | 347 Volt photocell |
| | | | | CGL | Convex Glass Lens |
| | | | | CP | Flat Polycarbonate Lens ² |
| | | | | Mini-Bounce | |
| | | | | HS | Houseside Shield |
| | | | | TG | Textured Glass Lens |
| | | | | BBC | Dark-Sky compliant Black Ballast Cover |
| | | | | SB | 120 Volt Single Fuse |
| | | | | DF | 208 Volt Double Fuse |
| | | | | DF | 240 Volt Double Fuse |
| | | | | DF | 277 Volt Double Fuse |
| | | | | DF | 347 Volt Double Fuse |
| | | | | DF | 480 Volt Double Fuse |
| | | | | DF | 120 Volt Single Fuse |
| | | | | DF | 208 Volt Single Fuse |
| | | | | DF | 240 Volt Single Fuse |
| | | | | DF | 277 Volt Single Fuse |
| | | | | DF | 347 Volt Single Fuse |

¹ Due to current unavailability of 347V and 480V drivers, specification of these voltages may feature an integral step-down transformer.

² CAUTION: Use only when vandalism is anticipated to be high. Useful life of lens is limited by UV discoloration from sunlight.

³ For full-cutoff distributions. Use with Black or Dark Bronze fixtures only.

⁴ Specify pole diameter if round, voltage and color, e.g. SCL-R4/277/BL.

⁵ Driver has a 0-10V dimming interface with a dimming range of 10-100%. Compatible with most control systems.

Note: HID to LED Upgrade Kits available. Contact factory. Consult DLC Website for current qualified product listings.

