

Architecture Committee

Orchard River Common Area Night Lighting Information and Recommendation

4/5/2020

At an Orchard River Security Meeting on 11/6/2019 the architecture committee was asked to come up with lighting recommendations. The security committee reported:

Our current internal road light poles are of a colonial design and to conform to historic designation therefore need to be changed. The security committee asks that when it is changed that brighter lighting be installed.

The quad lighting system has problems. The sheet metal holder of the plastic globes are rusting out. Also it was mentioned that the globes do not conform to the city/county ordinance for sky lighting.

In the subsequent emails several other points were made:

- we have some security/safety concerns that improved lighting would help.
- Please focus on the quad and pole lighting. The carport lighting is original and is under the canopies with minimal impact skyward.
- Quad Lighting
 - many front porch fixtures have been replaced to another style by the owner. They are not the same.
 - Many lights activated by motion sensor have been added by residents at both front doors and rear yards. These lack uniformity, don't conform to the Outdoor Lighting Code in terms of uplight or color temperature (3500k max.) and in some cases, may contribute to Light Trespass.
 - The quad lights were replaced in 2000. The sheet metal cups holding up the globe are rusting out; they do not conform to Outdoor Lighting Code and emit glare ranging from discomfort or disability depending on age of eyes). It's a 12v system put in in 2000. It could be replaced with shielded, landscape lighting fixtures to illuminate level changes in sidewalks.
- Pole Lighting: Can we come up with a modification of the arms on the Street poles to give us the three things we need 1. more light 2 light focused downward 3 historic designation relevance.
- What about motion sensors in the carport area along the wall, so that they would come on when cars drove in.

On 1/26.2020 Rich Franz-Under (#71) and Dennis Doxtatar (#48) met with Joyce Kelly an architect and lighting & controls specialist familiar with Orchard River since 2003. After discussion and touring the property the architecture committee has the following information and recommendations:

Information:

1. The key elements of outdoor lighting are 1) consistent light levels with no bright or dark spots and 2) no direct glare that can cause discomfort glare or disability glare. This is a complex design problem that requires a specialist skilled in night lighting design.
2. Light trespass (one example is lights shining in neighbors' windows) is a concern with any lighting design that increases the amount or location of light.

3. Most studies show increased lighting does not reduce crime.
4. The most recent crimes reported are related to vehicle theft and break-in. The carport areas are the areas of Orchard River with the most consistent light levels and in most cases without disability glare so non-residents can be recognized.
5. Rich spoke with Chris Evans, the historic designation architect regarding the pole lighting. Chris had not focused on the lighting. In general he did not think changes to the pole lighting would affect the designation. Once we have more specific ideas we will need to run those by Chris.
6. Changing more than 25% of the lamps in the common area from one type to another (like our change from incandescent to LED quad lights) requires meeting the City of Tucson/Pima County Outdoor Lighting Code. Note: this is the 2012 Code which will soon be updated with somewhat more stringent requirements. Changing more than 25% of the light fixtures in the common area from one type to another (like the suggestion to replace the “colonial” lights with a light that shines down) requires meeting the Outdoor Lighting Code.
7. A city building permit, with site plan, lumen calculations stamped by an electrical engineer, will also be required. Orchard River’s lighting area is E3 and the total outdoor light output of both shielded and unshielded lighting is limited to 55,000 shielded and 11,000 unshielded lumens per acre. The unshielded carport lighting is considered unshielded despite their location under the carports.

Recommendations:

1. Quad Lighting can be redesigned to improve the consistency of light levels and reduce direct glare. Options discussed were:

- a. New front door light fixtures that have a dusk to dawn low level light to help light the quads and a high level motion sensor light that will track movement. Unfortunately, these two features don’t appear to be available in one fixture. Full cut-off fixtures are available with LED retrofit lamps, such as the fixture to the right, and will be less costly than LED fixtures. Reasonable quality fixtures are available for \$100 - \$200. Including LED lamps under 3500k with integral photosensors.



- b. Motion sensor activated security lighting with photosensor override will activate at night or during inclement weather when motion is detected. These run about \$75 - \$150.



- c. New, full cut-off pathway lighting to reduce direct glare while illuminating steps and ramps range from \$80 - \$120 per fixture depending on output and optics but may require upgraded low voltage infrastructure including lighting controllers, pending in depth investigation and testing.



- d. Assuming 5-7 fixtures per quad, a budget estimate for this is \$400 to \$1,600 per quad depending on the quality and quantity of lights selected.

2. Pole lighting:

- a. There are ten, ~12' pedestrian scale pole lights along Orchard River Drive. These currently provide localized lighting. Increasing the amount of light output and focusing it down will reduce the consistency of light levels by providing bright spots. To provide a consistent light level along the road will require more poles. How many will depend on the final design. The lighting designer can calculate the amount as part of consulting services. A budget estimate for each pole is \$250 to \$500 per pole* depending on the quality chosen. Similarly, the cost of fixtures to mount on new or existing poles could range from \$350 to \$700, depending on performance attributes. Another unknown is the condition of the current electrical distribution system and the timeclock(s) and/or photosensor(s) controlling the lighting.
 - i. In order to re-use the existing poles, further investigation is needed to determine how much weight they will bear. The current "Colonial style" fixture heads are made of plastic. Some poles don't appear embedded in concrete in the ground. The "EPA" of fixture, pole and foundation must be calculated.
 1. <https://www.acuitybrands.com/en/resources/customer-tools/pole-resources/pole-selection>
 - b. There are two light poles in the RV yard. These poles appear to be of original wood construction. They are in poor condition. These poles should be replaced. If there is a lighting project that changes 25% of the lighting they will have to be replaced to meet the Outdoor Lighting Code.
 - c. There is one pole light at the south side of the pool area. If there is a lighting project that changes 25% of the lighting this light will have to be changed to meet the Outdoor Lighting Code.
3. The budget estimate for a lighting design stamped by an electrical engineer is between \$2,500 and \$10,000 depending on extent of scope of investigation and design work. Some free assistance can be obtained by Arizona Commercial Lighting, who are particularly skilled with the paperwork required to obtain TEP rebates for more efficient lighting. They are also capable of supplying product that complies with our Outdoor Lighting Code. Two months ago, they recommended Westgate lighting (see catalogs) for best compromise between affordability and value. RAB lighting produces a lot of suitable full cut-off LED products in suitable color temperatures (3500k max.) and voltages. Call AZ Commercial Lighting for quotes. Pathway fixtures available online include Volt and Focus.

Summary

Item	Minimum	Maximum
Full cut off front door LED lights	\$14,000	\$27,000
Motion sensor front door lights	\$10,000	\$20,000
full replacement of all quad path lighting	\$8,000	\$32,000
Full Replacement of pole lighting	\$8,000	\$16,000
Electrical Engineering	\$2,500	\$10,000
Total (not including additional poles)	\$42,500	\$105,000
Additional Poles with allowance for additional wiring	\$2,000 per pole	\$3,000 per pole
New pedestrian scale poles assume 20 new poles required for even light levels	\$40,000	\$60,000