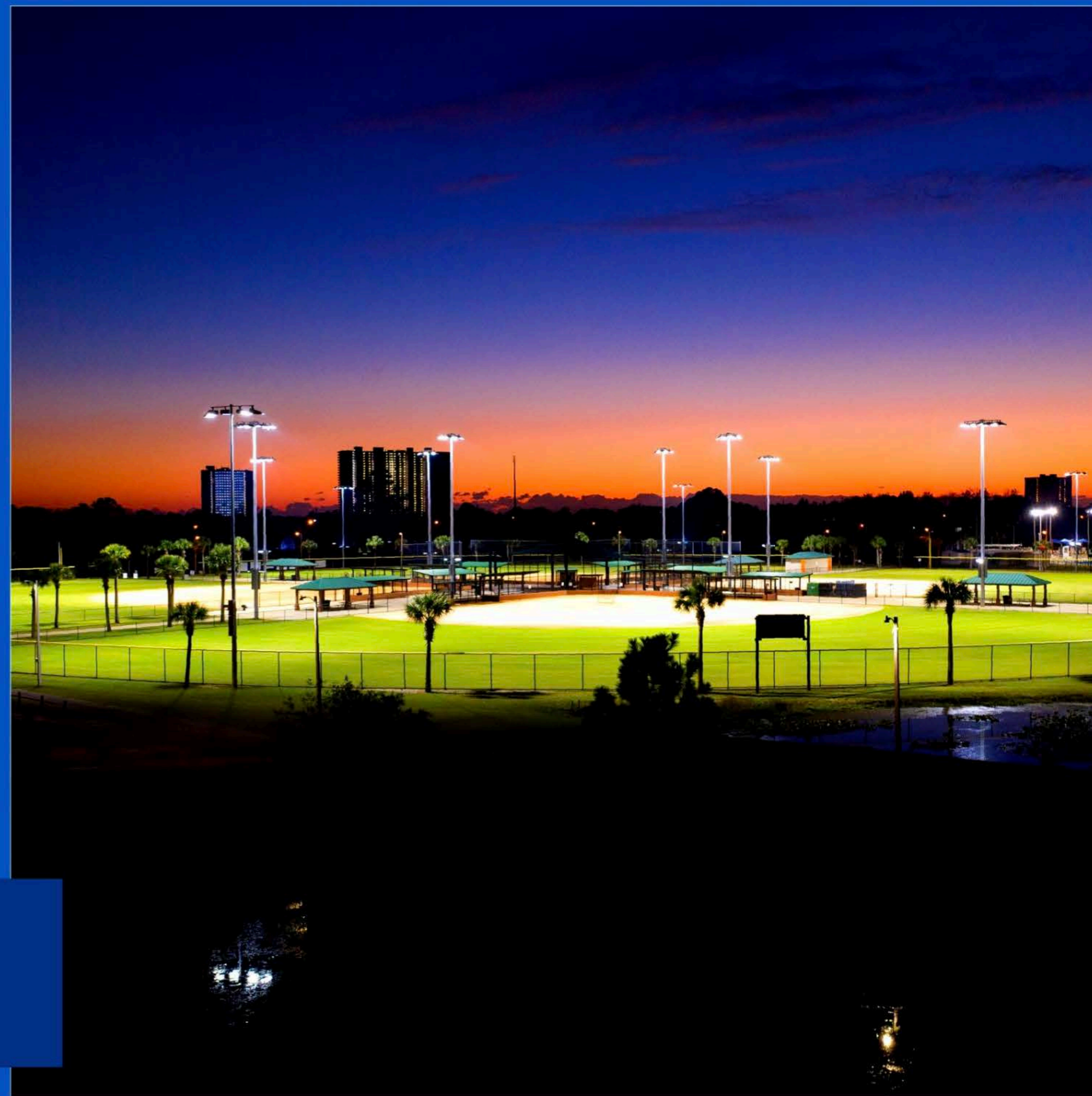


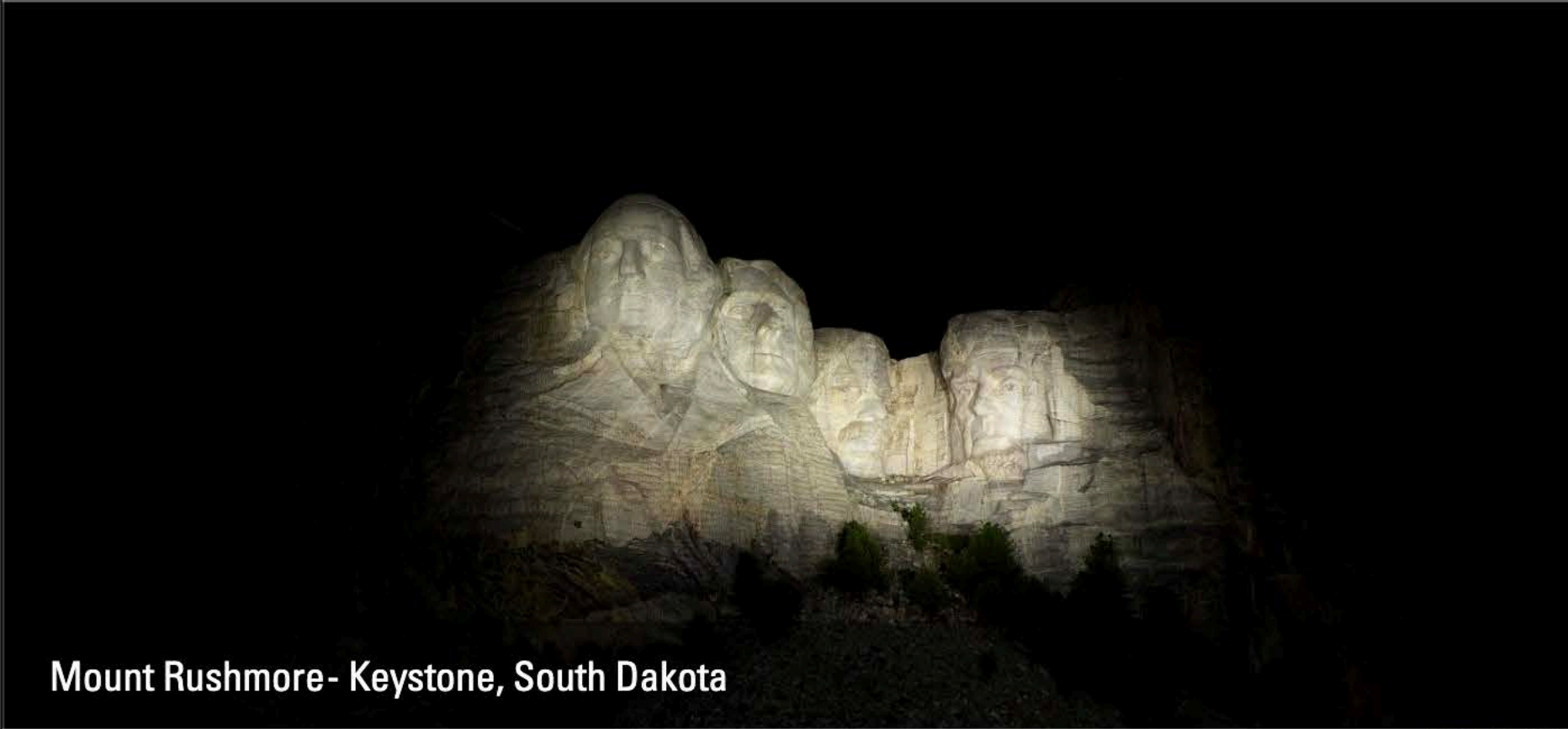
**SPORTS LIGHTING**

*Answers to*  
**9 common  
QUESTIONS**

*presented by*

**Tod Spears & Scott Fitzgerald**





Mount Rushmore- Keystone, South Dakota



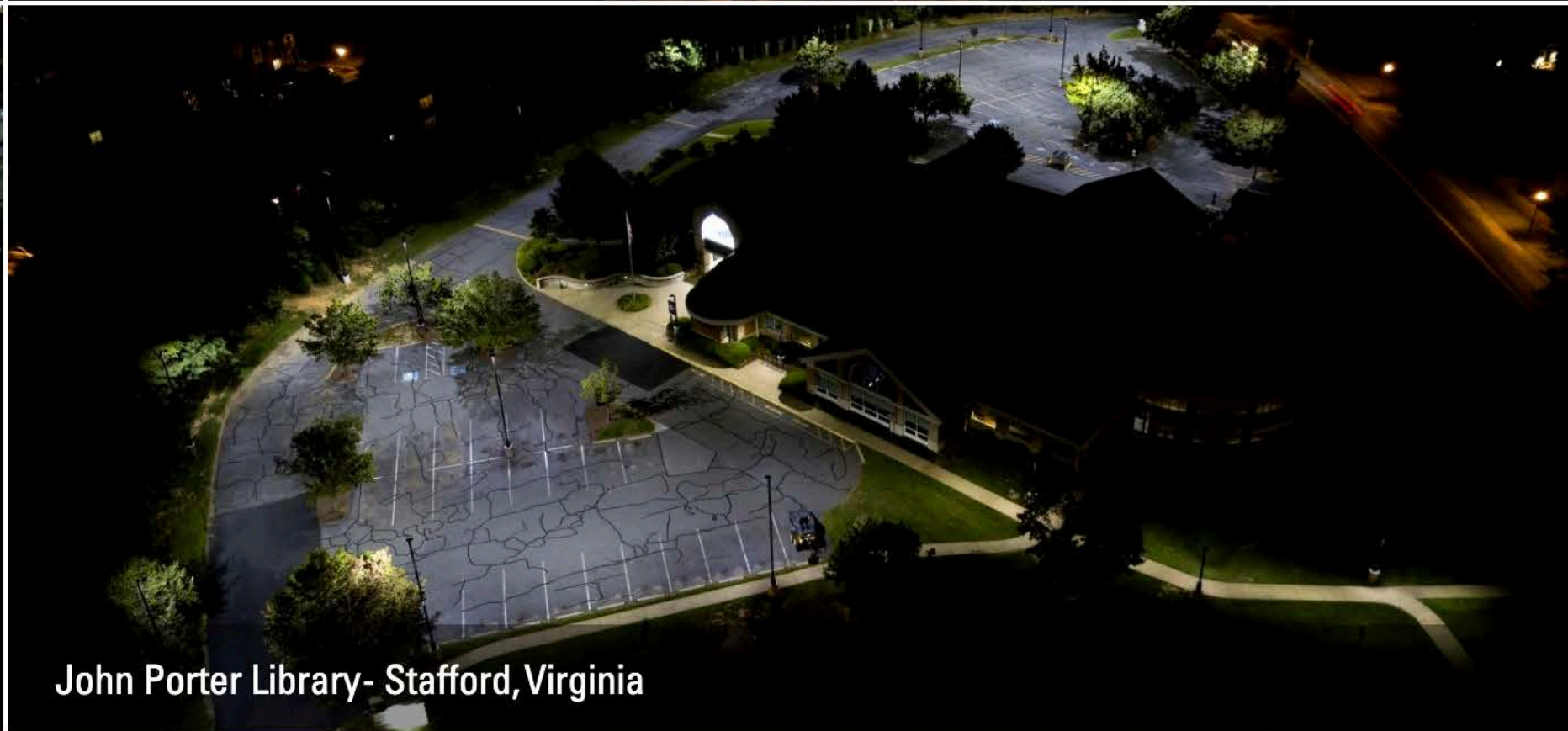
Statue of Liberty- New York, New York



DP World Vancouver- Vancouver, Canada



Vancouver Airport- Vancouver, Canada



John Porter Library- Stafford, Virginia



Ansong CC- Anseong, South Korea



Statue of Lord Shiva- Nathdwara, India



Barbados Turf Club- Bridgetown, Barbados



Sydney Motorsport Park- Eastern Creek, Australia

# Is LED right for my project?

- **Light Levels**

*How much light do I need?*

- **Spill & Glare**

*What is the definition of spill & glare?*

- **Energy Efficiency**

*Are all fixtures equal?*

- **Return on Investment**

*Is there energy savings?*

- **Warranty**

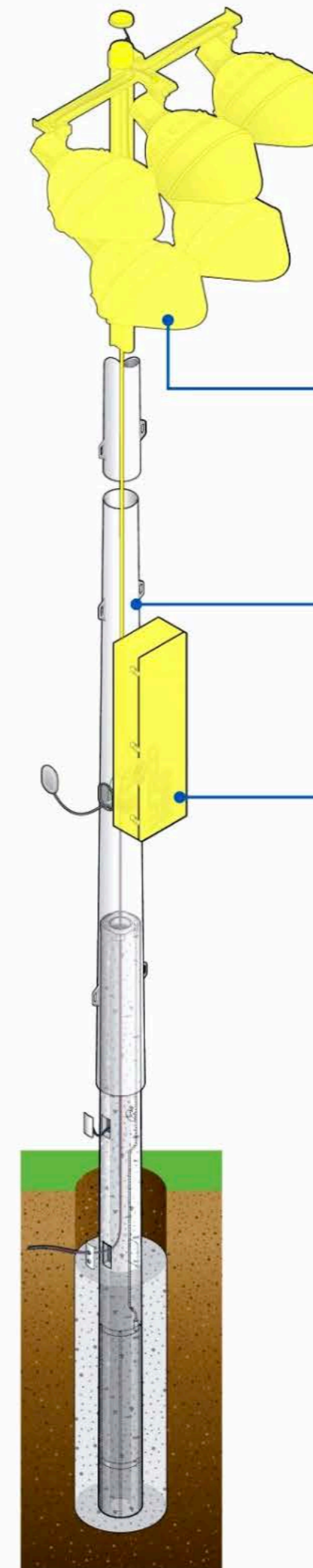
*How many years of warranty are part of the purchase?*



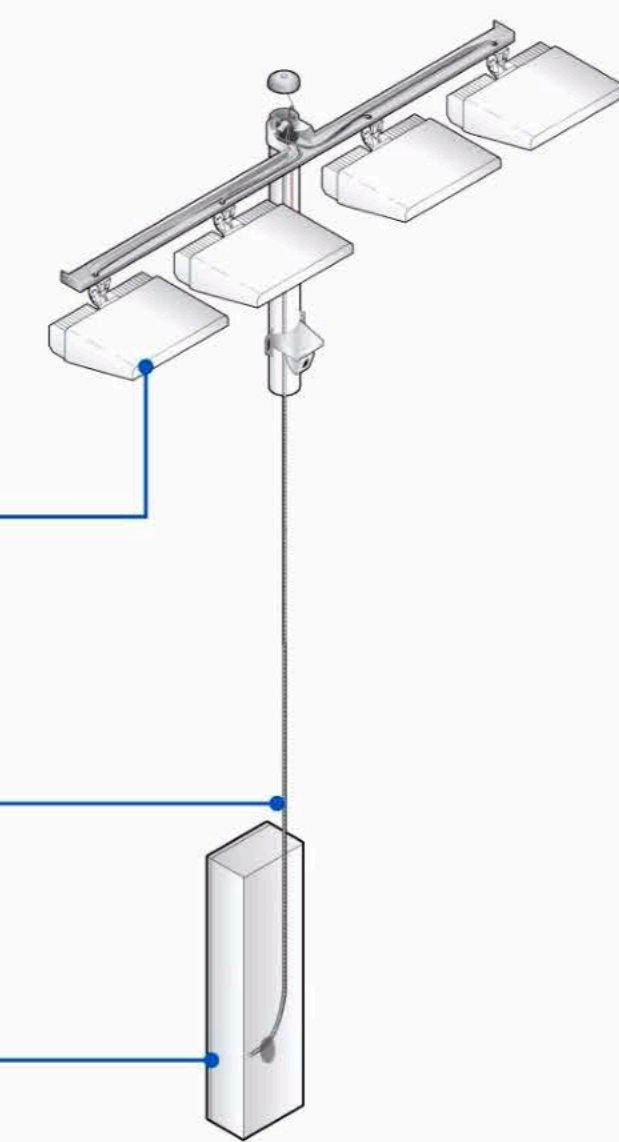
# Should I retrofit with LED?

- Retrofit it Right
- Light Levels
- Spill and Glare
- Maintain Structural Reliability
- Eliminate Maintenance Costs

Existing Lighting



Retrofit Solution



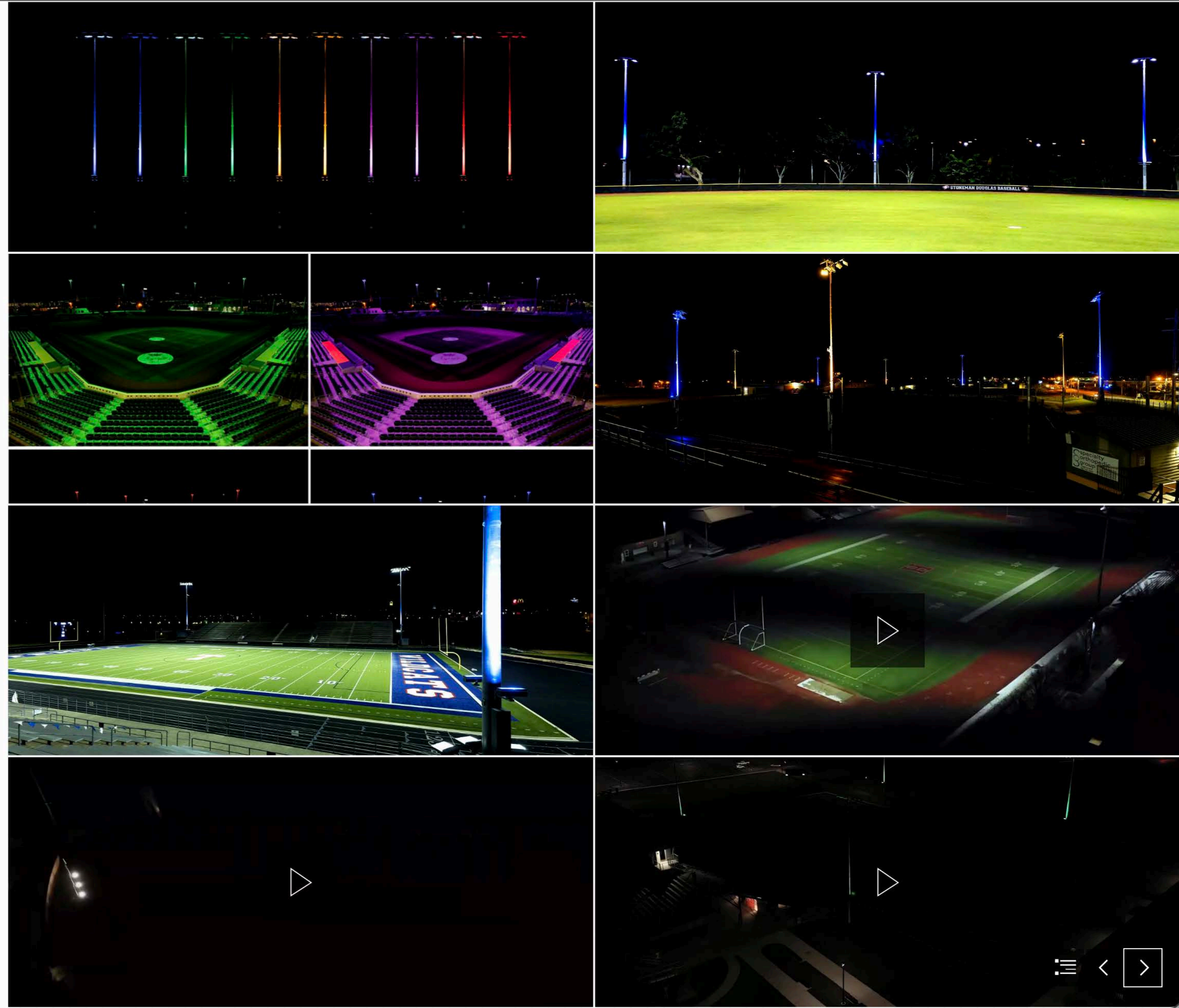
**1**  
Poletop  
Luminaire  
Assembly

**2**  
Wire  
Harness

**3**  
Electrical  
Components  
Enclosure

# Entertainment Features

- Show-Light®
- Show-Light+®
- RGB
- RGBW



# How much will it cost to install my lights?

## • Quantity and Quality of Light

*Facility type and size, players skill level, seating capacity, television/video broadcast requirements, lighting standards (for organizations such as Little League Baseball®)*

## • Geographical Issues

*Location (structural and local/state building codes, soil conditions, existing structures, pole setback requirements)*

## • Environmental Light Control Issues

*Proximity of neighbors, community light ordinances, nearby airports or observatories, multi-field complexes*

## • Lighting Usage

*Anticipated hours of operation, local initiatives for reducing energy usage, desire for dimming or special effects*

## 9 Important Lighting Decisions

|                | LIGHTING | STRUCTURAL | ELECTRICAL |
|----------------|----------|------------|------------|
| DESIGN         | ?        | ?          | ?          |
| SUPPLY         | ?        | ?          | ?          |
| INSTALL        | ?        | ?          | ?          |
| <b>OPERATE</b> |          |            |            |

# How many lights do I need?

- **Quantity of Light**

*Sport type, skill level, field size, seating capacity, video broadcast requirements*

- **Quality of Light**

- **Target Light Levels**

- **Do You Know Your Fields' Light Levels?**

## Generally Accepted Lighting Standards

| Sport                                  | Sport Level                  | Seating Capacity | Footcandles | Lux      |
|--|------------------------------|------------------|-------------|----------|
| <b>Baseball / Softball</b>             | Recreational                 | Limited or none  | 30/20       | 300/200  |
|  | Schools / Leagues            | Up to 2000       | 50/30       | 500/300  |
|  | Schools / Leagues / Semi-Pro | Up to 5000       | 100/70      | 1000/700 |
| <b>Basketball (indoor)</b>             | Recreational                 | Limited or none  | 30          | 300      |
|  | Schools / Leagues            | Up to 2000       | 50          | 500      |
|  | Schools / Leagues / Semi-Pro | Up to 5000       | 75          | 750      |
| <b>Football</b>                        | Recreational                 | Limited or none  | 20          | 200      |
|  | Schools / Leagues            | Up to 2000       | 30          | 300      |
|  | Schools / Leagues / Semi-Pro | Up to 5000       | 50          | 500      |
|  | Schools / Leagues / Semi-Pro | Over 5000        | 100         | 1000     |
| <b>Soccer</b>                          | Recreational                 | Limited or none  | 20          | 200      |
|  | Schools / Leagues            | Up to 2000       | 30          | 300      |
|  | Schools / Leagues / Semi-Pro | Up to 5000       | 50          | 500      |
| <b>Tennis – 2 court (side by side)</b> | Recreational                 | Limited or none  | 30          | 300      |
|  | Schools / Leagues            | Up to 2000       | 50          | 500      |
|  | Schools / Leagues / Semi-Pro | Up to 5000       | 75          | 750      |

Based on IES Recommended Practice: Lighting Sports and Recreational Areas RP-6-20. For larger facilities, please contact Musco.

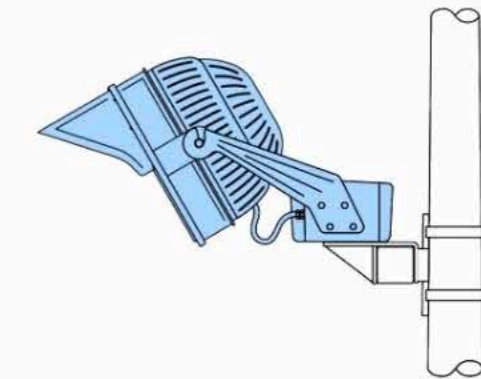
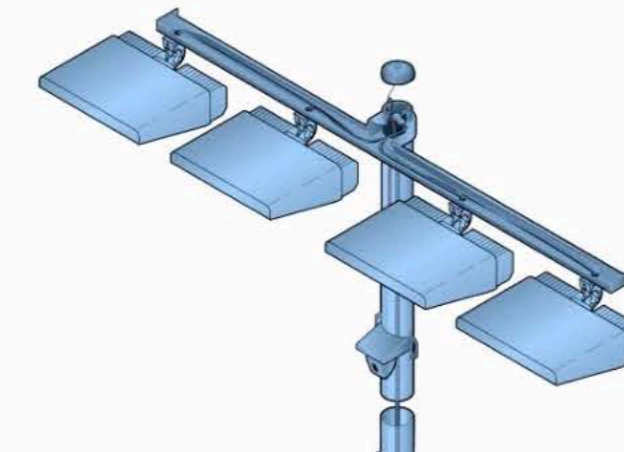
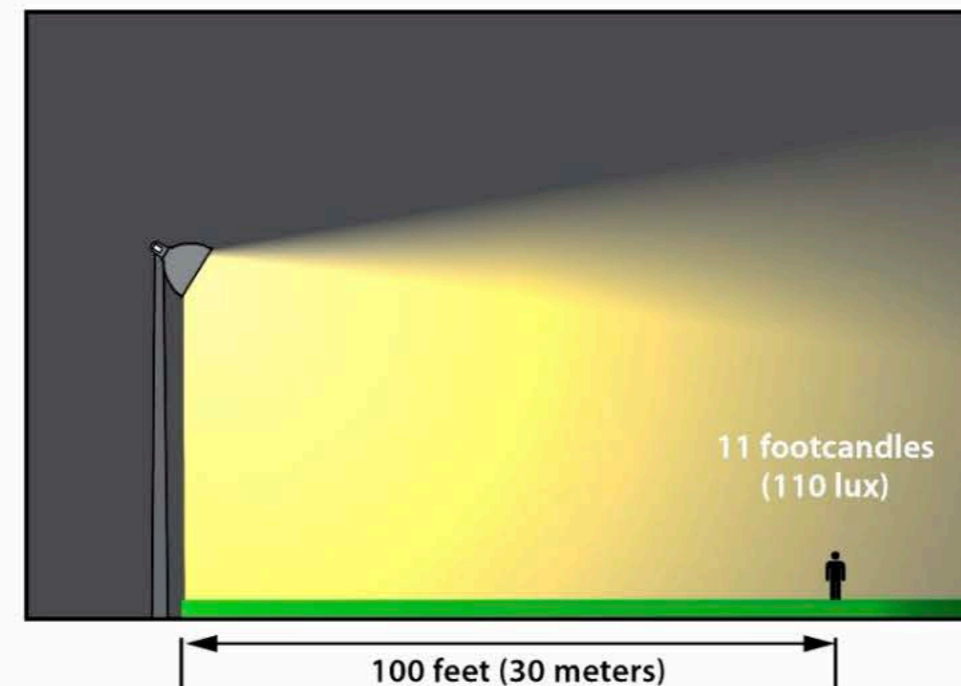
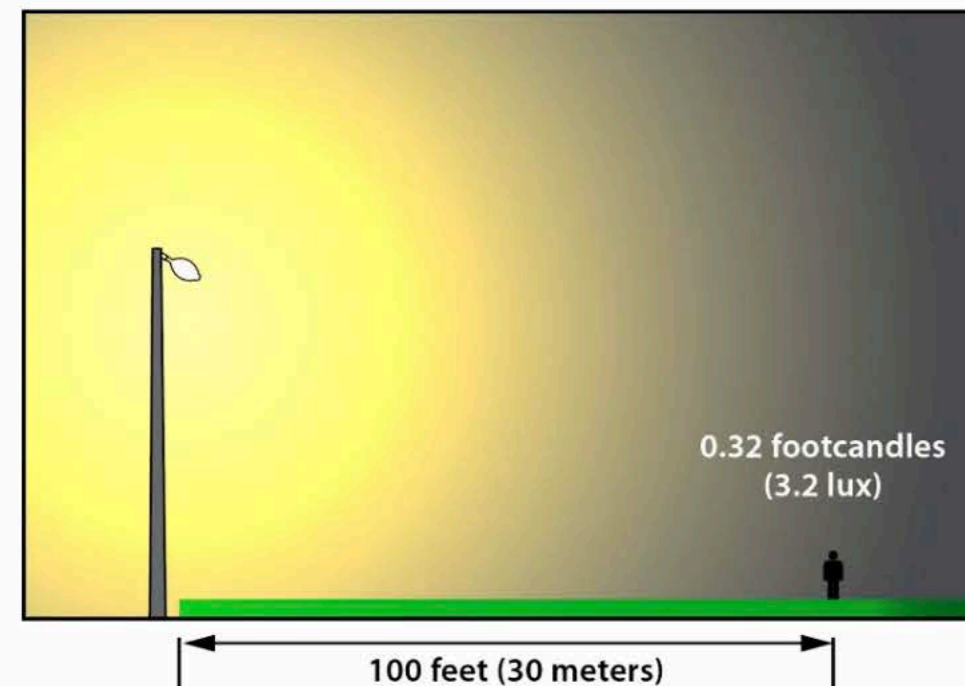
# Are all LED fixtures the same?

## • Same Light Source, Different Results

*Common mistake to specify a number of fixtures rather than the quantity of light delivered to the field.*

## • System vs Parts

*Lighting may be purchased as a complete system, or as a single fixture that must then be matched up with parts and pieces from a variety of sources.*



### Engineered as a complete system

- Parts selected by trained engineers for compatibility
- Critical components assembled in controlled environment
- Tested prior to shipping
- Single source accountability with light level guarantee and warranty on entire system

### Factory aimed

- Reduced installation time and expense
- Known results

### Electrical components mounted at pole base

- Easier maintenance
- Weight reduction at poletop assures better fixture alignment

### Built-in lightning and surge protection

- Assures it's installed and operating

### Parts and pieces of unknown strength and quality put together by the installer

- Inconsistent warranties from several sources
- Exposed wiring creates maintenance problems

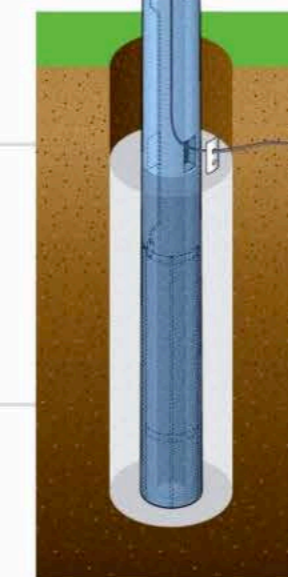
### Individual fixture-by-fixture aiming from the top of the pole

- Adds installation time and cost
- Unknown results

### Electrical components on fixture

- Troubleshooting must be done from the top of the pole
- Increases chance of misalignment

### Unknown protection





# Why should I be concerned with spill light and glare?

## • Spill Light is Wasted Energy

*Efficient fixture and system design, along with application expertise, will reduce the number of fixtures needed to get useful light onto the field.*

## • Impact on Players and Fans

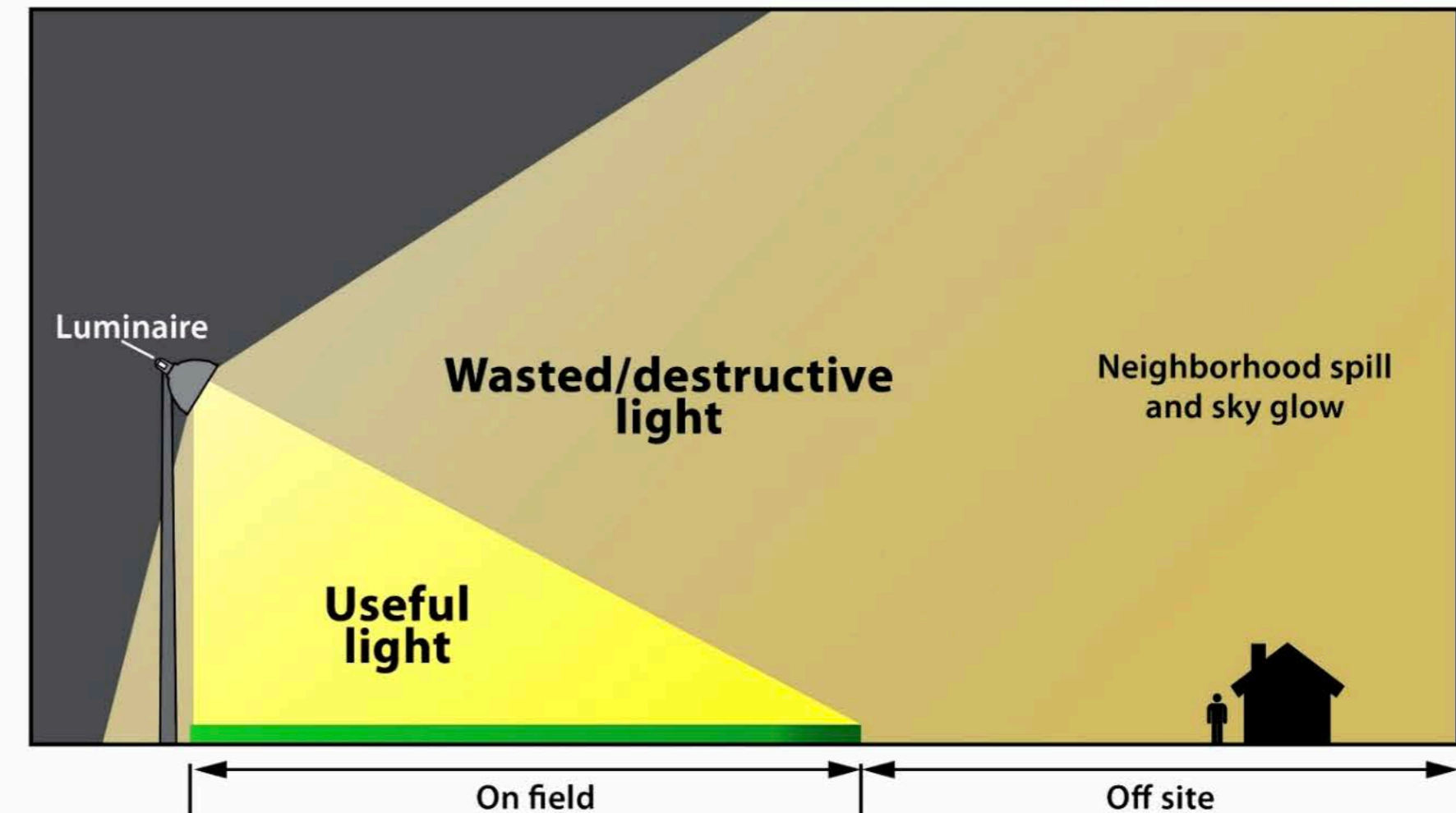
*Due to the intensity of the LED light source, increased measures should be taken to provide optic controls that minimize glare.*

## • Impact on Neighbors

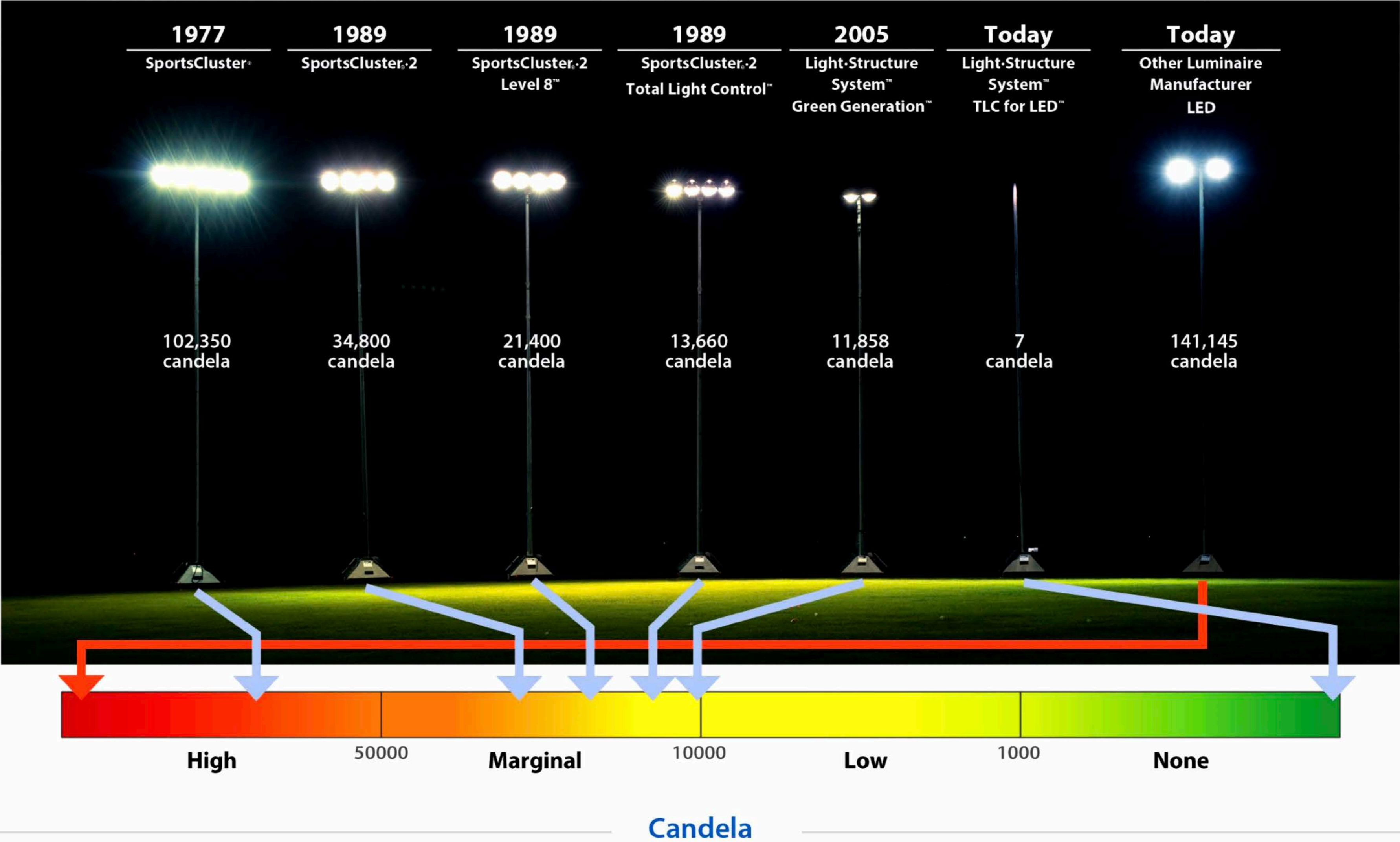
*Neighboring homes and businesses can be significantly impacted if your lights create glare and/or spill that disrupt their evening hours.*

## • Community Growth

*Communities often grow around sports facilities, and your lighting system should last 20 years or more. By minimizing spill light and glare now, you'll ensure happy neighbors when they do arrive and receive fewer complaints in the future.*



# How do you measure glare?



# Why does pole type and height matter?

## • Pole Types

*Wood, concrete, base-plate galvanized steel, direct burial galvanized steel*

## • Combination Concrete and Steel Pole

*Combination of concrete and steel poles offer the advantages of both without many of the drawbacks.*

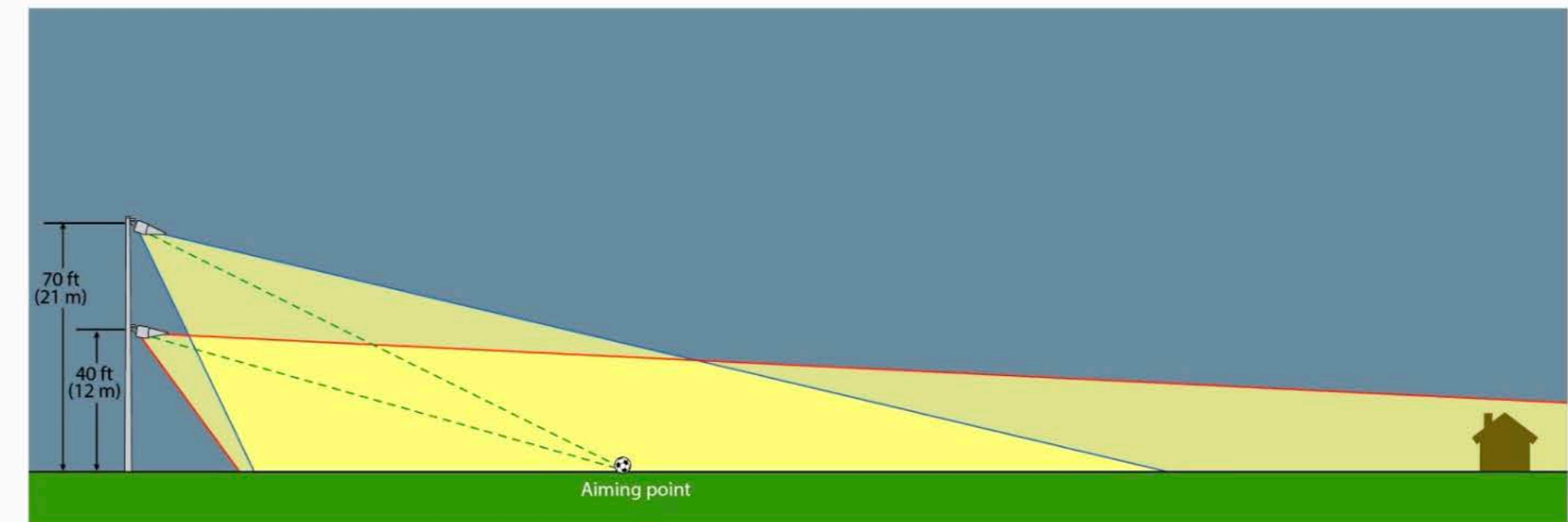
## • Pole Height

*Pole height impacts aiming angles, which affects the evenness of light distribution.*

## • Pole Distance

*The optimal height of the poles needed for your lighting system and resulting project cost is also affected by their distance from the playing surface.*

### Pole Height

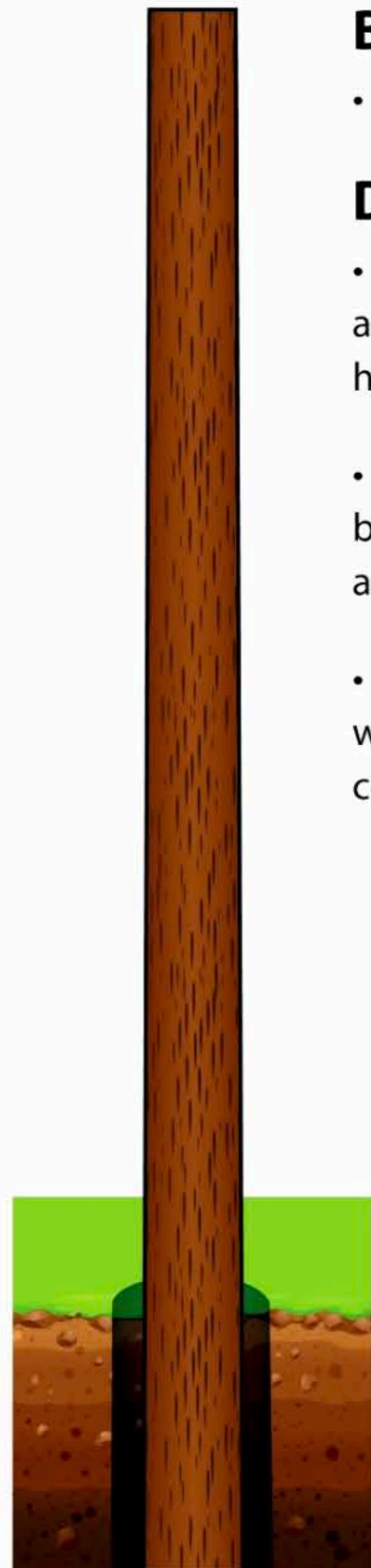


### Pole Distance



# Pole Types

## Wood



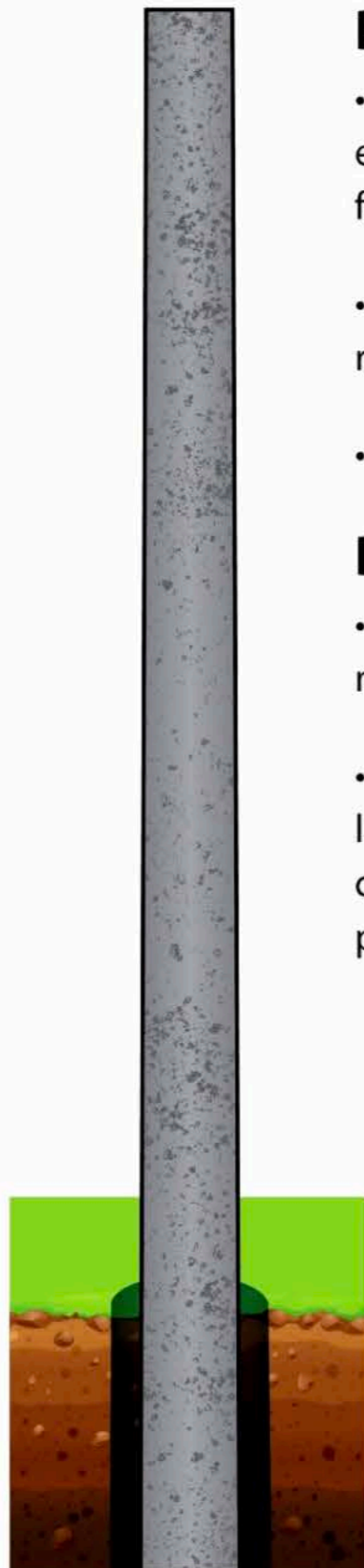
### Benefits:

- Low cost of material

### Drawbacks:

- Poles not tall enough to allow proper mounting height
- Fixture misalignment because wood twists and leans over time
- Safety hazards: rotting wood, exposed electrical conduit, toxic preservatives

## Concrete



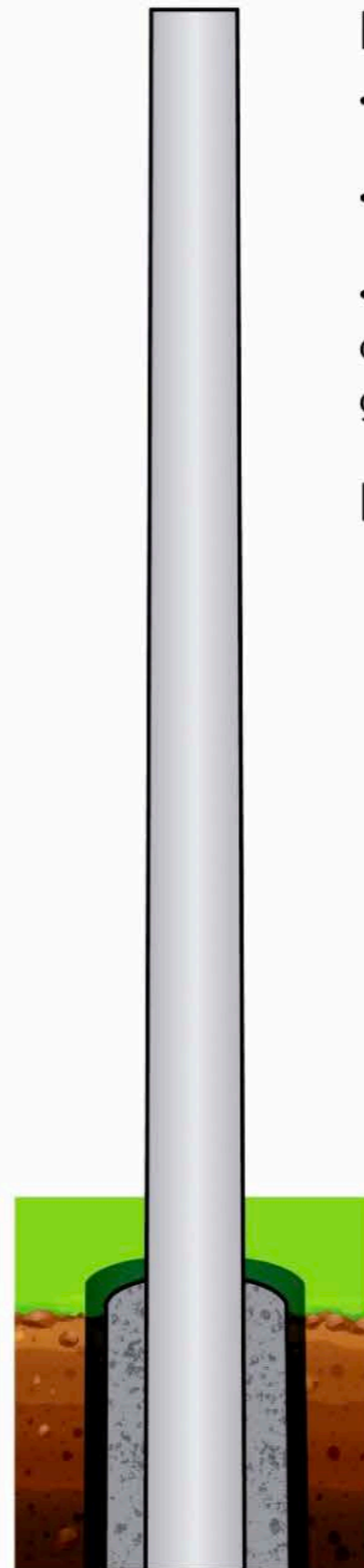
### Benefits:

- Can be direct buried, eliminating the cost of footings
- Corrosion and moisture resistant
- Pleasing appearance

### Drawbacks:

- Poles are heavier and more expensive to set
- High freight costs often limit their use to areas near concrete pole manufacturing plants

## Concrete & Galvanized Steel

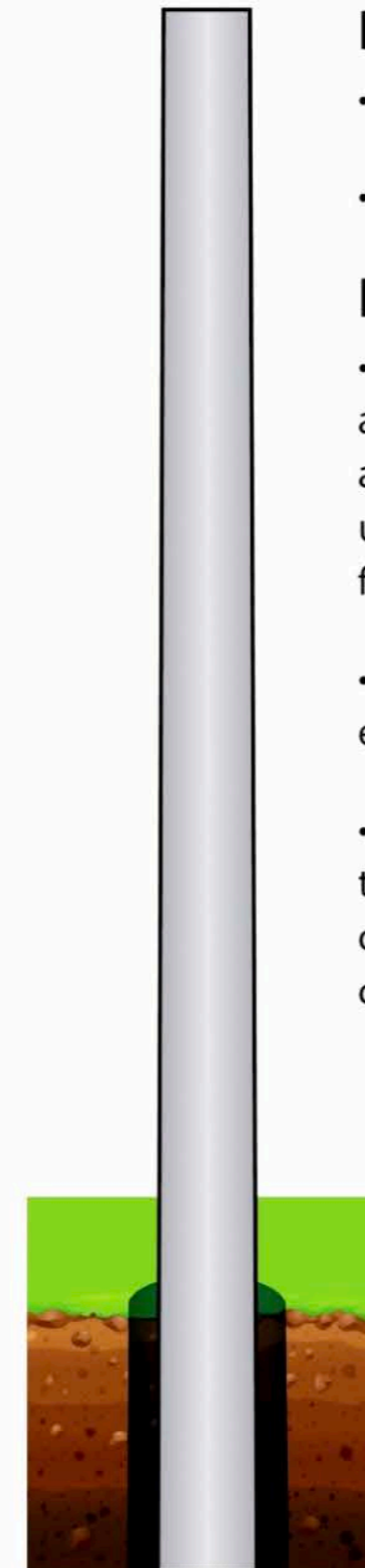


### Benefits:

- Simplify installation
- Save costs
- Reduce concerns about corrosion at and below ground level

### Drawbacks:

## Direct Burial Galvanized Steel



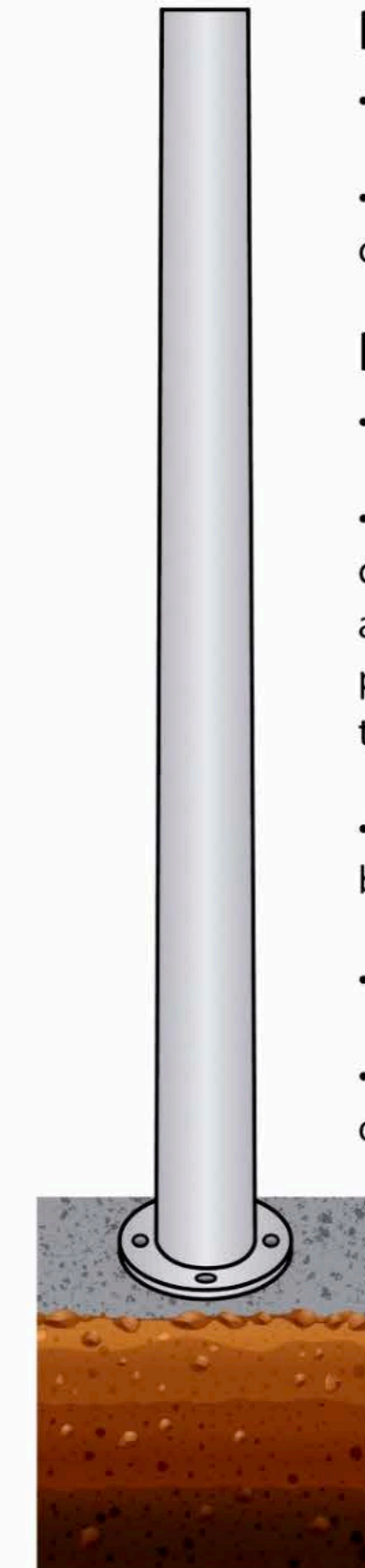
### Benefits:

- Pleasing appearance
- Lightweight

### Drawbacks:

- Underground corrosion accelerated due to moisture and soil chemicals (often undetectable prior to pole failure)
- Unpredictable life expectancy
- Increase installation time and cost depending on structural engineer's criteria

## Base-Plate Galvanized Steel



### Benefits:

- Pleasing appearance
- Lighter weight than concrete, easy to handle

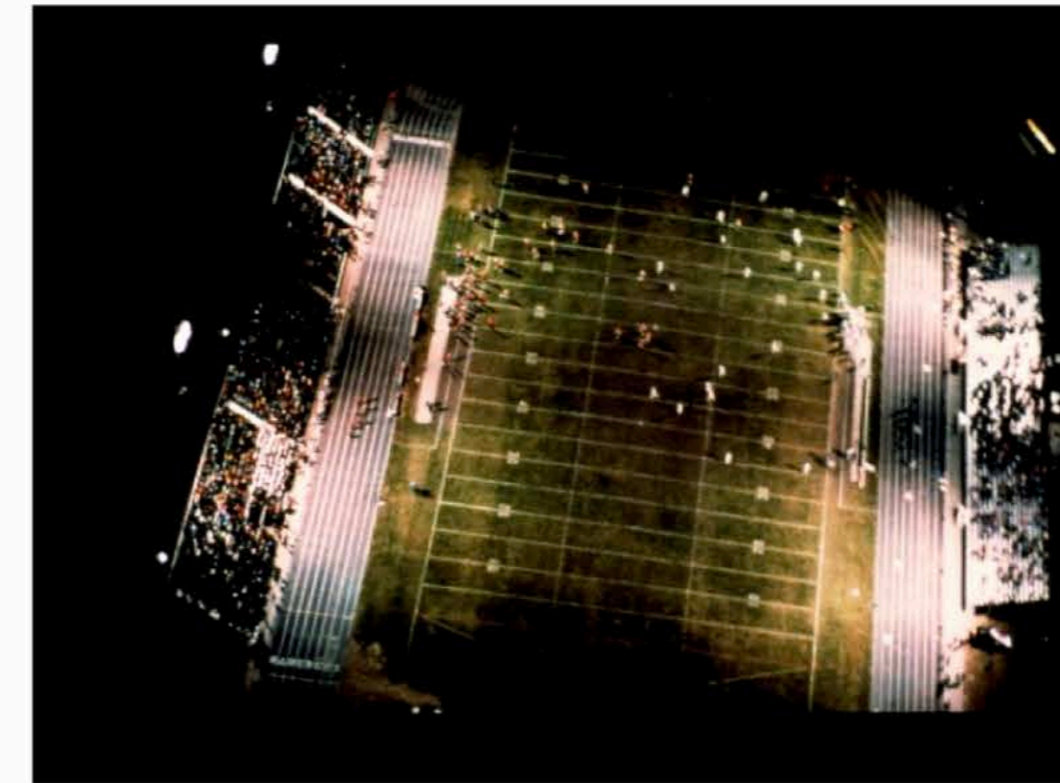
### Drawbacks:

- Higher initial cost
- Require construction of concrete foundation with anchor bolts to mount poles and sufficient curing time for concrete
- Curing time of concrete base
- Corrosion at ground level
- Difficulty with pole orientation

# How much will it cost to operate my lights?

- Electrical Costs
- Staffing Cost
- Routine Maintenance
- Unexpected Repair Costs

*Re-aiming, fixture outages, troubleshooting, lighting and surge protection.*



**Misalignment of as little as 10 degrees shifts light off the playing field into the stands.**

**Having major electrical components accessible at ground level avoids hiring a \$100/hour crane to replace a \$10 fuse.**



# How can I make sure I get the results I want?

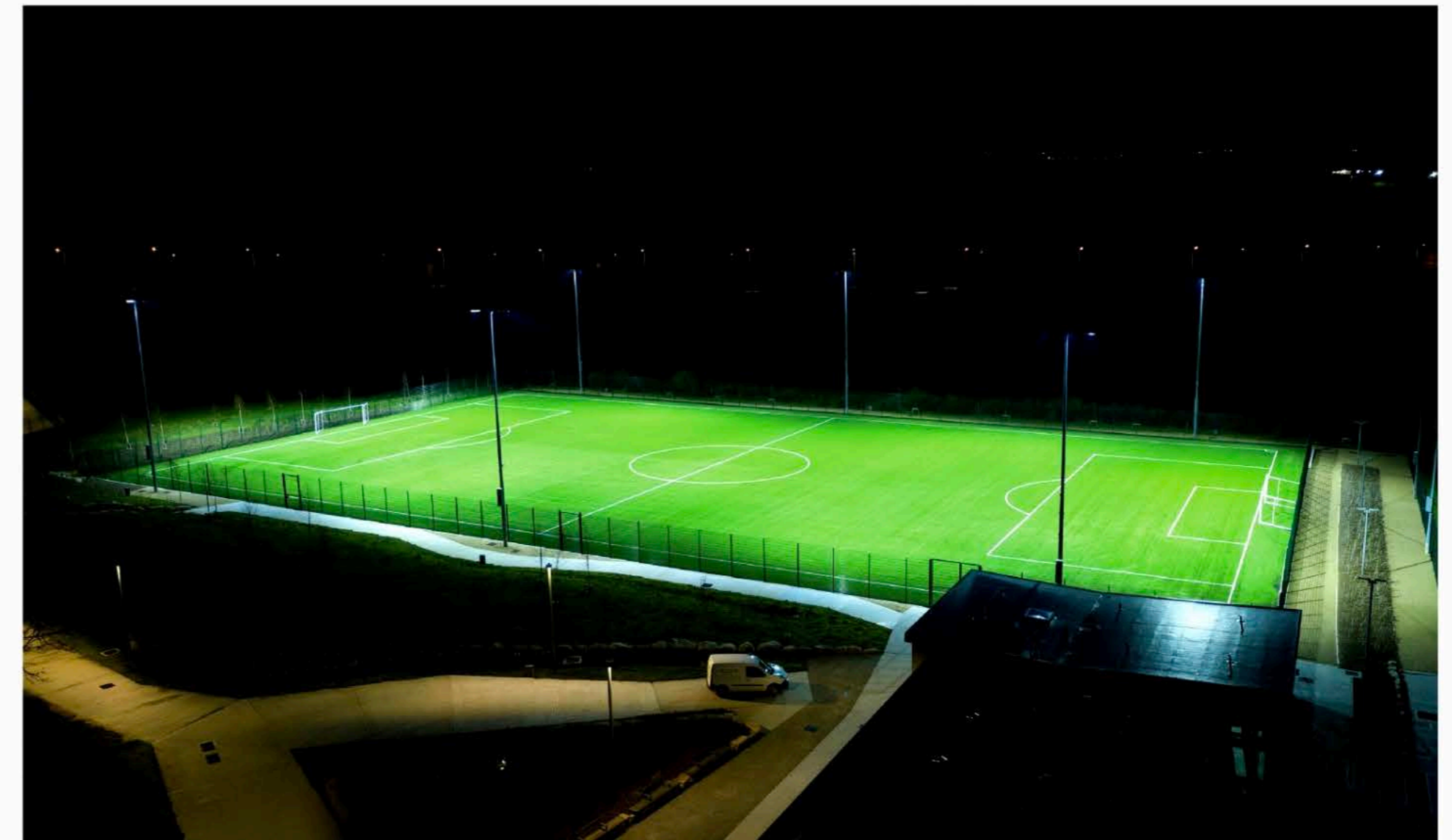
- Define Standards

- Seek Accountability

*Require written guarantees, compare warranties and services, get references, see for yourself.*

**“The bitterness of poor quality remains long after the sweetness of low price is forgotten.”**

— Benjamin Franklin



# Is there funding help available?

- Utility Grants and Rebates
- Manufacturer Financing
- Unique Fundraising
- Volunteer Installation



# Warranty

- What is Included?
- What is Guaranteed?
- Materials & Labor





## Automated Sports Broadcasting

- Complete Solution
- Broadcast Quality
- Accessing Games
- Scheduling Support
- Warranty



## Vehicles for procurement

- Is There a State Contract for my Purchase?
- Local City/Parish Procurement Guidelines
- Grant Opportunities
- Public Process Bid

# Thank you!



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