

Santa Fe Community-Guided Lighting Design

Working Group Meeting #1
Tuesday, April 13, 2021 5:30-7PM, via Zoom

Notes

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Meeting Agenda



City of Santa Fe Community-Guided Lighting Design Working Group

Tuesday, April 13, 2021 5:30-7PM MT

Agenda – Meeting #1

1. Introduction – 20 minutes
 - a. Group goals and responsibilities
 - i. Outcome of discussion is top 3-5 priorities for lighting design
 - ii. City Code
 - b. Facilitator role and responsibilities, ground rules
 - c. Group members
 - i. Name
 - ii. What groups or communities do you represent?
2. Presentation slides – 30 minutes – hold questions for item F
 - a. Lighting Design considerations
 - b. Regulatory Requirements
 - c. Project motivation and performance metrics
 - d. PNM/City partnership
 - e. Group objectives
 - f. 10 minutes for questions and clarification – raise hand function on Zoom
3. Discussion Forum – 40 minutes
 - a. Each member has 2 minutes to share priorities related to lighting design considerations in Santa Fe City Code
 - b. Discuss priorities
 - c. Outcome of discussion is recommendation of 3-5 priorities for lighting design
 - d. Schedule final meeting

Meeting summary and Q&A doc will be sent out after the meeting

Action items:

- Attend at least one demonstration
- Connect and converse with fellow community members
- Come to final meeting prepared to review design options with priorities and experience in mind

Attendance

Page Bueno, Independent Facilitator

Cheyenne Ernst, Community Engagement Leader, Dalkia

Regina Wheeler, Director of Public Works and Project Manager for lighting upgrade

Jamie Aranda, Community Relations Manager, PNM

Javier Rosado, Director of Engineering Division

Group members in attendance (alphabetical order by first name)

Name	Self-identified representation
Alba Blondis	Southwest Santa Fe Advocates Chair, Tierra Contenta resident
David A. Carr	Architect, Santa Fe chapter of AIA
Eric Gent	Railyard neighborhood resident and business owner
Hope Reed	Mayor's Committee on Disability representative
Ken Hughes	Sierra Club representative
Lucy Foma	Racial equity and safety advocate
Madeline Carey	Experience with large-scale climate solutions, outdoor runner/pedestrian advocate
Dr. Nancy Owen Lewis	Anthropologist, Public Safety Committee representative
Peter Lipscomb	sensible lighting advocate, wrote IDA nomination packet for Clayton Lake State Park, Cerrillos Hills State Park Manager
Richard Ellenberg	Canyon Neighborhood Association representative
Ruth Hamilton	Southwest Santa Fe Advocates Member, Tierra Contenta resident
Tom Jervis	Sangre de Cristo Audubon Society representative

Presentation Excerpt

Group Role, Design Process, Performance Requirements

Lighting Design Working Group Context

- Assembled with guidance for balance and equity
- Understand lighting design parameters
- Articulate community goals and needs
- Marry goals and needs with requirements
- Participate in Demonstrations
- Review Lighting Design

Community-Guided Lighting Design Process

- Website with education, feedback form
- Engage Neighbors
- Share information, demonstrations and gather feedback
- Analyze options and tradeoffs
- Ensure regulatory compliance
- Governing Body approval of design

Project Performance Requirements

- Minimum of 50% energy reduction
- Meet or exceed New Mexico Dark Sky Protection Act
- Support Dark Sky Community Designation
- Meet minimum Roadway Lighting Levels established by ANSI IES RP-8-18
 - Achieves lighting standard with existing lighting poles
- Meets PRC performance specs for replacement equipment
- First energy-savings payment due in December 2021

Discuss Priorities and Arrive at Top 3-5

“Reduce light pollution, reduce or prevent glare, reduce or prevent light trespass, conserve energy, promote a sense of safety and security, and ensure aesthetically appropriate outdoor lighting in keeping with the character of Santa Fe.”

City of Santa Fe Municipal Code 14-8.9 OUTDOOR LIGHTING (A) PURPOSE

The Group discussed guiding values for the community guided lighting design:

	Priorities
Group member	appreciates street lights for safety and visibility; energy consumption and cost effectiveness; having enough light to keep crime away
Group member	bird and wildlife impact - no uplight; important that shielding be available for residents to protect their property; lower kelvin is better for bugs and wildlife; energy consumption and savings; carbon neutrality
Group member	color temperature; work on uniformity; demonstrate what it means to be a good neighbor to outlying communities; demonstrate that we're stewards of our environment
Group member	conserve energy, promote sense of safety and security
Group member	equal distribution of lighting throughout communities that are currently dark; need lighting for safety; energy savings/consumption; light trespass and light pollution in a functional capacity
Group member	finding the sweet spot between energy savings and impact on character of city
Group member	light pollution and trespass; energy consumption; safety and dimming impact; wildlife impact, night sky; night blindness from too much blue light
Group member	light trespass; lower color temperature for health impact
Group member	District 3 diversity of work means movement at all hours so it's important to have safety at all times; downtown and tourist areas should be well-lit; pedestrians safety; protect night skies; cost effective and energy efficient
Group member	pedestrian and cyclist safety; environmental non-climate impacts on wildlife, dark sky; meeting carbon goals and progress to carbon neutrality
Group member	promoting health and safety - demonstrate that it will improve health and safety, and make roads safer; conserve energy; protecting dark skies as part of the heritage of the city
Group member	protect wildlife, both flying and ground base animals; capture energy savings and reduce energy use significantly; have an enhanced experience walking around Santa Fe

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Post Meeting Compilation of Guiding Values – most mentioned to least mentioned

Guiding Values (by most mentioned)
Conserve energy, reach carbon neutrality
Promote safety and security
Protect wildlife
Dark sky
Light pollution and trespass light
Color temperature
Shielding, zero uplight, additional shielding
Reduce cost
Enhanced experience Santa Fe streets
Uniformity, all have good lighting
Stewards of environment
Make people healthier and roads safer
Disposal and replacement lifecycle
Consider neighboring communities

Questions and Clarifications from Group on the Presentation

What is the opposition to the project?

Staff originally presented a plan to use 4000 Kelvin lights on major roadways and 3000 Kelvin on residential streets. Dark sky, sustainability, environmental, and city character advocates objected vehemently to this plan. With the new awareness, the City has engaged the International Dark Sky Association to provide guidance to ensure the lighting design supports becoming an Dark Sky Designated Community. Staff, PNM, and Dalkia and are all working with regulatory agencies and equipment analysis to be able to use lower color temperature lights in the City of Santa Fe while meeting project requirements.

How much is the loan for the project, who's it from, and what's the payback?

City secured a municipal loan for \$18M which will be paid back by energy savings. \$15M is for solar array installation on 17 facilities in the city as well as converting facility interior lighting to LEDs. \$3M is for the lighting conversion project. On-bill savings of \$500,000 per year will pay debt and deferred maintenance on existing street light infrastructure. The debt is configured for 18 year payback period. The loan is from Sterling Bank.

Will demonstrations coming up have lights 3000K or lower?

There will be 3000K and 2700K fixtures in the demonstrations. Models for 3000K and 2700K have been evaluated and meet performance metrics which include: City Code; energy savings needs for debt service; lighting levels compliant with ANSI IES RP-8-18 Design Of Roadway Facility Lighting; cut off and shielding requirements; reliability. Luminaires with color temperature less than 2700K are currently being evaluated by Dalkia and PNM for compliance with project performance requirements and PRC requirements.

PNM and NMDOT have expressed that they could be flexible with regulatory requirements, is that truly the case?

After conversations with NMDOT engineers and legal representatives, NMDOT has declined to provide a waiver from the existing specifications and indicated they, instead, will go through the process of changing their specifications. NMDOT won't control many Santa Fe streets after August 1, 2021 based on the Road Transfer Agreement which will transfer Cerrillos, St. Michaels Drive and Old Pecos Trail to City operation, maintenance and ownership. St. Francis and NM-599 will continue to be NMDOT owned and operated. Waiting to upgrade street lights on NMDOT roads until NMDOT modifies their specifications may a good strategy.

PNM is committed to matching the City's adopted community guided lighting design. Rate 20 which is PRC regulation that guides the project and the rate that the City pays for their lights.

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The new 16th version of Rate 20 provides PNM flexibility to add equipment to the qualified products list so that they can include additional color temperature options.

One member requested that the following lighting terms also be explained.

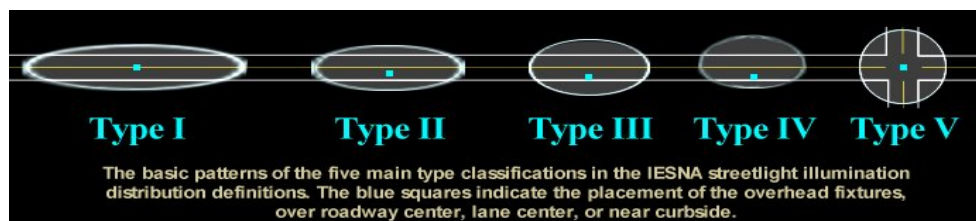
Candela (cd): The candela is the international basic physical quantity in all measurements of light: all other units are derived from it. An ordinary wax candle has a luminous intensity in a horizontal direction of approximately one candela. Candlepower is always a property of a source of light, and gives information regarding luminous flux at its origin.

Illumination at the roadway (also called illuminance, measured in footcandles (fc)): the intensity of light hitting a surface. The number of lumens on a surface is divided by the area of the surface to obtain the average illuminance over that area. In the United States Customary System (USCS), the unit is the footcandle (fc), where one foot candle is equal to one lumen per square foot.

Additional note: Human eyes do not see illuminance. They see only the portion of the light that is reflected toward them. An example is a white line on a black asphalt surface. The appearance of the white line is totally different from that of the black surface, even though each may be receiving identical illumination.

Luminance (reflectance of light from pavement surface): To understand what the eye sees, one must consider luminance, the concentration of light reflected toward the observer per unit area of surface. It is essentially the intensity divided by the area of the source and is measured in candelas per square meter (cd/m²).

Light distribution patterns:



Types II and III are preferred for street lights and are the types being evaluated for installation.

Old vapor lights have diffusion lenses, do LED lights have diffusion? Existing LEDs in the City seem to provide a cold and unwelcoming feeling.

Approximately 200 LED luminaires have been installed on City street lights over the past 10 years. They are an older technology and have higher CCT lights than are being considered for this project. Most of these fixtures are 5000K color temperature, which was never a consideration for this project. Additionally, many previously installed LEDs don't have the "full

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cut off” feature that keeps the light directed down from the horizontal plane; they also don’t have the option for additional shielding to prevent light trespass. Existing LEDs will be replaced as part of the upgrade with the community-guided lighting design plan. All fixtures being evaluated for the project are “full cutoff” and shielded, with additional shielding options available.

Regarding Diffusion: LED lights have one of two types of diffusion.

- Discrete LED - each has its own acrylic or glass refractor.
- Chip-on-board - multiple LED chips on the same platform, and utilize same same concept of refraction as discrete LEDs.

What might be consequences of the conversion that we haven’t discussed?

Since the new lights will have a more focused beam, it could make dark spots worse. It is common to have a subsequent effort to assess and adjust lighting in neighborhoods after the retrofit. Additional light could be more creative than installing new poles similar to existing street lighting to ensure compliance with International Dark Sky Association (IDA) standards to become an IDA Designated Community.

What is Correlated Color Temperature (CCT) measured in Kelvins (K)?

CCT is a measure of the visual “warmth” or “coolness” of light, expressed in Kelvins (K). Noon daylight has a CCT of about 5500K. The higher the value, the more blue or “cool” the light appears. (See Figure 6-19, from IES RP-8-18.)

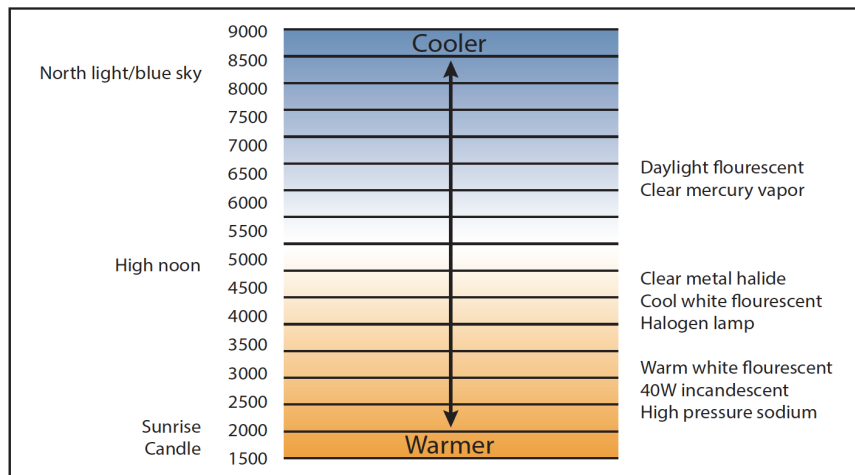


Figure 6-19. Correlated color temperature chart.

Follow Up Information – After Meeting

Has the Historic Design Review Board (HDRB) approved the street light conversion design?

According to the Land Use Planner Manager Nicole Ramirez-Thomas, the Historic Design Review Board has jurisdiction over outdoor lighting, but not street lighting.

Was there a method for determining where these poles went? Do trailer parks for example get as many as City thoroughfares? As areas have grown are street lights installed to keep up? If there is no strict protocol or procedure, there are areas within the City who will have been overlooked and existing poles won't exist. Thus, some assessment must be made to assure even distribution of street lights throughout all City neighborhoods.

How were light poles positioned originally?

1. Existing lights on main thoroughfares were largely designed and installed by NMDOT to meet specs (at the time) for those roadways.
2. Many if not most light poles in neighborhoods would have been designed and built by private developers according to City code and development plans approved by Land Use. I do not know if the City code has different street lighting guidelines for mobile home parks vs. other types of neighborhoods.

This project is the first step of getting our street lights understood and in order. We expect there will be subsequent efforts to improve lighting in neighborhoods where it is insufficient. We are also looking into the areas where HOAs are currently responsible for streetlights. In many of these areas, the lighting is not being maintained well and we want to understand how we can improve lighting in these neighborhoods.