

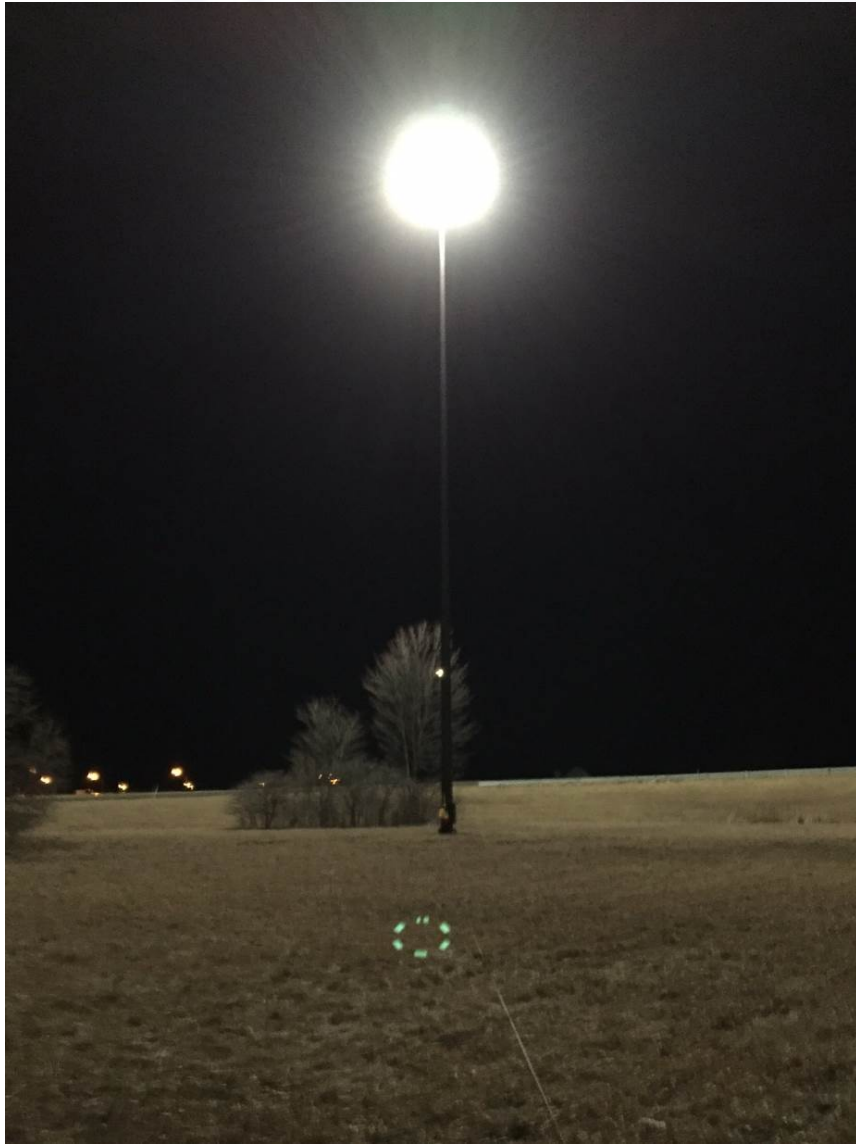
Moving Towards a Solid State Future INDOT Lighting Design Procedure Changes

David Boruff

Designing with LED- Luminaire Types

- Categorized into 5 Types, based on INDOT's existing lighting systems
- Luminaire type identified on plans, corresponding pay items used

Designing with LED- Luminaire Types



High Mast

Pay Item # 807-12201



Designing with LED- Luminaire Types



Roadway



High Lumen- Equivalents to 400 Watt High Pressure Sodium - Pay Item # 807-12119

Low Lumen- 250 Watt HPS Equivalents- Pay Item # 807-12202

Low Lumen-Low Mounting- 250 W HPS equivalents at 25-30 ft Mounting Heights-
Pay Item # 807-12203

Designing with LED- Luminaire Types

Underpass

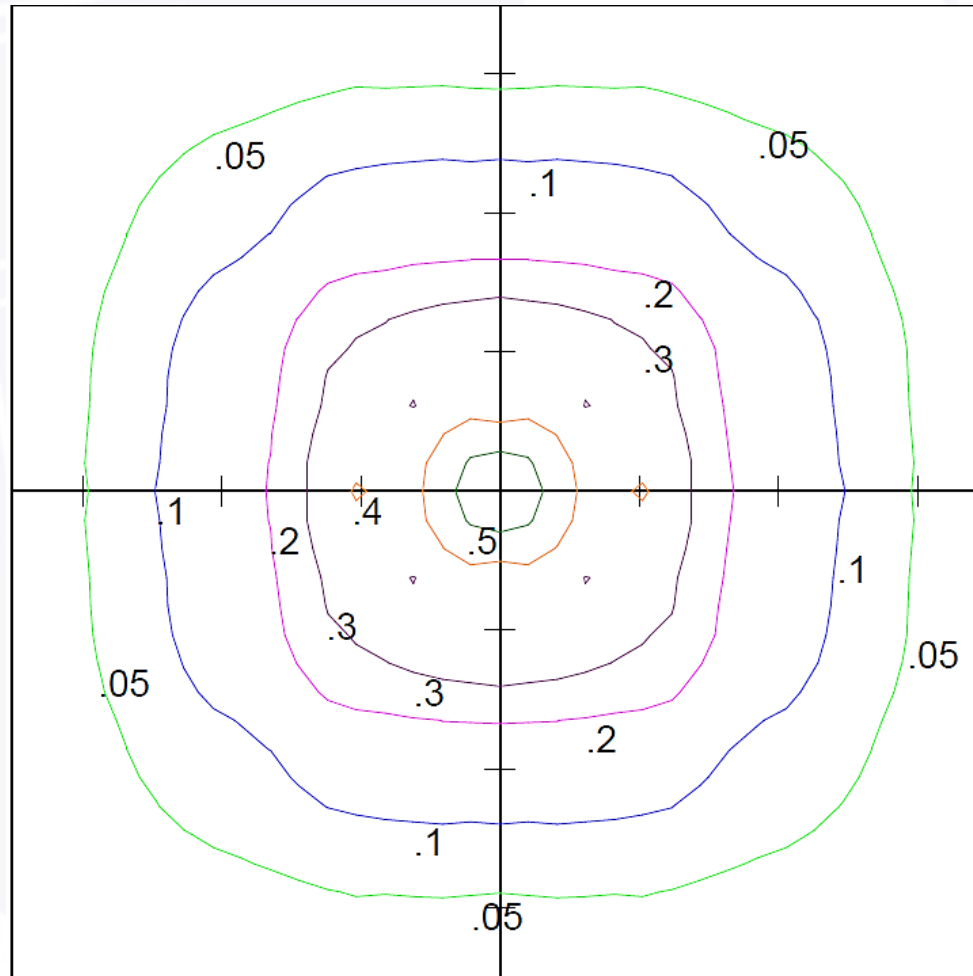
Pay Item # 807-12206



Designing with LED- Photometric Analysis

- Photometric Analysis: performed only with INDOT approved models
Estimate of light distribution at the end of service life (100,000 hrs)

LED High Mast Example:
At 100 ft mounting height
(units in foot-candles)



Designing with LED- Approved Models

- Approved in accordance with Indiana Test Method 957
 - Meet Standard Specification requirements
 - Pass INDOT testing
 - In Field, at 1 of 9 test sites across state
 - In Lab, at the Purdue Office of Energy Efficiency & Reliability (OEER)
 - Expect first approvals within a month or two.

Designing with LED- Light Loss Factors

- Light Loss Factors
 - Listed for each approved model
 - Developed by Purdue
 - Estimate light level at 100,000 hour service life
 - Incorporate dirt depreciation, based on
 - Material used in the lens/refractor
 - Manufacturer's cleaning method & 5 year cleaning cycle
 - IES Publication RES-1-16

Designing with LED- Life Cycle Costs

- Service Cost Per Year Analysis- **no longer needed**
 - Had been used to compare advantages of different light source types
 - Energy savings from LED “Built In” with models that are approved
 - 33% to 50% reduction in energy consumption

Change in Lighting Policy

- Deactivation/Removal Policy
 - INDOT District Offices will have authority to decide/implement
 - Decision still based on:
 - Reverse warrant analysis- looking at recent nighttime crash experience
 - Trial turn off period- tracking changes in nighttime crashes for 3 years

LED Lighting- Design Procedure Changes

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