

**COUNCIL ACTION FORM**

**SUBJECT: AWARD OF CONTRACT FOR THE BROOKSIDE PARK PATH LIGHTING PROJECT**

**BACKGROUND:**

In February, City Council approved plans and specifications for the Brookside Park Path Lighting Project which includes the installation of path lighting adjacent to the shared use paths in Brookside Park, 1325 6<sup>th</sup> St. The paths include the path that runs from 6<sup>th</sup> St. to 13<sup>th</sup> St., the path that enters the park from the east on Ridgewood Ave., and the path that enters the southeast corner of the park at Brookridge Ave. and 6<sup>th</sup> St. These paths are shown on Attachment A. The shared use path system is an integral part of improving mobility and connectivity through Ames and the lighting will assist in increasing safety of the park since the park is heavily populated with trees, which restrict the light that gets into the park. The project is expected to be completed in 2018.

Six companies submitted bids for the project and at Council's March 27 meeting, staff recommended awarding the project contract to Van Maanen Electric as they were the low bidder. At that time, Lori Biederman, a Brookside Park neighborhood resident, expressed concern about installing lights in the park, especially in the wooded area on the northern section of the park, and the negative impact it will have on wildlife. **Council accepted the report of bids and directed staff to do additional research on the impact of the lights on the wildlife.**

**PROJECT DETAIL:**

KCL Engineering, West Des Moines, Iowa, was hired to develop specifications, prepare a cost estimate, and provide project management for the lighting project. KCL was tasked with ensuring lighting components are compliant with City of Ames Outdoor Lighting Code and staff confirmed they are compliant.

LED light fixtures, Attachment B, are to be mounted on top of 15' poles spaced every 75' to 100' and two feet off of the path. The lighting is 4,000 Kelvin (K) which closely resembles moon light. Attachment C shows the difference between varied levels of LED Kelvin temperatures. The path lighting would be on photo cells which means the lights will come on when natural light levels diminish and go off when natural light levels increase.

A total of 60 light poles are in the plans with six being placed on the path from Brookridge to Squaw Creek; eleven on the path from the corner of 6<sup>th</sup> Street and Brookridge to Squaw Creek; and 43 along the path from 6<sup>th</sup> Street to 13<sup>th</sup> Street.

Bids were solicited to provide all labor, equipment, materials, and other components necessary to complete the Brookside Park Path Lighting in accordance with Plans and Specifications. Bid information is as follows:

<b>Bidders:</b>	<b>Bid Amount:</b>
Van Maanen Electric	\$128,700
Nelson Electric	\$136,640
Jasepering Electric	\$158,000
Voltmer, Inc.	\$158,515
NAI Electrical Contractors	\$174,985
Baker Electric Inc.	\$178,885

**Project Cost and Funding:**

Bid Amount	\$ 128,700
Design Fees	\$ 8,000
<b>Total Estimate</b>	<b>\$ 136,700</b>

City Council approved \$150,000 as part of the FY 2016/17 Capital Improvements Plan (CIP). The engineer’s cost estimate for the project was \$144,075. There are sufficient funds to complete the project as specified.

**SAFETY:**

This project was initiated due to safety concerns from park users. These concerns included not being able to see the path, not able to identify obstacles on the path, and personal safety when using the path. According to Ames Police, there is little to no criminal activity in Brookside Park, however, they did indicate that two of the more serious sexual assaults in Ames have occurred in parks with little to no lighting. In addition, there is a current liability claim from an individual who fell on the steps in Brookside Park.

Staff did reach out to the City’s insurance provider, Iowa Communities Assurance Pool (ICAP), to see if there were any standards they use for lighting paths. Below is the response received from ICAP:

*“This is to recap our conversation concerning the lighting of pathways or shared use paths in your city parks. There are no standards that I am aware of concerning the lighting of pathways however from a loss control best practice standpoint I would suggest that the paths be lighted. This will help from a security standpoint as well as reduce the potential for trips and fall.”*

*Daniel Cruse, Loss Control Manager, ICAP*

## **LIGHTING STANDARDS FOR PATHS:**

There is not a significant amount of information specifically related to lighting paths and/or parks. However, multiple sources, including the International Dark-Sky Association (IDA), recommend lighting of 3,000 K or less for outdoor areas.

## **LIGHTING TYPES:**

The light fixture specified for this project is a Type V fixture which means it produces a circular distribution of light that has the same intensity in all directions. Attachment D explains the different LED Lighting Distribution Types. The consultant recommended this type of lighting as it provides light beyond the edge of the path and is better from a security perspective. As a reference, Iowa State University uses Type II lighting on its paths.

## **IMPACT ON WILDLIFE:**

Council directed staff to reach out to Jim Pease and Iowa State University regarding the impact that lighting will have on the wildlife in Brookside Park. Three individuals were contacted and they are listed below along with their comments.

### **Jim Pease**

#### **Professor Emeritus**

#### **Iowa State University**

#### **Area of Expertise: Interpretation, Field Biology, and Ecosystem Biology**

#### **Comments:**

- He read the notes/articles provided by Lori Biederman and won't dispute the research, but can't tell if the methodology used applies to this area in Brookside Park
- Lights installed in what is otherwise a dark and isolated area may impact wildlife uses of the area
- Animals in the City get used to light
- With some modifications, you can both minimize the impacts to wildlife and improve human safety concerns in the area
  - Use of low-sodium lights instead of LED's
  - Lower the pole height from 15' to 8'-10' range
  - Putting timers on the lights would help minimize the impact
  - Making sure the light is concentrated downward
- With these measures, he thinks we can achieve both the park systems' desire for safety for human users and minimize the impacts on wildlife occupants in this important wild area in our city

- Impact on Barred Owls may be minimal as they will feed during the day; Great Horned Owls are pretty adaptable; Screech Owls are very nocturnal and may be impacted the most
- Not sure how much crepuscular animals (most active at dusk and dawn) will be affected

**Brent Danielson**

**Professor**

**Iowa State University**

**Area of Expertise: Small Mammal Ecology and Evolution**

Comments:

- Lighting does nothing good for wildlife; even small amounts of light have an impact
- Lighting adds stress to mammals
- Adding lighting will reduce the number of mammals
- Timers may make sense, but lighting from dusk to 10:30 PM and 6:00 AM to dawn will impact the wildlife which are most active during dusk and dawn
- Lighting will have a moderate to substantial impact on wildlife

**Steve Dinsmore**

**Professor**

**Iowa State University**

**Area of Expertise: Avian Ecology**

Comments:

- Defined light pollution as adding light to areas where it wasn't before
- Lighting will affect birds that migrate (spring and fall) at night
  - Birds coming in for a landing are attracted to the light and there is an increased risk for collision
  - Since birds are attracted to the light, they may be going to areas that is not optimal habitat and thus they may not get the nutrients needed to continue their migration
- Lighting extends activity for daytime birds (i.e. birds may sing well into the night)
  - The physiological response to extending daytime activities is birds use more energy and in turn will have less energy for mating and other functions
- Lights facing downward is good
- Long spacing (75'-100') between poles is good
- Timers make sense as lights are only on when people may be using the paths and timers would help conserve energy
- Pole height of 12'-15' seems appropriate

- Great Horned Owls and Barred Owls are doing well in urban environments and the Barred Owl population is increasing across Iowa
- Screech Owls are more of a conservation concern as they are less adaptable

### **ITEMS TO CONSIDER WITH COST IMPLICATIONS:**

Based on the aforementioned information, there are several issues to consider:

**Complete the project according to plans and specifications?** – This is comprised of 4,000 K lighting, 60 poles spaced 75'-100 feet apart, and photocells so the lights will come on when natural light levels diminish and turn off when natural light levels increase. User safety is the priority with this option. **Project cost is \$136,700.**

**Install 3,000 K fixtures?** – The project could move forward as designed, however, a change order would be issued to install 3,000 K fixtures in place of the 4,000 K fixtures. User safety and reducing the impact on wildlife can be accomplished. **Estimated project cost is \$136,700.**

**Install timers?** – These could be installed so the lights would go off at 10:30 PM and back on at 6:00 AM. This would correspond with park hours. User safety is addressed and lights would be off for a majority of the dark hours. **Cost to add timers to any alternative is estimated at \$2,100.**

**Install Type II lighting in place of Type V?** – This option would concentrate the light on the path with minimal spillover to the adjacent path area. Light fixtures would be 3,000 K. User safety and reducing the impact on wildlife can be accomplished. This option would require a redesign and rebid. **Estimated project cost is \$161,700.**

**Do not light the wooded section?** – Lighting would only be installed in the developed areas of the park. The wooded section would remain unlit. Focus is on minimizing the impact on wildlife and does not address user safety concerns in the wooded section. Redesign and rebid would be necessary. **Estimated project cost is unknown.**

**Install shorter poles?** – If this option is preferred, staff recommends shorter poles are only installed in the wooded section. This option focuses on minimizing the impact on wildlife and may not address user safety concerns. A redesign and rebid would be necessary. **Estimated project cost is unknown.**

## **ALTERNATIVES:**

1. Award the Brookside Park Path Lighting contract to Van Maanen Electric, Newton, IA for the bid amount of \$128,700.

*If Council desires 3,000 K lighting in place of 4,000 K lighting as specified, as well as, timers, a separate motion directing staff to initiate a change order would be needed.*

2. Reject all bids and direct staff to redesign the project utilizing Type II lighting, 3,000 K fixtures, photocells, and timers on all paths as shown in Attachment A.

*If Council prefers this alternative, additional funding will need to be identified.*

3. Reject all bids and direct staff to redesign the project utilizing Type II lighting, 3,000 K fixtures, and photocells for only the paths in the developed areas of the park.
4. Reject all bids and provide direction to staff regarding some other combination of desired changes to the plans and specifications.

*If Council prefers this alternative, the project will most likely need to be redesigned and rebid. Additional funding may need to be identified as well.*

5. Reject all bids and do not pursue this project at this time.

## **MANAGER'S RECOMMENDED ACTION:**

The proposed project is an important addition to Brookside Park, because it alleviates safety concerns regarding how dark it gets during certain times of the year due to the tree canopy. Also, it encourages pedestrians and bicyclists to use the park as a safe connection route instead of using a lighted roadway. The proposed lighting is compliant with the City of Ames Outdoor Lighting Code. Van Maanen Electric has successfully completed multiple projects for the City including the River Valley Park Softball Field Lighting, Inis Grove Park Sand Volleyball Court Lighting, and the Ames/ISU Ice Arena Lighting Project.

This project was initiated in response to safety concerns from users and designed with that in mind. However, minimizing the impact on wildlife is also important. Balancing these two concerns can be difficult. The City's liability insurance provider is advocating for path lighting to minimize risk to park users while the experts contacted indicate introducing light pollution will have negative impacts on the wildlife. Installing Type II lighting, 3,000 K fixtures, photocells, and timers may be the best way to balance these two concerns.

**Therefore, should the Council's main emphasis be on human safety, then it is the recommendation of the City Manager that the City Council approve Alternative #1.**

**However, if there is a desire to balance the welfare of the wildlife along with human safety, then it is the recommendation of the City Manager that the City Council adopt Alternative #2 as described above.**

**However, it is important to note that Alternative #2 will require the redesign and rebidding of the project that could add an additional cost of \$25,000.**

ATTACHMENT A





**ATTACHMENT B**





Kelvins Tell You What Color Your LED Is

This is a great photo illustrating the different color temperatures of lighting based on the Kelvin temperature scale. Warmer temperatures are a longer wavelength and also more closely resemble high pressure sodium (HPS) light types prevalent along streets until LEDs started taking over. Cooler tones are shorter wavelengths and more closely resemble direct sunlight.

. Moonlight is 4100 Kelvin - Sunlight ranges between 4,500 and 10,000 Kelvin.

. Lighting in the higher Kelvin range can trigger photoreceptor cells containing a photopigment called melanopsin which helps set your body's daily cycles and can keep you attentive and alert. However, recent studies has also shown that this cooler light (blue light) can adversely affect your circadian rhythm - a term used to indicate your body's natural energy cycles.

Degrees Kelvin is traditionally used to measure temperature on an absolute, thermodynamic scale. **LED color temperature uses measurements in Kelvin related to temperature changes as a piece of metal, specifically a black body radiator**, is heated.

As the metal is heated, the color of light emitted changes from red to orange, and then yellow, white, blue-white, and lastly, deeper shades of blue. Although LEDs do not produce light in the same manner as the heating of metal, the same color scale is used to describe the appearance or quality of light they produce.

When it comes to the Kelvin scale, bulbs with a **low Kelvin value produce a warmer, yellowish, cozier light**, while those with a **higher Kelvin value produce a cool blue**, more energizing light. To help you remember, think:

**'Low equals more golden glow'** and **'high looks like a crisp blue sky.'** **'Low equals more golden glow'** and **'high looks like a crisp blue sky.'**

In addition to factoring in the brightness of an LED bulb (which is measured in lumens), specific color temperatures will provide benefit to different activities, locations, and light fixtures.

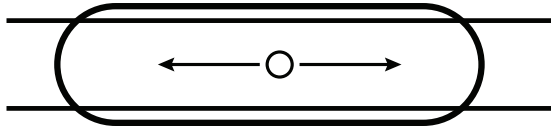
**Soft, warm white LED color temperature bulbs...**

are most similar in light quality to standard incandescent bulbs and measure 2,700 to 3,000K.

# LED Lighting Distribution Types

## Quick Reference Guide

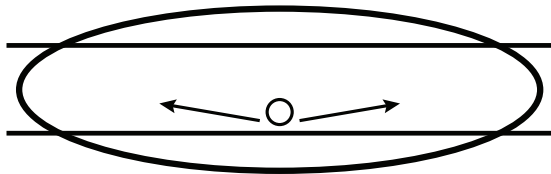
### Type I



The **Type I distribution** is great for lighting walkways, paths and sidewalks. This type of lighting is meant to be placed near the center of the pathway. This provides adequate lighting for smaller pathways.

Type I is a two-way lateral distribution having a preferred lateral width of 15 degrees in the cone of maximum candlepower. The two principal light concentrations are in opposite directions along a roadway. This type is generally applicable to a luminaire location near the center of a roadway where the mounting height is approximately equal to the roadway width.

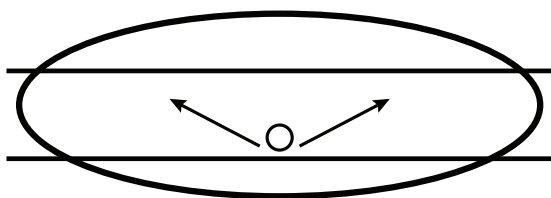
### Type II



The **Type II distribution** is used for wide walkways, on ramps and entrance roadways, as well as other long, narrow lighting. This type is meant for lighting larger areas and usually is located near the roadside. You'll find this type of lighting mostly on smaller side streets or jogging paths.

Type II light distributions have a preferred lateral width of 25 degrees. They are generally applicable to luminaires located at or near the side of relatively narrow roadways, where the width of the roadway does not exceed 1.75 times the designed mounting height.

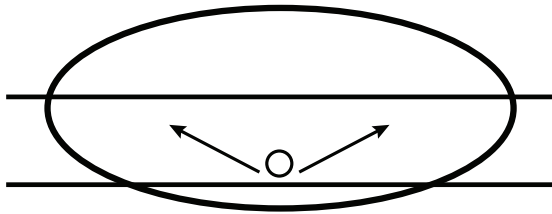
### Type III



The **Type III distribution** is meant for roadway lighting, general parking areas and other areas where a larger area of lighting is required. Type III lighting needs to be placed to the side of the area, allowing the light to project outward and fill the area. This produces a filling light flow.

Type III light distributions have a preferred lateral width of 40 degrees. This distribution is intended for luminaires mounted at or near the side of medium width roadways or areas, where the width of the roadway or area does not exceed 2.75 times the mounting height.

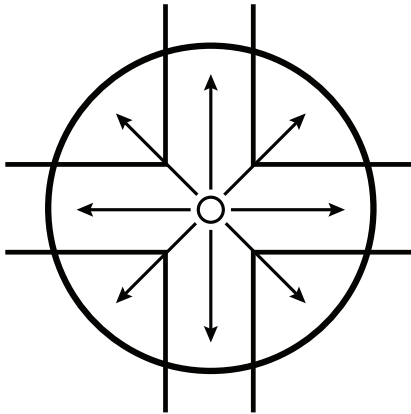
### Type IV



The **Type IV distribution** produces a semi-circular light meant for mounting on the sides of buildings and walls. It's best for illuminating the perimeter of parking areas and businesses. The intensity of the Type IV lighting has the same intensity at angles from 90 degrees to 270 degrees.

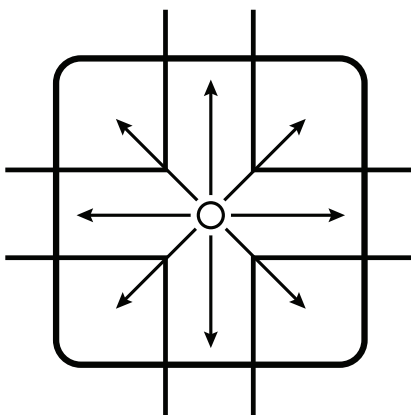
Type IV light distributions have a preferred lateral width of 60 degrees. This distribution is intended for side-of-road mounting and is generally used on wide roadways where the roadway width does not exceed 3.7 times the mounting height.

### Type V



The **Type V distribution** produces a circular distribution that has the same intensity at all angles. This distribution has a circular symmetry of candlepower that is essentially the same at all lateral angles. It is intended for luminaire mounting at or near center of roadways, center islands of parkway, and intersections. It is also meant for large, commercial parking lot lighting as well as areas where sufficient, evenly distributed light is necessary

### Type VS (square)



The **Type VS distribution** produces a square distribution that has the same intensity at all angles. This distribution has a square symmetry of candlepower that is essentially the same at all lateral angles. It is intended for luminaire mounting at or near center of roadways, center is-lands of parkway, and intersections. It is also meant for large, commercial parking lot lighting as well as areas where sufficient, evenly distributed light is necessary. Type VS is used where the light pattern needs a more de-fined edge.