Date Submitted:
April 21, 2021

TankoLighting

PROPOSAL TO THE CITY OF SACO, ME FOR REQUEST FOR PROPOSALS – STREET LIGHT CONVERSION

Submitted by:

Jason Tanko
Chief Executive Officer
Tanko Streetlighting, Inc.
220 Bayshore Boulevard
San Francisco, CA 94124
jason@tankolighting.com

Submitted to:

Patrick Fox
Public Works Director
City of Saco
15 Phillips Spring Rd.
Saco, ME 04072
PFox@sacomaine.org

2. TABLE OF CONTENTS

1. Title Page 1
2. Table of Contents 2
3. Letter 3
4. Proposed Scope of Services & Project Approach 5
Scope of Services 5
5. Product Description & Specifications 24
6. Project Completion Timeline 26
7. List of Key Personnel 27
8. References 29
9. Past Experiences 30
10. Capabilities & Customer Service Information 31
11. Cost of Services 34
12. Payment Terms 35
13. Appendices 35
Appendix A – Bidder Information Form 35
Appendix B – Statement of Compliance/Deviations Form 35
Appendix C – Resumes of Key Personnel 35
Appendix D – Bidding Sheet 35
Appendix E – Schedule of Prices 35
Appendix F – Bid Addendum Acknowledgement Form 35
Appendix G – Product Technical Specifications 35
Appendix H – List of Projects and Letters of Recommendation 35

3. LETTER

This letter should briefly state the firm's understanding of the scope of services to be done and give details of anticipated project approach. Should be no more than two pages.

April 21, 2021

Patrick Fox
Public Works Director
City of Saco
15 Phillips Spring Rd.
Saco, ME 04072
PFox@sacomaine.org

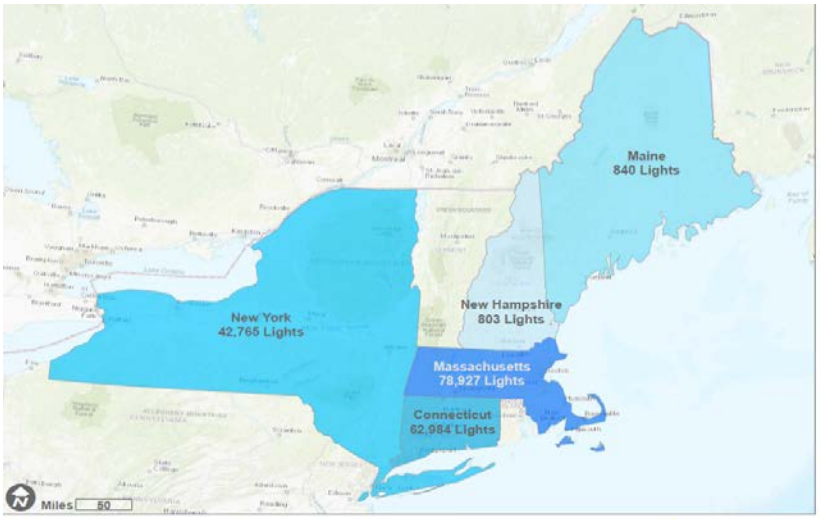
Dear Mr. Fox,

Tanko Streetlighting, Inc. ("Tanko Lighting") appreciates the opportunity to submit this proposal in response to the City of Saco's Request for Proposals (RFP) for Street Light Conversion. We are in receipt of the RFP documents. Please find our completed required forms in the Appendices section.

Tanko Lighting understands that City is seeking to partner with a firm that can assist with acquisition of the utility-owned streetlights in the City, as well as the implementation of an LED streetlight conversion within it, including an audit, design, project management, materials procurement, logistics management, installation coordination, rate change services, and commissioning services. We believe that our firm is the most qualified partner to assist the City with these services.

Tanko Lighting is a national firm focused solely providing professional services for municipal streetlighting projects, with an emphasis on cost-saving and energy efficiency measures. Our company has previously been or is currently involved with the energy efficiency conversion of more than 585,000 streetlights throughout the nation – and is actively developing projects for an additional 550,000 streetlight fixtures. Our work has spanned more than twenty-three states, and fifty-five utilities.

With a satellite office in Portland, ME, we have been actively working on similar projects with several municipalities in the region, including for the Cities of Brewer, ME and Orono, ME. Further, throughout the Northeast region, our experience with similar projects is unsurpassed – having been involved with more than 91 municipalities, representing more than 186,319 streetlight fixtures. This experience enables our team to appropriately translate technical information, market context, and industry standards into appropriate, high quality and cost-effective projects for our customers.



Tanko Street Light Projects - Northeast Region
Total Lights Contracted: 186,319

Our turn-key projects follow a similar process of project implementation, which includes an initial project development phase, when the existing inventory is collected, analyzed, acquisition assistance, and a proper design of replacement LED fixtures is developed. Once the City approves the design, we determine financing options, procure approved material, conduct the pre-construction meeting, generate installation maps, develop public messaging, and commence installation with ongoing daily data updates. The final phase involves our team managing the commissioning and punch list process,

preparing final as-built deliverables (including final GIS records), and final reporting. The final phase also often involves optional ongoing maintenance services. It is important to note that this is a well-developed process that has been proven successful in hundreds of municipal projects nationwide.

Our approach to this project includes the following tasks:

1 Investment Grade Audit
2 Data Reconciliation
3 Acquisition Assistance
4 Design
5 Financing Options
6 Financial Analysis
7 Technology Procurement
8 Community Outreach
9 Logistics Management
10 Installation
11 Commissioning
12 Tariff Change
13 Final Reporting
14 Maintenance (Optional)
15 Alt Bid: Equitable Streetlight Plan

Our team is highly capable of devoting its expertise – derived from years of working in hundreds of similar projects nationally – to ensure this project's success. Some of our team's strengths include:

- **Knowledge of Industry Standards**: Our technical understanding of streetlight systems nationwide results in a thorough knowledge base of industry standards – which will be helpful context for this project.
- **Proven Data Collection**: Our standard process of collecting comprehensive data (a minimum of thirty pieces of data) at every streetlight location not only provides clients with ample understanding of existing conditions, but equips them with the ability to proceed with subsequent projects on the system in a streamlined manner because they have an accurate blueprint of the existing system.
- **Field Measurements**: Field measurement collection, including photopic and scotopic light measurements, is a routine element of our data collection processes and our team has mastered not only how to accurately capture the data in the field, but also how to interpret the data, compare it to industry standards, and develop actionable recommendations.
- **Over/Under Lit Areas**: Over and under lit areas are always a consideration in our projects. We understand the fine balance between ensuring public safety while minimizing public complaints and backlash.
- **Financial Analyses**: Financial analyses of the cost/benefits of streetlight projects are involved in all our projects. We know that future plans and budgets depend on reliable financial analysis and therefore clearly outline our assumptions, methodologies, and recommendations in our financial reports.

Our team will leverage our expertise to provide the necessary context and value to assist the City with all the support, recommendations and coordination necessary to ensure the success of this project. Please let us know should you have any questions. We look forward to your feedback.

Regards,

Jason Tanko, CEO
Enclosures

Why Tanko Lighting?

- Sole Focus on Municipal Streetlighting
- 585,000+ Streetlights in Contract
- 323,500+ Streetlight Fixture Acquisitions
- 45,000+ Fixtures Maintained
- 155+ Nationwide Projects

4. PROPOSED SCOPE OF SERVICES & PROJECT APPROACH

Clear information about how the project will be undertaken.

Tanko Lighting's proven approach to municipal streetlight acquisition and LED conversion projects is comprehensive and data-driven, which results in accurate and efficient project implementation. The foundation of our project management approach is data. From Global Positioning System (GPS) location coordinates to fixture wattages, accurate data collection and data management is the backbone from which our methodology stems. Our Geographic Information System (GIS) and data expertise lead to accurate existing inventory characteristics and quantities, as well as granular design, precise material procurement, organized installation maps, and efficient installations. Having in-house experts in GIS streetlighting enables our team to provide superior service and unparalleled quality control on all projects. Ultimately, this results in minimized project delays (which translates into more expedient energy savings) and stabilized job costing by virtually eliminating change orders for our clients.

Our GIS audit is the backbone of the project – as the precise data enables accuracy throughout all phases.

Our turn-key projects follow a similar process of project implementation, which includes an initial project development phase, when the existing inventory is collected, analyzed, a proper design of replacement LED fixtures is developed, and we provide acquisition assistance. Once the City approves the design, we implement a second phase, when we determine financing options, procure approved material, conduct the pre-construction meeting, generate installation maps, develop public messaging, and commence installation with ongoing daily data updates. The final phase involves our team managing the commissioning and punch list process, preparing final as-built deliverables (including final GIS records), and final reporting. The final phase also often involves optional ongoing maintenance services. Please see the graphic below where this process is outlined. It is important to note that this is a well-developed process that has been proven successful in hundreds of municipal projects nationwide.

Tanko Standard Turn-Key LED Conversion

Scope of Services

Based on our extensive experience with successful projects similar to the City's, we propose the following scope of services for this project.

Task 1: Investment Grade Audit

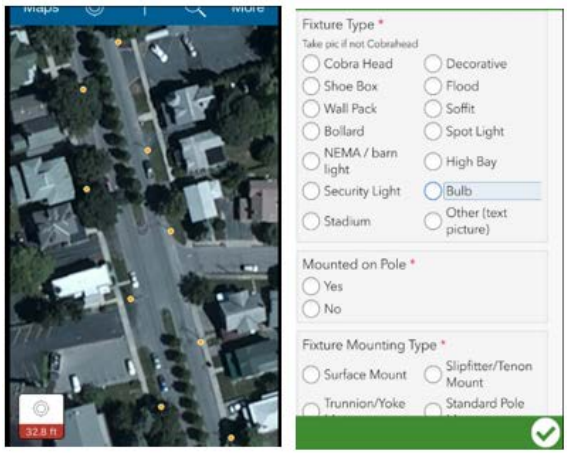
In our experience, a proper GIS audit is essential to equipping the client with a comprehensive and accurate understanding of its existing infrastructure. The GIS audit is pivotal, as the data collected positions the municipality or its contractor to effectively maintain the system, as well as manage any system upgrades, such as LED conversion, which requires detailed field data to properly design and install.

Our data-driven approach to project implementation has defined our success. Our auditors collect more than thirty fields of data per streetlight fixture to ensure that after the ownership transfer, the same data set can be used to create an LED streetlight design customized to our clients' needs and tailored to each streetlight's unique location.

Our approach to the audit is an in-field strategy that poses the following advantages:

- Our initial audit has a 98% accuracy rate. Since we identify and rectify any missing data or errors, our final error rate is significantly less than 1% - which is further rectified during the installation and final commissioning phases of a project.
- Deploying trained auditors to the field at the onset of the project enables our team to obtain the most definitive, up-to-date data set possible. While we supplement our field data with digital data sources (e.g., aerial imagery, street-level imagery, and municipal/utility inventories), the integrity of our audit is never dependent on the age or accuracy of available digital data sources.
- Our in-field approach provides the greatest accuracy and access to the pole and fixture. In person, we can identify potential safety issues, such as leaning poles or structural damage to the pole/arm/fixture. We can also verify pole numbers/labels and confirm any locations where numbers/labels are damaged or missing. This in-person verification of pole labels and exact locations is also invaluable in reconciling the utility billing inventory with what we find in the field (see Task 2).
- Comprehensive access to the pole and fixture allows for a more conscientious design. Because our team collects so much information that can only be gathered in person (e.g., fixture wattage, various height/distance measurements of the light and street, and factors that inform lighting levels and distribution patterns), we can create a highly-customized design tailored to a city's specific lighting needs – and identify any concerns from the project start.

Auditor Data Collection Screens



Our GIS auditing team uses dedicated tools, refined over hundreds of similar streetlighting projects, to ensure the accuracy of the data collection.

- Knowing exactly what assets are in the field, as well as the current condition of those assets, enables us to identify which assets are eligible for purchase and determine a fair valuation of the lighting system.
- Collecting data in person gives our team the highest possible certainty of what is in the field. This precision means that when the municipality moves forward with an LED conversion or other system-wide updates, the municipality is able to budget and procure for exactly what is in the field - money is not wasted on over-ordering, nor is project completion delayed by under-ordering. This precision also minimizes sloppy design (and inherent lower energy savings) – which are more likely from a subcontracted audit – something that our team never does because we use in-house professional staff to conduct each audit.

The preparation phase for the audit will involve the following activities that are critical to the accuracy of the data collection:

- Tanko Lighting working with City staff to clearly define audit scope, including priority areas, municipal boundaries, and any areas outside the right-of-way that should be included.
- Our team developing and providing to City staff a list of the attributes that will be collected at each streetlight during the audit.
- City staff providing our team with all available City and utility records for streetlights.
- Our team reviewing these data records to determine which should be utilized for the data reconciliation phase.
- Our team developing audit maps, scheduling, and dispatching auditors to the field.

Once the preparation phase is complete, the audit will commence. We will collect data on all of the existing inventory and identify attributes on-site, including:

Sample Audit Attributes

- Global Positioning Service (GPS) coordinates (latitude, longitude) of each fixture location and date of capture
- Fixture type
- Lamp type and wattage
- Pole material, mounting height, and arm length
- Pole ID number
- Street width and configuration (e.g. intersection, crosswalk, cul-de-sac)
- Electrical feed (overhead, underground)
- Visible issues (e.g. pole leaning, fixture damage, tree obstruction)

Our auditors collect and transmit data points daily. We will compile data weekly to provide the City with a Weekly Audit Report (a sample can be provided upon request). The Weekly Audit Report will enable the City to identify and address any immediate safety concerns, as well as other issues – such as tree trimming – that may need attention prior to future maintenance or LED conversion.

Unlike other potential providers, Tanko Lighting is an industry expert focused solely on streetlighting. We have built our own in-house data team with the right blend of both streetlighting technical expertise and data analysis skills to collect and reconcile accurate project data (note that we never subcontract out the audit or data services – even when it would result in higher profits for our firm – because we so adamantly believe that controlling the data knowledge base and quality internally is the utmost priority). Further, our field auditors have accurately collected data on hundreds of thousands of streetlight fixtures nationwide – ensuring that the City's audit will be conducted by highly qualified professionals with tremendous experience. This renders Tanko Lighting as the most qualified to perform the GIS audit, as our staff is significantly experienced in the nuances and characteristics of all streetlight configurations.

> "At Graybar, we have worked with ESCOs around the country and there is no organization that is as professional, meticulous, and efficient as Tanko Lighting. We have serviced over 300,000 streetlights with Tanko Lighting and have had ZERO returns. Their audit is far more comprehensive than any other audits we have seen in the marketplace and allows for municipalities to have a true grasp on their lighting system. Utilizing Tanko Lighting ensures that the job will be completed on schedule and all parties involved will be well informed. There is no organization that can implement a streetlighting solution the way that Tanko Lighting can."
>
> Kristian Reyes, Manager
> Lighting and PowerSmart Solutions
> Graybar

Deliverables:

- Audit Report: An overview map listing the locations completed during the data collection phase, along with a description of any issues that the City or utility would need to devote immediate attention to.

Task 2: Data Reconciliation

We have developed a methodology to capture every streetlight asset owned by and/or billed to a municipality. Using precise GPS technology and expert streetlighting GIS Analysts, our team reconciles every asset it locates in the field with each record in the utility's billing inventory to ensure that all assets eligible for acquisition have been identified. In our team's experience, cross referencing these various data sources results in extremely precise and clean data. Projects typically have a utility billing discrepancy of approximately 5 – 10 percent of the inventory quantity, which can result in municipalities being over-billed by their utility. Any such

discrepancies will be identified during this phase of the project, included in a data reconciliation report to the City, and taken into account during negotiations with the utility on the City's behalf.

The data reconciliation report will include the following items:

- Analysis of locations confirmed during the audit
- Analysis of locations appearing in the utility records but not in the confirmed audit records
- Analysis of locations confirmed in the audit records but not in the utility records

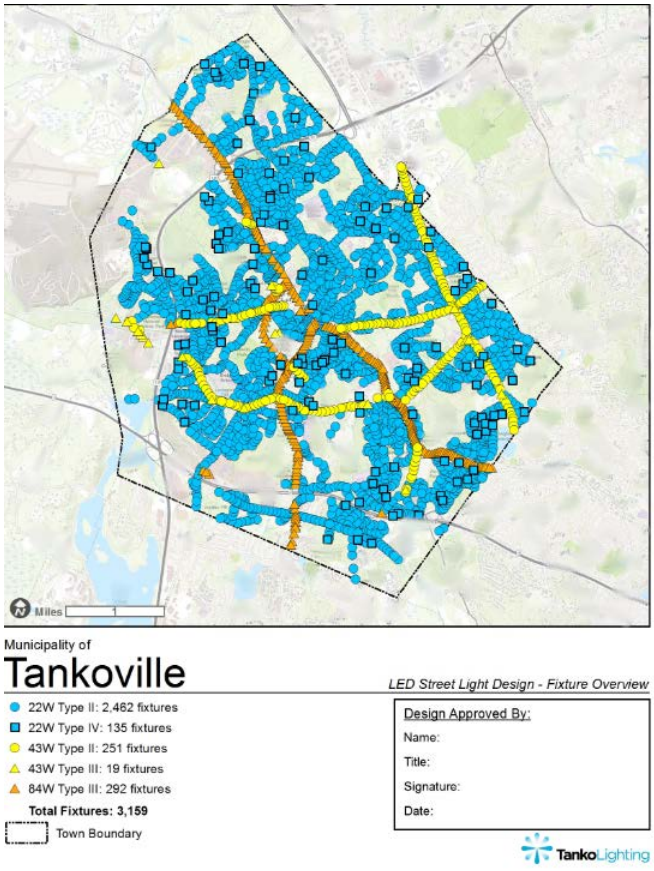
Deliverables:

- Reconciliation Report: A concise report detailing any discrepancies found between field data and utility billing records, as well as where records tied out cleanly. Note that any locations where discrepancies exist will not be included in the design phase. Further, addressing these discrepancy locations with the utility will occur during the installation phase of the project.
- Audit Data: Record of fixtures found in the field audit and their associated attributes, to be provided in geodatabase, shapefile, or spreadsheet form (this deliverable will be provided at the end of the entire project).

Task 3: Acquisition Assistance

Our team is well-versed in the process of assisting municipalities nationwide with acquiring their streetlight assets from their utilities. (For more specific information on our experience, please see the Acquisition of Streetlights section, below.) Our team will leverage its expertise to assist the City with developing and documenting an independent initial assessment of valuation based on the audit data, as well as information provided by the City and its utility. This process will entail determining fair market value by analyzing the audit data to determine key elements of existing field conditions (such as vintage of the system, pole types, etc.), comparing regional acquisition data to provide valuation context from other neighboring jurisdictions, and then reviewing the streetlighting "buyout" costs identified by the utility to be charged to the City. Once a fair market valuation has been determined, our team will assist the City in negotiations with its utility to complete the purchase of the remaining system. Should a more robust scope of acquisition assistance be necessary, we can provide an additional scope of work and pricing upon request.

Figure 1: Our Municipal Overview Map shows an entire municipality with recommended replacement fixtures.



Deliverables:

- Valuation Analysis: Written feedback analyzing the utility's valuation of the City's streetlight system.

Task 4: Design

In our experience, a comprehensive LED streetlight conversion project is the ideal opportunity for a municipality to reassess its entire streetlighting design and ensure that it has been optimized for existing field conditions. To achieve this, our team routinely conducts municipal-wide design processes for each of its turn-key streetlighting projects. Recent projects in which design processes were implemented include Orono, ME, Brewer, ME, Simi Valley, CA, La Verne, CA, Santa Clarita, CA, Chino Hills, CA, Fullerton, CA, Vernon, CT, Malden, MA, Bristol, CT, and Norwich, CT. This experience has led to our team's streamlined approach to design.

Once our team has canvassed the City through the audit and established a "clean" data set of the existing conditions via the data reconciliation process, we can then develop and apply a replacement design. Our team utilizes Illuminating Engineering Society (IES) RP-8-18 standards for roadways and right of ways. Additionally, we utilize Trade Manual 12-12 for direction on light level equivalencies between HPS and LED and maintain a working knowledge of all the latest publications and updates in the market. However, there are

many instances when municipal customers need to alter these standards to best meet their specific needs. Thus, our team uses these types of industry accepted standards as guidelines and works closely with the City to develop customized proposed standards of comfort and functionality that match its needs.

Our goal will be to provide the City with an appropriate replacement design that includes the brand of fixture, photocell, replacement wattages, color temperatures, distribution patterns and other appropriate settings and options to optimize the LED streetlight retrofit. The design will ultimately result in a replacement plan (see Figure 1) for all existing streetlights that includes photometric data, lifecycle cost analysis (including the initial capital outlay), net present value and return on investment, energy savings, as well as maps of the replacement plan.

In our experience, a critical initial step in proper design involves photometric analysis – which is an examination of the distribution or "spread" of light from the fixture onto the ground. Whereas a typical High Pressure Sodium (HPS) fixture indiscriminately throws the light in all directions, a typical LED fixture pinpoints the light spread to where it is needed most – on the roadway (see Figure 2).

Figure 2: Examples of the different light distribution patterns from an HPS fixture (top) vs. an LED fixture (bottom).

Given that an LED streetlight conversion is a significant investment, ensuring that the replacement LED fixtures properly distribute the light is imperative before the installation phase begins. The only way to confirm that the LED replacement fixtures improve the existing conditions is to model the light spread of the existing and replacement fixtures.

Tanko Lighting is seasoned in this type of modeling. Our proven process involves both theoretical photometrics modeling (demonstrating the light distribution from an aerial perspective at the fixture location), as well as photopic (which measures the light that the cones of the eyes typically perceive) and scotopic (which measures the light that the rods of the eyes typically perceive) field measurements obtained from directly under the fixture and at varying distances to the sides of and across the street from the fixture. The results from these models portray the most accurate existing and replacement conditions that verify that the replacement LED fixtures will improve the system.

Our approach to comprehensive design typically includes the following elements:

- Developing typical photometric layouts based on assumptions, including wattage, distribution type, pole height, spacing etc.
- Organizing the streetlight infrastructure by roadway classifications (such a residential, collector and arterial) and conducting a minimum of three theoretic photometric layouts (representing the aforementioned roadway classifications) for replacement fixtures of the City's preferred fixture brands and lines. Developing theoretic photometric layouts for one typical existing fixture per main roadway classification (one for residential, one for collector and one for arterial) to demonstrate baseline conditions and utilize as a point of comparison to the photometric layouts for replacement fixtures.
- Applying standard LED replacement wattage recommendations based on the location of each existing HPS fixture.
- Addressing distribution pattern needs for the specific roadway types and neighborhood characteristics (such as cul-de-sac locations) to ensure a tight light distribution pattern and minimize backlighting.
- Conferring with the City's safety coordinators and police officers to solicit feedback on areas that are currently over- or under-lit and are public safety concerns.
- Selecting appropriate wattages and distribution types for replacement fixtures to meet the City's needs, while maintaining the objective of providing a simplified design that standardizes inventory (so that the system has consistency and can be more easily maintained over time).

- Applying the City's preferred products, typical models and special considerations to its GIS inventory to produce maps of the type and wattages by location (see Figure 1), as well as an analysis of the total cost, incentives, savings, and payback for the potential retrofit design.
- Presenting the options and total cost/incentives/savings/payback to the City and obtain its final approval on design.

Our team will guide the City through how to interpret the photometrics, reviewing how the results indicate the products' spread of light, the distances the fixtures reach, how much back light is present, how much light is distributed directly under the fixture, and the general containment of light in the road/right-of-way. The interpretation of the photometrics data will enable the City to confidently choose a fixture that meets its preferences.

The overall benefits to Tanko Lighting's design approach include:

Benefits to our Design Approach

Standardization – The City is ensured that there is a consistent design method resulting in wattage continuity on its streets. Standardization also leads to a reduction in the variety of fixtures that the City must keep in its inventory

Safety – Based on the most updated field conditions, the City can be assured that the design matches the system's current needs and results in improved public safety from streets no longer being under- or over-lit

Efficiency – The process takes a very thorough approach by examining all relevant field factors and thereby maximizes the available savings by utilizing the most efficient design, while meeting light output needs

Streamlined Installation – The process allows for the development of a detailed scope of work (via a map of all replacements) by fixture for the installers to follow in the field – which enables proactive and efficient inventory tracking, route planning, and materials preparation at the start of each work day

Deliverables:

- Replacement Plan Maps: City-wide maps with recommended LED replacement wattages for the City to review and approve.

Our project in Orono, ME

Task 5: Financing Options

Our team has worked on numerous contracts in which it facilitated project financing for municipal streetlighting projects, including both public and private financing. We have assisted municipalities by providing an investment grade audit, determining project costs, life cycle costs, savings models, grant options and payback schedules, as well as directly coordinating with the financing entity and the municipality, providing documentation, and reporting about project progress to the financing entity.

The industry standard for financing municipal turn-key streetlight conversion projects is typically through either a public bond or private financing. Our financing options are all compliant with the most current GAAP accounting regulations.

Our team facilitates private financing through third party entities (such as Graybar Financial Services, GE Government Finance, TCF Equipment Financing, and Banc of America Public Capital Corp, etc.), which typically offer low-interest, financing that includes all costs related to the project, which are repaid through the

project's savings. Our team will leverage its experience to identify and assist with coordinating financing for the project. It should be noted that our team is neutral when it comes to financing options – we have nothing to gain from any of the partners or offers that we help to facilitate – which means that our company has no ulterior motives.

Deliverables

- Financing Assistance: Every city is different, and all cities have varying sensitivities to debt and the management of asset depreciation. Our team will deliver financing options that meet the City's individual needs at the most competitive price possible with consideration to debt and financial reporting.

Our project in Brewer, ME

Task 6: Financial Analysis

Tanko Lighting will utilize the reconciled data from the audit, as well as the City's preferences on fixtures, and/or other products, to develop a financial analysis, which will include:

- Baseline energy use, energy cost and operations and maintenance costs
- Estimated retrofit energy use and operations and maintenance costs
- Estimated sources of funding, including rebates
- Calculation of estimated total conversion cost (remaining design tasks, product, and installation), energy reduction, and simple payback
- Fixed unit pricing encompassing all costs that locks in the pricing and minimizes change orders
- Estimated twenty-year projected savings and cash flows

Our approach uses industry standards, published rates and operational hours, as well as conservative estimates on energy rate increases, savings and costs, which enables greater actual savings than the model. These elements – in conjunction with the fact that streetlight energy efficiency measures are not subject to the behavioral, weather, and other factors that can result in shifts in expected savings – enable minimal risk and maximized return for the City. Based on our experience, the projected energy savings associated with streetlighting measures are in line with (or are often understated compared with) realized energy savings upon completion of the project. Because the use of the streetlight facilities is constant, elaborate verification approaches over time are not necessary and the City's utility bills are the best indicators of consistency of savings. Given that the rated life of all the LED fixtures that Tanko Lighting will recommend is greater than twenty years, as well as the consistency of the annual operating hours, the savings verified from the first-year utility bills will be consistent for the rated life of the fixtures – and will maximize return for the City for more than twenty years.

We will present the financial analysis to the City for final review of all energy savings and construction cost estimates to ensure accuracy and compliance.

Deliverables:

- Financial Analysis: A report outlining baseline conditions, as well as estimated project costs and savings.

Task 7: Technology Procurement

Fixtures

Tanko Lighting is uniquely positioned for this project in that we have worked with a wide variety of products across multiple manufacturers – in fact, no one in the market has worked with a broader set of brands than our team, and all the major manufacturers have projects with us. This extensive experience enables our team with an understanding of the best products currently available in the market and which manufacturers are leading the industry with innovative products.

We employ a neutral approach to products and work with all major manufacturers.

As a full-service, solutions-based company focused on customer satisfaction, we strive to ensure that our customers obtain the products they desire, regardless of the type or brand. Thus, we employ a neutral approach to products – our team specifies the highest quality, energy efficient fixtures to meet each customer's unique needs – regardless of brand. This allows an approach that considers the City's preferences and needs devoid of any ulterior motives. (It should be noted that Tanko Lighting's product expertise and project experience extends beyond just LED cobra head fixture replacements, but also includes conversions of decorative fixtures, outdoor area lighting, parking facility lighting, and lighting controls.) Given that technology advances rapidly, our team is constantly reviewing the marketplace to track new and/or enhanced product lines that could be beneficial to our clients – which means that our brand and product recommendations never remain static but evolve as available products in the industry evolve.

Further, our national reach translates into an unequaled level of exposure to a variety of products. Familiarity with how various products are deployed in different regions – including in extreme weather conditions (such as extreme heat, snow, coastal climates with high salt exposure, etc.) – is essential to our team's understanding of the quality and longevity of streetlight brands and products.

> "Any concerns I had with Tanko's ability to perform their duties because they are based out of California were quickly eliminated through their ability to effectively work with multiple vendors."
>
> James A. Duggan
> Town Manager
> Town of Dracut, MA

For this bid, we are recommending products from two different brands to give the City an initial array of product options. These recommended brands include Cooper and GE, because they each have a long history (100 years +) of successful streetlight manufacturing, are financially robust to consistently support any warranty needs, and we have had good working experiences with these brands. Each of these products also includes a ten-year warranty, are cut-off/traditional cobra head styles, meet the City's requirements for color temperatures, and are equipped with a 7-pin NEMA photocell receptacle. Please find more information in the Product Description & Specifications section below, as well as product specifications for these proposed fixtures in Appendix G, and note that we are providing pricing for each brand in Appendix E.

Despite the fact that we are providing initial product recommendations, we will still provide the City with a comprehensive process to determine the brand that will best meet its needs. Our approach to this process includes the following elements:

- Needs Assessment: Our team will conduct initial conversations with the City to assess its current knowledge of nuances, options and available products – as well as any brand/product preferences and specific needs it may have. Our team has developed a list of specific questions that it will present to the City during the discussions (e.g., cost as a weighted priority and/or fixture specification, and/or twenty-year savings, etc.). We have also developed a matrix of comparative product information by major product brands – which will be presented to the City for review and will enhance the City's ability to make an informed decision on product options.
- Product Recommendations: Equipped with input from the City, we will explore the marketplace for available products that meet the City's needs/interests, and will recommend fixture brands with the following elements considered:
    - Fixture Efficiency: The efficiency of a streetlight fixture is measured by how many lumens-per-watt the fixture utilizes – which is like how a car's efficiency is measured by miles per gallon. When the lumens-per-watt ratio is maximized, this translates into higher long-term savings and maximizes the municipality's potential rebates. When evaluating potential products, our team prioritizes fixture efficiency as one of the highest magnitudes and will include this measurement in our recommendations.
    - Light Distribution: The ability of the fixture to appropriately distribute light directly to the roadway is crucial – because light trespass is one of the most common citizen complaints and needlessly wastes energy. We will explain this concept to the City and how it translates into photometric performance.
    - Country of Origin: Where a streetlight fixture is made often is an indicator of the product's quality. We will outline this element in our recommendations, and highlight any products made in the US and/or North America.
    - Fixture Flexibility: There are a variety of options, such as dimmable drivers, color temperature, shields, distribution types, available wattage burn options (e.g., to dial up/down the wattage consumed), Smart City and Internet-of-Things (IoT) options, controls, and other adders that need to be considered when selecting brands and products. We have experience with these elements across a variety of brands and will provide product recommendations that maximize the products' cost-effective

flexibility and available options. Further, our team will ensure that the City is aware of the options that might impact its ability to use the required seven-pin receptacle with wireless/smart controls for dimming in the future.

- Product Quality: Our team will focus on quality brands and products that have Design Lights Consortium (DLC) listings, high quantities of installations throughout the nation, and superb brand reputation (including proven longevity and a history of high-quality streetlight manufacturing – including pre-LED technologies).
- Cost: We are cognizant that taxpayer dollars are invested in municipal streetlight projects and thus strive to recommend products that are the most cost-effective as possible. We will consider cost of the products as a parameter in our recommendations to the City, as well as the long-term lifetime costs and savings of each recommendation (as some fixtures may have a slightly higher upfront cost but will last longer and are also more efficient and thus save far more than a less expensive fixture over the lifetime of the fixture).

Our project in North Stratford, NH

- Historical Performance & Longevity: Our team will ensure that the product options include reputable manufacturers with longevity in the market and will provide information to the City about how long the manufacturer has been operating, its financial strength, and how tested and proven its products are. This will reduce warranty risks and confirm quality of the products.

Our approach to product education and eventual technology selection and procurement is rooted in the initial needs assessment. We work with the City each step of the way to ensure that the choice is its. This includes providing a list of questions that the City should ask, as well as walking the City through each option and the pros and cons. Further, given our team's extensive experience, we can also provide other municipal contacts from completed installations with a variety of product brands for the City to connect to if it has any specific questions about in-field performance. It is because of this that our system not only helps the City make a decision, but specifically guides it to make an informed decision.

Deliverables:

- Recommended Product Submittals: Technical specification submittal sheets for recommended products.

Figure 3: Examples of our projects involving controls.

Project	Installed Controls	Controls Brand	Year Installed
Rancho Cucamonga	1,230	Echelon	2017
Leominster, MA	3,500	Echelon	2017
Ayer, MA	500	Cimcon	2018
Weymouth, MA	4,000	Cimcon	2019
Medford, MA	4,900	Cimcon	2019
Clinton, MA	830	Cimcon	2019
Manchester-By-The Sea, MA	450	Cimcon	2019
Dracut, MA	1,500	Cimcon	2018
Sunnyvale, CA	5,750	Echelon	2018
Kaua'i, HI	3,700	GE LightGrid	2017
Corona, CA	11,600	GE LightGrid	2018
Saugus, MA	2,700	Cimcon	2020
Spencer, MA	770	Cimcon	2020
Billerica, MA	65	Cimcon	2020
Bridgewater, MA	1,175	Cimcon	2020
Grafton, MA	780	Cimcon	2020
Lawrence Berkeley National Laboratory, Berkeley, CA	300	Osram	2021 (pending)

Smart Controls, IoT, and other Smart City Solutions

Smart controls can offer many benefits to cities, including asset management, increased fixture life (due to dimming), and more control over the streetlight system. They are not always the correct choice for each community, however, and the project managers at Tanko Lighting like to have a discussion with each client to see if it is the right move for each community. To date, our team has managed the installation of seventeen streetlighting projects that included smart controls systems from a variety of manufacturers (see Figure 3 for more details), as well as additional projects with a variety of other smart controls on the streetlight system, such as roadway temperature monitor systems (Spencer, MA, and Saugus, MA), air quality sensors (Saugus, MA), noise level sensors (Saugus, MA), and traffic analytics (Grafton, MA). Our team feels confident that it can help the City make an informed decision about whether controls are right for it, and if so, which manufacturer(s) offers the benefits the communities need, as well as how best to implement the technology.

For this project, we are recommending a variety of controls from Ubicquia. Please find more information in the Product Description & Specifications section below, as well as product specifications for these proposed products in Appendix G, and find pricing for these in our Service Enhancements section of Appendix E.

Although the use of adaptive controls, Smart City and IoT technologies are not yet industry standard, our team has been involved in several projects where such elements have been utilized and can leverage this experience to assist with this project if the City feels compelled to explore it.

> "A member of Tanko's team was always very responsive to any of our needs. They managed the project very well so that I could take a hands-off approach and not worry if the project was progressing."
>
> Doug Willardson
> Town Administrator
> Town of Webster, MA

Deliverables:

- Recommended Product Submittals: Technical specification submittal sheets for recommended products.

Task 8: Community Outreach & Notification

We believe that proper coordination of information and outreach to stakeholders is an essential part of ensuring a successful streetlight conversion project. To that end, our team will coordinate with the City's media office to help develop a community outreach and notification plan prior to the commencement of any project activities. The plan will ensure project awareness and minimize public disturbance. Specifically, our team will develop the message and provide the schedule to the City's media staff for distribution through the City's existing media outlets (press releases, website, etc.).

Deliverables:

- Stakeholder Outreach Materials: Specific language, draft press release, and timelines related to project activities to assist with notifying community members of the project.

Task 9: Logistics Management

We will ensure that all logistics are carefully coordinated for the project. Our team will work with the City's main point of contact to develop an installation plan that minimizes inconvenience to the City and includes ordering schedules, traffic control plan, waste disposal procedures (that comply with all applicable State and Federal laws), and installation and commissioning schedules as required to the City.

Our team is very familiar with the traffic control needs of a municipal streetlight conversion project, as traffic control is an element of virtually every one of our projects. Given that a streetlight conversion project is a mobile operation requiring just a few minutes of work at each location, it can easily be likened to the same traffic control needs as the typical trash collection service in a city. As such, we will work closely with the City during the Logistics Management phase to confirm the traffic control plan that will seamlessly maintaining safe traffic conditions. Please note that we do not anticipate any police protection needs for this project, and while we have included standard traffic control in our proposed pricing, we have not included any costs for police protection.

We will maintain proper communication and coordination with installers to ensure installation quality, work and public safety, compliance with project schedule and proper handling of waste. Our team will facilitate a pre-construction Kick-Off meeting with City staff and installers to review the traffic control plans, work safety, public safety and waste material handling procedures and requirements prior to the start of installation. We will also coordinate and participate in bi-weekly progress meetings with City staff.

Our project in Newbury, MA

Deliverables:

- Logistics Management Details: Ordering, traffic control plans, required permits, disposal strategy, pre-construction meeting, ongoing meetings, installation and commissioning schedules.

Task 10: Installation

We routinely partner with subcontractors for installation for our turn-key municipal streetlighting projects. We believe that this is an ideal way to utilize local knowledge and leverage taxpayer dollars back to the local economy. As such, we are very familiar with how to properly solicit, vet and manage qualified local subcontractors.

For this project, we will utilize Red Thread Spaces, LLC ("Red Thread") as our subcontractor for installation services. We have enjoyed a long and successful history working relationship with Red Thread on municipal streetlight conversion projects throughout the Northeast. As such, we will apply our proven collaborative model to this project.

Located in close proximity to the City – in Portland, ME, Red Thread is a professional and successful electrical contractor that has been doing business in and with the Northeast for more than thirty years. The firm currently holds Master Electrician License (#MS60018895) with the State of Maine's Department of Professional & Financial Regulation. It is an innovative firm focused on technology solutions for workplace and public environments. Red Thread's services include public infrastructure projects – which are significantly focused on municipal LED streetlight conversion projects.

Tanko Lighting will ensure that Red Thread utilizes highly-trained professionals, properly trained in and abiding by all company and industry safety standards. Red Thread is fully insured and will be responsible for meeting all federal, state and local codes and laws.

Red Thread will provide safety, installation, traffic control, and environmental disposal services for this project. Red Thread's efforts will be directed by a foreman, who will be responsible for all logistics and field installation, including safety and traffic control, and all management of field staff. Additionally, the foreman will be responsible for routine field inspections and quality control. Red Thread will provide all required safety equipment for the project.

It is expected that each installation crew will install an average of thirty fixtures per day. Completion of the project commissioning (see Commissioning section below) will coincide at the end of the installation phase to quickly address any errors, punch list items, or troubleshooting needs. Please see our installation schedule in the Project Completion Timeline section below.

Utilizing the data from the design process, we will develop installation maps (a sample can be provided upon request) and provide to installers and relevant City staff for accurate project tracking.

An additional feature of our approach is that our GPS data collection activities are integrated throughout project implementation – as a routine practice. We can stay intimately involved with the daily installation phase via our data collection protocols that are required of all installers. We will ensure that installers are equipped with handheld devices and train them in collecting relevant data on both the HPS fixtures being removed, as well as the LED fixtures being installed. Installers will be required to collect data at every location and transmit it *in real time* to Tanko Lighting. We can track each crew's daily progress via time-stamped data on every fixture location. This not only enables our team to know every location where each crew has been, it also allows us to track the routes that each crew has used and any inefficiencies in the process. We review this information daily, which allows us to provide immediate instruction to crews on any course corrections necessary. Our proven experience with managing installation crews through data collection activities routinely integrated into the installation phase ensures the accuracy and accountability of project partners.

If the City determines that pole labeling is a needed service, upon request, we can provide labeling for all fixtures or just a subset of fixtures missing labels. If a labeling strategy is of interest to the City, we will develop a scope of work based on the City's needs and an estimated additional cost for these services.

We track crew's progress via time-stamped data at every fixture location.

Please note that our team will be retrofitting the fixtures within an "as-is" system; however, we will not be responsible for remedying any "as-is" system needs/issues outside of the scope of this project (which is merely to retrofit the fixtures, install photocells, and provide first responder support for maintenance services). We will identify any "as-is" system needs/issues, including but not limited to no power, faulty fuses, 480V fixtures, series fixture wiring, poles in violation of any trespass/clear zones because of high voltage, poles in disrepair, etc. during the course of the LED conversion phase or during the maintenance services phase (see below) and report to the City. However, while we will work with the City to recommend solutions, the City will be responsible for the costs associated with implementing any such remedies.

We will be responsible for warranty work related only to materials and installation for a period of one year from the installation date. The installation warranty will cover fixture or photocell failure and issues related to the installation, such as incorrect mounting or wiring of fixture. The installation warranty will not cover issues unrelated to the installation, such as fuse failure, knockdowns, wire shorting, disconnection of the pole or arm from power source, weather related damage, vandalism, Acts of God, or unrelated capital work impacting the pole or fixture.

Our project in Ware, MA

Upon installation, the City or its standard maintenance contractor will be responsible to serve as first-responder to all outages, shall identify locations where warranty-related work is necessary, and will notify Tanko Lighting of the warranty-related locations so that a remedy can be implemented. If the City selects our team for its maintenance services (see optional Task 14 below), our team will serve as the first-responder and dispatch accordingly.

Deliverables:

- Installation Maps: Maps with locations and fixture information used to dispatch installation crews and allow City staff to track installation routes.
- Weekly Installation Report: A detailed listing of the locations completed during the installation phase, along with maps corresponding to locations.

Task 11: Commissioning

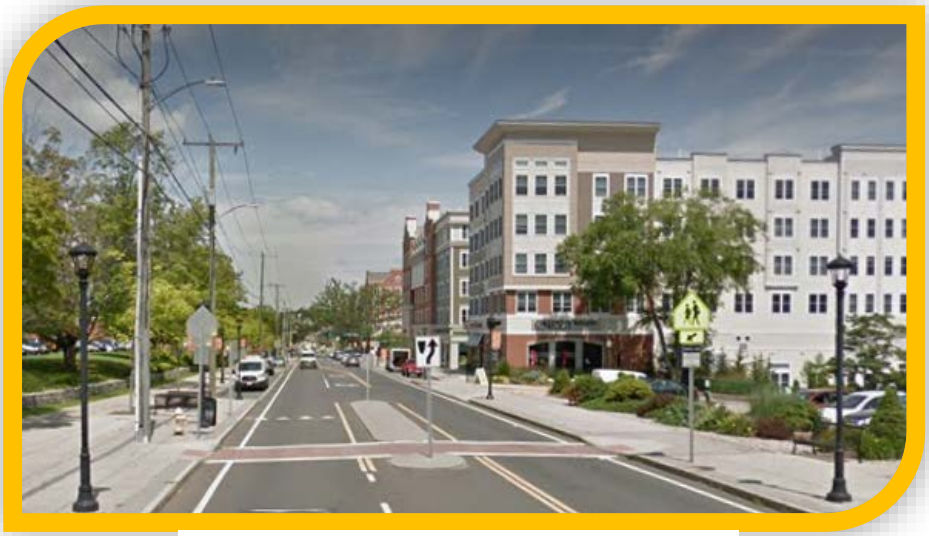
Given our significant focus on thorough data collection during both the audit and installation phases, approximately ninety-five percent of the commissioning efforts take place during the time of installation. This is because our team can quickly validate the installation data against the confirmed audit data (which is validated against City records during the Data Reconciliation phase) and accurately identify any locations where both data sets do not match. This ensures tremendous precision that establishes a finite subset of the installation locations that require additional review.

Upon completion of the installation, we will ensure that the installers perform final inspection on all fixtures, correct any "punch list" items, test lights to

ensure that they work, and identify locations where repair needs City assistance. Tanko Lighting will provide the City with a complete commissioning report outlining any errors and actions taken to correct errors.

Deliverables:

- Commissioning Report: Detailed analysis of final installation verification and testing, including an outline of any errors and actions taken to correct errors.



Our project in Mansfield, CT

Task 12: Tariff Change Coordination

Our team will ensure that the City receives the billing changes for which it is eligible. We will coordinate with the utility on changing tariffs to the newly-installed LED fixture rates. We will prepare the necessary documentation, submit to the utility, confirm the materials have been received and obtain the timing for the modification to be processed. If known, we will provide the contact information for the appropriate party addressing any rate changes for the City. Based on the timeframe provided by the utility, the City staff will need to confirm that the modification appears in the City utility bills. If there are any inquiries from the utility to the City regarding the submitted applications, we will assist the City with responding to any questions.

While we recognize that the City noted in its Addendum No. 2 that bidders would not be required to assist with rebates, we routinely provide this as part of our approach to turn-key projects and can assist with rebate applications at no extra cost, upon the City's request.

Deliverables:

- Tariff Change Documentation: A compilation of copies of paperwork submitted and processed with the utility regarding tariff changes.

Task 13: Final Reporting

A project is never completed until the final documentation and administrative requirements are met. We understand that proper follow through is essential to considering a project successfully executed. To that end, our team will coordinate all final reporting and data requirements to ensure that the City considers the project is compliant and complete. This includes finalizing the GIS layer with design and construction data and updating the analysis of gross cost, savings, incentives, net cost, and payback of finalized design, including any operation and maintenance of costs and savings. We will also provide contacts and the process whereby the City can obtain warranty support with the manufacturer(s) should it be necessary.

Deliverables:

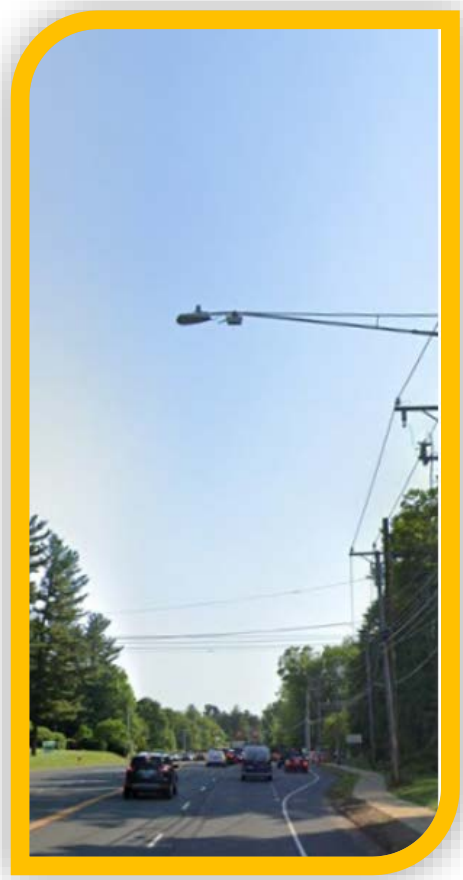
- Final Reporting Documentation: Final requirements necessary to process the available rebates and tariff changes with the City, as well as post-construction electronic GIS records for all newly-installed streetlights in the City, including all wattages, badge numbers, locations, and other associate attributes, and environmental disposal documentation.

Task 14: Ongoing Maintenance (Optional)

For more than a decade, Tanko Lighting has been providing municipalities with repair services, custom design support, material procurement, logistics management, and preventative maintenance for streetlight systems nationwide. Our team has successfully assisted other municipalities with recently-acquired systems in such places as Mansfield, CT, Groton, CT, Chester, CT, Berlin, CT, Meriden, CT, Vernon, CT, Wolcott, CT, Simi Valley, CA, Santa Clarita, CA, Rancho Cucamonga, CA, La Puente, CA Darien, CT, and East Lyme, CT. As a result, we are likely one of the only proposers with direct municipal streetlight maintenance coordination and installation.

Should the City be interested, we will develop both short (pre-LED conversion) and long-term (post-LED conversion) maintenance options for the City that will include:

- Routine Maintenance
- Emergency Repair Service
- Recommended Response Times
- Reporting and Tracking
- Contract Terms
- Pricing



Our maintenance project in Farmington, CT

Our approach to ongoing service and maintenance procedures is outlined below:

- Routine Maintenance: Routine maintenance will include all streetlight repairs that are communicated to our team by the close of any business day. We will respond to outage/repair calls from the City and/or residents and businesses and will provide a local or toll free telephone number, as well as a web portal for receipt of such reports. Our team will utilize a dispatch system that immediately notifies our local subcontractor of the service ticket via a proprietary text messaging, GIS mapping and application system. Our subcontractor will be responsible for servicing the location within seven business days of notification, weather permitting. To ensure timely repairs, our team will have readily available LED fixtures, and photocontrols/photocells that are routinely used for these repairs.
- Emergency Repair Service: In the event that the City determines it is necessary to perform any streetlight maintenance on an emergency basis, without waiting for normally scheduled maintenance, we will respond by dispatching a local on-call technician to provide an immediate response within two to four hours of the request.
- Reporting: Our maintenance approach is streamlined with our GIS software, such that service tickets and documentation of remedies can be directly imported into the City's GIS records. Thus, we will develop a report of any maintenance issues and results and routinely provide to the City.
- Contract Term: Tanko Lighting typically proposes a three-year contract term for maintenance services, followed by two, one-year renewals. This ensures the City that pricing is secure and consistent. However, we will also entertain other contract durations as suggested by the City and work with the City to finalize a contract term for maintenance services that is mutually agreeable.
- Pricing: Our pricing for maintenance services includes the following elements: a monthly per pole administration fee, which includes managing the website, call center and reporting services, and Time and Materials pricing for in-field dispatch for routine repairs and emergency services based on hourly rates.

We are likely one of the only proposers with direct municipal streetlight maintenance coordination and installation.

It should be noted that one critical path aspect to performing quality maintenance services is controlling and managing the data. Contractors who can remedy the service ticket in the field are plentiful; however, to properly coordinate the logistics and accurately report results to a city, an experienced streetlighting project manager with a healthy respect for data is needed. With its GIS software, baseline city GIS records from the LED conversion, and experience utilizing local subcontractors to respond to service tickets, our team is well-suited to directly maintain the City's streetlight system. Should the City be interested in our ongoing maintenance services, we can provide a full scope of work and pricing for various options upon request.

Task 15: Bid Alternate – Equitable Streetlight Plan (Optional)

We recognize that the City is interested in upgrading its existing streetlight system to LED through this project, but also future-proofing the system by developing a plan to offer equitable streetlight design throughout the City moving forward. We have extensive experience with this type of planning and routinely review over and/or under-lit areas in our clients' streetlight systems to determine how to optimize their systems. Our methodology to successfully complete the Equitable Streetlight Plan includes the following activities:

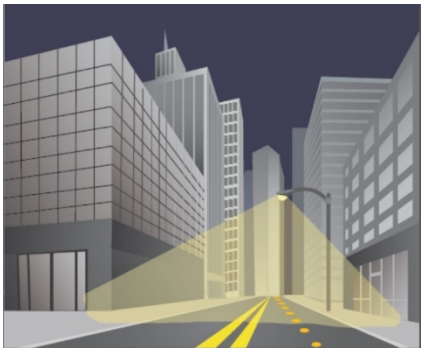
- Review Plans, Policies and Programs

  We will review and analyze City ordinances, resolutions, or policies and/or utilities' previous studies, plans, policies, and programs pertaining to the streetlight system in the City. We will also review additional data sets (only if there is readily available data) to identify potential areas in need of special consideration (such as available data on important localized land uses (e.g., parks, schools, hospitals, etc.), pedestrian, vehicle use and crash data, relative volumes of pedestrian and bicycle activity, unique neighborhood characteristics) and incorporating the analysis of the additional data into the recommendations.

- Lighting Level Study & Analysis

  Our team will obtain and record existing light levels using light meters at various locations in the City. Our proposed pricing assumes a maximum of eight locations. We will also create a photometric plan or layout of the lighting level at the specific locations, as well as typical plans for standard roadway classifications (e.g., arterial, collector, and residential roadways) to demonstrate the existing conditions and compare them with national/industry standards.

  It is important to note that other bidders may propose field light measurements via a drive-through methodology that uses photometrics equipment on a vehicle to measure the light distribution while the vehicle drives out the municipality's streets at night. While this may sound compelling and efficient, our team believes that this methodology is ultimately insufficient because it only captures light measurements from the single point on the roadway – from wherever the vehicle's position is on the road – and not from the multiple points (such as from directly under the fixture and at varying distances to the sides and across the street from the fixture) that are required to assess the overall performance of the fixture. (Please see the graphics below that depict the insufficiency of the drive-through method (on the left) vs. the comprehensive method that our team employs (on the right).)



The dotted line in the graphic above represents the typical path of a car collecting data during a drive-through in-

The dotted lines in the graphic above represent our method – which collects light measurements from significantly more locations – providing a comprehensive understanding of the fixture's light distribution pattern and photopic/scotopic performance.

Ultimately, our team will apply the photometrics data to the Equitable Streetlight Plan. See the graphic below for a demonstration of how the photometrics layout can be impacted by residential and arterial roadway classifications. This shows the approximate light footprint of typical LED replacement fixtures used on corresponding street types. Street classification data and measurements of street geometry taken during the field audit allow our team to appropriately develop a design without collecting or calculating photometrics for every street in a municipality.

Examples of the different distribution pattern requirements based on roadway classification.

- Development of Equitable Streetlight Plan

  We will develop an Equitable Streetlight Plan that outlines existing needs and clearly identifies options based on available technology and national/industry standards, and integrates policies and programs within the context of the community's goals and objectives. It will also maintain infrastructure aesthetics that are compatible with the surrounding area, provide standardization to minimize inventory and maintenance needs, comply with Dark Sky standards and the American Medical Association's lighting recommendations, identify unique neighborhoods, include equity considerations throughout the community and in critical areas of denser development, and be cost effective and energy efficient. The plan will include an implementation and action plan with a realistic funding strategy.

  The plan will include an existing conditions section, identifying the following information:
  - Inventory of existing lights by types, wattages, and roadway classifications
  - Existing lighting level comparison (based on in-field light measurements) with national/industry standards
  - Identification of needs based on any gaps in the existing system

  The plan will also include recommended options based on the identified needs for the streetlight infrastructure, including but not limited to:
  - Streetlight design styles with illustrations and photos
  - Lighting technology, including appropriate lighting level range, associated temperature and color and photos
  - Spacing between light poles (for up to 3 different street widths to be provided by the City) for the final selected options
  - Lighting control technology
  - Associated construction, operations and maintenance costs of the items listed above

We will present the advantages and/or disadvantages of each of the recommended options, including return on investment. Further, we will provide standard details and specifications for the recommended options and assist with creating a streetlight standard for the City.

We will ensure that consideration is given for the same bolt pattern as on existing foundations so that the recommended poles can be used as the standard for maintenance replacement at specific locations or future wider area construction.

We will ensure that the plan includes cost effective strategies, such as:

- Over-lit Areas: When it comes to removing streetlights from a system, there are typically significant costs associated with this. As such, our approach is to keep existing streetlights where they are located and instead of removing them in over-lit areas, we typically recommend using lower-output fixtures (with lower wattages) to minimize the over-lit hazard and unnecessary costs for a client.
- Under-lit Areas: When it comes to adding streetlights to a system for under-lit areas, we typically recommend adding an arm to an existing distribution pole, rather than relocating an existing fixture and arm in an over-lit area to an under-lit area. This is because removing and relocating doubles the labor costs, instead of a single unit of labor associated with adding a fixture. Further, purchasing a new arm is more cost effective than removing and relocating an existing arm.

> "The project was completed without a hitch and we've had zero complaints to date. The best Project I've been responsible for."
>
> David Daltorio, PE
> Town Engineer/Facilities Director
> Town of Hopkinton, MA

Deliverables:

- Equitable Streetlight Plan: A report including existing conditions and identified needs, recommended strategies/policies, and financial analysis of costs and savings associated with the recommendations.

Project Management

Bidders shall describe their approach to project management and how this will impact cost, quality control and project timeline.

Tanko Lighting's proven approach to municipal streetlight acquisition and LED conversion projects is comprehensive and data-driven, which results in accurate and efficient project implementation. The foundation of our project management approach is data. From Global Positioning System (GPS) location coordinates to fixture wattages, accurate data collection and data management is the backbone from which our methodology stems. Our Geographic Information System (GIS) and data expertise lead to accurate existing inventory characteristics and quantities, as well as granular design, precise material procurement, organized installation maps, and efficient installations. Having in-house experts in GIS streetlighting enables our team to provide superior service and unparalleled quality control on all projects. Ultimately, this results in minimized project delays (which translates into more expedient energy savings) and stabilized job costing by virtually eliminating change orders for our clients.

We utilize a variety of internal procedures to ensure responsible project management, including:

- Financial spreadsheets document and track project activities on both a monthly and quarterly basis
- Corporate accounting software provides automated fiscal reports
- Documentation (such as packing slips, Purchase Orders, invoices, installation records, etc.) is collected and cross referenced on both a monthly and quarterly basis
- Project managers, accounting staff and our Vice President of Operations and Chief Executive Officer review project activities on a quarterly basis to track progress and provide quality control
- Our Certified Public Accounting firm provides quarterly reviews of financials to assist with quality control and provides annual Reviewed Financials to substantiate company accounting records
- Our extensive experience with implementing municipal streetlight projects provides our team with the appropriate context from which to accurately determine costs and budgets associated with this project
- We will maintain regular communication with the City to provide ongoing updates, identify any challenges, and address any concerns
- We will rely upon industry standards when identifying recommendations and estimates related to design and costs – this will ensure that the information provided by our team is based on best practices

- Our firm provides most services (except for direct installation and maintenance field services) in-house, which enables us to monitor and enforce quality standards
- Our focus on data management ensures accurate project tracking, accountability and transparency. Especially during the installation phase, having the GPS coordinates of installers' positions on a real-time basis allows our team to track progress, identify any methodology issues, and impose swift course correction when necessary

Our team is tremendously aware of how critical client satisfaction is to its success. Thus, we strive to make every client an enthusiastic reference for future work. Employing these proven strategies will ensure that the City is satisfied with our performance throughout all phases of this project.

Technology Procurement

Fixtures: Describe process for recommending and selecting appropriate fixtures. Bidder should develop complete and detailed specifications for LEDs to replace lighting fixtures. The specifications should be non-proprietary performance specifications describing all relevant photometric, electrical, physical, and durability characteristics of the luminaires. Bidder should provide details on methods of developing specifications and how quality standards will be met.

Please find our response to this in Task 7, above.

Smart Controls and other Street Light Enhancements: Bidder will advise City on use of controls that may impact standardization, safety, energy and cost reductions. Bidder should be able to provide analysis on how advanced controls will impact long-term costs of maintenance and operation.

Please find our response to this in Task 7, above.

Other: Bidder should advise City on other value-add systems and discuss such systems with the City.

Please find our response to this in the Value Added Services section, below.

Construction Administration

Bidder will describe approach to construction administration.

Please find elements of our construction administration approach in Tasks 9: Logistics Management, 10: Installation, and Task 11: Commissioning, above. These Tasks include discussion on our approach to verification, data management, reporting, and project completion. Our goal is to provide seamless, safe, and efficient coordination of installation elements. By utilizing data collection during the installation phase, we will closely monitor activities and ensure ongoing progress.

Acquisition of Streetlights

Bidder will describe their experience and methodology for assisting municipalities in acquiring their street lights. Bidder will also describe what approach they recommend when negotiating with the City's local utility for acquisition of street lights.

There is a growing nationwide industry trend in which municipalities are acquiring their streetlight infrastructure from their local private utility companies. This poses tremendous advantages to the municipality, in that not only does it allow the municipality to control the management of the system within its geographic borders, but it also involves tremendous cost savings – particularly related to maintenance and energy (as many utilities charge exorbitant fees for energy and maintenance rates for the systems). Further, once a municipality acquires its system, it can reap additional savings benefits by converting to LED fixtures.

Tanko Lighting is at the forefront of this movement and has been working with several municipalities nationwide to assist in their streetlight acquisition strategies from investor-owned utilities. Our team's experience with acquisitions includes providing valuation, field data collection, acquisition feasibility analysis, and acquisition negotiations with the utility on behalf of the client. Recent projects involving acquisition support include the following municipalities: Brewer, ME (600 fixtures); Orono, ME (240 fixtures), as well as 116 other projects (please see Figure 4 for details).

Our extensive experience equips us with the best context for issues related to buyouts, disconnects, market value, negotiations, etc., and an intimate familiarity with:

- Points of disconnect (demarcation between the municipality and the utility)
- Identification of which poles are included in the acquisition and how to verify them
- Identification of the condition of the existing system, including any deferred maintenance – to leverage as a discount strategy in the purchase price and confirm fair market value
- Handling of deferred maintenance needs upon acquisition, while balancing the LED conversion phase

Please find our methodology for assisting with acquisition in the Task 3: Acquisition Assistance section of the Approach section, above. Should a more robust scope of acquisition assistance be necessary, we can provide an additional scope of work and pricing upon request.

In our experience, the most effective approach to negotiating with cities' local utilities for the acquisition of streetlights involves us confirming and presenting the fair market value of the system to the utility, as well as reviewing the elements of the utility's Purchase and Sale Agreement to ensure that matters such as separation requirements are reasonable and equitable for our clients. Unnecessarily onerous requirements, such as installing fusing in new hand holes external to the streetlight pole to establish separation, are issues that we have extensive experience with and typically negotiate more reasonable requirements by showing evidence of industry standard across the nation to convince the utility to shift to requirements that are more favorable – and thereby reduce the cost of acquisition for our clients.

Tanko's Utility-Owned Streetlight Acquisition Projects		
Utility	# of Projects	# of Streetlights
Southern California Edison (CA)	23	109,775
Eversource (CT, MA)	31	48,024
National Grid (NY, MA)	43	103,156
Pacific Gas & Electric (CA)	2	1,745
New York State Electric & Gas (NY)	2	6,889
Xcel Energy (CO)	3	6,758
Ameren (MO)	2	6,613
Emera (ME)	2	840
Oncor Electric (TX)	4	11,238
Duke Energy (OH)	1	18,000
The Illuminating Company (OH)	1	2,497
American Electric Power (OH)	1	1,100
First Energy (OH)	1	1,000
Northwest Edison (MT)	1	6,000
Entergy (AR)	1	16
Total	118	323,651

Figure 4: Examples of our projects involving streetlight acquisitions from utilities.

Rebates/Incentives

Bidder will describe their experience and approach to managing rebates/incentives for street lights on behalf of municipalities (i.e. Efficiency Maine).

The majority of our projects nationwide involve rebates and incentives. We have worked with utility, non-profit and government programs to submit incentive applications on behalf of our municipal streetlight projects. We understand how important an incentive can be for a project, in that it dramatically impacts the project payback. By meticulously auditing and designing projects using qualified products with the highest efficiency levels, our team has maximized our clients' rebate payments.

Current rebates for municipal streetlight projects in Maine are administered through Efficiency Maine. We are familiar with Efficiency Maine's application and data submission process, as we completed it for the Cities of Brewer and Orono's rebates. We recognize that, per Addendum No. 2, the City is not requiring assistance with rebate applications. However, we are able to provide this at no additional cost, should the City request our assistance.

Value Added Services

Bidder should describe value added services or products and detail what the bidder is prepared to supply as part of a contract. The City is interested in opportunities including but not limited to smart traffic and parking management, interactive electronic communication with residents and visitors, advanced lighting controls, and opportunities to provide the public with enhanced services. The City is open to collaborations with third party partners who may be able to offer revenue in support of such services.

There are a variety of options for value-added services that Tanko Lighting can offer the City with this project. However, it should be noted that we highly recommend proceeding with the LED streetlight conversion as a priority, to expedite the savings and then shift to other potential value-added services such as:

- Traffic Control: There are several different manufactures that offer expanded capabilities other than traditional streetlight control measures. One such expanded use is traffic control. We have narrowed down the three traffic control related issues most commonly mentioned by our clients – parking congestion, emergency responses, and monitoring traffic flow and violations. Most recently, we coordinated the installation of a traffic analytics control system on the streetlights in Grafton, MA. We have many industry partnerships that we can leverage to provide these products, should the City be interested.
- Wi-Fi: Many cities have approached us with interest in a city-wide Wi-Fi system to provide free streaming internet access for residents. Public Wi-Fi is a growing trend, but is currently utilized on only select streets or portions of a city. Some of the concerns related to such a system include bandwidth, requirement of direct fiber and cost to the municipality. Successful projects have involved private companies which pay the upfront cost while returning revenue to the municipality via advertisement to users. We are familiar with the options and will assist with providing a quote for such a system at the request of the City.

- Small Cell Phone Tower Installations: The telecommunications industry is quickly evolving to the point that technological advancements have minimized infrastructure needs, while customer demand has increased the industry's capacity requirements. It is thus wise for the City to consider wireless cellular leases (including 5G) on its streetlight infrastructure, as the opportunities are plentiful. Yet, to shield the City from some of the previous pitfalls, we will partner with our national firm to provide turn-key services that will reduce burden on City staff and streamline the City's ability to comprehensively approach the industry for the most advantageous revenue streams.
- Other Control Systems: We have experience with a variety of other smart controls on streetlight systems, such as roadway temperature monitor systems (Spencer, MA, and Saugus, MA), air quality sensors (Saugus, MA), and noise level sensors (Saugus, MA). We will leverage this experience to present additional options, should the City be interested.

We will review these value added services during our activities for Task 7: Technology Procurement. Once we obtain a better understanding of the City's needs and preferences, we can also coordinate sample installations of products as part of our product recommendations process, should the City be interested.

Bid Alternate – Scope of Services – Equitable Street Light Plan:

The City wishes to explore how street lighting can be more equitably planned in the future to offer the best street lighting solutions for residents. Therefore, as a bid alternate to this RFP the proposer should:

- *Provide proposal to equitably distribute and redistribute, in some cases increasing, in other areas reducing, the number of street lights throughout the City, with the overall goal of providing residents with safe and well-lit streets that comply to Dark Sky standards and American Medical Association's lighting recommendations. The purpose of this plan, if the City chooses to adopt said plan, would be to provide the City a roadmap on lighting policy decisions that create equitable and safe places.*
- *Bid Alternate – Design: For bid alternate, bidder should include analysis of the following data points to identify target areas:*
  - *Pedestrian/vehicle and bicycle/vehicle crash data for the last five years to identify where light levels and/or spacing have affected or have the potential to affect public safety*
  - *Important localized land uses (parks, schools, hospitals, etc.)*
  - *Relative volumes of pedestrian and bicycle activity*
  - *Unique neighborhood characteristics*
  - *Policy proposal to more equitably plan for and distribute lighting throughout community and in critical areas of denser development*

Please find our approach to the Equitable Streetlight Plan in Task 15, in the Scope of Services section, above.

5. PRODUCT DESCRIPTION & SPECIFICATIONS

Description and specifications for lighting fixture line, including manufacturer warranty information.

Fixtures

For this bid, we are recommending products from two different brands to give the City an initial array of product options. These recommended brands include Cooper and GE because they each have a long history of successful streetlight manufacturing and we have had good working experiences with these brands. Each of these products also includes a ten-year warranty, are cut-off/traditional cobra head styles, meet the City's requirements for color temperatures, and are equipped with a 7-pin NEMA photocell receptacle. See below for a brief description of each product. Please find product specifications for these proposed fixtures in Appendix G and note that we are providing pricing for each brand in Appendix E.

Cooper Streetworks Archeon Series Fixture

- Cooper Streetworks Archeon Series LED Cobrahead Roadway Luminaires: These LED roadway luminaires delivers all the optical performance benefits from the advanced LED technology in a modern, yet familiar cobrahead design. The patented, high-efficiency AccuLED Optics system provides uniform and energy conscious illumination and customer-focused features include single latch tool-less entry for easy installation and maintenance, and industry-leading surge protection and control options.

- GE Evolve Series LED Cobrahead Roadway Lighting: The Evolve® LED Roadway Luminaire is optimized for customers requiring a LED solution for local, collector and major roadways. GE's unique reflective optics are designed to optimize application efficiency and minimize glare. The modern design incorporates the heat sink directly into the unit for heat transfer to prolong LED life. This reliable unit has a 100,000 hour design life, significantly reducing maintenance needs and expense over the life of the fixture. This efficient solution lowers energy consumption compared to a traditional HID fixture for additional operating cost savings.

GE Evolve Series Fixture

- Sun-Tech P Series Photocontrols: P Series electronic photocontrols utilize a phototransistor light sensor. The photo sensor holds its original operating parameters throughout its life. It is not susceptible to operational "drift" caused by cadmium sulfide breakdown caused by harsh environments or breakdown caused by overheating (a condition of AC electromechanical designs). Extended life is achieved through a non-chatter load break from a low power consumption DC circuit.

- Cooper-Bussmann Fuses & Fuse Holders: This product line includes a time-delay supplemental fuse, TRON® In-Line Fuseholders, and an Eaton Dummy Fuse Neutral.

Smart City Products

We are recommending Ubicquia products because they are one of the few controls products companies that has been relatively stable in the controls market and offer unique products that perform well and provide valuable services.

- Service Enhancement #1: Ubicquia's Ubicell Model 2.0 Smart Streetlight Controller – standard control unit for programmable controls that includes, but is not limited to photocell level detection, tilt detection, sunrise/sunset offsets, and vibration detection. It comes with a standard 5 year warranty, with an optional 5 year extended warranty.

  Our pricing for this product is included in Appendix E. Please note the following about the pricing:
  - The controller node price is included in Appendix E. The pricing in this sheet includes all the installation and material costs that Tanko Lighting will be directly invoicing to the City. This excludes the following additional costs associated with this product, which will be directly billed from Ubicquia to the City:
    - Annual service fees = $10.50 per unit per year for the first three years, which includes the software, data hosting, and licensing costs
    - Optional 5-year extended warranty (for a total 10 year warranty) = $5.00 per unit

Ubicquia's Ubicell Smart Controller

- Service Enhancement #2: Ubicquia's Ubihub WiFi Access Point & Smart Streetlight Controller - WiFi Access Point unit with standard control module already embedded. It requires updated data/software service every 3 years. This service will be directly handled with Ubicquia and the City.

  Our pricing for this product is included in Appendix E. Please note the following about the pricing:
  - The controller node price is included in Appendix E. The pricing in this sheet includes all the installation and material costs that Tanko Lighting will be directly invoicing to the City. This excludes the following additional costs associated with this product, which will be directly billed from Ubicquia to the City:

- Annual service fees = $6.00 per unit per year for the first three years, which includes the data hosting, and licensing costs
- Software costs = $144 for initial setup fee, charged again each time a three-year service period commences

- Service Enhancement #3: Ubicquia's UbiAir Air Quality Sensor - a small sensor that measures, monitors, records, analyzes, and communicates precise local air quality and environmental data. This will be an additional piece of equipment is installed on the pole and requires pairing with either Service Enhancement #1 or #2. It comes with a 1 year warranty, but has the option for 2-3 year extended warranty at time of purchase. It requires updated data/software service every 3 years. This service will be directly handled by Ubicquia and the City.

  Our pricing for this product is included in Appendix E. Please note the following about the pricing:
  - The sensor price is included in Appendix E. The pricing in this sheet includes all the installation and material costs that Tanko Lighting will be directly invoicing to the City. This excludes the following additional costs associated with this product, which will be directly billed from Ubicquia to the City:
    - Annual service fees = $60.00 per year for the connectivity fee
    - Software costs = $128.00 for initial setup fee, charged again each time a new three-year period commences
    - Optional 2-3 year extended warranty = $92.00 per unit per year – that must be purchased at the time of initial installation

6. PROJECT COMPLETION TIMELINE

Clearly articulates the firm's timeline for completion, from starting date to implementation and project closeout, outlining milestones with target completion dates of each.

Please find our proposed project schedule below. Please note that with the current global pandemic significantly impacting manufacturing, we are unable to guarantee the lead times for materials procurement but will remain committed to coordinating with suppliers to ensure timely delivery of the products for this project.

Proposed Project Schedule:		Month					
Task	Estimated Completion Date	1	2	3	4	5	6
GIS Audit	NTP + 4 weeks (includes time to gather existing City records)						
Data Reconciliation	3 -6 weeks after Audit completion						
Acquisition Assistance	TBD: Depends on Utility's process						
Design	Initial Design Submission = 4-6 weeks after Data Reconciliation completion						
Financing Assistance	2 weeks after completion of Design						
Financial Analysis	2 weeks after completion of Design						
Technology Procurement	Submittals to City = 1 week after City approval of Design;						
	Ordering = 1 week after City submittal approval;						
	Shipment of Fixtures = 4 – 6 weeks from order placement, depending on type of fixture & manufacturer, as well as pandemic status.						
Community Outreach	2 – 4 weeks prior to Installation						
Logistics Management	2 weeks prior to Installation						
Installation	Commencement = 1 week from material receipt;						
	Substantial Completion = 3 weeks from commencement						
Commissioning & Final Punch List	3 weeks following Substantial Completion						
Rate Change & Final Reporting	4 weeks following Substantial Completion						
Maintenance Services (Optional)	Ongoing						
Alterate Bid: Equitable Streetlight Plan	4 weeks after completion of base design						

7. LIST OF KEY PERSONNEL

Identify key personnel that would be employed for this program and provide detailed resume/CV of their relevant experience, education and successes. Key personnel should demonstrate ample experience in managing turn-key street lighting projects.

Tanko Lighting is comprised of more than thirty professionals with significant experience in streetlight conversion projects, as well as energy efficiency, project management, data, auditing, installation and logistics management experience. Please see below for key staff's qualifications and experience. Please find resumes in Appendix C.

Jason Tanko, Chief Executive Officer

Role: Mr. Tanko will serve as the principal-in-charge, engineer and technical support lead.

Relevant Experience: As Tanko Lighting's leader, Mr. Tanko has been involved in every project since the company's inception. Most of these projects have focused on municipal streetlighting. A small sample of successful projects involving Mr. Tanko include LED streetlight conversion projects for the following municipalities: Orono, ME; Brewer, ME; Sharon, MA; Winchester, MA; New London, CT; Somerville, MA; Lowell, MA; Berkeley, CA; Santa Ana, CA; West Hollywood, CA; Vacaville, CA; Rancho Cordova, CA; Rancho Cucamonga, CA; Mountain View, CA; Pleasanton, CA; Napa, CA; Hayward, CA; Corona, CA; Orange, CA; Tustin, CA; Vallejo, CA; and Morgan Hill, CA.

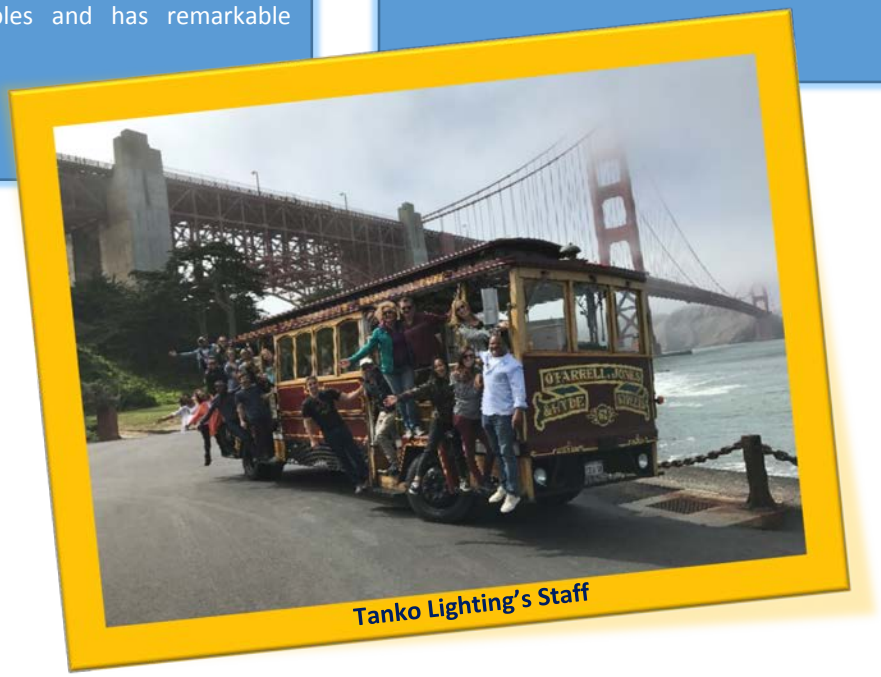
Applicable Training/Education: Mr. Tanko has decades of experience with streetlighting, electrical engineering and project management. Mr. Tanko holds a California C-10 Electrical Contractor's License, an Arizona A-17 Electrical Contractor's License, has a Bachelor of Science degree in Electrical Engineering and a Master of Business Administration degree from Seattle University, is well-versed in electrical principles and has remarkable acumen for business.

Nicole Kelner, Vice President of Operations

Role: Ms. Kelner will serve as the project director, responsible for compliance and deliverables.

Relevant Experience: Ms. Kelner is responsible for all current company projects, including projects for the Cities of Brewer, ME, Orono, ME, Rancho Cucamonga, CA, Fullerton, CA, Corona, CA, Orange, CA, Tustin, CA, Claremont, CA, West Hollywood, CA, Lowell, MA, Geneva, NY, Rockwood, TN, and Paris, TN.

Applicable Training/Education: Ms. Kelner is a seasoned business and project developer with more than eighteen years of experience in project management, operations and development. Her expertise is centered on compliance, energy, law, planning, cleantech, wireless and sustainability. Ms. Kelner directs all company projects and is responsible for performance and client satisfaction. Ms. Kelner holds a Bachelor in Business and Marketing from George Washington University, a Juris Doctor from the Delaware Law School Widener, and is currently a candidate for a Master of Business Administration in Sustainability from the San Francisco Institute of Architecture.



Tanko Lighting's Staff

Nick Fiore, Project Manager

Role: Mr. Fiore will serve as the primary point of contact and the project manager for this project, responsible for coordinating schedules, design, and coordination of deliverables.

Relevant Experience: Mr. Fiore has extensive experience with GIS data analysis, project management, and logistics management. He currently assists with the management, implementation, and coordination of projects. Mr. Fiore has served on a variety of Tanko Lighting projects during his tenure with the company. Recent projects include the LED streetlight conversion projects for the Cities of Sterling, CT, Dracut, CT, Ayer, MA, West Hartford, CT, Medford, CT, Farmington, CT, Norwich, CT, Groton, CT, Burlington, MA, Bell, CA, Sunnyvale, CA, and Santa Ana, CA.

Applicable Training/Education: Mr. Fiore holds a Bachelor of Science degree in Environmental Earth Sciences from the California Polytechnic State University, San Luis Obispo.

Rebecca Rodriguez, Data Program Manager

Role: Ms. Rodriguez will lead data collection, management and mapping efforts for the project.

Relevant Experience: Ms. Rodriguez has been at the helm of Tanko Lighting's Data Analyst Team for several years. Her leadership skills, technical knowledge, and analytical skills are paramount to her role. She has managed data quality for the LED conversion projects for the Metropolitan Area Planning Council, as well as the Cities of Cities of Orono, ME; Brewer, ME; Berkeley, CA; Rancho Cucamonga, CA; Tustin, CA; Fullerton, CA; Corona, CA; Oakland, CA; Santa Ana, CA; West Hollywood, CA; Lowell, MA; Malden, MA; Meriden, CT; Warren, MA; Miami Lakes, FL; Simi Valley, CA; Geneva, NY; Santa Clarita, CA; Stanton, CA; La Verne, CA; and Londonderry, CT.

Applicable Training/Education: Ms. Rodriguez holds a Bachelor of Science degree in Earth and Ocean Sciences from Duke University and a Master of Science in Geosciences from Virginia Tech.

Lauren Mathisen, Project Associate

Role: Ms. Mathisen will support the project management needs of the project, assisting with design, logistics, documentation and reporting.

Relevant Experience: Ms. Mathisen has served on a variety of Tanko Lighting projects during her tenure with the company. Recent projects include the LED streetlight conversion projects for the Cities of Spencer, MA, Lexington, MA, Bell, CA, Corinth, TX, Suffield, CT, Poway, CA, South Norwalk, CT, Orono, ME, and Longmeadow, MA.

Applicable Training/Education Ms. Mathisen holds a Bachelor of Science degree in Economics and Environmental Studies from the Lafayette College.

Red Thread's Project Staff

Michael Richi, Manager of Technology Services

Role: Installation services director

Qualifications: Mr. Richi joined Red Thread in 2004 and has over 30 years of industry experience. As a licensed electrician and experienced professional, he leads his teams to achieve the highest quality standard. Prior to joining Red Thread, he worked at CB Richard Ellis and other organizations in positions that managed and implemented high voltage electrical, fire alarm, data cabling, and building automation for the commercial, industrial, retail and residential industries.

Edward Leavitt, Senior Project Manager

Role: Field foreman

Qualifications: Mr. Leavitt joined Red Thread more than fifteen years ago and has decades of industry experience. As a licensed electrician and experienced professional, he oversees crews in the field. Mr. Leavitt is certified in Arc Flash Training, OSHA and Lock-out/Tag-out.

8. REFERENCES

Provide three current references, with current contact information from three current clients or past clients, preferably within one year.

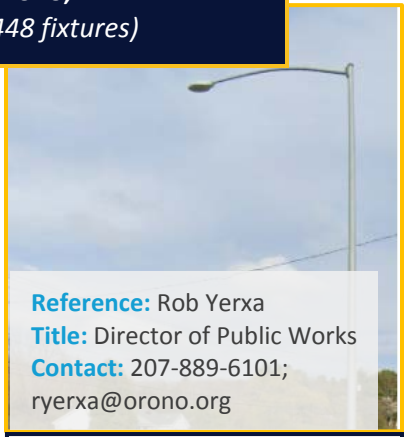
To gain an understanding of what we can provide through this project, it is crucial for the City to contact those we have worked with in the past. Our references routinely speak to our high quality customer service, technical expertise, expert data management, stellar design, and streamlined processes. Please find a sample of our references below.

Brewer, ME
(600 fixtures)

Reference: Frank Higgins,
Title: City Engineer
Contact: 207-989-7800;
fhiggins@brewermaine.gov

Project Summary:
GIS Audit, Acquisition Support, Data Reconciliation, Design, Materials Procurement, Installation Coordination, Commissioning, Rebate/Rate Change Submissions, and Project Management Support.

Orono, ME
(448 fixtures)



Reference: Rob Yerxa
Title: Director of Public Works
Contact: 207-889-6101;
ryerxa@orono.org

Project Summary:
GIS Audit, Ownership Support, Data Reconciliation, Design, Materials Procurement, Installation Coordination, Commissioning, Rebate/Rate Change Submissions, and Project Management Support.

Longmeadow, MA
(1,500 fixtures)

Reference: Mark Gold
Title: Board Member
Contact: 413-567-0859;
mgold@longmeadow.org

Project Summary:
GIS Audit, Ownership Support, Data Reconciliation, Design, Materials Procurement, Installation Coordination, Commissioning, Rebate/Rate Change Submissions, and Project Management Support.

9. PAST EXPERIENCES

Brief summary of past experiences providing service to at least three similar organizations – Should be based on currently active projects or projects completed within past three years.

Our Successes: We have successfully completed hundreds of municipal streetlight projects nationwide. Additionally, we have been actively working on similar projects with several municipalities in the region, including for the Cities of Brewer, ME and Orono, ME. Further, throughout the Northeast region, our experience with similar projects is unsurpassed – having been involved with more than 91 municipalities, representing more than 186,319 streetlight fixtures. This experience enables our team to appropriately translate technical information, market context, and industry standards into appropriate, high quality and cost-effective projects for our customers.

Our success lies in our unique passion for streetlighting, which translates into a drive to ensure that projects are successfully completed. We are tremendously aware of how critical client satisfaction is to our success. Thus, we strive to make every client an enthusiastic reference for future work. Clients are receptive to this drive, to the point that they frequently recommend us to other municipalities. Please find a full list of our projects and letters of recommendation in Appendix H. A few of our major successes include:

- City of Brewer, ME: The City of Brewer was the first municipal streetlight acquisition with Emera Utility in Maine. Our team worked diligently with the City and Emera to develop a successful strategy for the acquisition. Our team completed a comprehensive GIS audit of the existing inventory and cross-referenced that with Emera's records to confirm a complete data set that the City referred to during the acquisition process. We leveraged our experience working with other utilities through acquisition and guided the City throughout the transfer of ownership to maximize potential savings. Finally, our team managed the design and installation of the 600 fixture LED streetlight conversion to enable the City to gain significant energy savings.

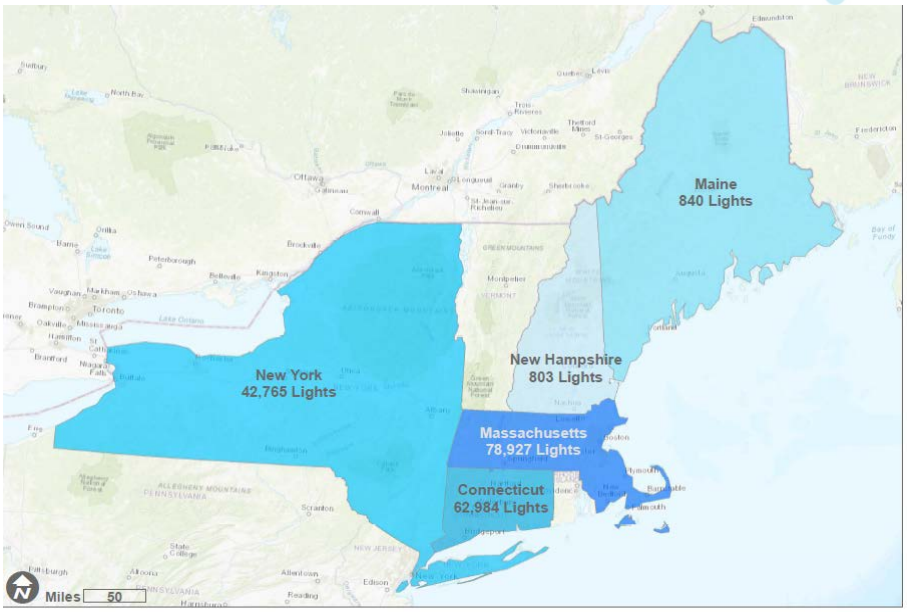
- City of Orono, ME: Our team worked diligently with the City to develop a successful strategy for the City's purchase of the streetlights from its utility. Our team completed a comprehensive GIS audit of the existing inventory and cross-referenced that with utility records to confirm a complete data set that the City referred to during the acquisition process. Additionally, our team managed the design and completed the installation of the LED streetlight conversion to enable the City to gain significant energy savings.

- Town of Farmington, CT: Our project for the Town of Farmington, CT involved an acquisition and LED conversion of the Town's 1,728 streetlights from its utility. We provided project management, GIS auditing, design, equipment selection, materials procurement, financial analyses, installation management, commissioning, rebate/rate change coordination and final reporting. We continue to provide ongoing maintenance services for the Town.

- City of Meriden, CT: Our turn-key project for the City of Meriden, CT involved the LED conversion of 4,300 fixtures, as well as the maintenance of the system. Upon acquisition of its streetlight system from its utility, the City inherited significant deferred maintenance issues that quickly resulted in substantial outage reports and citizen complaints. Tanko Lighting successfully designed an approach that quickly addressed the maintenance needs of these locations, while simultaneously proceeding with the LED conversion. This diverted a potential public relations nightmare and ensured that the City's streets were safely lit.

- City of Geneva, NY: This was a turn-key streetlight acquisition and LED conversion project that Tanko Lighting implemented for the City of Geneva's approximate 1,800 fixtures. This was one of the initial acquisition and LED conversion projects in New York State Electric and Gas's (NYSEG) territory and was ground breaking for municipal acquisition efforts. Tanko Lighting's comprehensive GIS audit was so accurate that NYSEG was willing to accept it, and therefore reduce the timeframe for the acquisition completion by months.

- Town of Saugus, MA: We provided the Town of Saugus with turn-key support to implement its LED streetlight conversion project of 2,850 fixtures. We provided project management, GIS auditing, design, equipment selection, financial analyses, installation management, commissioning, rebate/rate change coordination and final reporting. We also coordinated the additional controls systems for the project, including installation of roadway temperature monitor systems, air quality sensors, and noise level sensors.



Tanko Street Light Projects - Northeast Region
Total Lights Contracted: 186,319

10. CAPABILITIES & CUSTOMER SERVICE INFORMATION

Should outline how firm works with current, similar clients and what type of customer service the firm provides to their client, including general response times.

To understand our capabilities and commitment to customer service, it is first important to comprehend our history and qualifications. Find brief descriptions of these below, followed by our approach to customer service.

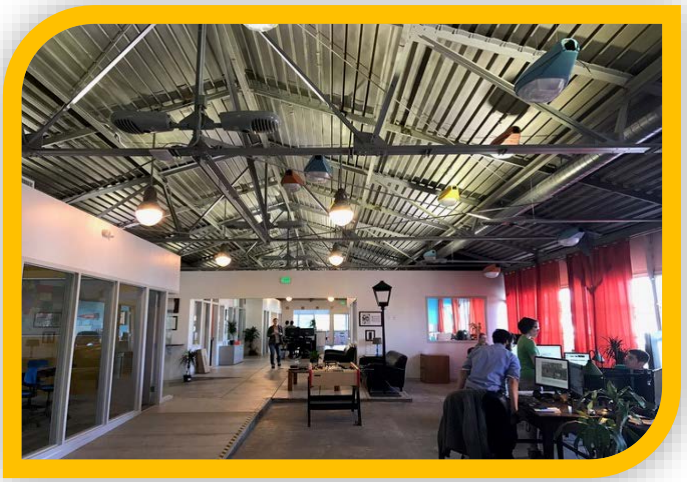
Our History: For more than 18 years – since 2003, Tanko Streetlighting, Inc. ("Tanko Lighting") has assisted municipalities with their streetlighting needs and is a national firm solely focused on providing professional services for turn-key municipal streetlighting projects. In our early days, we focused on re-manufacturing High Pressure Sodium (HPS) fixtures, providing a cost-effective waste diversion strategy by rebuilding existing fixtures to be re-deployed back into the field. This kept costs low and was a better option for clients than buying new streetlights. However, with the advent of Light Emitting Diode (LED) technology, we realized that we could no longer compete with commodity-priced and energy efficient LED streetlight fixtures. Thus, in 2011, we shifted our business model to focus on services to help municipalities comprehensively upgrade their streetlight systems to the most energy efficient options. Our evolution demonstrates three notable elements about our company:

1. **Our technical knowledge.** Our history as a streetlight manufacturer means that we have a thorough understanding of the technical components of a streetlight system. We know what quality looks like, as well as how a streetlight system operates over time and the challenges and needs of an ongoing streetlight infrastructure.
2. **Our agility.** We are a nimble organization. Our agility serves us – not only in our company's successful evolution of its business model but on an ongoing basis because we are a learning organization that is constantly evaluating our processes and striving to perfect them.
3. **Our passion.** It may be a strange passion, but streetlighting is what drives us to the point that, rather than shutter our doors years ago when faced with the sunset of our original business model, we pivoted to a new model that continued to foster our core competency and interest – our passion for streetlighting. This passion translates into our focus on ensuring that projects are done well.

Our Qualifications: We are a boutique firm, surgically focused exclusively on municipal streetlight projects. While other firms perform some of these services, the vast majority are generalists – contractors or consultants who provide a myriad of other services and measures.

Given the nuanced needs of the City's project, selecting a specialist for a project focused solely on streetlighting is the best way for the City to ensure that it has the most qualified partner to implement this project. Tanko Lighting is this specialist. Please find several elements demonstrating our firm's capabilities to accomplish this project below:

- **Municipal Streetlight Experience:** We are solely dedicated to municipal streetlighting projects – with an entire staff exclusively focused on such projects. As such, we have a large portfolio of active municipal streetlight projects, have previously been or are currently involved with the energy efficiency conversion of more than 585,000 streetlights throughout the nation, and are actively developing projects for an additional 550,000+ streetlight fixtures. Additionally, our work spans more than twenty-three states, and fifty-five utilities. Our company's sole focus on streetlighting distinguishes it from others, which focus on diverse measures and renders them generalists, while we are streetlight specialists. Finally, our expertise has been forged by diverse project types – including various sized projects (ranging from as large as 38,000+ fixtures to as few as 49 fixtures), as well as incredibly complex projects, derived from such factors as square mileage/area, complicated data, inconsistent existing design, and complex scopes of work.
- **Technical Knowledge:** Tanko Lighting has significant technical expertise centered on municipal streetlighting infrastructure. Led by an electrical engineer and licensed electrical contractor, Jason Tanko (Chief Executive Officer), our team understands the field conditions and system constraints that are often involved with municipal streetlighting projects. This enables the team to accurately design projects to prevent anticipated challenges, as well as quickly respond with streamlined solutions in the event of technical difficulties during a project.
- **Project Management Experience:** Tanko Lighting utilizes the extensive experience and organizational skills of its in-house project managers to develop project timelines and manage schedules. Because of our organizational skills, our projects are completed within the client's required timeline and the company has never paid any liquidated damages to a client for failing to complete a project.
- **National/Regional Context:** Tanko Lighting's broad experience with feasibility, and design and implementation of streetlight projects provides tremendous national context that will benefit the City by ensuring that the project is consistent with industry standards during each phase of the project. We have also been involved in similar projects with several municipalities in the region, including for the Cities of Brewer, ME and Orono, ME. Further, throughout the Northeast region, our experience with these projects is unsurpassed – having been involved with more than eighty-eight municipalities, representing more than 186,319 streetlight fixtures.



Our office – where streetlighting is integrated into the fabric of everything we do.

- **Data Management:** Tanko Lighting believes that utilizing data collection and analysis throughout all stages of a project results in superior project management. We built our own in-house data team with the right blend of both streetlighting technical expertise and data analysis skills to collect and reconcile accurate project data. While others often subcontract data collection and management, our team retains these activities in-house to better inform the design and project management processes. Field staff are provided devices that track the Global Position System (GPS) coordinates and other characteristics of the existing fixtures for the design and development phase. Additionally, our team utilizes the most state-of-the-art technology with the highest degree of spatial accuracy and utilize the industry standard software – ESRI's ArcGIS – to process data and provide shape files that are fully compatible with clients' GIS records. Our field auditors have accurately collected data on hundreds of thousands of streetlight fixtures – ensuring that the City's audit will be conducted by highly qualified professionals with tremendous field experience. As a result, our projects are well-designed, streamlined, accurate, efficient, and cost effective. Our focus on data results in significant transparency throughout all phases of the project.
- **Data Reconciliation:** Reconciling the initial data with existing City records is critical to providing an accurate final existing inventory. In our experience, most initial utility inventory records are highly inaccurate, which can lead to overstating or understating the quantity of existing assets. In countless projects, our team has demonstrated its ability to reconcile audit data,

as well as provide substantiated evidence to utility companies when field conditions vary from initial utility-provided inventory records.

- **Design:** Any consultant can select streetlight fixtures from a catalog, but only an expert can walk the City through its specific nuances and existing field conditions that warrant a customized approach to design of standards. As a streetlight design expert, Tanko Lighting is equipped to provide a comprehensive approach to the design process. Because of our nationwide experience, we have tremendous context from which to base our LED design recommendations. Tanko Lighting is product neutral and has worked with all the major LED streetlight manufacturers, including cobra head, as well as decorative products. Yet, we do not merely rely on manufacturers for information related to design but have the knowledge and skills to interpret how manufacturer data impacts a client's needs. We utilize industry guidelines (including Illuminating Engineering Society (IES) RP-8-18 guidelines), which form the basis of design. Additionally, our team obtains client feedback (from such stakeholders as safety coordinators and police officers), considers areas of concern that are currently over or under-lit, and applies customized solutions to these locations so that a municipality's project results in a comprehensive re-design that improves public safety and meets the needs of the current system. We appeal to the traditional aesthetics of municipalities' decorative fixtures by utilizing a custom design approach for these specific fixture types, including unique designs for retrofit kits (which preserve aesthetics, improve light quality, and significantly reduce costs over entire replacement fixtures). We believe that customized approaches to design are integral to successful projects, so our team places significant focus on this critical process. This is in contrast with other firms, which often apply a cookie cutter approach to design that oversimplifies areas that are currently being over or under-lit.

- **Selective Subcontracting:** Our team is highly aware of its core competencies. We retain the essential project activities (such as design, engineering, data collection/reconciliation, product procurement and project management) in-house to ensure that the project is run cost-effectively, efficiently and successfully. We also practice selective subcontracting, in that we source out limited key project activities (such as installation) to qualified (e.g., a stellar reputation and stable bonding capacity), licensed streetlight experts local to the project to obtain competitive pricing and prevent the project from accruing unnecessary costs and change orders. Further, selective subcontracting allows our firm the flexibility to obtain additional installation resources as needed, and allows the City to invest in the local economy and leverage local expertise by including local subcontractors in the project. For this project, we will utilize Red Thread Spaces, LLC ("Red Thread") as our subcontractor for installation and maintenance services. Please find more information about Red Thread in Task 10 of the Scope of Services section, above.

Our Customer Service: We are focused on providing superior customer service to alleviate burden from our clients so that they can focus on other priorities. As a mid-sized firm, we provide our municipal clients with all the necessary resources to successfully accomplish complex streetlighting projects – without the challenges of a large, bureaucratic firm. This enables every client to receive personal attention, with a primary point of contact (the Project Manager) providing superior customer service through responsiveness, accessibility, and the agility to create expedited decisions and solutions leading to effective results.

> "Tanko is extremely proficient at timely responses to any call for advice and can be counted on for frank, honest discussions on project issues."
>
> Bob O'Connor
> Mayor's Representative,
> Asset Management/Energy
> Town of Weymouth, MA

Because our reputation is so important to us, we are structured to provide boutique-level service to all clients. Our process for managing municipal streetlight projects is proven through the hundreds of successful contracts we have completed throughout the nation. As a result, our projects are completed on time and on budget and we have never had to pay any liquidated damages to a client. Our approach to customer service includes the following elements:

- We establish the primary point of contact for our team (Nick Fiore, Project Manager), through which all communications will flow. Mr. Fiore will schedule an initial kick-off meeting to introduce our team to the City and identify initial project tasks. He will also confirm regularly scheduled meetings. Further, Mr. Fiore will lead weekly internal meetings to ensure that tasks are delegated and progressing. He will confirm the City's primary point of contact and ensure that this person is regularly apprised on all project activities. This structure results in minimized confusion and streamlines interaction.
- Mr. Fiore will manage our internal team and utilize our internal project management software to streamline communication, resulting in efficient progress progression.

- Our staff members are trained in the importance of prompt responses to clients, and we have a standard internal rule to respond to clients within twenty-four hours, but ideally within four hours.
- Should our primary point of contact (Nick Fiore) ever be unavailable, we will equip City staff with a secondary contact (Lauren Mathisen), who will be readily available.
- Our team develops project deliverables based on an initial drafting process involving the Project Manager, with subsequent review and approval by the Projects Division Manager, and final review by a company Principal. This ensures consistency, accuracy, and quality.
- Since most clients have never undertaken a comprehensive streetlight project before, we make it a priority to educate clients on our processes, as well as the technical aspects of the project – in a way that is accessible and digestible.
- We take pride in providing a variety of recommendations and options to our clients so that they can determine their preferences based on informed decisions.
- Our firm's size enables all clients to have direct access to our Chief Executive Officer, Jason Tanko, at any point during the project – which results in clients having an industry expert available at their fingertips.

As a result of our approach, our projects are streamlined, and our clients are satisfied. Our processes are successful, demonstrated by the fact that we do not have complaints or legacy problems resulting from our projects.

"Most notably, their responsiveness and customer service to go above and beyond the regular call of duty was very important to a community our size with almost 1,800 street lights. They worked as a team to answer all questions and directives in a very efficient and swift manner. Any project of these sorts has many hurdles during installation and Tanko and their staff triaged every hurdle with professionalism and accuracy every time. We truly felt like they were a member of our own staff and always looking out for our best interests, as we all the taxpayers of the community."

Jamie Hellen
Deputy Town Administrator
Town of Franklin, MA

11. COST OF SERVICES

Complete the attached itemized bid form. If bidder chooses to also consider bid alternate, cost of bid alternate services should be provided separately to be considered eligible for consideration. Report costs on Appendix A.

Please find our completed Bidding Sheet in Appendix D and Schedule of Prices in Appendix E. Please note the following about our pricing:

- Base Bid Items:
  - All items exclude sales tax.
  - All fixture items include compliance with the CMP fusing requirements.
  - Items 1 and 2 assume a fixture quantity of 1,425 units. We are including Bid Alternate Items 5 and 6 to indicate a per fixture add or deduct amount for both the audit and the design tasks.
  - Items 3 and 5: the pricing includes a Sun-tech photocell product (see Section 5 – Product Description & Specifications).
  - Item 4: Replacement and Relocation of Existing Fixture – our pricing includes labor only to remove arm, wire, and head at one location within the City limits and reinstall it at another available pole location. This does not include the material costs for the new fixture.
  - Item 5: New Lighting Fixture at New Location – our pricing includes labor to install a new arm, wire, and new LED fixture head at a new location within the City limits. It includes the base fixture cost from Base Bid Item #3, plus a new 1 ¼ inch six-foot steel arm.
  - Item 6: Removal of Existing Fixture with No Replacement – our pricing includes labor only to remove the arm, wire, and head from an existing pole and to deliver that material to the City yard.
- Bid Alternate Items:
  - Item 1: the pricing includes a Sun-tech photocell product (see Section 5 – Product Description & Specifications).
  - For the pricing based on Cooper fixtures:
    - Item 1, for 50W, 70W and 100W LED replacements, the unit cost is the same as Base Bid Item 3.

- Item 1, for the 250W LED replacements, the unit cost is an additional $21.10 to the Base Bid Item 3.
- Item 1, for the 400W LED replacements, the unit cost is an additional $121.32 to the Base Bid Item 3.
- Item 1, for the 150W LED replacements, the unit cost is an additional $3.16 to the Base Bid Item 3.

o For the pricing based on GE fixtures:
- Item 1, for the 50W, the Base Bid Item 3 price is deducted by $6.00.
- Item 1, for, 70W, the unit cost is the same as Base Bid Item 3.
- Item 1, for the 100W LED replacements, the Base Bid Item 3 price is increased by $5.00.
- Item 1, for the 250W LED replacements, the unit cost is an additional $73.00 to the Base Bid Item 3.
- Item 1, for the 400W LED replacements, the unit cost is an additional $128.00 to the Base Bid Item 3.
- Item 1, for the 150W LED replacements, the unit cost is an additional $16.00 to the Base Bid Item 3.

o Items 2, 3, 4 Service Enhancements – our pricing includes material and installation costs only, with the cost of the Sun-tech photocell already deducted. Please see Section 5. Product Description and Specifications for more details on additional costs associated with these products.

12. PAYMENT TERMS

RFP responses shall include a schedule of proposed payment terms. The City anticipates that partial payments will be made commensurate of work performed and/or project milestones achieved. Payment terms negotiated and agreed upon prior to contract signing.

Below are our proposed payment terms for this project:

- Base Bid Item 1: Investment Grade Audit – we will invoice the City for Tasks 1 and 2 of the Scope of Services upon submission of the Audit Report (the deliverable for Task 1).
- Base Bid Item 2: Design Analysis – we will invoice the City for the Design line item upon submission of the Replacement Plan Maps (the deliverable for Task 4).
- Base Bid Items 3-6: We will invoice the City for these on a monthly basis, upon completion of installation of each task.
- Bid Alternate Item 1: Equitable Street Light Plan – we will invoice the City for this upon submission of the plan.
- Bid Alternate Item 1: Price Difference List – Wattage for Bid Alternate – we will invoice the City for these on a monthly basis, upon completion of installation of each task.
- Bid Alternate Item 2 - 4: Service Enhancement #1-3 – we will invoice the City for these on a monthly basis, upon completion of installation of each product.
- The City shall pay Tanko Lighting within thirty (30) days of receipt of invoices.

13. APPENDICES

Appendix A – Bidder Information Form

Appendix B – Statement of Compliance/Deviations Form

Appendix C – Resumes of Key Personnel

Appendix D – Bidding Sheet

Appendix E – Schedule of Prices

Appendix F – Bid Addendum Acknowledgement Form

Appendix G – Product Technical Specifications

Appendix H – List of Projects and Letters of Recommendation

Our project in New London, CT

APPENDIX A

Street Light Conversion
Bidder Information Form

Please complete the following. Attach additional sheets as necessary.

Our Company is:	A corporation X A partnership _____ Individually Owned _____ Other:
SS or Fed I.D. No: (Submission is voluntary)	Fed ID No.: 26-2819585
Company Name and Address:	Tanko Streetlighting, Inc. ("Tanko Lighting") 220 Bayshore Blvd. San Francisco, CA 94124
Name of Principal:	Jason Tanko, Chief Executive Officer
Telephone Number: Facsimile Number: E-mail Address:	415-254-7579 415-822-3626 jason@tankolighting.com
References (List Three References, with names, address and telephone numbers)	City of Brewer, ME Frank Higgins, City Engineer 207-989-7800; fhiggins@brewermaine.gov City of Orono, ME Rob Yerxa, Director of Public Works 207-889-6101; ryerxa@orono.org Town of Longmeadow, MA Mark Gold, Board Member 413-567-0859; mgold@longmeadow.org
Date of Delivery	April 21, 2021

All sections above must be completed. All deviations from the specifications must be fully explained in writing on the following Statement of Compliance/Deviations Form.

Bidders understand that the City reserves the right to reject any or all bids, reject any or all items, and delete any item or parts of items.

APPENDIX B

Street Light Conversion
Statement of Compliance/Deviations Form

The Bidder proposes the following deviations from the Specifications, which the Bidder represents and warrants as being fully equal or superior to the requirements of the Specifications, for the reason(s) set forth fully below. If there are no deviations, please state so below.

Tanko Lighting has no deviations from the City's Specifications.

Jason Tanko

CEO + Founder

APPENDIX C

TankoLighting

Bringing Passion to Light

Licenses & Certifications

State of California
C-10 Electrical Contractor's

State of Arizona
A-17 Contractor's License

Education

Seattle University
Bachelor of Science in Electrical Engineering

Seattle University
Master of Business Administration

Years of Experience

20+ years

Intro

A life-long streetlight enthusiast, Jason Tanko created Tanko Streetlighting, Inc. (DBA: "Tanko Lighting") more than a decade ago with a focus on manufacturing, engineering and technical support for municipal streetlight projects. Given the need for street lighting-specific expertise, this quickly expanded into project management services. Today, Tanko Lighting functions as a full-service street lighting company, providing tailored, turnkey solutions for any street lighting project. Mr. Tanko continues to lead the company, serving as Chief Executive Officer, and provides oversight on engineering, product development, business development, and project management.

Relevant Experience

Mr. Tanko's success with Tanko Lighting is a result of his extensive educational and professional background. Prior to founding Tanko Lighting, Mr. Tanko enjoyed a long career in energy efficiency and electrical engineering. As a Project Manager for Newcomb Anderson Associates, Mr. Tanko implemented the highly-successful Power Savers program – an energy efficiency program for small businesses in San Francisco. During his tenure as an Electrical Engineer for the Massachusetts Institute of Technology Lincoln Laboratory, Mr. Tanko designed energy efficient low and medium voltage power and lighting systems. As an Electrical Engineer/Project Manager with Wilson Construction Engineering Services, Mr. Tanko engineered and managed new construction and major electrical infrastructure projects. Mr. Tanko served as a District Engineer for Puget Sound Energy, in which he coordinated outage management, operations, budget and maintenance activities and supervised line crews for East King County, WA. As a Senior Engineer with Boeing Commercial Airplane Group, Mr. Tanko designed and drafted electrical systems for airplane equipment. During his tenure as an Electrical Engineer/Designer with Team Engineering, Inc., Mr. Tanko designed and drafted power distribution, lighting, and building control systems for commercial and public buildings.

Project Highlights

Sharon, MA (1,600 fixtures)

New London, CT (2,5106 fixtures)

Lowell, MA (7,000 fixtures)

Santa Ana, CA (11,500 fixtures)

Napa, CA (4,500 fixtures)

Corona, CA (8,700 fixtures)

Winchester, MA (1,571 fixtures)

Somerville, MA (4,842 fixtures)

Berkeley, CA (8,000 fixtures)

Ventura, CA (9,000 fixtures)

Hayward, CA (7,700 fixtures)

Vallejo, CA (9,000 fixtures)

Nicole Kelner

Vice President of Operations

TankoLighting

Bringing Passion to Light

Licenses & Certifications

Merritt College
Environmental Management & Renewable Technology

LEED
Green Building Professional

Education

Delaware Law School
Juris Doctor

George Washington University
Business Marketing

Years of Experience

18+ years

Additional Training

Candidate for Sustainability MBA from the San Francisco Institute of Architecture.

Intro

Ms. Kelner is a seasoned business and project developer, with more than eighteen years of experience in project management, operations and development. Her expertise is centered on compliance, energy, law, planning, cleantech, wireless and sustainability. Ms. Kelner directs all company projects, and is responsible for all operations, performance and client satisfaction.

Relevant Experience

Prior to joining Tanko Lighting, Ms. Kelner served and a Project Manager and Market Lead with Sure Site Consulting, where she led and trained staff, was responsible for profit and loss, budgets, invoices, and managed multiple clients, vendors and consultants. As an Environmental Management Supervisor with Pacific Gas & Electric, Ms. Kelner managed a multi-disciplinary team of thirteen environmental professionals, implemented permitting for gas and electric projects, and strategically facilitated a portfolio of over 3,400 assigned projects with multiple consulting firms. As Director of Compliance with Solar Trust of America, Ms. Kelner managed all regulatory compliance for the development and construction of 2,000 MW of solar power, acquired timely agency approvals for the world's largest solar power project (budgeted at over $3 billion), and developed highly-detailed compliance trackers for over 800 complicated conditions in 21 fields. Ms. Kelner also held additional positions with Earth Zone Consultants (Principal), Sustainable Spaces (General Manager), WFI Consulting (Senior Planning Project Manager), Young & Associates (Senior Project Manager), and Vetrano & Bravacos (Attorney).

Project Highlights

Rancho Cucamonga, CA (15,000 fixtures)

Corona, CA (8,700 fixtures)

Tustin, CA (3,500 fixtures)

West Hollywood, CA (2,500 fixtures)

Geneva, NY (1,696 fixtures)

Paris, TN (2,541 fixtures)

Fullerton, CA (6,600 fixtures)

Orange, CA (4,400 fixtures)

Claremont, CA (1,300 fixtures)

Lowell, MA (7,000 fixtures)

Rockwood, TN (808 fixtures)

Nick Fiore

Project Manager

TankoLighting

Bringing Passion to Light

Education

California Polytechnic State University, San Luis Obispo

Bachelor of Science in Environmental Earth Sciences

Intro

Nick Fiore has extensive experience with GIS data analysis, project management, and logistics management. He currently leads the design, management, implementation, and coordination of projects.

Relevant Experience

Prior to joining his current role with Tanko Lighting, Mr. Fiore served a GIS Data Analyst, focused on reconciling streetlight data for municipalities. Prior to his tenure with Tanko Lighting, Mr. Fiore conducted ArcMAP GIS analyses demonstrating snowpack changes in the Sierra Mountains of California and conducted geologic field mapping of Rainbow Basin, CA and El Paso Basin, CA for the California Polytechnic State University, San Luis Obispo. As a Sales Associate with Gilman's Kitchens and Baths, Mr. Fiore conducted sales, customer service, and project management for construction projects.

Project Highlights

Sterling, CT (75 fixtures)

Orono, ME (240 fixtures)

West Hartford, CT (6,500 fixtures)

Farmington, CT (1,728 fixtures)

Groton, CT (1,550 fixtures)

Bell, CA (1,600 fixtures)

Santa Ana, CA (11,500 fixtures)

Dracut, MA (1,555 fixtures)

Ayer, MA (520 fixtures)

Medford, MA (4,618 fixtures)

Norwich, CT (5,049 fixtures)

Burlington, MA (2,400 fixtures)

Sunnyvale, CA (7,000 fixtures)

Lauren Mathisen

Project Associate

TankoLighting

Bringing Passion to Light

Education

Lafayette College
Bachelor of Science in Economics and Earth Studies

Intro

Lauren Mathisen has extensive experience with environmental services, research, and project management. She currently assists with the design, management, implementation, and coordination of projects.

Relevant Experience

Prior to her tenure with Tanko Lighting, Ms. Mathisen served as a Climate Corps Fellow with the City of Sunnyvale's (CA) Environmental Services Department. In this role, she collaborated with the external municipal agencies for hands-on and logistical implementation of pollution prevention programs, and tracked and reported the City's compliance with various environmental initiatives. As an Undergraduate Economics Research Assistant at Lafayette College, Ms. Mathisen worked with an environmental professor to prove the environmental and economic value of removing a local dam.

Project Highlights

Spencer, MA (885 fixtures)

Bell, CA (1,600 fixtures)

Suffield, CT (680 fixtures)

South Norwalk, CT (1,158 fixtures)

Longmeadow, MA (1,500 fixtures)

Lexington, MA (2,700 fixtures)

Corinth, TX (898 fixtures)

Poway, CA (3,600 fixtures)

Orono, ME (240 fixtures)

Rebecca Rodriguez

Data Program Manager

TankoLighting

Bringing Passion to Light

Education

Virginia Tech
Master of Science in Geosciences

Duke University
Bachelor of Science in Earth & Ocean Sciences

Intro

Rebecca Rodriguez has extensive experience with Geographic Information Systems (GIS) focused on urban street infrastructure. She currently serves as Tanko Lighting's Data Program Manager, responsible for overseeing the company's data management services.

Relevant Experience

Prior to joining Tanko Lighting, Ms. Rodriguez served as a Research Fellow for the US Department of Energy's National Energy Technology Laboratory, where she performed lead mapping for a water quality monitoring project, analyzed environmental impacts of shale oil/gas development and hydraulic fracturing, and examined water management practices of the oil and gas industry. As a Teaching Assistant with the Virginia Tech Geoscience Field Observations, Ms. Rodriguez explained topographic and geologic map creation, and provided guidance to students with safety, as well as outcrop sketches, data collection and feature identification. As a Research Assistant with Duke University Geochemistry Laboratory, Ms. Rodriguez established the first-ever recycling program for plastic sample vials and bottles, managed laboratory data, samples, analytical equipment and supplies, supported climate reconstruction research via isotopic analysis of marine microfossils, and analyzed major and trace chemical components of water, soil, and rock samples.

Project Highlights

Berkeley, CA (3,200 fixtures)
Tustin, CA (3,500 fixtures)
Corona, CA (8,700 fixtures)
Santa Ana, CA (11,500 fixtures)
Lowell, MA (7,000 fixtures)
Meriden, CT (4,799 fixtures)
Miami Lakes, FL (900 fixtures)
Geneva, NY (1,696 fixtures)
Rancho Cucamonga, CA (15,000 fixtures)
Fullerton, CA (6,600 fixtures)
Oakland, CA (37,000 fixtures)
West Hollywood, CA (2,500 fixtures)
Malden, MA (3,694 fixtures)
Warren, MA (437 fixtures)
Simi Valley, CA (8,000 fixtures)
Londonderry, NH (143 fixtures)

RED THREAD

Key Personnel:

List the proposed key members of staff to be assigned, including their roles and estimated participation in delivering the services. Also for each staff member:
Please list names and titles and any relevant licenses held.
Attach resumes of the key personnel that will be assigned to these services. Include education and training. Resumes shall state clearly any experience specifically related to the Scope of Work and list any similar work successfully completed.

Michael Richi
Manager of Technology Services
Red Thread
860.338.3557
mrichi@red-thread.com

Role
Mike would be the account manager for Tanko Lighting and lead our team for the execution of the project.

Experience
Mike joined Red Thread in 2004 and has over 30 years of industry experience. As a licensed electrician and an experienced professional, he leads his teams to achieve the highest quality standard. Prior to joining Red Thread, he worked at CB Richard Ellis and other organizations in positions that managed and implemented high voltage electrical, fire alarm, data cabling, building automation for the commercial, industrial, retail and residential industries.
He holds the following licenses:

Maine - MS60018895	Master Electrician
Mass - 30645E	Journeyman Electrician
Mass - 13195A	Master Electrician
Conn - 123419	Contractor Electrician
New Hampshire -12493	Master Electrician

OSHA – 001110952
Arc Flash Training and Lock-out Tag-out certified

RED THREAD

James DiCiocco
Operations Manager
Years with Red Thread: 13 years
Current Certifications: Arc Flash Training, OSHA certified, Lock-out Tag-out certified.

Edward Leavitt
Senior Project Manager
Years with Red Thread: 15 years
Licensed Electrician E2 CT
Current Certifications: Arc Flash Training, OSHA certified, Lock-out Tag-out certified.

Ted Bednarczyk
Senior Estimator
Years with Red Thread: 5 years
Licensed Electrician E2 CT
Current Certifications: Arc Flash Training, OSHA Certified, Lock-out Tag-out certified.

Antonio Pimentel
Field Supervisor
Years with Red Thread: 16 years
Telecommunications license CT & Rhode Island
Current Certifications: Arc Flash Training, OSHA certified, Lock-out Tag-out certified.

Frank Gaetani
Warehouse Manager
Years with Red Thread: 10 years
Shipping/receiving all materials related to Technology Services.

Chelsea Steady
Senior Administrative Coordinator
Years with Red Thread: 5 years
Responsible for all internal communication including billing and coordination of same

APPENDIX D

Street Light Conversion
Bidding Sheet (rev. 1)

The undersigned, as bidder, declares as follows:

1. The bidder has carefully examined the information herein and understands and agrees to the terms and provisions of this bid.
2. The only parties interested in the bid as principals are named herein.
3. This bid is made without collusion with any other person, firm, or corporation.
4. No officer, agent, or employee of the City of Saco is directly or indirectly involved with the bid.
5. All deviations from the information provided herein must be fully explained in writing and included on the Statement of Compliance/Deviations Form provided.

Bidders understand that the City reserves the right to reject any or all bids, reject any or all items, and further, reserves the right to delete any item or parts of items.

DATE: April 21, 2021

BIDDER: Tanko Streetlighting, Inc. ("Tanko Lighting")
(Company Name)

BY: _____
(Authorized Company Representative)

ATTEST: _____

Its: Chief Executive Officer
(Title)

Signature below by the City of Saco represents acceptance of the above bidder's Bidding Sheet in accordance with the contract specifications. Upon execution by the city, this official bid form, any attached documents and such other documents (instructions, general specifications, technical specifications) shall serve as the contract.

DATE: _____

BY: _____
Bryan Kaenrath
City Administrator

[SEAL]

ATTEST: _____

APPENDIX E

Pricing Based on a COOPER Fixture

APPENDIX A - SCHEDULE OF PRICES (rev. 1)

Note: All bidders shall complete this form, with the Unit Prices written in numerals. For complete information concerning these items, see the Street Light Conversion RFP.

BASE BID

Bid Item	Description	Unit	Unit Price	Quantity	Amount
1	Investment grade audit (IGA) of existing lighting	lump sum	$14,250	1	$ 14,250 -
2	Design Analysis	lump sum	$7,125	1	$ 7,125 -
3	Replacement of Existing Fixture (70W equivalent)	each	$297.18	1350	$ 401,193 -
4	Replacement and Relocation of Existing Fixture	each	$781.25	50	$ 39,062.50 -
5	New Lighting Fixture at new location	each	$1,015.96	25	$ 25,399 -
6	Removal of Existing Light Fixture (no replacement)	each	$406.25	25	$ 10,156.25 -

TOTAL AMOUNT OF BASE BID	$ 497,185.75

BID ALTERNATE AND/OR SERVICE ENHANCEMENTS

Item #	Description	Unit	Unit Price	Quantity	Amount
	Bid Alternate (Task 15)	lump sum	$8,500	1	$ 8,500 -
	Price Difference List - Wattage for Bid Alternate				
1	50W 70W 100W	each	same	N/A	-
	100W 250W / 400W	each	$21.10 / $121.32	N/A	-
	150W	each	$3.16	N/A	-
2	Service Enhancement #1 - Controls	each	$98	1425	$ 139,650 -
3	Service Enhancement #2- WiFi	each	$1,612.25	1	$ 1,612.75 -
4	Service Enhancement #3- Air Quality	each	$1,381.25	1	$ 1,381.25 -

The City of Saco reserves the right to accept or reject any and all bids received, waive informalities, and award the contract to the lowest responsible bidder, with or without consideration of Bid Alternates. The City of Saco reserves the right to reduce or increase the scope of work and/or delete work items using unit prices to match available funds.

Bid Alternate for Base Bid Item 1: add or deduct $10 per fixture

Bid Alternate for Base Bid Item 2: add or deduct $5 per fixture

Pricing Based on a GE Fixture

APPENDIX A - SCHEDULE OF PRICES (rev. 1)

Note: All bidders shall complete this form, with the Unit Prices written in numerals. For complete information concerning these items, see the Street Light Conversion RFP.

BASE BID

Bid Item	Description	Unit	Unit Price	Quantity	Amount
1	Investment grade audit (IGA) of existing lighting	lump sum	$14,250	1	$ 14,250 -
2	Design Analysis	lump sum	$7,125	1	$ 7,125 -
3	Replacement of Existing Fixture (70W)	each	$293.18	1350	$ 395,793 -
4	Replacement and Relocation of Existing Fixture	each	$781.25	50	$ 39,062.50
5	New Lighting Fixture at new location	each	$1,011.96	25	$ 25,299 -
6	Removal of Existing Light Fixture (no replacement)	each	$406.25	25	$ 10,156.25 -

TOTAL AMOUNT OF BASE BID	$491,685.75

BID ALTERNATE AND/OR SERVICE ENHANCEMENTS

Item #	Description	Unit	Unit Price	Quantity	Amount
	Bid Alternate (Task 15)	lump sum	$8,500	1	$ 8,500 -
	Price Difference List - Wattage for Bid Alternate				
1	50W 100W	each	-$6 / $5	N/A	-
	100W 250W / 400W	each	$73 / $128	N/A	-
	150W	each	$16	N/A	-
2	Service Enhancement #1 - Controls	each	$98	1425	$ 139,650 -
3	Service Enhancement #2- WiFi	each	$1,612.25	1	$ 1,612.75 -
4	Service Enhancement #3- Air Quality	each	$1,381.25	1	$ 1,381.25 -

The City of Saco reserves the right to accept or reject any and all bids received, waive informalities, and award the contract to the lowest responsible bidder, with or without consideration of Bid Alternates. The City of Saco reserves the right to reduce or increase the scope of work and/or delete work items using unit prices to match available funds.

Bid Alternate for Base Bid Item 1: add or deduct $10 per fixture

Bid Alternate for Base Bid Item 2: add or deduct $5 per fixture

APPENDIX F

CITY OF SACO, MAINE

Public Works Department
15 Phillips Spring Road
Saco, Maine 04072

Patrick Fox, Director
Telephone: (207) 284-6641
Email: pfox@sacomaine.org

Street Light Conversion Project

Bid Addendum Acknowledgement

Please acknowledge the receipt of all addendums issued by listing the Addendum numbers and providing signature and date below.

Addendum # 1

Addendum # 2

Addendum # 3

Addendum # _____

Bidder: Tanko Streetlighting, Inc. ("Tanko Lighting")

Authorized Signature: _____ Date: 4/21/21

Please include this form with your bid submission.

APPENDIX G

Project		Catalog #		Type	
Prepared by		Notes		Date	

Streetworks

Archeon Medium

Roadway Luminaire

Product Features

Light ARchitect™

Product Certifications

CERTIFIED SAFETY · IP66 · 3G VIB · ida DARK SKY APPROVED · ISO SYSTEMS CERTIFIED

Interactive Menu

- Ordering Information page 2
- Product Specifications page 2
- Energy and Performance Data page 3

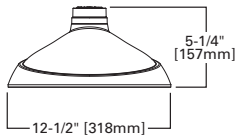
Quick Facts

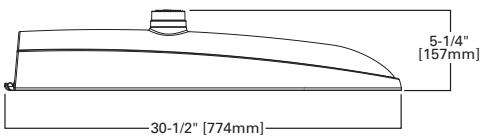
- Die-cast aluminum construction; Single latch tool-less entry
- Replaces up to 400W equivalent HID; -40°C to 40°C operating range
- Pole-mounted; Optional arm and offset adjustable arm mounting
- 120-277V 50/60Hz, 347V 60Hz or 480V 60Hz operation; IP66 rated

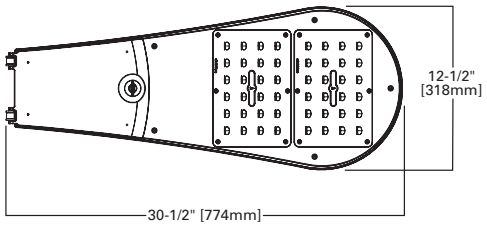
Connected Systems

- WaveLinx
- Enlighted

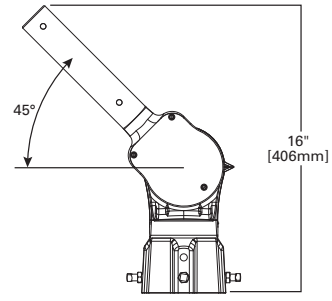
Dimensional Details



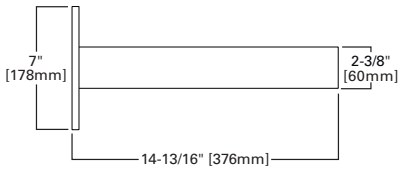




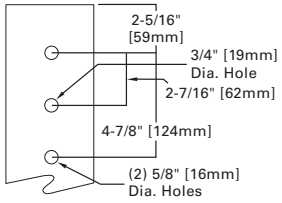
Adjustable Slipfitter Offset Arm



15" Straight Arm



Type "M" - Drilling Pattern



Ordering Information

SAMPLE ORDER NUMBER: **ARCH-M-PA2-40-740-U-T2R-A15-AP-10K-PR**

Product Family [1, 2]	Light Engine	Wattage Bucket	Color Temperature	Voltage	Distribution	Mounting	Finish
ARCH-M=Archeon Medium	**PA2**=(2) Direct Mount Rectangle (48 LED)	**40** **50** **60** **70** **80** **90** **100** **110** **120** **130** **140** **150** **160**	**722**=70CRI, 2200K **727**=70CRI, 2700K **730**=70CRI, 3000K **735**=70CRI, 3500K **740**=70CRI, 4000K **750**=70CRI, 5000K **827**=80CRI, 2700K [6] **AMB**=Amber, 590nm [18, 25]	**U**=Universal (120-277V) **8**=480V [4, 5] **9**=347V [4]	**T2R**=Type II Roadway **T2U**=Type II Urban **T3**=Type III **T4W**=Type IV Wide **5WQ**=Type V Square Wide	**[Blank]**=None **A15**=15" Straight Mast Arm [14] **ASJS15**=Adjustable Slipfitter (Factory set at 15° degrees) **ASJS25**=Adjustable Slipfitter (Factory set at 25° degrees) **ASJS45**=Adjustable Slipfitter (Factory set at 45° degrees)	**AP**=Grey **BZ**=Bronze **BK**=Black **DP**=Dark Platinum **WH**=White

Options (Add as Suffix)	**Controls**
10K=Series 10kV UL 1449 Surge Protective Device **20K**=Series 20kV UL 1449 Surge Protective Device **20KI**=Series 20kV UL 1449 Surge Protective Device with light indicator **10MSP**=Parallel 10kV MOV Surge Protective Device **20MSP**=Parallel 20kV MOV Surge Protective Device **K**=Level Indicator **HA**=50°C High Ambient Temperature **HSS**=Factory Install House Side Shield [13] **PSC**=Photocontrol Shorting Cap **NPC**=NEMA Photocontrol - Multi-Tap **LLPC**=Longlife Photocontrol Included **IP66**=IP66 Rated Housing **FADC**=Field Adjustable Dimming Controller [26] **CC**=Coastal Construction [27]	**PR**=NEMA 3-PIN Twistlock Photocontrol Receptacle [7] **PR7**=NEMA 7-PIN Twistlock Photocontrol Receptacle **SPB1**=Dimming Occupancy Sensor with Bluetooth Interface, <8' Mounting [28] **SPB2**=Dimming Occupancy Sensor with Bluetooth Interface, 8'-20' Mounting [28] **SPB4**=Dimming Occupancy Sensor with Bluetooth Interface, 21'-40' Mounting [28] **MS/DIM-L08**=Motion Sensor for Dimming Operation, Maximum 8' Mounting Height [8, 9] **MS/DIM-L20**=Motion Sensor for Dimming Operation, Maximum 9' - 20' Mounting Height [8, 9] **MS/DIM-L40**=Motion Sensor for Dimming Operation, Maximum 21' - 40' Mounting Height [8, 9] **LWR-LW**=Enlighted Wireless Sensor, Wide Lens for 8' - 16' Mounting Heights [8, 10, 11] **LWR-LN**=Enlighted Wireless Sensor, Narrow Lens for 16' - 40' Mounting Heights [8, 10, 11] **5LTD**=DALI [3] **ZD**=DALI-enabled 4-PIN Twistlock Receptacle [19, 20] **ZW**=WaveLinx-enabled 4-PIN Twistlock Receptacle [19, 20] **SWPD4XX**=WaveLinx Wireless Sensor, 7' - 15' Mounting Height [21, 22, 23, 24] **SWPD5XX**=WaveLinx Wireless Sensor, 15' - 40' Mounting Height [21, 22, 23, 24]

Accessories (Order Separately) [17]

OA / RA1013=Photocontrol Shorting Cap OA1223=10kV Surge Module Replacement
OA/RA1014=NEMA Photocontrol - 120V
OA/RA1016=NEMA Photocontrol - Multi-Tap
OA/RA1027=NEMA Photocontrol - 480V
OA/RA1201=NEMA Photocontrol - 347V
OA1223=10kV Surge Module Replacement
A15-XX=Arm (15" Straight Arm) [14, 16]
ASJS15-XX=Adjustable slipfitter (Factory set at 15 degrees) [16]
ASJS25-XX=Adjustable slipfitter (Factory set at 25 degrees) [16]
ASJS45-XX=Adjustable slipfitter (Factory set at 45 degrees) [16]
FSIR-100=Wireless Configuration Tool for Occupancy Sensor [17]
HS-ARCH=Field Install ARCH House Side Shield [13, 15]
SWPD4XX=WaveLinx Wireless Sensor, 7' - 15' Mounting Height [21, 22, 23, 24]
SWPD5XX=WaveLinx Wireless Sensor, 15' - 40' Mounting Height [21, 22, 23, 24]
VGS-ARCH=Short Vertical Drop Shield
VGL-ARCH=Long Vertical Drop Shield

NOTES:

1. Customer is responsible for engineering analysis to confirm pole and fixture compatibility for all applications. Refer to our white paper WP513001EN for additional support information.
2. Nominal wattage values will be labeled on fixture as per ANSI C136.15. For specific fixture wattage, refer to Power and Lumens table.
3. Only available in universal voltage.
4. Not available at 40W or 50W.
5. Only for use with 480V Wye systems. Per NEC, not for use with ungrounded systems, impedance grounded systems or corner grounded systems (commonly known as Three Phase Three Wire Delta, Three Phase High Leg Delta and Three Phase Corner Grounded Delta systems).
6. Extended lead times may apply.
7. If "PR" selected, dimming functionality not available. Dimming leads will be capped.
8. Only available in Universal voltage.
9. The FSIR-100 accessory is required to adjust parameters.
10. Enlighted wireless system is not available with photocontrol receptacle (not required)
11. Enlighted wireless sensors are factory installed and require network components LWP-EM-1, LWP-GW-1, and LWP-PoE8 in appropriate quantities. See website for Enlighted application information.
12. HA option not available with the following configurations, 347/480V 150W and 160W if paired with HS-ARCH or 5TLD 140 160W.
13. HSS not available with 5WQ distribution.
14. Round pole adapter and mounting hardware included. "M" drill pattern.
15. Archeon Medium requires two house side shields.
16. Replace XX with color designation.
17. This tool enables adjustment of parameters including high and low modes, sensitivity, time delay, cutoff and more. Consult your lighting representative at Cooper Lighting Solutions for more information.
18. Amber 590nm +/- 5nm for wildlife and observatory use. Supplied in PA2-60 wattage bucket only.
19. Utilizes internal step-down transformer when 347V or 480V is selected.
20. Controls system is not available with photocontrol (BPC), photocontrol receptacle (PR or PR7), or other controls systems (MS, ZD, ZW, LWR, DALI, or DIM).
21. Requires 4-PIN twistlock receptacle (ZD or ZW) option.
22. Replace XX with sensor color (WH, BZ or BK).
23. Sensor passive infrared (PIR) may be overly sensitive with operating below -20°C (-4°F).
24. For this device to be field-configurable, requires WAC Gateway components WAC-PoE and WPOE-120 in appropriate quantities. Only compatible with WaveLinx system and software and requires system components to be installed for operation. See website for more WaveLinx application information.
25. Not available with HA option.
26. Cannot be used with motion response control options.
27. Coastal construction finish salt spray tested to over 5,000-hours per ASTM B117, with a scribe rating of 9 per ASTM D1654.
28. Smart device with Sensor Configuration mobile application by Wattstopper required to change system defaults.

Product Specifications

Construction

- Heavy-duty die-cast aluminum housing and door
- Tool-less entry, hinged removable door for easy maintenance
- 3G vibration rated

Optics

- Choice of four patented, high efficiency AccuLED Optics
- Available in Type IIR, IIU, III, IV wide and V square wide the optics are precisely designed to shape the distribution maximizing efficiency and application spacing
- Offered standard in 4000K (+/- 275K) CCT and minimum 70 CRI. Optional 2200K, 2700K,3000K, and 5000K CCT
- For the ultimate level of spill light control, an optional house side shield accessory is available and can be field or factory installed
- Optics are IP66 enclosure rated
- IDA Certified for 3000K CCT and warmer only.

Electrical

- 120-277V 50/60Hz, 347V 60Hz or 480V 60Hz operation
- Standard 0-10V dimming
- 10kV/10kA common- and differential- mode surge protection available
- Ambient operating temperature from -40°C to 40°C; 50°C HA, high ambient, capability available
- Standard with three position tunnel type compression terminal block
- Greater than 98% lumen maintenance expected at 60,000 hours
- Replaces 150W to 400W HID
- Luminaire available with the field adjustable dimming controller (FADC) to manually adjust wattage and reduce the total lumen output and light levels. Comes pre-set to the highest position at the lumen output selected.

Mounting

- Two-bolt/one-bracket slipfitter with cast-in pipe stop and 2.5° leveling steps
- Fixed-in-place bird guard seals around 1-1/4" to 2" (1-5/8" to 2-3/8" O.D.) mounting arms
- Optional 15" pole mount arm available with round pole adapter and mounting hardware included

Finish

- Housing and cast parts finished in five-stage super TGIC polyester powder coat paint, 2.5 mil nominal thickness for superior protection against fade and wear
- Consult your lighting representative at Cooper Lighting Solutions for a complete selection of standard colors

Shipping Data

- Approximate Net Weight: 18 lbs. (8.16 kgs.)
- Effective Projected Area: 0.71 (Sq. Ft.)

Warranty

- Five year limited warranty, consult website for details. www.cooperlighting.com/legal
- Optional ten-year warranty, please see your CLS Streetworks sales representative for more information

Energy and Performance Data

View Archeon Medium IES files

Power and Lumens (PA2 Light Engine)

Light Engine - PA2*		PA2-40	PA2-50	PA2-60	PA2-70	PA2-80	PA2-90	PA2-100	PA2-110	PA2-120	PA2-130	PA2-140	PA2-150	PA2-160
Power (Watts)		38	48	63	73	83	92	101	111	122	131	141	151	161
Wattage Label		40	50	60	70	80	90	100	110	120	130	140	150	160
Input Current @ 120V (A)		0.318	0.399	0.527	0.609	0.693	0.768	0.846	0.925	1.020	1.100	1.180	1.260	1.340
Input Current @ 277V (A)		0.145	0.178	0.243	0.275	0.309	0.342	0.374	0.407	0.453	0.486	0.518	0.553	0.586
Input Current @ 347V (A)		--	--	0.188	0.216	0.245	0.271	0.298	0.325	0.371	0.400	0.428	0.458	0.487
Input Current @ 480V (A)		--	--	0.146	0.165	0.185	0.203	0.222	0.240	0.286	0.304	0.323	0.344	0.363
Optics														
T2R	4000K/5000K Lumens	6,489	8,063	10,434	11,891	13,299	14,714	15,925	17,033	18,278	19,311	20,317	21,323	22,189
	Bug Rating	B1-U0- G1	B1-U0- G2	B1-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G3	B2-U0- G3	B2-U0- G3	B2-U0- G3
	3000K Lumens	5,911	7,342	9,502	10,829	12,111	13,400	14,501	15,512	16,646	17,586	18,502	19,418	20,206
	Bug Rating	B1-U0- G1	B1-U0- G2	B1-U0- G2	B1-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G3	B2-U0- G3	B2-U0- G3
T3	4000K/5000K Lumens	6,649	8,013	10,367	11,816	13,216	14,621	15,825	16,926	18,164	19,190	20,190	21,189	22,050
	Bug Rating	B1-U0- G2	B1-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G3	B2-U0- G3	B2-U0- G3	B2-U0- G3	B3-U0- G3	B3-U0- G3	B3-U0- G3
	3000K Lumens	5,873	7,297	9,441	10,761	12,036	13,317	14,410	15,415	16,542	17,476	18,388	19,297	20,081
	Bug Rating	B1-U0- G2	B1-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G2	B2-U0- G3	B2-U0- G3	B2-U0- G3	B3-U0- G3	B3-U0- G3
T4W	4000K/5000K Lumens	6,416	7,971	10,313	11,756	13,147	14,547	15,742	16,839	18,070	19,091	20,085	21,080	21,936
	Bug Rating	B1-U0- G2	B1-U0- G2	B2-U0- G3	B2-U0- G3	B2-U0- G3	B2-U0- G3	B2-U0- G3	B3-U0- G3	B3-U0- G3	B3-U0- G3	B3-U0- G3	B3-U0- G4	B3-U0- G4
	3000K Lumens	5,843	7,259	9,392	10,706	11,973	13,247	14,336	15,334	16,455	17,385	18,292	19,197	19,977
	Bug Rating	B1-U0- G2	B1-U0- G2	B2-U0- G3	B2-U0- G3	B2-U0- G3	B2-U0- G3	B2-U0- G3	B2-U0- G3	B3-U0- G3	B3-U0- G3	B3-U0- G3	B3-U0- G3	B3-U0- G3
5WQ	4000K/5000K Lumens	6,619	8,223	10,640	12,127	13,563	15,007	16,241	17,372	18,642	19,694	20,721	21,747	22,629
	Bug Rating	B3-U0- G1	B3-U0- G2	B4-U0- G2	B4-U0- G2	B4-U0- G2	B4-U0- G2	B4-U0- G3	B4-U0- G3	B4-U0- G3	B4-U0- G3	B5-U0- G3	B5-U0- G3	B5-U0- G3
	3000K Lumens	6,029	7,489	9,690	11,043	12,353	13,666	14,789	15,820	16,977	17,935	18,870	19,804	20,609
	Bug Rating	B3-U0- G1	B3-U0- G2	B4-U0- G2	B4-U0- G2	B4-U0- G2	B4-U0- G2	B4-U0- G3	B4-U0- G3	B4-U0- G3	B4-U0- G3	B4-U0- G3	B5-U0- G3	B5-U0- G3
T2U	4000K/5000K Lumens	6,411	7,965	10,306	11,747	13,138	14,535	15,731	16,826	18,056	19,076	20,070	21,064	21,918
	Bug Rating	5,838	7,253	9,385	10,698	11,963	13,238	14,325	15,323	16,443	17,373	18,277	19,182	19,961
	3000K Lumens	B2-U0- G2	B2-U0- G2	B2-U0- G2	B3-U0- G3	B3-U0- G3	B3-U0- G3	B3-U0- G3	B3-U0- G3	B3-U0- G3	B3-U0- G3	B3-U0- G3	B3-U0- G3	B3-U0- G3
	Bug Rating	B2-U0-G1	B3-U0-G1	B3-U0-G1	B3-U0-G2	B3-U0-G2	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2

Lumen Maintenance

Light Engine	Ambient Temperature	TM-21 Lumen Maintenance (60,000 Hours)	Theoretical L70 (Hours)
PA2	Up to 40°C	> 98%	> 800,000

Lumen Multiplier

Ambient Temperature	Lumen Multiplier
0°C	1.02
10°C	1.01
25°C	1.00
40°C	0.99
50°C	0.97

FADC Settings

FADC Position	Percent of Typical Lumen Output
1	25%
2	48%
3	56%
4	65%
5	75%
6	80%
7	85%
8	90%
9	95%
10	100%

Note: +/-5% typical value

Cooper Lighting Solutions
1121 Highway 74 South
Peachtree City, GA 30269
P: 770-486-4800
www.cooperlighting.com

Project		Catalog #		Type	
Prepared by		Notes		Date	

Streetworks

Archeon Small

Roadway Luminaire

Product Features

Light ARchitect™

Interactive Menu

- Ordering Information page 2
- Product Specifications page 2
- Energy and Performance Data page 3

Product Certifications

CERTIFIED SAFETY · IP66 · 3G VIB · ida DARK SKY APPROVED · ISO SYSTEMS CERTIFIED

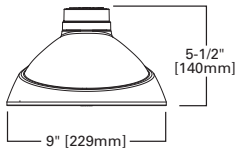
Quick Facts

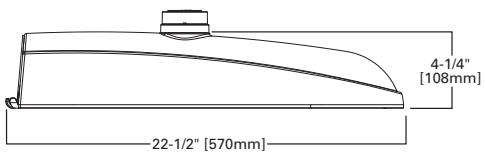
- Die-cast aluminum construction; Single latch tool-less entry
- Replaces up to 200W equivalent HID; -40°C to 40°C operating range
- Pole-mounted; Optional arm and offset adjustable arm mounting
- 120-277V 50/60Hz, 347V 60Hz or 480V 60Hz operation; IP66 rated

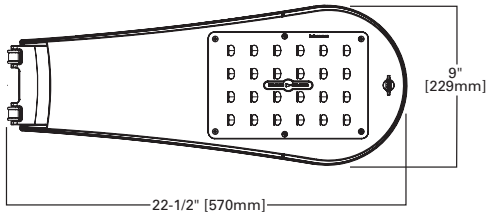
Connected Systems

- WaveLinx
- Enlighted

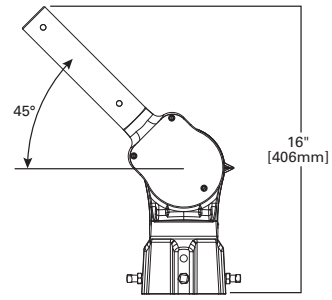
Dimensional Details



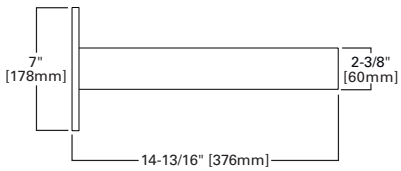




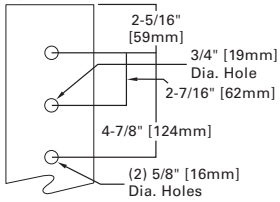
Adjustable Slipfitter Offset Arm



15" Straight Arm



Type "M" - Drilling Pattern



Ordering Information

SAMPLE ORDER NUMBER: **ARCH-S-PA1-20-740-U-T2R-A15-AP-10K-PR**

Product Family [1, 2]	Light Engine	Wattage Bucket	Color Temperature	Voltage	Distribution	Mounting	Finish
ARCH-S=Archeon Small	**PA1**=Direct Mount Rectangle (24 LED)	**20** **30** **40** **50** **60** **70** **80** **90** **100**	**722**=70CRI, 2200K **727**=70CRI, 2700K **730**=70CRI, 3000K **735**=70CRI, 3500K **740**=70CRI, 4000K **750**=70CRI, 5000K **827**=80CRI, 2700K [4] **AMB**=Amber 590nm [16, 17]	**U**=Universal **8**=480V [2, 3] **9**=347V [2]	**T2R**=Type II Roadway **T2U**=Type II Urban **T3**=Type III **T4W**=Type IV Wide **5WQ**=Type V Square Wide	**[Blank]**=None **A15**=15" Straight Mast Arm **ASJS15**=Adjustable Slipfitter (Factory set at 15° degrees) [9] **ASJS25**=Adjustable Slipfitter (Factory set at 25° degrees)[9] **ASJS45**=Adjustable Slipfitter (Factory set at 45° degrees)[9]	**AP**=Grey **BZ**=Bronze **BK**=Black **DP**=Dark Platinum **WH**=White

Options (Add as Suffix)	**Controls**
10K=Series 10kV UL 1449 Surge Protective Device **20K**=Series 20kV UL 1449 Surge Protective Device **20KI**=Series 20kV UL 1449 Surge Protective Device with light indicator **10MSP**=Parallel 10kV MOV Surge Protective Device **20MSP**=Parallel 20kV MOV Surge Protective Device **K**=Level Indicator **HA**=50°C High Ambient Temperature [6] **HSS**=Factory Install House Side Shield [7] **PSC**=Photocontrol Shorting Cap **NPC**=NEMA Photocontrol - Multi-Tap **LLPC**=Longlife Photocontrol Included **FADC**=Field Adjustable Dimming Controller [18] **CC**=Coastal Construction [19]	**PR**=NEMA 3-PIN Twistlock Photocontrol Receptacle [5] **PR7**=NEMA 7-PIN Twistlock Photocontrol Receptacle **5LTD**=DALI **SPB1**=Dimming Occupancy Sensor with Bluetooth Interface, <8' Mounting [20] **SPB2**=Dimming Occupancy Sensor with Bluetooth Interface, 8'-20' Mounting [20] **SPB4**=Dimming Occupancy Sensor with Bluetooth Interface, 21'-40' Mounting [20] **ZD**=DALI-enabled 4-PIN Twistlock Receptacle [10, 11] **ZW**=WaveLinx-enabled 4-PIN Twistlock Receptacle [10, 11] **SWPD4XX**=WaveLinx Wireless Sensor, 7' - 15 Mounting Height [12, 13, 14, 15] **SWPD5XX**=WaveLinx Wireless Sensor, 15' - 40' Mounting Height [12, 13, 14, 15]

Accessories (Order Separately) [17]

OA / RA1013=Photocontrol Shorting Cap
OA/RA1201=NEMA Photocontrol - 347V
OA1223=10kV Surge Module Replacement
OA/RA1014=NEMA Photocontrol - 120V
OA/RA1016=NEMA Photocontrol - Multi-Tap
OA/RA1027=NEMA Photocontrol - 480V
OA/RA1201=NEMA Photocontrol - 347V
A15-XX=Arm (15" Straight Arm) [8,9]
ASJS15-XX=Adjustable slipfitter (Factory set at 15 degrees) [9]
ASJS25-XX=Adjustable slipfitter (Factory set at 25 degrees) [9]
ASJS45-XX=Adjustable slipfitter (Factory set at 45 degrees) [9]
HS-ARCH-24=Field Install ARCH House Side Shield
VGS-ARCH=Short Vertical Drop Shield
VGL-ARCH=Long Vertical Drop Shield
SWPD4-XX=WaveLinx Wireless Sensor, 7' - 15' Mounting Height [12,13,14,15]
SWPD5-XX=WaveLinx Wireless Sensor, 15' - 40' Mounting Height [12,13,14,15]

NOTES:

1. Customer is responsible for engineering analysis to confirm pole and fixture compatiblity for all applications. Refer to our white paper WP513001EN for additional support information.
2. Not available with PA1-20.
3. Only for use with 480V Wye systems. Per NEC, not for use with ungrounded systems, impedance grounded systems or corner grounded systems (commonly known as Three Phase Three Wire Delta, Three Phase High Leg Delta and Three Phase Corner Grounded Delta systems).
4. Extended lead times may apply.
5. If "PR" selected, dimming functionality not available, dimming leads will be capped.
6. Option not available with PA1-90 or PA1-100.
7. HS-ARCH not available with 5WQ and T2U distribution.
8. Round pole adapter and mounting hardware included. "M" drill pattern.
9. Replace XX with color designation.
10. Utilizes internal step-down transformer when 347V or 480V is selected.
11. Controls system is not available with photocontrol (BPC), photocontrol receptacle (PR or PR7), or other controls systems (MS,ZD, ZW, LWR, DALI, or DIM).
12. Requires 4-PIN twistlock receptacle (ZD or ZW) option.
13. Replace XX with sensor color (WH, BZ or BK).
14. Sensor passive infrared (PIR) may be overly sensitive with operating below -20°C (-4°F).
15. For this device to be field-configurable, requires WAC Gateway components WAC-PoE and WPOE-120 in appropriate quantities. Only compatible with WaveLinx system and software and requires system components to be installed for operation. See website for more WaveLinx application information.
16. Not available with HA option.
17. Amber 590nm +/-5nm for wildlife and observatory use. Supplied in PA1 30 wattage bucket only.
18. Cannot be used with motion response control options.
19. Coastal construction finish salt spray tested to over 5,000-hours per ASTM B117, with a scribe rating of 9 per ASTM D1654.
20. Smart device with Sensor Configuration mobile application by Wattstopper required to change system defaults.

Product Specifications

Construction

- Heavy-duty die-cast aluminum housing and door
- Tool-less entry, hinged removable door for easy maintenance
- 3G vibration rated

Optics

- Choice of four patented, high efficiency AccuLED Optics
- Available in Type IIR, IIU, III, IV wide and V square wide the optics are precisely designed to shape the distribution maximizing efficiency and application spacing
- Offered standard in 4000K (+/- 275K) CCT and minimum 70 CRI. Optional 2200K, 2700K, 3000K, and 5000K CCT
- For the ultimate level of spill light control, an optional house side shield accessory is available and can be field or factory installed
- Optics are IP66 enclosure rated
- IDA Certified for 3000K CCT and warmer only.

Electrical

- 120-277V 50/60Hz, 347V 60Hz or 480V 60Hz operation
- Standard 0-10V dimming
- 10kV/10kA common- and differential- mode surge protection available
- Ambient operating temperature from -40°C to 40°C; 50°C HA, high ambient, capability available
- Standard with three position tunnel type compression terminal block
- Greater than 98% lumen maintenance expected at 60,000 hours
- Replaces 50W to 150W HID
- Luminaire available with the field adjustable dimming controller (FADC) to manually adjust wattage and reduce the total lumen output and light levels. Comes pre-set to the highest position at the lumen output selected.

Mounting

- Two-bolt/one-bracket slipfitter with cast-in pipe stop and 2.5° leveling steps
- Fixed-in-place bird guard seals around 1-1/4" to 2" (1-5/8" to 2-3/8" O.D.) mounting arms
- Optional 15" pole mount arm available with round pole adapter and mounting hardware included

Finish

- Housing and cast parts finished in five-stage super TGIC polyester powder coat paint, 2.5 mil nominal thickness for superior protection against fade and wear
- Consult your lighting representative at Cooper Lighting Solutions for a complete selection of standard colors

Shipping Data

- Approximate Net Weight: 12 lbs. (5.4 kgs.)
- Effective Projected Area: 0.5 (Sq. Ft.)

Warranty

- Five year limited warranty, consult website for details. www.cooperlighting.com/legal
- Optional ten-year warranty, please see your Cooper Lighting Solutions Streetworks sales representative for more information

Energy and Performance Data

View Archeon Small IES files

Power and Lumens (PA1 Light Engine)

Light Engine - PA1		PA1-20	PA1-30	PA1-40	PA1-50	PA1-60	PA1-70	PA1-80	PA1-90	PA1-100
Power (Watts)		21	31	40	54	64	74	83	94	96
Wattage Label		20	30	40	50	60	70	80	90	100
Input Current @ 120V (A)		0.179	0.257	0.338	0.450	0.534	0.619	0.695	0.783	0.798
Input Current @ 277V (A)		--	0.122	0.155	0.212	0.244	0.279	0.312	0.347	0.354
Input Current @ 347V (A)		--	0.100	0.125	0.161	0.187	0.217	0.244	0.275	0.280
Input Current @ 480V (A)		--	0.073	0.094	0.127	0.145	0.165	0.184	0.205	0.209
Optics										
T2R	4000K/5000K Lumens	3,398	4,756	6,137	7,912	9,083	10,127	10,942	11,729	11,850
	Bug Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B1-U0-G2	B1-U0-G2	B1-U0-G2	B1-U0-G2	B2-U0-G2
	3000K Lumens	3,094	4,331	5,588	7,206	8,271	9,223	9,966	10,681	10,791
	Bug Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B1-U0-G2	B1-U0-G2	B1-U0-G2	B1-U0-G2
T2U	4000K/5000K Lumens	3,385	4,739	6,114	7,884	9,052	10,091	10,905	11,688	11,809
	Bug Rating	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B3-U0-G3	B3-U0-G3
	3000K Lumens	3,084	4,316	5,568	7,180	8,243	9,189	9,930	10,644	10,755
	Bug Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2
T3	4000K/5000K Lumens	3,378	4,729	6,102	7,868	9,033	10,071	10,882	11,664	11,785
	Bug Rating	B1-U0-G1	B1-U0-G1	B1-U0-G2	B1-U0-G2	B1-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2
	3000K Lumens	3,077	4,307	5,558	7,165	8,226	9,172	9,911	10,623	10,732
	Bug Rating	B1-U0-G1	B1-U0-G1	B1-U0-G2	B1-U0-G2	B1-U0-G2	B1-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G2
T4W	4000K/5000K Lumens	3,357	4,700	6,062	7,819	8,976	10,006	10,813	11,591	11,710
	Bug Rating	B1-U0-G1	B1-U0-G2	B1-U0-G2	B1-U0-G2	B2-U0-G2	B2-U0-G3	B2-U0-G3	B2-U0-G3	B2-U0-G3
	3000K Lumens	3,058	4,280	5,521	7,121	8,175	9,112	9,847	10,554	10,665
	Bug Rating	B1-U0-G1	B1-U0-G2	B1-U0-G2	B1-U0-G2	B2-U0-G2	B2-U0-G2	B2-U0-G3	B2-U0-G3	B2-U0-G3
5WQ	4000K/5000K Lumens	3,452	4,832	6,234	8,040	9,230	10,291	11,120	11,918	12,042
	Bug Rating	B2-U0-G1	B3-U0-G1	B3-U0-G1	B3-U0-G2	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2
	3000K Lumens	3,144	4,401	5,678	7,322	8,406	9,372	10,127	10,854	10,967
	Bug Rating	B2-U0-G1	B3-U0-G1	B3-U0-G1	B3-U0-G2	B3-U0-G2	B3-U0-G2	B4-U0-G2	B4-U0-G2	B4-U0-G2

Lumen Maintenance

Light Engine	Ambient Temperature	TM-21 Lumen Maintenance (60,000 Hours)	Theoretical L70 (Hours)
PA1	40°C	98%	> 800,000 @ 40°C

Lumen Multiplier

Ambient Temperature	Lumen Multiplier
0°C	1.02
10°C	1.01
25°C	1.00
40°C	0.99
50°C	0.97

FADC Settings

FADC Position	Percent of Typical Lumen Output
1	25%
2	46%
3	55%
4	62%
5	72%
6	77%
7	82%
8	85%
9	90%
10	100%

Note: +/-5% typical value

Cooper Lighting Solutions
1121 Highway 74 South
Peachtree City, GA 30269
P: 770-486-4800
www.cooperlighting.com

Project		Catalog #		Type	
Prepared by		Notes		Date	

Streetworks

Archeon Nano

Roadway Luminaire

Product Features

Light ARchitect™

Interactive Menu

- Ordering Information page 2
- Product Specifications page 2
- Energy and Performance Data page 3

Product Certifications

CERTIFIED SAFETY · IP66 · 3G VIB · ISTA SYSTEMS CERTIFIED · ida DARK SKY APPROVED · DLC QPL LISTED · DLC QPL LISTED PREMIUM

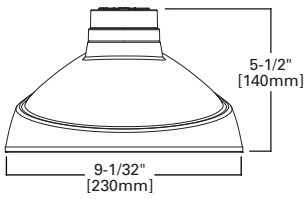
Quick Facts

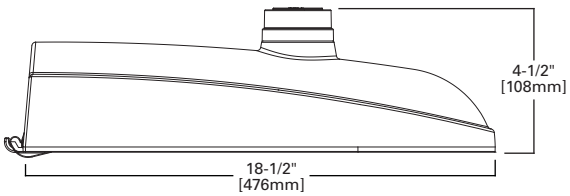
- Up to 164 lumens per watt
- Five optical distributions (Type II, III, IV and V)
- Multiple lumen packages ranging from 2,000 - 7,800 delivered lumens
- 4000K CCT standard, optional 2700K CCT, 3000K CCT, 5000K CCT

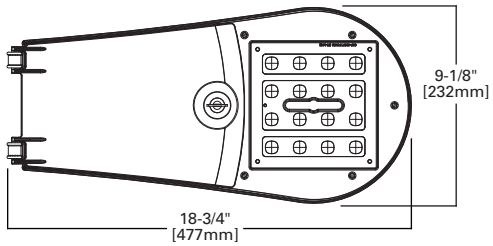
Connected Systems

- WaveLinx
- Enlighted

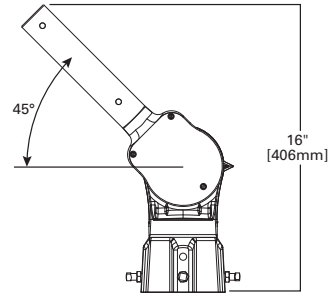
Dimensional Details



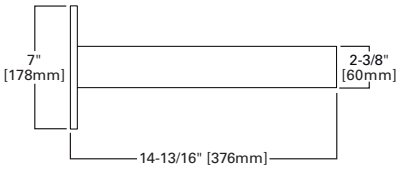




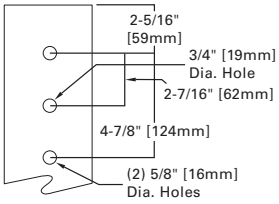
Adjustable Slipfitter Offset Arm



15" Straight Arm



Type "M" - Drilling Pattern



Ordering Information

SAMPLE ORDER NUMBER: **ARCH-N-PA1-20-D-U-T2R-A15-AP**

Product Family [1, 2]	Configuration	Wattage Bucket	Color Temperature	Voltage	Distribution	Finish
ARCH-N=Archeon Nano	**PA1**=Direct Mount Rectangle (16 LED)	**10** **19** **20** **30** **40** **50** **60**	**722**=70CRI, 2200K **727**=70CRI, 2700K **730**=70CRI, 3000K **735**=70CRI, 3500K **740**=70CRI, 4000K **750**=70CRI, 5000K **827**=80CRI, 2700K [4]	**U**=Universal (120- 277V) **8**=480V [3] **9**=347V **H**=High Voltage Driver (347V-480V) [9]	**T2R**=Type II Roadway **T2U**=Type II Urban **T3**=Type III **T4W**=Type IV Wide **5WQ**=Type V Square Wide	**AP**=Grey **BZ**=Bronze **BK**=Black **DP**=Dark Platinum **GM**=Graphite Metallic **WH**=White

Options (Add as Suffix)

10K=10kV UL 1449 Surge Protective Device
20K=Series 20kV UL 1449 Surge Protective Device [17]
10MSP=10kV MOV Surge Protective Device
20MSP=20kV MOV Surge Protective Device
K=Level Indicator
HA=50˚C High Ambient Temperature
HSS=House Side Shield [10]
PSC=Photocontrol Shorting Cap [11]
NPC=NEMA Photocontrol [11, 12]
LLPC=Longlife Photocontrol Included [11, 12]
IP66=IP66 Rated Housing
ZD=DALI-enabled 4-PIN Twistlock Receptacle [21, 22]
ZW=WaveLinx-enabled 4-PIN Twistlock Receptacle [21, 22]
SWPD4XX=WaveLinx Wireless Sensor, 7' - 15' Mounting Height [23, 24, 25, 26]
SWPD5XX=WaveLinx Wireless Sensor, 15' - 40' Mounting Height [23, 24, 25, 26]
CC=Coastal Construction [28]
FADC=Field Adjustable Dimming Controller [27]
A15=15" Straight Mast Arm
ASJS15=Adjustable Slipfitter (Factory set at 15° degrees)
ASJS25=Adjustable Slipfitter (Factory set at 25° degrees)
ASJS45=Adjustable Slipfitter (Factory set at 45° degrees)

Controls

PR=NEMA 3-PIN Twistlock Photocontrol Receptacle [6]
PR7=NEMA 7-PIN Twistlock Photocontrol Receptacle
5LTD=DALI [12, 15, 18]
SPB1=Dimming Occupancy Sensor with Bluetooth Interface, <8' Mounting [29]
SPB2=Dimming Occupancy Sensor with Bluetooth Interface, 8'-20' Mounting [29]
SPB4=Dimming Occupancy Sensor with Bluetooth Interface, 21'-40' Mounting [29]
MS/DIM-L08=Motion Sensor for Dimming Operation, Maximum 8' Mounting Height [12, 13]
MS/DIM-L20=Motion Sensor for Dimming Operation, 9'-20' Mounting Height [12, 13]
MS/DIM-L40=Motion Sensor for Dimming Operation, 21'- 40' Mounting Height [12, 13]

Accessories (Order Separately)

OA / RA1013=Photocontrol Shorting Cap
OA1223=10kV Surge Module Replacement
OA/RA1014=NEMA Photocontrol - 120V [11]
OA/RA1016=NEMA Photocontrol - Multi-Tap [11]
OA/RA1027=NEMA Photocontrol - 480V [11]
OA/RA1201=NEMA Photocontrol - 347V [11, 20]
HS-ARCHN=Field Install ARCHN House Side Shield [10]
FSIR-100=Wireless Configuration Tool for Occupancy Sensor [14]
A15-XX=Arm (15" Straight Arm) [7, 8]
ASJS15-XX=Adjustable slipfitter (Factory set at 15 degrees) [8]
ASJS25-XX=Adjustable slipfitter (Factory set at 25 degrees) [8]
ASJS45-XX=Adjustable slipfitter (Factory set at 45 degrees) [8]
SWPD4-XX=WaveLinx Wireless Sensor, 7' - 15' Mounting Height [23, 24, 25, 26]
SWPD5-XX=WaveLinx Wireless Sensor, 15' - 40' Mounting Height [23, 24, 25, 26]

NOTES:

1. Customer is responsible for engineering analysis to confirm pole and fixture compatiblity for all applications. Refer to our white paper WP513001EN for additional support information.
2. DesignLights Consortium® Qualified. Refer to www.designlights.org Qualified Products List under Family Models for details.
3. Only for use with 480V Wye systems. Per NEC, not for use with ungrounded systems, impedance grounded systems or corner grounded systems (commonly known as Three Phase Three Wire Delta, Three Phase High Leg Delta and Three Phase Corner Grounded Delta systems).
4. Use dedicated IES files for 2700K, 3000K, and 5000K when performing layouts. These files are published on the ARCH Archeon luminaire product page on the website.
5. Extended lead times may apply.
6. If "PR" selected, dimming functionality not available, dimming leads will be capped.
7. Round pole adapter and mounting hardware included. "M" drill pattern.
8. Replace XX with color designation.
9. Only available with 50W and 60W skus.
10. Not available with 5WQ.
11. Requires ordering of a twistlock photocontrol (3-PIN or 7-PIN) receptacle (PR or PR7).
12. Not available with "H" High Voltage Driver.
13. The FSIR-100 accessory is required to adjust parameters.
14. This tool enables adjustment of parameters including high and low modes, sensitivity, time delay, cutoff and more. Consult your lighting representative at Cooper Lighting Solutions for more information.
15. Not available for 10W or 60W.
16. Not available for 50 or 60 watts.
17. Only available with "U" universal voltage.
18. Not available with any sensor options.
19. Extended lead times may apply.
20. Not compatible with Surge options when used with "H" High Voltage Driver.
21. Utilizes internal step-down transformer when 347V or 480V is selected.
22. Controls system is not available with photocontrol (BPC), photocontrol receptacle (PR or PR7), or other controls systems (MS, ZD, ZW, LWR, DALI, or DIM).
23. Requires 4-PIN twistlock receptacle (ZD or ZW) option.
24. Replace XX with sensor color (WH, BZ or BK).
25. Sensor passive infrared (PIR) may be overly sensitive with operating below -20°C (-4°F).
26. For this device to be field-configurable, requires WAC Gateway components WAC-PoE and WPOE-120 in appropriate quantities. Only compatible with WaveLinx system and software and requires system components to be installed for operation. See website for more WaveLinx application information.
27. Cannot be used with motion response control options.
28. Coastal construction finish salt spray tested to over 5,000-hours per ASTM B117, with a scribe rating of 9 per ASTM D1654.
29. Smart device with Sensor Configuration mobile application by Wattstopper required to change system defaults.

Product Specifications

Construction

- Heavy-duty die-cast aluminum housing and door
- Tool-less entry, hinged removable door for easy maintenance
- 3G vibration rated
- Optics Choice of four patented, high efficiency AccuLED Optics; Available in Type IIR, III, IV wide and V square wide the optics are precisely designed to shape the distribution maximizing efficiency and application spacing; Offered standard in 4000K (+/- 275K) CCT and minimum 70 CRI. Optional 2700K,3000K, or 5000K CCT
- For the ultimate level of spill light control, an optional house side shield accessory is available and can be field or factory installed; The house side shield is designed to seamlessly integrate with the T2R, T3, and T4W optics
- Optics are IP66 enclosure rated

Electrical

- 120-277V 50/60Hz, 347V 60Hz or 480V 60Hz operation
- Standard 0-10V dimming
- 10kV/10kA common- and differential- mode surge protection available
- Thermal management transfers heat away from the LED source for optimal efficiency, light output and lumen maintenance
- Ambient operating temperature from -40°C to 40°C; 50°C HA, high ambient, capability available
- Standard with three-position tunnel type compression terminal block
- Greater than 90% lumen maintenance expected at 60,000 hours
- Luminaire available with the field adjustable dimming controller (FADC) to manually adjust wattage and reduce the total lumen output and light levels. Comes pre-set to the highest position at the lumen output selected.

Mounting

- Two-bolt/one-bracket slipfitter with cast-in pipe stop and 2.5° leveling steps
- Fixed-in-place bird guard seals around 1-1/4" to 2" (1-5/8" to 2-3/8" O.D.) mounting arms
- Optional 15" pole mount arm available with round pole adapter and mounting hardware included

Finish

- Housing and cast parts finished in five-stage super TGIC polyester powder coat paint, 2.5 mil nominal thickness for superior protection against fade and wear
- Consult your lighting representative at Cooper Lighting Solutions for a complete selection of standard colors

Shipping Data

- Approximate Net Weight: 12 lbs. (5.4 kgs.)
- Effective Projected Area: 0.35 (Sq. Ft.)

Warranty

- Five year limited warranty, consult website for details. www.cooperlighting.com/legal
- Optional ten-year warranty, please see your Cooper Lighting Solutions Streetworks sales representative for more information

Energy and Performance Data

View Archeon Nano IES files

Power and Lumens

Light Engine - PA		10	19	20	30	40	50	60
Power (Watts)		14	19	24	31	41	52	62
Label		10	20	20	30	40	50	60
Input current @ 120V (A)		0.117	0.159	0.201	0.261	0.344	0.438	0.521
Input current @ 277V (A)		0.056	0.074	0.098	0.121	0.155	0.212	0.244
Input current @ 347V (A)		0.045	0.065	0.080	0.100	0.127	0.173	0.200
Input current @ 480V (A)		0.037	0.047	0.058	0.072	0.093	0.126	0.147
Optics								
T2R	4000K/5000K Lumens	2267	3041	3444	4429	5594	6850	7706
	Bug Rating	B0-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2
	3000K Lumens	2065	2770	3137	4034	5095	6238	7018
	Bug Rating	B0-U0-G1	B0-U0-G1	B0-U0-G1	B0-U0-G1	B0-U0-G1	B0-U0-G1	B0-U0-G1
T2U	4000K/5000K Lumens	2,246	3,013	3,413	4,388	5,543	6,787	7,635
	Bug Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B2-U0-G2
	3000K Lumens	2,046	2,744	3,108	3,997	5,048	6,181	6,953
	Bug Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2
T3	4000K/5000K Lumens	2246	3012	3411	4387	5541	6784	7632
	Bug Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B1-U0-G2	B1-U0-G2
	3000K Lumens	2045	2743	3107	3995	5046	6179	6951
	Bug Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B1-U0-G2
T4W	4000K/5000K Lumens	2245	3012	3411	4386	5540	6783	7631
	Bug Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B1-U0-G2	B2-U0-G2
	3000K Lumens	2045	2743	3106	3994	5045	6178	6950
	Bug Rating	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G1	B1-U0-G2	B1-U0-G2	B1-U0-G2
5WQ	4000K/5000K Lumens	2302	3088	3497	4497	5680	6955	7824
	Bug Rating	B2-U0-G1	B2-U0-G1	B2-U0-G1	B3-U0-G1	B3-U0-G1	B3-U0-G2	B3-U0-G2
	3000K Lumens	2096	2812	3185	4095	5173	6334	7125
	Bug Rating	B2-U0-G1	B2-U0-G1	B2-U0-G1	B3-U0-G1	B3-U0-G1	B3-U0-G1	B3-U0-G2

Lumen Maintenance

Light Engine	Ambient Temperature	TM-21 Lumen Maintenance (60,000 Hours)	Theoretical L70 (Hours)
PA1	Up to 50°C	> 95%	416,000

Lumen Multiplier

Ambient Temperature	Lumen Multiplier
0°C	1.02
10°C	1.01
25°C	1.00
40°C	0.99
50°C	0.97

FADC Settings

FADC Position	Percent of Typical Lumen Output
1	25%
2	48%
3	56%
4	65%
5	75%
6	80%
7	85%
8	90%
9	95%
10	100%

Note: +/-5% typical value

Cooper Lighting Solutions
1121 Highway 74 South
Peachtree City, GA 30269
P: 770-486-4800
www.cooperlighting.com

GE Evolve®

LED Roadway Lighting

ERL1-ERLH-ERL2

current
powered by GE

GE Evolve®
LED Roadway Lighting
ERL1-ERLH-ERL2

The **Evolve®** LED Roadway Luminaire is optimized for customers requiring a LED solution for local, collector and major roadways. GE's unique reflective optics are designed to optimize application efficiency and minimize glare. The modern design incorporates the heat sink directly into the unit for heat transfer to prolong LED life. This reliable unit has a 100,000 hour design life, significantly reducing maintenance needs and expense over the life of the fixture. This efficient solution lowers energy consumption compared to a traditional HID fixture for additional operating cost savings.

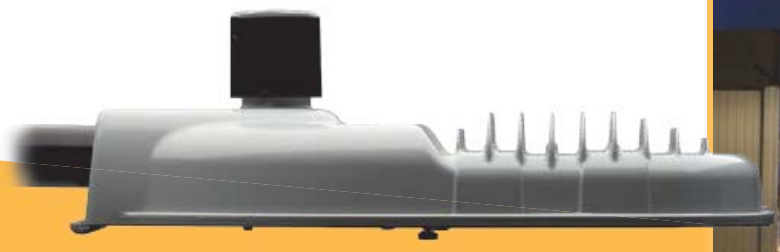
Features:

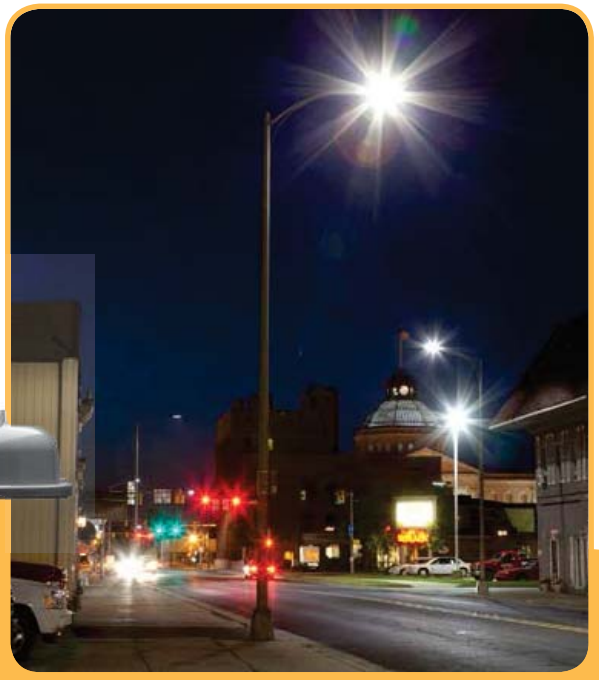
- Optimized roadway photometric distributions
- **Evolve®** light engine consisting of reflective technology designed to optimize application efficiency and minimize glare
- 70 CRI at 2700K, 3000K and 4000K typical.
- –40°C to 50°C UL Ambient Typical.
- ULOR = 0 (zero uplight)
- Designed & Assembled in USA

Applications:

- Local Roadways
- Collector Roadways
- Major Roadway/Streets

Compatible with **LightGrid** Outdoor Wireless Control System





To learn more about **GE Evolve® LED Roadway Lighting**, go to: **www.currentbyge.com**

GE Evolve®
LED Roadway Lighting
ERL1-ERLH-ERL2

Project name _____
Date _____
Type _____

Typical Specifications: ERL1-ERLH-ERL2

LED & Optical

- **Output Range:** 1900 – 30000 lm
- **Photometric Options:** Type II Narrow, Type II Wide, Type III, Type IV
- **System Efficacy:** 100 - 145 LPW
- **CCT:** 2700K, 3000K, 4000K; LEDs @ 70 CRI

Lumen Maintenance Tables

Projected Lxx per IES TM-21 at 25°C for reference:

ERL1 LUMEN OUTPUT CODES	LXX(10K)@HOURS 25,000 HR	50,000 HR	60,000 HR
02,03,04,05,06	L96	L95	L94
07,08,09	L95	L91	L89
10	L89	L80	L76

ERLH LUMEN OUTPUT CODES	LXX(10K)@HOURS 25,000 HR	50,000 HR	60,000 HR
10, 11	L97	L96	L96
13, 14	L95	L93	L92
15, 16	L94	L91	L91

ERL2 LUMEN OUTPUT CODES	LXX(10K)@HOURS 25,000 HR	50,000 HR	60,000 HR
16, 18, 19, 21, 23	L96	L94	L95
25, 27, 28	L95	L93	L92
30	L94	L91	L90

Note: Projected Lxx based on LM80 (10,000 hour testing). Accepted industry tolerances apply to initial luminous flux and lumen maintenance measurements.

Electrical

- **Input Voltage:** 120-277 volt and 347-480 volt
- **Input Frequency:** 50/60Hz
- **Power Factor (PF)*:** >90%
- **Total Harmonic Distortion (THD)*:** <20%

**Power factor and THD tolerance exceptions: ERL1 "02" Lumen output: PF and THD within tolerances above only at 120 volt. ERL1 "03" Lumen output: @120 volt PF~0.89; @ 480 volt THD~26% ERL1 "04" Lumen output: @480 volt THD~22%*

Ratings

- **Surge Protection:** per ANSI C136.2-2015:
  (Driver Internal):
  - 6kV/3kA "Basic: (120 Strikes)" - Standard on ERL1 (02-06)
  - 10kV/5kA "Enhanced: (40 Strikes)" - Standard on ERL1 (07 - 10), ERLH, ERL2

  (Additional Separate Secondary SPD)
  - 10kV/5kA "Enhanced: (40 Strikes) - Option "R"
  - 20kV/10kA "Elevated" (40 Strikes) - Option "T"
- **Safety:** UL/cUL Listed. UL 1598 listed, suitable for wet locations
- **Environmental:** Compliant with the materials restrictions of RoHS
- **EMI:** Title 47 CFR Part 15 Class A
- **Vibration:** 3G per ANSI C136.31-2010
- LM-79 testing in accordance with IESNA Standards
- Std. Optical enclosure rated per ANSI C136.25-2009:
  — ERL1/ERLH/ERL2 = IP65, Optional: IP66

International Dark Sky Association listed. 2700K or 3000K must be selected to meet IDA certification and approval.

- **Operating Temperature:**

PRODUCT ID	LUMEN OUTPUT	AMBIENT READING
ERL1	02-10	-40°C to 50°C
ERLH	10-11, 13	-40°C to 50°C
ERLH	14-16	-40°C to 45°C
ERL2	16-28	-40°C to 50°C
ERL2	30	-40°C to 45°C

Delayed start may be experienced < -35°C

Construction & Finish

- **Housing:**
  — Die Cast Enclosure
  — Casting-integral heat sink for maximum heat transfer
- **Lensing:** Impact resistant tempered glass, standard
- **Paint:** Corrosion resistant polyester powder painted, minimum 2.0 mil. thickness.
  — Standard Colors: Dark Bronze, Black, & Gray
  — RAL & custom colors available
  — Optional coastal finish available.
- **Weight:** 12.4lbs (5.6kg) – 24lbs (10.9kg)

Warranty

- **System Warranty:** 5 Year Standard, 10 Year Optional

Controls

- **Dimming:**
  — Standard: 0-10V; Optional: DALI (120-277V Only)
- **Sensors:**
  — Photo electric sensors (PE) available.
- LightGrid™ compatible

Mounting

- Slipfitter with +/- 5 degree of adjustment for leveling.
- Integral die cast mounting pipe stop.
- Adjustable for 1.25 in. or 2 in. mounting pipe.

Suggested HID Replacement Lumen Levels

- ~4,000–5,000 lumens to replace 100W HPS Cobra-head
- ~7,000–8,800 lumens to replace 150W HPS Cobra-head
- ~8,500–11,500 lumens to replace 200W HPS Cobra-head
- ~11,500–14,000 lumens to replace 250W HPS Cobra-head
- ~21,000–30,000 lumens to replace 400W HPS Cobra-head

Note: Actual replacement lumens may vary based upon mounting height, pole spacing, design criteria, etc.

CONVERSION FROM PREVIOUS GENERATION OPTICS TO CURRENT GENERATION OPTICS** PREVIOUS	DESCRIPTION	CURRENT	DESCRIPTION
A1, B1	Extra Narrow/Narrow Asymmetric	A3	Type II Narrow
C1, E1	Asymmetric Short/Medium	B3	Type II Wide
D1, G1	Asymmetric Forward/Extra Wide	C3	Type III
F1	Asymmetric Wide	D3	Type IV
		E3	Type II Enhanced Back Light

**The information above is designed to provide a guideline to select the correct luminaire for a roadway application. The best and most accurate way to ensure the proper design is do a lighting layout Utilizing AGI.

GE Evolve®

LED Roadway Lighting

ERL1-ERLH-ERL2

Project name _____

Date _____

Type _____

E R L 1 _ _ _ _ – _ _ _ _ _ _ _ – _ _ _ _ – _ _ _

PROD. ID	VOLTAGE	LUMEN OUTPUT	DISTRIBUTION*	CCT	CONTROLS	COLOR	OPTIONS
E = Evolve **R** = Roadway **L** = Local **1** = Single Module	**0** = 120-277V* **1** = 120 **2** = 208 **3** = 240 **4** = 277 **5** = 480 **D** = 347 **H** = 347-480*# * Not available with Fusing. Must choose a discrete voltage with F option. # **Not** available with E controls option.	**02*** **03** **04** **05** **06** **07** **08** **09** **10** See Table *120V only, not compatible with 0-10V dimming.	**A3** = Type II Narrow **B3** = Type II Wide **C3** = Type III **D3** = Type IV **E3** = Type II Enhanced Back Light See Table *Nominal IES Type classing subject to typical variation, individual units may differ.	**27** = 2700K<>* **30** = 3000K<>* **40** = 4000K <> Select 2700K or 3000K CCT for IDA approved units.	**A** = ANSI C136.41 7-pin **D** = ANSI C136.41 7-pin with Shorting Cap **E** = ANSI C136.41 7-pin with non-Dimming PE Control.* *PE Control Only available for 120-277V or 480V Discrete. Not available for 347-480V. **NOTE:** Dimming controls wired for 0-10V standard unless DALI option "U" requested.	**GRAY** = Gray **BLCK** = Black **DKBZ** = Dark Bronze	**A** = 4 Bolt Slipfitter † **F** = Fusing **G** = Internal Bubble Level **I** = IP66 Optical **L** = Tool-Less Entry **R** = Secondary 10kV/5kA SPD **T** = Secondary 20kV/10kA SPD **U** = DALI Programmable +^ **V1** = Variable Output via Field Adjustable Module** **X** = Single Package # **Y** = Coastal Finish* **XXX** = Special Options † Contact manufacturer for Lead-Time. # "X" option provides single pack box per fixture. Std Packaging = 20 units per Magna pak container. * Recommended for installations within 750 ft. from the coast. Contact Factory for Lead-Time. + Compatible with LightGrid 2.0 nodes. ^ Not available in 347V, 480V or 347-480V for Lumen Output Levels 07, 08, 09, and 10. ** Not available with DALI (U) option.

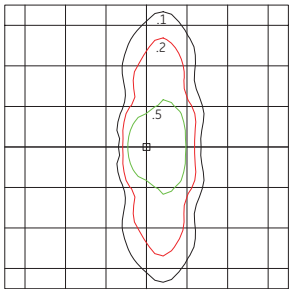
LUMEN OUTPUT	DISTRIBUTION	TYPICAL INITIAL LUMENS 4000K	3000K	2700K	TYPICAL SYSTEM WATTAGE 120-277V	347-480V	BUG RATING 4000K	3000K	2700K	IES FILE NUMBER 4000K 120-277V	4000K 347-480V	3000K 120-277V	3000K 347-480V	2700K 120-277V	2700K 347-480V
02	A3	2000	1900	1900	14	N/A	B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_02A340_-120VIES	N/A	ERL1_02A330_-120VIES	N/A	ERL1_02A327_-120VIES	N/A
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_02B340_-120VIES	N/A	ERL1_02B330_-120VIES	N/A	ERL1_02B327_-120VIES	N/A
	C3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_02C340_-120VIES	N/A	ERL1_02C330_-120VIES	N/A	ERL1_02C327_-120VIES	N/A
	D3						B0-U0-G1	B0-U0-G1	B0-U0-G1	ERL1_02D340_-120VIES	N/A	ERL1_02D330_-120VIES	N/A	ERL1_02D327_-120VIES	N/A
	E3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_02E340_-120VIES	N/A	ERL1_02E330_-120VIES	N/A	ERL1_02E327_-120VIES	N/A
03	A3	3000	2900	2800	22	26	B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_03A340_-120-277VIES	ERL1_03A340_-347-480VIES	ERL1_03A330_-120-277VIES	ERL1_03A330_-347-480VIES	ERL1_03A327_-120-277VIES	ERL1_03A327_-347-480VIES
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_03B340_-120-277VIES	ERL1_03B340_-347-480VIES	ERL1_03B330_-120-277VIES	ERL1_03B330_-347-480VIES	ERL1_03B327_-120-277VIES	ERL1_03B327_-347-480VIES
	C3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_03C340_-120-277VIES	ERL1_03C340_-347-480VIES	ERL1_03C330_-120-277VIES	ERL1_03C330_-347-480VIES	ERL1_03C327_-120-277VIES	ERL1_03C327_-347-480VIES
	D3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_03D340_-120-277VIES	ERL1_03D340_-347-480VIES	ERL1_03D330_-120-277VIES	ERL1_03D330_-347-480VIES	ERL1_03D327_-120-277VIES	ERL1_03D327–347-480VIES
	E3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_03E340_-120-277VIES	ERL1_03E340_-347-480VIES	ERL1_03E330_-120-277VIES	ERL1_03E330_-347-480VIES	ERL1_03E327_-120-277VIES	ERL1_03E327_-347-480VIES
04	A3	4000	3900	3800	31	34	B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_04A340_-120-277VIES	ERL1_04A340_-347-480VIES	ERL1_04A330_-120-277VIES	ERL1_04A330_-347-480VIES	ERL1_04A327_-120-277VIES	ERL1_04A327_-347-480VIES
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_04B340_-120-277VIES	ERL1_04B340_-347-480VIES	ERL1_04B330_-120-277VIES	ERL1_04B330_-347-480VIES	ERL1_04B327_-120-277VIES	ERL1_04B327_-347-480VIES
	C3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_04C340_-120-277VIES	ERL1_04C340_-347-480VIES	ERL1_04C330_-120-277VIES	ERL1_04C330_-347-480VIES	ERL1_04C327_-120-277VIES	ERL1_04C327_-347-480VIES
	D3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_04D340_-120-277VIES	ERL1_04D340_-347-480VIES	ERL1_04D330_-120-277VIES	ERL1_04D330_-347-480VIES	ERL1_04D327_-120-277VIES	ERL1_04D327_-347-480VIES
	E3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_04E340_-120-277VIES	ERL1_04E340_-347-480VIES	ERL1_04E330_-120-277VIES	ERL1_04E330_-347-480VIES	ERL1_04E327_-120-277VIES	ERL1_04E327_-347-480VIES
05	A3	5000	4900	4700	39	43	B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_05A340_-120-277VIES	ERL1_05A340_-347-480VIES	ERL1_05A330_-120-277VIES	ERL1_05A330_-347-480VIES	ERL1_05A327_-120-277VIES	ERL1_05A327_-347-480VIES
	B3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_05B340_-120-277VIES	ERL1_05B340_-347-480VIES	ERL1_05B330_-120-277VIES	ERL1_05B330_-347-480VIES	ERL1_05B327_-120-277VIES	ERL1_05B327_-347-480VIES
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_05C340_-120-277VIES	ERL1_05C340_-347-480VIES	ERL1_05C330_-120-277VIES	ERL1_05C330_-347-480VIES	ERL1_05C327_-120-277VIES	ERL1_05C327_-347-480VIES
	D3						B1-U0-G1	B1-U0-G1	B1-U0-G1	ERL1_05D340_-120-277VIES	ERL1_05D340_-347-480VIES	ERL1_05D330_-120-277VIES	ERL1_05D330_-347-480VIES	ERL1_05D327_-120-277VIES	ERL1_05D327_-347-480VIES
	E3						B2-U0-G2	B1-U0-G1	B1-U0-G1	ERL1_05E340_-120-277VIES	ERL1_05E340_-347-480VIES	ERL1_05E330_-120-277VIES	ERL1_05E330_-347-480VIES	ERL1_05E327_-120-277VIES	ERL1_05E327_-347-480VIES
06	A3	6000	5800	5700	47	52	B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_06A340_-120-277VIES	ERL1_06A340_-347-480VIES	ERL1_06A330_-120-277VIES	ERL1_06A330_-347-480VIES	ERL1_06A327_-120-277VIES	ERL1_06A327_-347-480VIES
	B3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_06B340_-120-277VIES	ERL1_06B340_-347-480VIES	ERL1_06B330_-120-277VIES	ERL1_06B330_-347-480VIES	ERL1_06B327_-120-277VIES	ERL1_06B327_-347-480VIES
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_06C340_-120-277VIES	ERL1_06C340_-347-480VIES	ERL1_06C330_-120-277VIES	ERL1_06C330_-347-480VIES	ERL1_06C327_-120-277VIES	ERL1_06C327_-347-480VIES
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_06D340_-120-277VIES	ERL1_06D340_-347-480VIES	ERL1_06D330_-120-277VIES	ERL1_06D330_-347-480VIES	ERL1_06D327_-120-277VIES	ERL1_06D327_-347-480VIES
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_06E340_-120-277VIES	ERL1_06E340_-347-480VIES	ERL1_06E330_-120-277VIES	ERL1_06E330_-347-480VIES	ERL1_06E327_-120-277VIES	ERL1_06E327_-347-480VIES
07	A3	7000	6800	6600	58		B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_07A340____.IES		ERL1_07A330____.IES		ERL1_07A327____.IES	
	B3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_07B340____.IES		ERL1_07B330____.IES		ERL1_07B327____.IES	
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_07C340____.IES		ERL1_07C330____.IES		ERL1_07C327____.IES	
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_07D340____.IES		ERL1_07D330____.IES		ERL1_07D327____.IES	
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_07E340____.IES		ERL1_07E330____.IES		ERL1_07E327____.IES	
08	A3	8000	7800	7600	71		B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_08A340____.IES		ERL1_08A330____.IES		ERL1_08A327____.IES	
	B3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_08B340____.IES		ERL1_08B330____.IES		ERL1_08B327____.IES	
	C3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_08C340____.IES		ERL1_08C330____.IES		ERL1_08C327____.IES	
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_08D340____.IES		ERL1_08D330____.IES		ERL1_08D327____.IES	
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_08E340____.IES		ERL1_08E330____.IES		ERL1_08E327____.IES	
09	A3	9000	8800	8500	84		B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_09A340____.IES		ERL1_09A330____.IES		ERL1_09A327____.IES	
	B3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_09B340____.IES		ERL1_09B330____.IES		ERL1_09B327____.IES	
	C3						B2-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_09C340____.IES		ERL1_09C330____.IES		ERL1_09C327____.IES	
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_09D340____.IES		ERL1_09D330____.IES		ERL1_09D327____.IES	
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_09E340____.IES		ERL1_09E330____.IES		ERL1_09E327____.IES	
10	A3	9800	9600	9250	97		B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_10A340____.IES		ERL1_10A330____.IES		ERL1_10A327____.IES	
	B3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_10B340____.IES		ERL1_10B330____.IES		ERL1_10B327____.IES	
	C3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_10C340____.IES		ERL1_10C330____.IES		ERL1_10C327____.IES	
	D3						B1-U0-G2	B1-U0-G2	B1-U0-G2	ERL1_10D340____.IES		ERL1_10D330____.IES		ERL1_10D327____.IES	
	E3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERL1_10E340____.IES		ERL1_10E330____.IES		ERL1_10E327____.IES	

Photometrics:

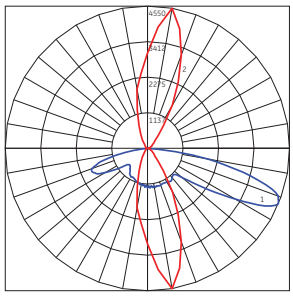
Evolve® LED Streetlight (ERL1)

ERL1
Type II Narrow
(05A340)

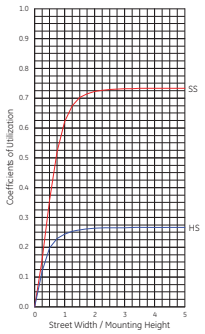
5,000 Lumens
4000K
ERL1_05A340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

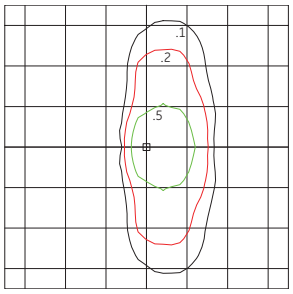


– Vertical plane through horizontal angle of Max. Cd at 80°
– Horizontal cone through vertical angle of Max. Cd at 67°

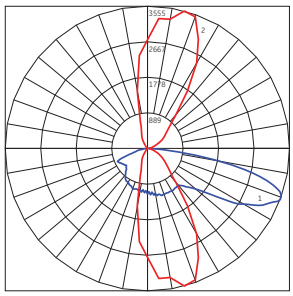


ERL1
Type II Wide
(05B340)

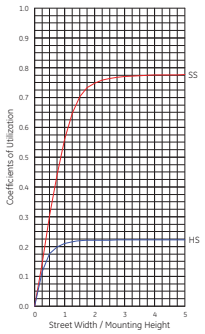
5,000 Lumens
4000K
ERL1_05B340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

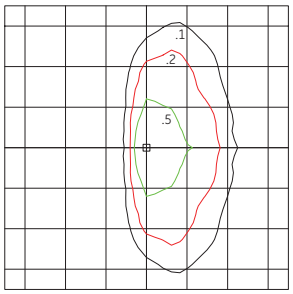


– Vertical plane through horizontal angle of Max. Cd at 75°
– Horizontal cone through vertical angle of Max. Cd at 69°

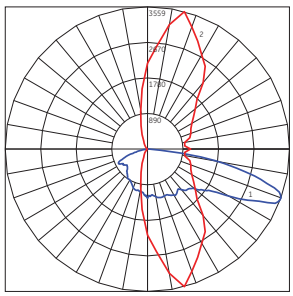


ERL1
Type III
((05C340)

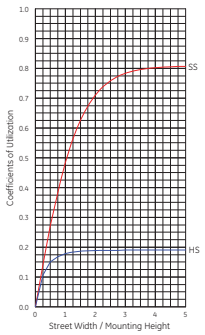
5,000 Lumens
4000K
ERL1_05C340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

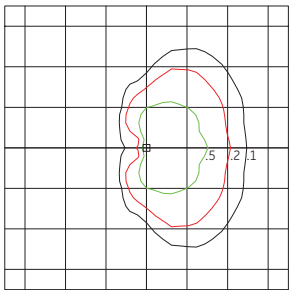


– Vertical plane through horizontal angle of Max. Cd at 75°
– Horizontal cone through vertical angle of Max. Cd at 70°

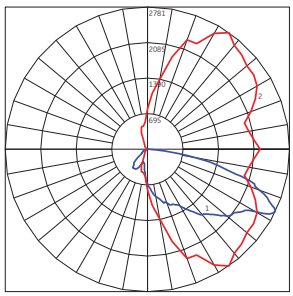


ERL1
Type IV
(05D340)

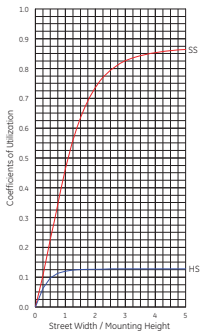
5,000 Lumens
4000K
ERL1_(05D340)___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

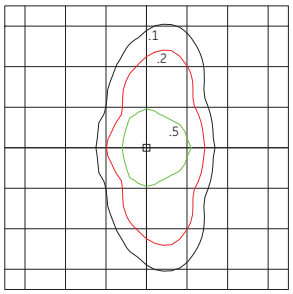


– Vertical plane through horizontal angle of Max. Cd at 55°
– Horizontal cone through vertical angle of Max. Cd at 64°

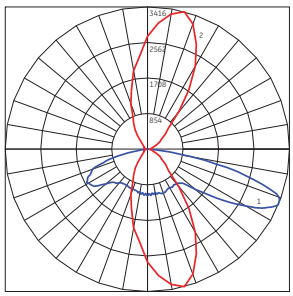


ERL1
Type II Enhanced Back Light
(05E340)

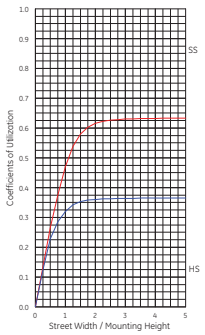
5,000 Lumens
4000K
ERL1_(05E340)___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade



– Vertical plane through horizontal angle of Max. Cd at 75°
– Horizontal cone through vertical angle of Max. Cd at 67°



GE Evolve®

LED Roadway Lighting

ERL1-ERLH-ERL2

Project name _____

Date _____

Type _____

E R L H _ _ _ _ – _ _ _ _ _ _ _ _ – _ _ _ _ – _ _ _

PROD. ID	VOLTAGE	LUMEN OUTPUT	DISTRIBUTION*	CCT	CONTROLS	COLOR	OPTIONS
E = Evolve **R** = Roadway **L** = Local **H** = High Output	**0** = 120-277V* **1** = 120 **2** = 208 **3** = 240 **4** = 277 **5** = 480 **D** = 347 **H** = 347-480*# * Not available with Fusing. Must choose a discrete voltage with F option. # **Not** available with E controls option.	**10** **11** **13** **14** **15** **16** See Table	**A3** = Type II Narrow **B3** = Type II Wide **C3** = Type III **D3** = Type IV **E3** = Type II Enhanced Back Light See Table *Nominal IES Type classing subject to typical variation, individual units may differ.	**27** = 2700K<>**30** = 3000K<>**40** = 4000K <> Select 2700K or 3000K CCT for IDA approved units.	**A** = ANSI C136.41 7-pin **D** = ANSI C136.41 7-pin with Shorting Cap **E** = ANSI C136.41 7-pin with non-Dimming PE Control.* *PE Control Only available for 120-277V or 480V Discrete. Not available for 347-480V. **NOTE:** Dimming controls wired for 0-10V standard unless DALI option "U" requested.	**GRAY** = Gray **BLCK** = Black **DKBZ** = Dark Bronze	**A** = 4 Bolt Slipfitter † **F** = Fusing **G** = Internal Bubble Level **I** = IP66 Optical **L** = Tool-Less Entry **R** = Secondary 10kV/5kA SPD **T** = Secondary 20kV/10kA SPD **U** = DALI Programmable +^ **V1** = Variable Output via Field Adjustable Module** **X** = Single Package # **Y** = Coastal Finish* **XXX** = Special Options † Contact manufacturer for Lead-Time. # "X" option provides single pack box per fixture. Std Packaging = 20 units per Magna pak container. * Recommended for installations within 750 ft. from the coast. Contact Factory for Lead-Time. + Compatible with LightGrid 2.0 nodes. ^ Not available in 347V, 480V or 347-480V. ** Not available with DALI (U) option.

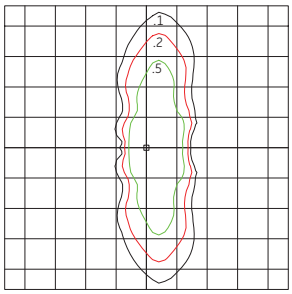
LUMEN OUTPUT	DISTRIBUTION	TYPICAL INITIAL LUMENS 4000K	3000K	2700K	TYPICAL SYSTEM WATTAGE 120-277V	347-480V	BUG RATING 4000K	3000K	2700K	IES FILE NUMBER 4000K	3000K	2700K
10	A3	10000	9600	9300	82		B2-U0-G2	B2-U0-G2	B2-U0-G2	ERLH_10A340____.IES	ERLH_10A330____.IES	ERLH_10A327____.IES
	B3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERLH_10B340____.IES	ERLH_10B330____.IES	ERLH_10B327____.IES
	C3						B2-U0-G2	B2-U0-G2	B2-U0-G2	ERLH_10C340____.IES	ERLH_10C330____.IES	ERLH_10C327____.IES
	D3						B1-U0-G3	B1-U0-G2	B1-U0-G2	ERLH_10D340____.IES	ERLH_10D330____.IES	ERLH_10D327____.IES
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERLH_10E340____.IES	ERLH_10E330____.IES	ERLH_10E327____.IES
11	A3	11500	11000	10700	98		B3-U0-G3	B2-U0-G2	B2-U0-G2	ERLH_11A340____.IES	ERLH_11A330____.IES	ERLH_11A327____.IES
	B3						B3-U0-G3	B2-U0-G2	B2-U0-G2	ERLH_11B340____.IES	ERLH_11B330____.IES	ERLH_11B327____.IES
	C3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERLH_11C340____.IES	ERLH_11C330____.IES	ERLH_11C327____.IES
	D3						B1-U0-G3	B1-U0-G2	B1-U0-G2	ERLH_11D340____.IES	ERLH_11D330____.IES	ERLH_11D327____.IES
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERLH_11E340____.IES	ERLH_11E330____.IES	ERLH_11E327____.IES
13	A3	13000	12500	12100	111		B3-U0-G3	B3-U0-G3	B3-U0-G3	ERLH_13A340____.IES	ERLH_13A330____.IES	ERLH_13A327____.IES
	B3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERLH_13B340____.IES	ERLH_13B330____.IES	ERLH_13B327____.IES
	C3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERLH_13C340____.IES	ERLH_13C330____.IES	ERLH_13C327____.IES
	D3						B2-U0-G3	B2-U0-G3	B1-U0-G3	ERLH_13D340____.IES	ERLH_13D330____.IES	ERLH_13D327____.IES
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERLH_13E340____.IES	ERLH_13E330____.IES	ERLH_13E327____.IES
14	A3	14000	13400	13000	122		B3-U0-G3	B3-U0-G3	B3-U0-G3	ERLH_14A340____.IES	ERLH_14A330____.IES	ERLH_14A327____.IES
	B3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERLH_14B340____.IES	ERLH_14B330____.IES	ERLH_14B327____.IES
	C3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERLH_14C340____.IES	ERLH_14C330____.IES	ERLH_14C327____.IES
	D3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERLH_14D340____.IES	ERLH_14D330____.IES	ERLH_14D327____.IES
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERLH_14E340____.IES	ERLH_14E330____.IES	ERLH_14E327____.IES
15	A3	15000	14400	13900	136		B3-U0-G3	B3-U0-G3	B3-U0-G3	ERLH_15A340____.IES	ERLH_15A330____.IES	ERLH_15A327____.IES
	B3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERLH_15B340____.IES	ERLH_15B330____.IES	ERLH_15B327____.IES
	C3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERLH_15C340____.IES	ERLH_15C330____.IES	ERLH_15C327____.IES
	D3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERLH_15D340____.IES	ERLH_15D330____.IES	ERLH_15D327____.IES
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERLH_15E340____.IES	ERLH_15E330____.IES	ERLH_15E327____.IES
16	A3	16000	15300	14900	149		B3-U0-G3	B3-U0-G3	B3-U0-G3	ERLH_16A340____.IES	ERLH_16A330____.IES	ERLH_16A327____.IES
	B3						B3-U0-G3	B3-U0-G3	B2-U0-G3	ERLH_16B340____.IES	ERLH_16B330____.IES	ERLH_16B327____.IES
	C3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERLH_16C340____.IES	ERLH_16C330____.IES	ERLH_16C327____.IES
	D3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERLH_16D340____.IES	ERLH_16D330____.IES	ERLH_16D327____.IES
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERLH_16E340____.IES	ERLH_16E330____.IES	ERLH_16E327____.IES

Photometrics:

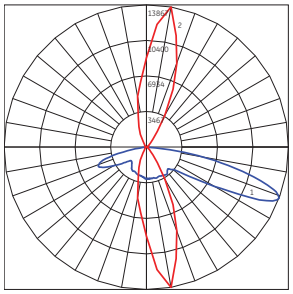
Evolve® LED Streetlight (ERLH)

ERLH
Type II Narrow
(13A340)

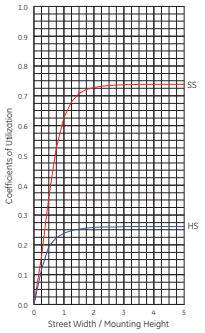
13,000 Lumens
4000K
ERLH_13A340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

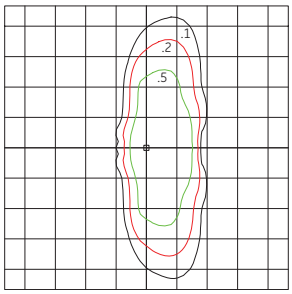


– Vertical plane through horizontal angle of Max. Cd at 80°
– Horizontal cone through vertical angle of Max. Cd at 69°

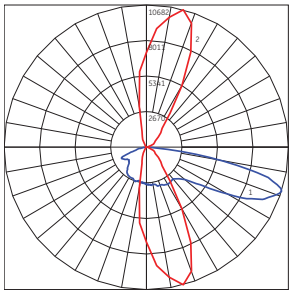


ERLH
Type II Wide
(13B340)

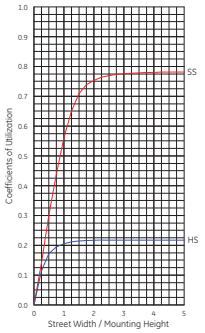
13,000 Lumens
4000K
ERLH_13B340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

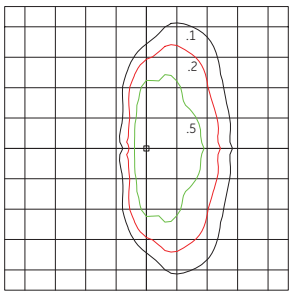


– Vertical plane through horizontal angle of Max. Cd at 75°
– Horizontal cone through vertical angle of Max. Cd at 72°

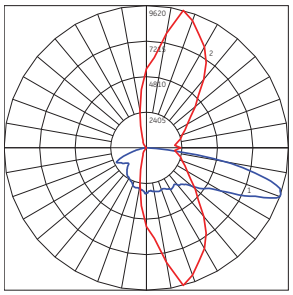


ERLH
Type III
(13C340)

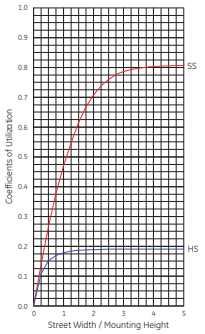
13,000 Lumens
4000K
ERLH_13C340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

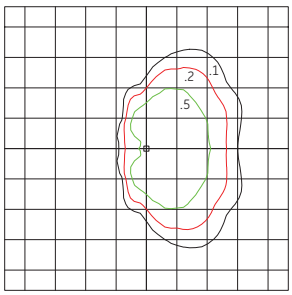


– Vertical plane through horizontal angle of Max. Cd at 75°
– Horizontal cone through vertical angle of Max. Cd at 71°

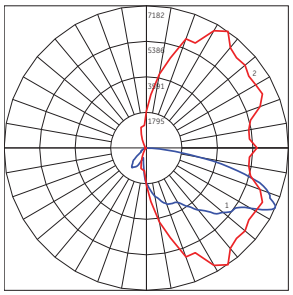


ERLH
Type IV
13D340

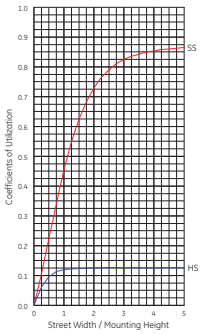
13,000 Lumens
4000K
ERLH_13D340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

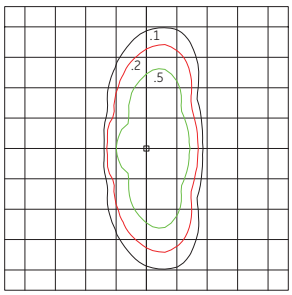


– Vertical plane through horizontal angle of Max. Cd at 55°
– Horizontal cone through vertical angle of Max. Cd at 65°

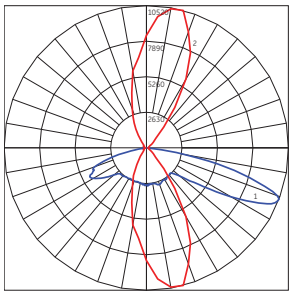


ERLH
Type II Enhanced Back Light
13E340

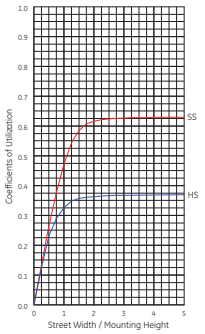
13,000 Lumens
4000K
ERLH_13E340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade



– Vertical plane through horizontal angle of Max. Cd at 75°
– Horizontal cone through vertical angle of Max. Cd at 69°



GE Evolve®

LED Roadway Lighting

ERL1-ERLH-ERL2

Project name ________________

Date ________________

Type ________________

E R L 2
_ _ _ _   _   _ _   _ _   _ _   _   _ _ _ _   _ _ _

PROD. ID	VOLTAGE	LUMEN OUTPUT	DISTRIBUTION*	CCT	CONTROLS	COLOR	OPTIONS
E = Evolve **R** = Roadway **L** = Local **2** = Double Module	**0** = 120-277V* **1** = 120 **2** = 208 **3** = 240 **4** = 277 **5** = 480 **D** = 347 **H** = 347-480*# * Not available with Fusing. Must choose a discrete voltage with F option. # **Not** available with E controls option.	**16** **18** **19** **21** **23** **25** **27** **28** **30** See Table	**A3** = Type II Narrow **B3** = Type II Wide **C3** = Type III **D3** = Type IV **E3** = Type II Enhanced Back Light See Table *Nominal IES Type classing subject to typical variation, individual units may differ.	**27** = 2700K<> **30** = 3000K<> **40** = 4000K <> Select 2700K or 3000K CCT for IDA approved units.	**A** = ANSI C136.41 7-pin **D** = ANSI C136.41 7-pin with Shorting Cap **E** = ANSI C136.41 7-pin with non-Dimming PE Control.* *PE Control Only available for 120-277V or 480V Discrete. Not available for 347-480V. **NOTE:** Dimming controls wired for 0-10V standard unless DALI option "U" requested.	**GRAY** = Gray **BLCK** = Black **DKBZ** = Dark Bronze	**A** = 4 Bolt Slipfitter † **F** = Fusing **G** = Internal Bubble Level **I** = IP66 Optical **L** = Tool-Less Entry **M1** = Magnapack*** **R** = Secondary 10kV/5kA SPD **T** = Secondary 20kV/10kA SPD **U** = DALI Programmable ^ **V1** = Variable Output via Field Adjustable Module** **Y** = Coastal Finish* **XXX** = Special Options † Contact manufacturer for Lead-Time. * Recommended for installations within 750 ft. from the coast. Contact Factory for Lead-Time. + Compatible with LightGrid 2.0 nodes. ^ Not available in 347V, 480V or 347-480V. ** Not available with DALI (U) option. *** 20 fixtures per Magnapack.

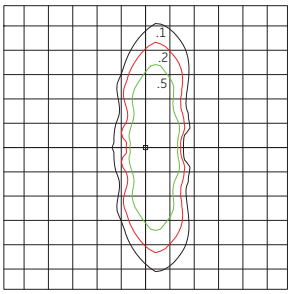
LUMEN OUTPUT	DISTRIBUTION	TYPICAL INITIAL LUMENS 4000K	3000K	2700K	TYPICAL SYSTEM WATTAGE 120-277V	347-480V	BUG RATING 4000K	3000K	2700K	IES FILE NUMBER 4000K 120-277V	4000K 347-480V	3000K 120-277V	3000K 347-480V	2700K 120-277V	2700K 347-480V
16	A3	16000	15300	14900	120		B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_16A340_.IES		ERL2_16A330_.IES		ERL2_16A327_.IES	
	B3						B3-U0-G3	B3-U0-G3	B2-U0-G3	ERL2_16B340_.IES		ERL2_16B330_.IES		ERL2_16B327_.IES	
	C3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERL2_16C340_.IES		ERL2_16C330_.IES		ERL2_16C327_.IES	
	D3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERL2_16D340_.IES		ERL2_16D330_.IES		ERL2_16D327_.IES	
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_16E340_.IES		ERL2_16E330_.IES		ERL2_16E327_.IES	
18	A3	18000	17300	16700	140		B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_18A340_.IES		ERL2_18A330_.IES		ERL2_18A327_.IES	
	B3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_18B340_.IES		ERL2_18B330_.IES		ERL2_18B327_.IES	
	C3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERL2_18C340_.IES		ERL2_18C330_.IES		ERL2_18C327_.IES	
	D3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERL2_18D340_.IES		ERL2_18D330_.IES		ERL2_18D327_.IES	
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_18E340_.IES		ERL2_18E330_.IES		ERL2_18E327_.IES	
19	A3	19000	18200	17700	149		B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_19A340_.IES		ERL2_19A330_.IES		ERL2_19A327_.IES	
	B3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_19B340_.IES		ERL2_19B330_.IES		ERL2_19B327_.IES	
	C3						B3-U0-G3	B2-U0-G3	B2-U0-G3	ERL2_19C340_.IES		ERL2_19C330_.IES		ERL2_19C327_.IES	
	D3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERL2_19D340_.IES		ERL2_19D330_.IES		ERL2_19D327_.IES	
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_19E340_.IES		ERL2_19E330_.IES		ERL2_19E327_.IES	
21	A3	21000	20100	19500	174	177	B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_21A340_-120-277V.IES	ERL2_21A340_-347-480V.IES	ERL2_21A330_-120-277V.IES	ERL2_21A330_-347-480V.IES	ERL2_21A327_-120-277V.IES	ERL2_21A327_-347-480V.IES
	B3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_21B340_-120-277V.IES	ERL2_21B340_-347-480V.IES	ERL2_21B330_-120-277V.IES	ERL2_21B330_-347-480V.IES	ERL2_21B327_-120-277V.IES	ERL2_21B327_-347-480V.IES
	C3						B3-U0-G4	B3-U0-G3	B3-U0-G3	ERL2_21C340_-120-277V.IES	ERL2_21C340_-347-480V.IES	ERL2_21C330_-120-277V.IES	ERL2_21C330_-347-480V.IES	ERL2_21C327_-120-277V.IES	ERL2_21C327_-347-480V.IES
	D3						B2-U0-G3	B2-U0-G3	B2-U0-G3	ERL2_21D340_-120-277V.IES	ERL2_21D340_-347-480V.IES	ERL2_21D330_-120-277V.IES	ERL2_21D330_-347-480V.IES	ERL2_21D327_-120-277V.IES	ERL2_21D327_-347-480V.IES
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_21E340_-120-277V.IES	ERL2_21E340_-347-480V.IES	ERL2_21E330_-120-277V.IES	ERL2_21E330_-347-480V.IES	ERL2_21E327_-120-277V.IES	ERL2_21E327_-347-480V.IES
23	A3	23000	22100	21400	194	196	B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_23A340_-120-277V.IES	ERL2_23A340_-347-480V.IES	ERL2_23A330_-120-277V.IES	ERL2_23A330_-347-480V.IES	ERL2_23A327_-120-277V.IES	ERL2_23A327_-347-480V.IES
	B3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_23B340_-120-277V.IES	ERL2_23B340_-347-480V.IES	ERL2_23B330_-120-277V.IES	ERL2_23B330_-347-480V.IES	ERL2_23B327_-120-277V.IES	ERL2_23B327_-347-480V.IES
	C3						B3-U0-G4	B3-U0-G4	B3-U0-G4	ERL2_23C340_-120-277V.IES	ERL2_23C340_-347-480V.IES	ERL2_23C330_-120-277V.IES	ERL2_23C330_-347-480V.IES	ERL2_23C327_-120-277V.IES	ERL2_23C327_-347-480V.IES
	D3						B2-U0-G4	B2-U0-G4	B2-U0-G3	ERL2_23D340_-120-277V.IES	ERL2_23D340_-347-480V.IES	ERL2_23D330_-120-277V.IES	ERL2_23D330_-347-480V.IES	ERL2_23D327_-120-277V.IES	ERL2_23D327_-347-480V.IES
	E3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_23E340_-120-277V.IES	ERL2_23E340_-347-480V.IES	ERL2_23E330_-120-277V.IES	ERL2_23E330_-347-480V.IES	ERL2_23E327_-120-277V.IES	ERL2_23E327_-347-480V.IES
25	A3	25000	24000	23300	214		B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_25A340_.IES		ERL2_25A330_.IES		ERL2_25A327_.IES	
	B3						B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_25B340_.IES		ERL2_25B330_.IES		ERL2_25B327_.IES	
	C3						B3-U0-G4	B3-U0-G4	B3-U0-G4	ERL2_25C340_.IES		ERL2_25C330_.IES		ERL2_25C327_.IES	
	D3						B2-U0-G4	B2-U0-G4	B2-U0-G4	ERL2_25D340_.IES		ERL2_25D330_.IES		ERL2_25D327_.IES	
	E3						B4-U0-G4	B4-U0-G4	B4-U0-G4	ERL2_25E340_.IES		ERL2_25E330_.IES		ERL2_25E327_.IES	
27	A3	27000	25900	25100	237		B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_27A340_.IES		ERL2_27A330_.IES		ERL2_27A327_.IES	
	B3						B3-U0-G4	B3-U0-G4	B3-U0-G3	ERL2_27B340_.IES		ERL2_27B330_.IES		ERL2_27B327_.IES	
	C3						B3-U0-G4	B3-U0-G4	B3-U0-G4	ERL2_27C340_.IES		ERL2_27C330_.IES		ERL2_27C327_.IES	
	D3						B2-U0-G4	B2-U0-G4	B2-U0-G4	ERL2_27D340_.IES		ERL2_27D330_.IES		ERL2_27D327_.IES	
	E3						B4-U0-G4	B4-U0-G4	B4-U0-G4	ERL2_27E340_.IES		ERL2_27E330_.IES		ERL2_27E327_.IES	
28	A3	28000	26900	26100	251		B3-U0-G3	B3-U0-G3	B3-U0-G3	ERL2_28A340_.IES		ERL2_28A330_.IES		ERL2_28A327_.IES	
	B3						B3-U0-G4	B3-U0-G4	B3-U0-G4	ERL2_28B340_.IES		ERL2_28B330_.IES		ERL2_28B327_.IES	
	C3						B3-U0-G4	B3-U0-G4	B3-U0-G4	ERL2_28C340_.IES		ERL2_28C330_.IES		ERL2_28C327_.IES	
	D3						B2-U0-G4	B2-U0-G4	B2-U0-G4	ERL2_28D340_.IES		ERL2_28D330_.IES		ERL2_28D327_.IES	
	E3						B4-U0-G4	B4-U0-G4	B4-U0-G4	ERL2_28E340_.IES		ERL2_28E330_.IES		ERL2_28E327_.IES	
30	A3	30000	28800	27900	278		B4-U0-G4	B4-U0-G4	B3-U0-G3	ERL2_30A340_.IES		ERL2_30A330_.IES		ERL2_30A327_.IES	
	B3						B3-U0-G4	B3-U0-G4	B3-U0-G4	ERL2_30B340_.IES		ERL2_30B330_.IES		ERL2_30B327_.IES	
	C3						B3-U0-G4	B3-U0-G4	B3-U0-G4	ERL2_30C340_.IES		ERL2_30C330_.IES		ERL2_30C327_.IES	
	D3						B2-U0-G4	B2-U0-G4	B2-U0-G4	ERL2_30D340_.IES		ERL2_30D330_.IES		ERL2_30D327_.IES	
	E3						B4-U0-G4	B4-U0-G4	B4-U0-G4	ERL2_30E340_.IES		ERL2_30E330_.IES		ERL2_30E327_.IES	

Photometrics:

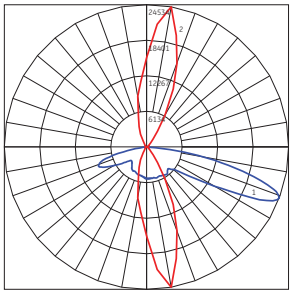
Evolve® LED Streetlight (ERL2)

ERL2
Type II Narrow
(23A340)

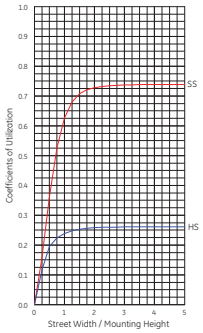
23,000 Lumens
4000K
ERL2_23A340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

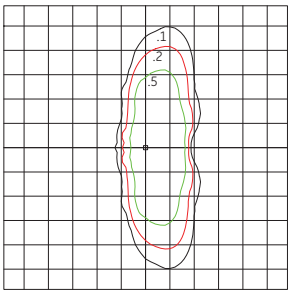


– Vertical plane through horizontal angle of Max. Cd at 80°
– Horizontal cone through vertical angle of Max. Cd at 69°

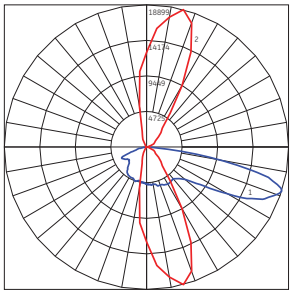


ERL2
Type II Wide
(23B340)

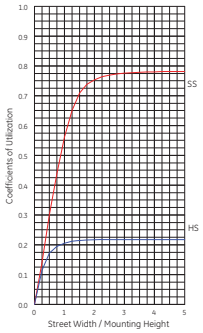
23,000 Lumens
4000K
ERL2_23B340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

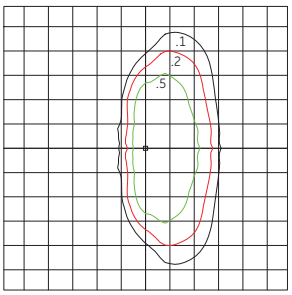


– Vertical plane through horizontal angle of Max. Cd at 75°
– Horizontal cone through vertical angle of Max. Cd at 72°

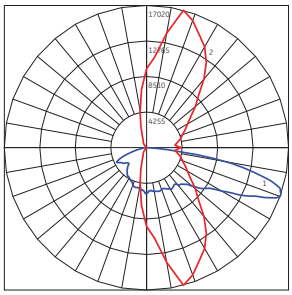


ERL2
Type III
(23C340)

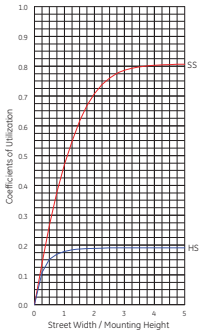
23,000 Lumens
4000K
ERL2_23C340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

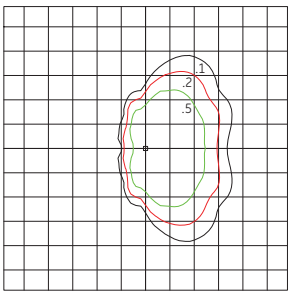


– Vertical plane through horizontal angle of Max. Cd at 75°
– Horizontal cone through vertical angle of Max. Cd at 71°

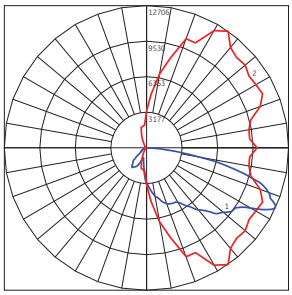


ERL2
Type IV
(23D340)

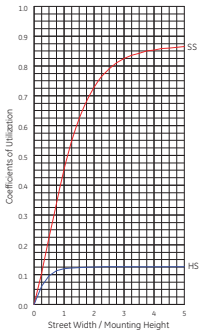
23,000 Lumens
4000K
ERL2_23D340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

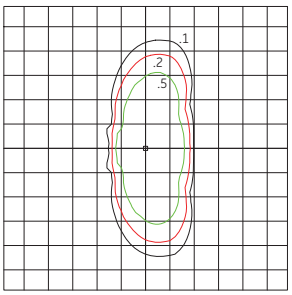


– Vertical plane through horizontal angle of Max. Cd at 55°
– Horizontal cone through vertical angle of Max. Cd at 65°

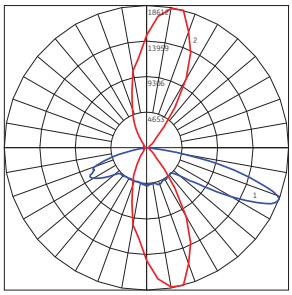


ERL2
Type II Enhanced Back Light
(23E340)

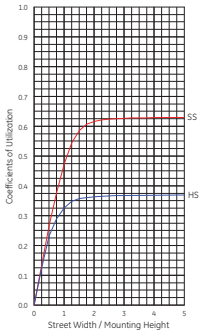
23,000 Lumens
4000K
ERL2_23E340___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade



– Vertical plane through horizontal angle of Max. Cd at 75°
– Horizontal cone through vertical angle of Max. Cd at 69°



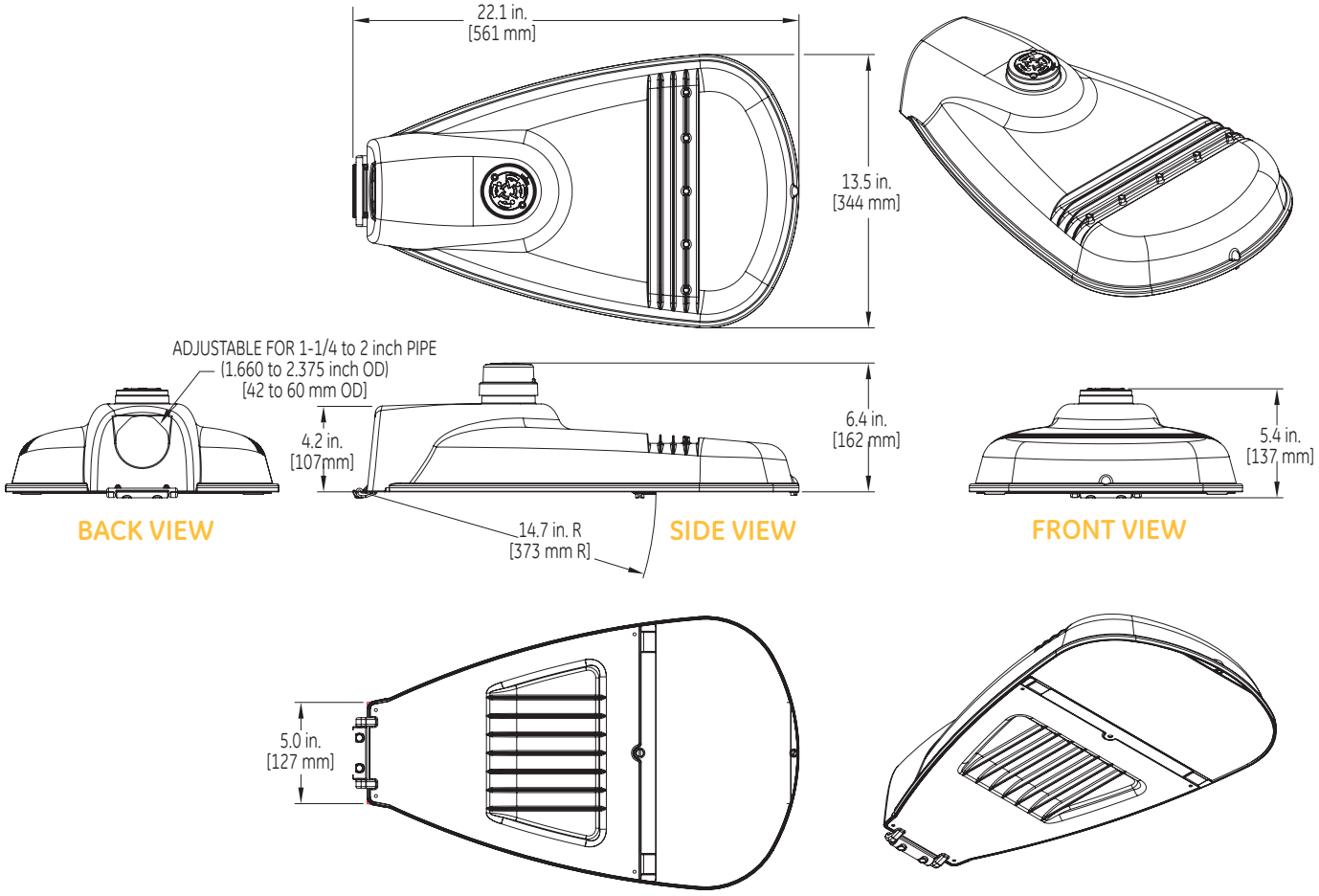
GE Evolve®

LED Roadway Lighting

ERL1-ERLH-ERL2

Product Dimensions:

Evolve® LED Streetlight (ERL1)



DATA

- Approximate net weight: 12.4 lbs (5.6kgs) -15.5 lbs (7.0kgs) with XFMR
- Effective Projected Area (EPA): 0.5 sq ft max (0.046 sq m)

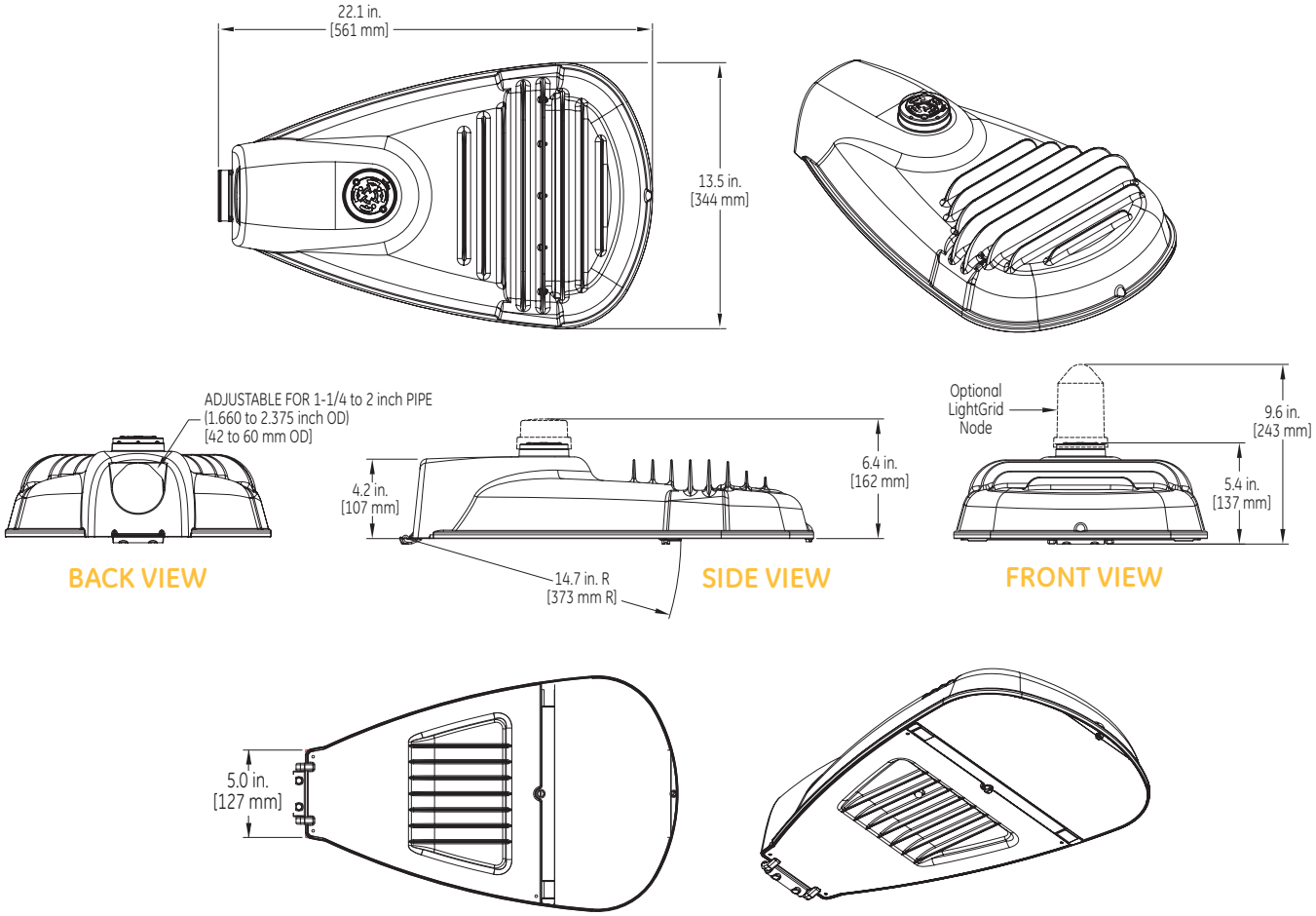
GE Evolve®

LED Roadway Lighting

ERL1-ERLH-ERL2

Product Dimensions:

Evolve® LED Streetlight (ERLH)



DATA

- Approximate net weight: 15.15 lbs (6.9 kgs) - 2 Bolt Slipfitter
- Approximate net weight: 15.85 lbs (7.2 kgs) - 4 Bolt Slipfitter
- Effective Projected Area (EPA): 0.5 sq ft max (0.046 sq m)

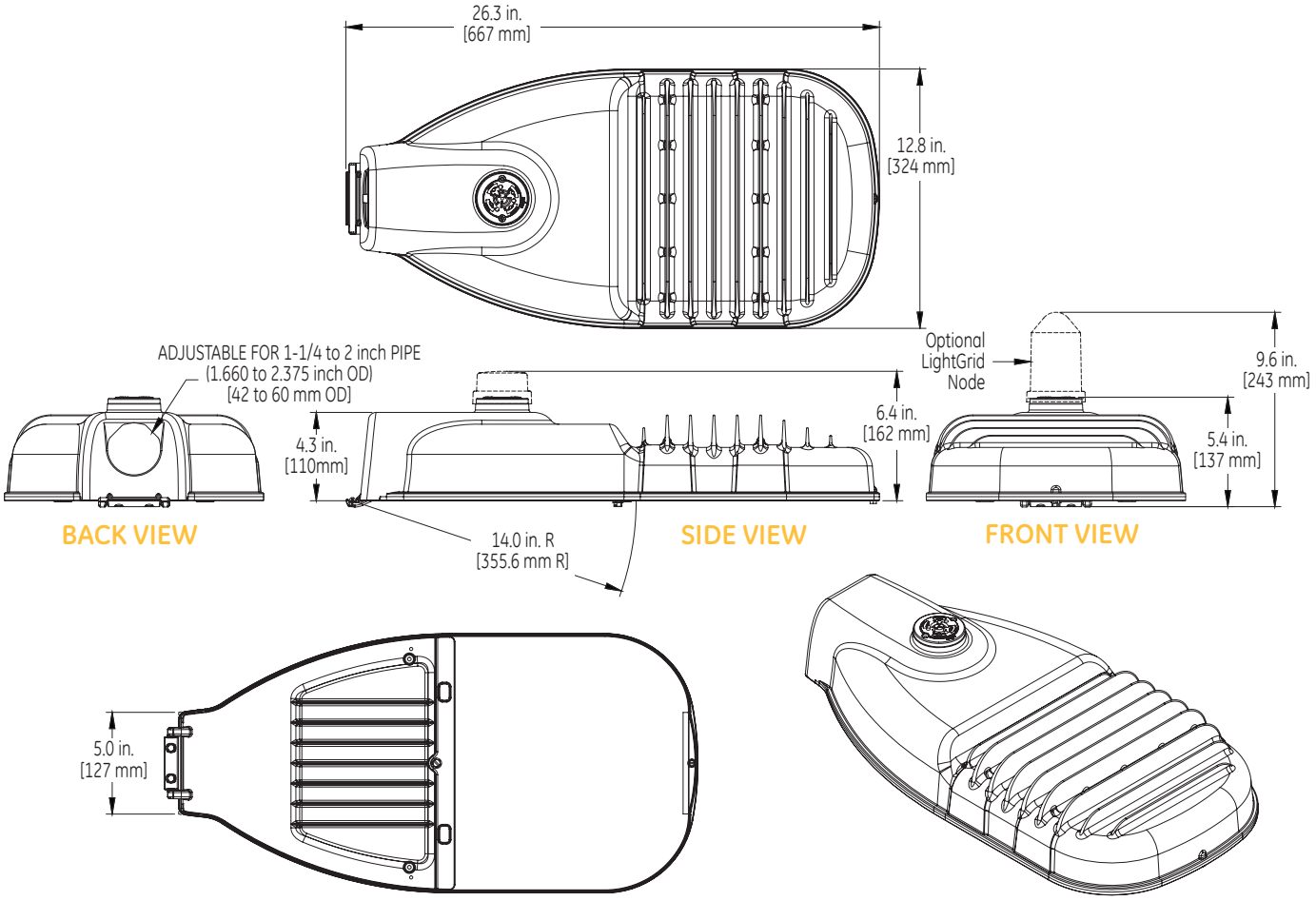
GE Evolve®

LED Roadway Lighting

ERL1-ERLH-ERL2

Product Dimensions:

Evolve® LED Streetlight (ERL2)



DATA

- Approximate net weight: 24.0 lbs (10.9 kgs)
  Contact manufacturer for specific configuration weight.
- Effective Projected Area (EPA): 0.57 sq ft max (0.053 sq m)

Evolve®

LED Roadway Lighting

(ERLC)

Product Description:

The **Evolve**® LED Roadway ERLC Luminaire is optimized for customers requiring a LED solution for residential, local and collector roadways. GE's unique reflective optics are designed to optimize application efficiency and minimize glare. The modern design incorporates the heat sink directly into the unit for heat transfer to prolong LED life. This reliable unit has a 100,000 hour design life, significantly reducing maintenance needs and expense over the life of the fixture. This efficient solution lowers energy consumption compared to a traditional HID fixture for additional operating cost savings.

Product Features:

Applications:
- Local, Collector & Residential Roadway/Streets utilizing advanced LED reflective optical system.

Housing:
  - — Aluminum Die Cast Enclosure
  - — Casting-integral heat sink for maximum heat transfer
- **Lens:** Impact resistant tempered glass
- **Paint:** Corrosion resistant polyester powder paint, minimum 2.0 mil. thickness.
  - — Standard Colors: Gray, Black, Dark Bronze & White
  - — RAL & custom colors available
  - — Optional coastal finish available.
- **Weight:** 8.5 Lbs

Optical System:
- **Lumen Output:** 2,000 - 7,000 lm
- **Photometry:** Types II Narrow, II/III, III, V
- **Efficacy:** 110-143 LPW
- **CCT:** 2700K, 3000K, 4000K, 5000K
  High Brightness LED's @ 70 CRI Minimum

Ratings:
- **Surge Protection:** Per ANSI C136.2-2015
  - — Standard: 10kV/5kA "Enhanced" (40 Strikes)
  - — Optional: Secondary 10kV/5kA SPD
- **Safety:** UL/cUL Listed. UL 1598, suitable for wet locations.
- **Environmental:** Compliant with the materials restrictions of RoHS.
- **EMI:** Title 47 CFR Part 15 Class A
- **Vibration:** 3G per ANSI C136.31-2010
- LM-79 testing in accordance with IESNA Standards
- **Ingress Rating:** IP66 optical enclosure rated per ANSI C136.25-2013
- **Impact:** IK08 Lens

Lumen Maintenance Tables

Projected Lxx per IES TM-21 at 25°C:

ERLC LUMEN OUTPUT CODES	DISTRIBUTIONS	LXX(10K)@HOURS 25,000 HR	50,000 HR	60,000 HR
02, 03, 04, 05	A5, B5, C5	L97	L93	L92
06	A5, B5, C5	L96	L91	L89
07	A5, B5, C5	L95	L89	L87

ERLC LUMEN OUTPUT CODES	DISTRIBUTIONS	LXX(10K)@HOURS 25,000 HR	50,000 HR	60,000 HR
02, 03, 04, 05	V4	L96	L93	L93
06	V4	L94	L90	L88

Note: Projected Lxx based on LM80 (≥10,000 hour testing). Accepted industry tolerances apply to initial luminous flux and lumen maintenance claims.

Lumen Ambient Temperature

PRODUCT ID	LUMEN OUTPUT	AMBIENT READING
ERLC	02-07	-40°C to 50°C

Mounting:
- Adjustable for 1.25 to 2 in. nominal mounting pipe
- Integral diecast mounting pipe stop
- Slipfitter with +/- 5 degrees of leveling adjustment

Electrical:
- **Input Voltage:** 120-277 volt
- **Input Frequency:** 50/60Hz
- **Power Factor (PF)*:** ≥ 90%
- **Total Harmonic Distortion (THD)*:** ≤20%

** System PF and THD specified at rated watts*

International Dark Sky Association listed. 2700K or 3000K must be selected to meet IDA certification and approval.

Controls

- **Dimming:**
  - — Standard: 0-10V;
  - — Optional: DALI (Option U)
- **Sensors:**
  - — Photo electric sensors (PE) available.
  - — LightGrid™ compatible

Warranty:

- 5 Year Standard, 10 Year Optional

Suggested HID Replacement Lumen Levels

- ~2,000–7,000 lumens to replace 50-150W HPS Cobrahead

CONVERSION FROM PREVIOUS GENERATION OPTICS TO CURRENT GENERATION OPTICS**			
PREVIOUS	DESCRIPTION	CURRENT	DESCRIPTION
A3/A4	Type II Narrow	A5	Type II Narrow
B3/B4	Type II Wide	B5	Type II/III
C3/C4	Type III	C5	Type III
D3	Type IV	None	
E3	Type II Enhanced Backlight	None	
		V4	Type V

Notes: Actual replacement lumens may vary based upon mounting height, pole spacing, design criteria, etc.

**These guidelines assist in luminaire selection. To ensure an accurate selection, do a lighting design layout.

Ordering Logic and Spec Tables

ERLC

_ _ _ _   _   _ _   _ _   _ _   _   _ _ _ _   _ _ _

PROD. ID	VOLTAGE	LUMEN OUTPUT	DISTRIBUTION	CCT	CONTROLS	COLOR	OPTIONS
E = Evolve **R** = Roadway **L** = Local **C** = Compact	**0** = 120-277* **1** = 120 **2** = 208 **3** = 240 **4** = 277 **8** = 120-240V* * Not available with Fusing.	**02*** **03** **04** **05** **06** **07** *02 Lumen choice only offered for 120-240V.	**For ERLC 02-07** **A5** = Type II Narrow **B5** = Type II/III^ **C5** = Type III **V4** = Type V	**27** = 2700K ◇ **30** = 3000K ◇ **40** = 4000K **50** = 5000K ◇ Select 2700K or 3000K CCT for IDA approved units.	**A** = ANSI C136.41 7-pin **D** = ANSI C136.41 7-pin receptacle with Shorting Cap **E** = ANSI C136.41 7-pin receptacle with non-Dimming PE Control **NOTE:** 0-10V control standard unless DALI option"U"requested.	**GRAY** = Gray **BLCK** = Black **DKBZ** = Dark Bronze **WHTE** = White	**B** = Tether **C1** = Captive Door **F** = Fusing **G** = Internal Bubble Level **L** = Tool-Less Entry **M1** = Magnapak** **R** = Optional Secondary Enhanced Surge Protection (10kV/5kA) **U** = DALI Programmable +, # **V1** = Variable Output via Field Adjustable Module*** **Y** = Coastal Finish* **XXX** = Special Options * Recommended for installations within 750 ft. from the coast. Contact Factory for Lead-Time. + Compatible with LightGrid 2.0 nodes. ** 40 fixtures per Magnapak ***No DALI available (U) or Fusing (F). System PF and THD specified at rated watts. # Add 1W on Typical System Wattage for A5-B5-C5 Distribution Lumen Output 04 & 05.

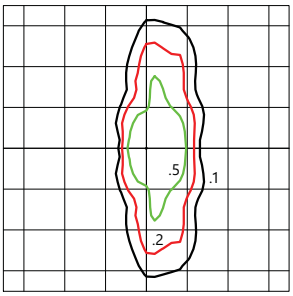
LUMEN OUTPUT	DISTRIBUTION	TYPICAL INITIAL LUMENS 4000K/5000K	3000K	2700K	TYPICAL SYSTEM WATTAGE	BUG RATING 4000K/5000K	3000K	2700K	IES FILE NUMBER 5000K	4000K	3000K	2700K
02	A5	2000	1940	1760	15	B1-U0-G1	B1-U0-G1	B1-U0-G1	ERLC_02A550_120-240V.IES	ERLC_02A540_120-240V.IES	ERLC_02A530_120-240V.IES	ERLC_02A527_120-240V.IES
	B5	2000	1940	1760		B1-U0-G1	B1-U0-G1	B1-U0-G1	ERLC_02B550_120-240V.IES	ERLC_02B540_120-240V.IES	ERLC_02B530_120-240V.IES	ERLC_02B527_120-240V.IES
	C5	2000	1940	1760		B1-U0-G1	B1-U0-G1	B1-U0-G1	ERLC_02C550_120-240V.IES	ERLC_02C540_120-240V.IES	ERLC_02C530_120-240V.IES	ERLC_02C527_120-240V.IES
	V4	1990	1950	1890		B1-U0-G0	B1-U0-G0	B1-U0-G0	ERLC_02V450_120-240V.IES	ERLC_02V440_120-240V.IES	ERLC_02V430_120-240V.IES	ERLC_02V427_120-240V.IES
03	A5	3000	2910	2640	22	B1-U0-G1	B1-U0-G1	B1-U0-G1	ERLC_03A550_120-277V.IES	ERLC_03A540_120-277V.IES	ERLC_03A530_120-277V.IES	ERLC_03A527_120-277V.IES
	B5	3000	2910	2640		B1-U0-G1	B1-U0-G1	B1-U0-G1	ERLC_03B550_120-277V.IES	ERLC_03B540_120-277V.IES	ERLC_03B530_120-277V.IES	ERLC_03B527_120-277V.IES
	C5	3000	2910	2640		B1-U0-G1	B1-U0-G1	B1-U0-G1	ERLC_03C550_120-277V.IES	ERLC_03C540_120-277V.IES	ERLC_03C530_120-277V.IES	ERLC_03C527_120-277V.IES
	V4	3100	3030	2950	23	B1-U0-G0	B1-U0-G0	B1-U0-G0	ERLC_03V450_120-277V.IES	ERLC_03V440_120-277V.IES	ERLC_03V430_120-277V.IES	ERLC_03V427_120-277V.IES
04	A5	4000	3880	3520	28	B1-U0-G1	B1-U0-G1	B1-U0-G1	ERLC_04A550_120-277V.IES	ERLC_04A540_120-277V.IES	ERLC_04A530_120-277V.IES	ERLC_04A527_120-277V.IES
	B5	4000	3880	3520		B1-U0-G1	B1-U0-G1	B1-U0-G1	ERLC_04B550_120-277V.IES	ERLC_04B540_120-277V.IES	ERLC_04B530_120-277V.IES	ERLC_04B527_120-277V.IES
	C5	4000	3880	3520		B1-U0-G1	B1-U0-G1	B1-U0-G1	ERLC_04C550_120-277V.IES	ERLC_04C540_120-277V.IES	ERLC_04C530_120-277V.IES	ERLC_04C527_120-277V.IES
	V4	4030	3940	3840	32	B2-U0-G0	B2-U0-G0	B2-U0-G0	ERLC_04V450_120-277V.IES	ERLC_04V440_120-277V.IES	ERLC_04V430_120-277V.IES	ERLC_04V427_120-277V.IES
05	A5	5000	4850	4400	36	B1-U0-G1	B1-U0-G1	B1-U0-G1	ERLC_05A550_120-277V.IES	ERLC_05A540_120-277V.IES	ERLC_05A530_120-277V.IES	ERLC_05A527_120-277V.IES
	B5	5000	4850	4400		B1-U0-G1	B1-U0-G1	B1-U0-G1	ERLC_05B550_120-277V.IES	ERLC_05B540_120-277V.IES	ERLC_05B530_120-277V.IES	ERLC_05B527_120-277V.IES
	C5	5000	4850	4400		B1-U0-G2	B1-U0-G2	B1-U0-G1	ERLC_05C550_120-277V.IES	ERLC_05C540_120-277V.IES	ERLC_05C530_120-277V.IES	ERLC_05C527_120-277V.IES
	V4	5200	5090	4950	43	B2-U0-G1	B2-U0-G1	B2-U0-G1	ERLC_05V450_120-277V.IES	ERLC_05V440_120-277V.IES	ERLC_05V430_120-277V.IES	ERLC_05V427_120-277V.IES
06	A5	6000	5820	5280	46	B2-U0-G2	B1-U0-G1	B1-U0-G1	ERLC_06A550_120-277V.IES	ERLC_06A540_120-277V.IES	ERLC_06A530_120-277V.IES	ERLC_06A527_120-277V.IES
	B5	6000	5820	5280		B1-U0-G2	B1-U0-G2	B1-U0-G2	ERLC_06B550_120-277V.IES	ERLC_06B540_120-277V.IES	ERLC_06B530_120-277V.IES	ERLC_06B527_120-277V.IES
	C5	6000	5820	5280		B1-U0-G2	B1-U0-G2	B1-U0-G2	ERLC_06C550_120-277V.IES	ERLC_06C540_120-277V.IES	ERLC_06C530_120-277V.IES	ERLC_06C527_120-277V.IES
	V4	6350	6220	6050	55	B2-U0-G1	B2-U0-G1	B2-U0-G1	ERLC_06V450_120-277V.IES	ERLC_06V440_120-277V.IES	ERLC_06V430_120-277V.IES	ERLC_06V427_120-277V.IES
07	A5	7000	6790	6160	56	B2-U0-G2	B2-U0-G2	B2-U0-G2	ERLC_07A550_120-277V.IES	ERLC_07A550_120-277V.IES	ERLC_07A550_120-277V.IES	ERLC_07A550_120-277V.IES
	B5	7000	6790	6160		B1-U0-G2	B1-U0-G2	B1-U0-G2	ERLC_07B550_120-277V.IES	ERLC_07B550_120-277V.IES	ERLC_07B550_120-277V.IES	ERLC_07B550_120-277V.IES
	C5	7000	6790	6160		B1-U0-G2	B1-U0-G2	B1-U0-G2	ERLC_07C550_120-277V.IES	ERLC_07C550_120-277V.IES	ERLC_07C550_120-277V.IES	ERLC_07C550_120-277V.IES

^ See Page 3 for the typical ISO Plot of the B5 distribution. This optic is designed to address a Roadway Photometric Application and may classify as Type II or III.

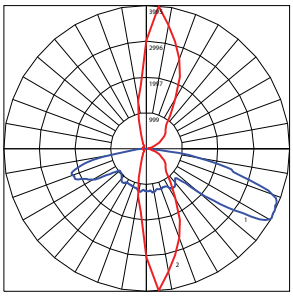
Photometric Data

ERLC
Type II Narrow
(05A540)

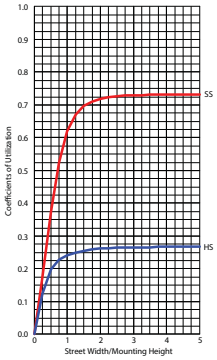
5,000 Lumens
4000K
ERLC_05A540___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

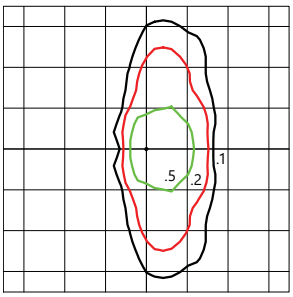


— Vertical plane through horizontal angle of Max. Cd at 85°
— Horizontal cone through vertical angle of Max. Cd at 61°

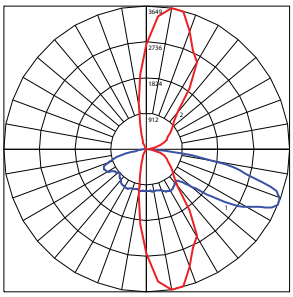


ERLC
Type II/III^
(05B540)

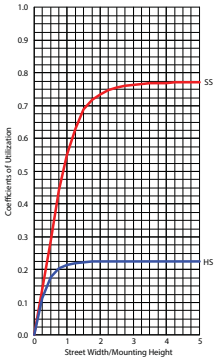
5,000 Lumens
4000K
ERLC_05B540___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

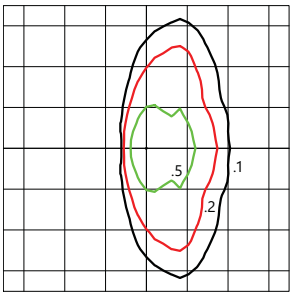


— Vertical plane through horizontal angle of Max. Cd at 80°
— Horizontal cone through vertical angle of Max. Cd at 67°

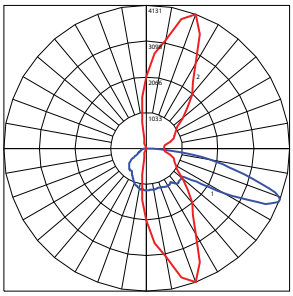


ERLC
Type III
(05C540)

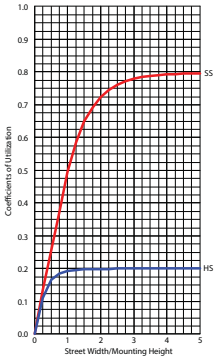
5,000 Lumens
4000K
ERLC_05C540___.IES



Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade

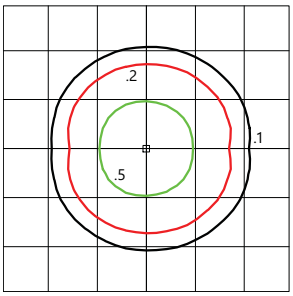


— Vertical plane through horizontal angle of Max. Cd at 70°
— Horizontal cone through vertical angle of Max. Cd at 69°

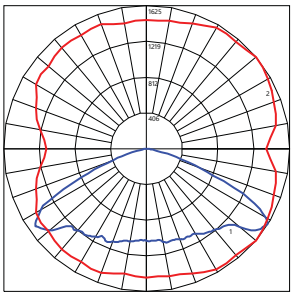


ERLC
Type V
(05V440)

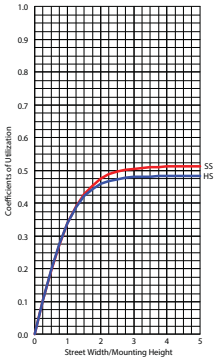
5,200 Lumens
4000K
ERLC_05V440___.IES



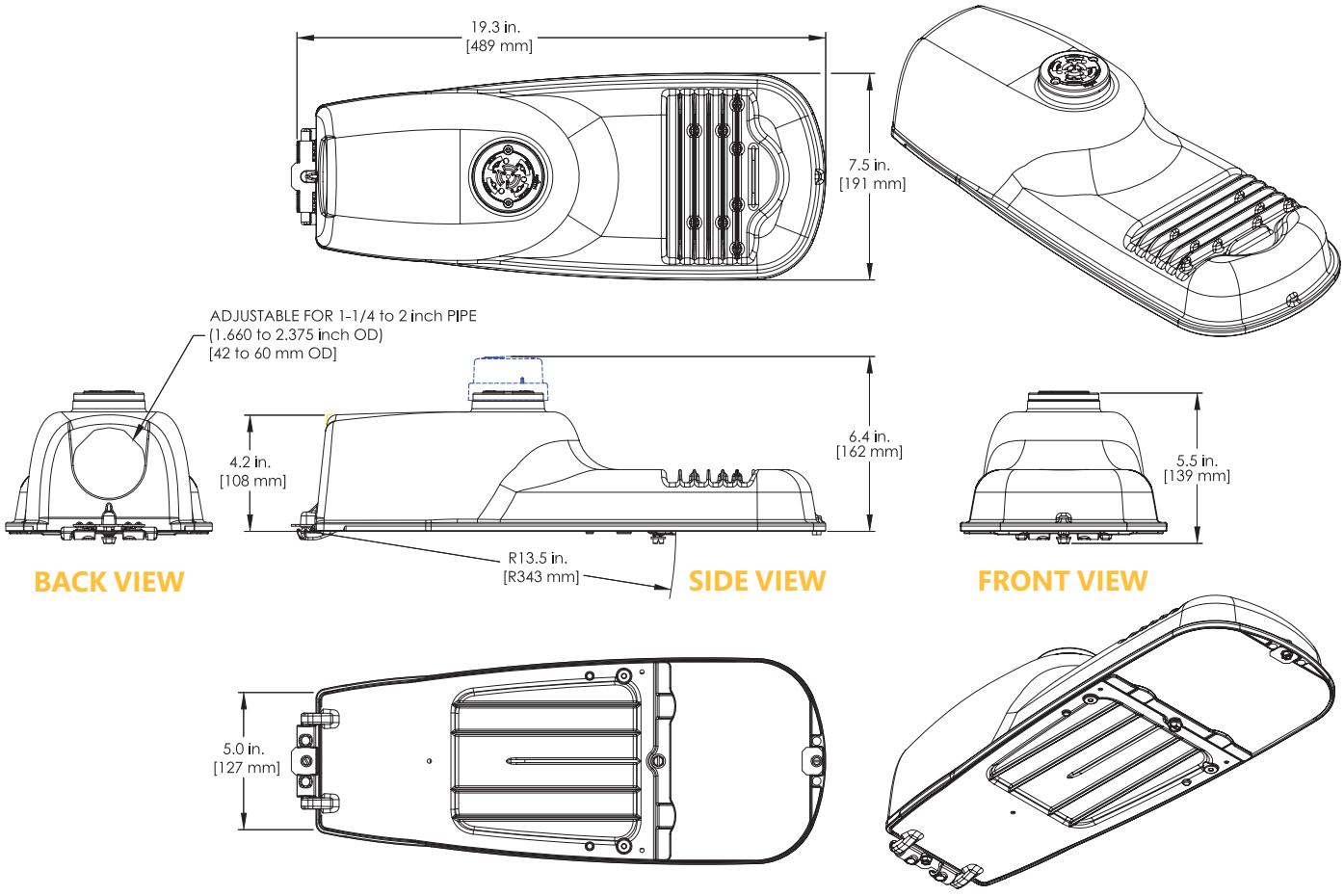
Grid Distance in Units of Mounting Height at 30'
Initial Footcandle Values at Grade



— Vertical plane through horizontal angle of Max. Cd at 40°
— Horizontal cone through vertical angle of Max. Cd at 58°



Product Dimensions



DATA

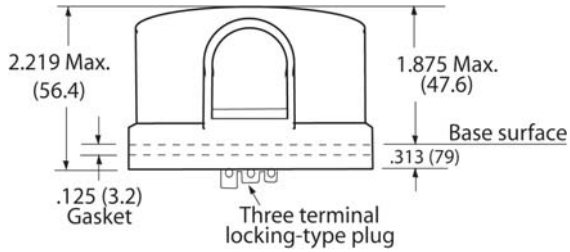
- Approximate net weight: 8.5 lbs (3.8 kgs)
  Contact manufacturer for specific configuration weight.
- Effective Projected Area (EPA): 0.3 sq ft max (0.029 sq m)

OLP3143 (Rev 02/05/21) Enovia - A-1028314

P Series

Phototransistor sensor solid state photocontrols

"Optimum Performance Without Operational Drift"



P Series Photocontrols

P Series electronic photocontrols utilize a phototransistor light sensor. The photo sensor holds its original operating parameters throughout its life. It is not susceptible to operational "drift" caused by cadmium sulfide breakdown caused by harsh environments or breakdown caused by over heating (a condition of AC electromechanical designs). Extended life is achieved through a non-chatter load break from a low power consumption DC circuit.

Features

- Meets or exceeds ANSI C136.10
- Proven DC circuit design
- Close 1:1.5 On to Off operating ratio
- Non-chatter load break
- Electronic phototransistor light sensor maintains operational levels throughout its life
- Heavy duty construction

Benefits

- 12 year expected life
- Low power consumption and extended life from "cool" operating DC circuit
- Close ratio reduces burning hours at sunrise
- Reduced burning from consistent operating levels throughout its life
- Significantly reduced energy and maintenance costs

Specifications

Housing:	UV stabilized, impact resistant polypropylene
Base:	High temperature ABS
Contact Blades:	Solid brass, three prong, locking type
Gasket:	Cross linked polyethylene
Packaging:	Individual units are sealed in water resistant plastic
Weight:	3.0 oz. each, 20 lbs. per 100 unit carton
Size:	16" x 16" x 12" per 100 unit carton

Operating Voltage

Load Rating:	1000 Watt tungsten, 1800 VA
Life at rated load:	5,000 Operations (13.7 Years)
Power Consumption:	1.0 watts average @ 120 volts 1.6 watts average @ 208 volts 1.9 watts average @ 240 volts 2.1 watts average @ 277 volts
Moisture Resistance:	100% RH
Standard Surge Protections:	90 Joule (4,500 Amps) MOV 190 Joule (6,500 Amps) MOV 2 190 Joule (13,000 Amps) MOV 380 Joule (10,000 Amps) MOV
Operating Light Levels:	+/- 0.1 fc. from specified turn-on level 1:1.5 Average turn-on to turn-off ratio
Photosensor:	Encapsulated phototransistor
Dielectric Strength:	5,000 Volts between any current carrying part
Ambient Temperature Range:	-40°C to +70°C (-40°F to + 158°F)

Ordering Information

P120 - 1.0 - P - T - M - BR

Model #	Turn On	Photosensor	Time Delay	Surge Protection	Color
P120 (105-130V)	**1.0** fcs. On	**P** Phototransistor	_ No Delay**	_ 90J MOV**	_ Per ANSI**
P124 (105-305V)	**1.5** fcs. On		**T** 3-5 sec. Delay	**M** 190 MOV	**BR** Brown
P240 (195-305V)	**2.0** fcs On			**Y** 2 190 MOV's	**BK** Black
P480 (420-530V)	**2.5** fcs. On			**W** 380 MOV	

PX - standard grade electronics PEX - filtered phototransistor FAIL OFF Version Available

** No Letter

FP Outdoor Lighting Controls
Quality Electrical Products

Sun - Tech
Sunrise Technologies, Inc.

Sunrise Technologies
54 Commercial Street | Raynham, MA 02767, U.S.A.
Tel: 508-821-1597 | Fax: 508-822-0593
www.sun-tech.biz

FNM 13/32″ x 1-1/2″ 250Vac time-delay supplemental fuses

RoHS

250Vac
1/10 to 30A

Catalog symbol / color code:

- FNM
  - Green (250Vac max)

Description:

Time-delay supplemental fuse.

For superior protection, Eaton recommends upgrading to Bussmann series Low-Peak™ Class CC fuses. See data sheet No. 1023.

Specifications:

Ratings

Fuse amp range	Interrupting rating at system voltage		Agency information	
	250Vac	125Vac	UL®	CSA®
1/10 to 1	35A	10kA	X	X
1-1/8 to 3-1/2	100A	10kA	X	X
4 to 10	200A	10kA	X	X
12 to 30	10kA	–	X	X

Agency information

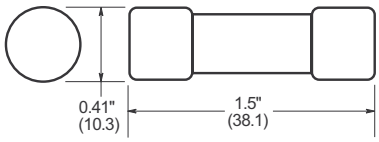
- CE
- UL Listed, Std. 248-14, Guide JDYX; File E19180
- CSA Certified, Class 1422-01, File 53787
- RoHS compliant

Catalog numbers (amps)			
FNM-1⁄10	FNM-8⁄10	FNM-2-1⁄2	FNM-6-1⁄4
FNM-1⁄8	FNM-1	FNM-2-8⁄10	FNM-7
FNM-15⁄100	FNM-1-1⁄8	FNM-3	FNM-8
FNM-2⁄10	FNM-1-1⁄4	FNM-3-2⁄10	FNM-9
FNM-1⁄4	FNM-1-4⁄10	FNM-3-1⁄2	FNM-10
FNM-3⁄10	FNM-1-1⁄2	FNM-4	FNM-12
FNM-4⁄10	FNM-1-6⁄10	FNM-4-1⁄2	FNM-15
FNM-1⁄2	FNM-1-8⁄10	FNM-5	FNM-20
FNM-6⁄10	FNM-2	FNM-5-6⁄10	FNM-25
FNM-3⁄4	FNM-2-1⁄4	FNM-6	FNM-30

Carton quantity

Amps	Qty.
1/10 to 30	10

Dimensions - in (mm):



Features

- Color coded green for 250Vac maximum voltage rating
- Melamine tube construction
- Nickel-plated endcaps

Typical applications

- Circuits with high inrush currents (motor/transformer loads)
- Supplemental protection for inductive circuits up to 250Vac.

Recommended fuse blocks/fuse holders

Catalog symbol	Description	Data sheet No.
	Blocks	
BMM	1-, 2- and 3-pole modular blocks with optional covers	10235
DIN-Rail holders / switches		
CCP-_-30M	1-, 2- and 3-pole switch	1157
CHM	1-, 2- and 3-pole	3185
Optima NG	3-pole protection module	1109
Optima	3-pole holder	1102
Optima	3-pole holder + switch	1103
Panel mount holders		
HPM and HPM-D	1-pole holder	2112
HPC-D	1-pole holder	2109
HPS2	2-pole holder	2140
HPF, HPF-C and HPF-WT	1-pole holder	2114
HPS	1-pole holder	2113
HPG and HPD	1-pole holder	2108
In-line holders		
HEB	1-pole holder	2127
HEX	2-pole holder	2126
Fuseclips		
1A3400, 5956 and 5960	PCB fuseclips	2132
Fuse covers		
CVR(I)-CCM(-QC)	Finger-safe fuse cover	10235

Powering Business Worldwide

TRON® In-Line Fuseholders
Double-Pole for Class CC and 13/32″ × 1½″ Fuses

HEX & HEY Series

HEX Series
Catalog Symbol: HEX-AA(1) (2), HEX-AB, HEX-AC, HEX-AD, HEX-AE, HEX-AY, HEX-BB, HEX-CC, HEX-JJ, HEX-JK, and HEX-KK.
In-Line Fuseholders, Double Pole
Water-Resistant
For breakaway holders, see page 2
Agency Information:
(1)UL Recognized, Guide IZLT2, File E14853
(2)CSA Certified, Class 6225-01, File 47235

HEX — For any 13/32″ × 1½″ fuse. Fuseholder rated 30A, 600V (CSA Listed 15A max.). Typical fuse types: BAF, FNM, FNQ, and KTK (1/10 - 30A).

HEY Series
Catalog Symbol: HEY-AA, HEY-AB, HEY-AC, HEY-AD, HEY-AE, HEY-AL, HEY-BB, and HEY-JJ.
In-Line Fuseholders, Double-Pole
Water-Resistant
For breakaway holders, see page 2

HEY — Optional breakaway receptacle, water-resistant, polarized, and accepting Class CC branch circuit fuses (Buss Type KTK-R, FNQ-R, & LP-CC; 600V or less, 200,000A interrupting rating.) Particularly applicable in street lighting circuits.
Example:
A double-pole, in-line holder for Class CC fuses. A single #12 stranded copper wire, copper crimp, on the load side. A single #4 stranded, copper wire, copper crimp on the line side. Insulating boots are required.
1. Choose HEY- Series.
2. Choose “A” for load side.
3. Choose “C” for line side.
4. Choose 2A0660 insulating boots from page 2.

Complete Catalog Number: HEY-AC, 2A0660; 4 insulating boots required per holder

Recommended Torque on Coupling Nut: 10-20 in-lb.

Catalog and Specification Data

Conductor Terminals

Terminal Type	Conductor Data Size	No. Per Terminal	Solid	Stranded	Catalog Symbol
Copper Crimp					
	#12 to #8	1	•	•	A
	#12	2	•	•	
	#10	2	•	•	B
	#6	1	•	•	
	#4	1	•	•	
	#8	2	•	•	C
	#4	1	—	•	
	#6	2	•	•	D
	#2	1	—	•	
	#4	2	•	•	E
Copper Set-Screw					
	#12 to #3	1	•	•	J
	#12 to #3	2	•	•	K
Aluminum Set-Screw					
	#12 to #2	1	•	•	L
	#12 to #2	2	•	•	Y

Catalog Data — Insulating Boots

Catalog Numbers	Type
2A0660	Single Conductor
2A0661	Two Conductor

General Information:
- Insulating boots are not included with non-breakaway parts and must be ordered separately. They come standard with the breakaway series. The HEX-AW does not have the boots. This catalog item does not have a breakaway receptacle.
- When boots are utilized, extra heat retention requires that fuses are sized at a minimum of 200% of the RMS load current.

Ordering Information:

HEX HEY	—		
		Load Terminal	**Line Terminal**

Powering Business Worldwide

pe.eaton.com

Dummy Fuse Neutral

NNB-R

UPC:051712120784

Dimensions:

- **Height:** 1.47 IN
- **Length:** .37 IN
- **Width:** .37 IN

Weight:.6 LB

Warranties:

- Not Applicable

Specifications:

- **Type:** Dummy Fuse Neutral
- **Class:** Class CC
- **Fuse Indicator:** Non Indicating

Supporting documents:

- Product Catalog
- BUSS SOLID NEUTRAL
- Product Datasheet

Certifications: No Data

Product compliance:

- Not Applicable

TRON® In-Line Fuseholders
Double-Pole for Class CC and 13/32″ × 1½″ Fuses

HEX & HEY Series

Breakaway Holders
HEX Series Catalog Symbol: HEX-AW, HEX-AW-DRLC-A, HEX-AW-DRYC, and HEX-JW-DRYC.
HEY Series Catalog Symbol: HEY-AW-DRLC-A, HEY-AW-DRYC, and HEY-AW-DRLC-B.
In-Line Fuseholders, Double Pole

Example:
A double-pole, in-line, breakaway holder for 13/32″ × 1½″ fuses, a single #12 solid copper wire, copper crimp, on the load side. A single #10 stranded copper wire, copper crimp on the line side. Insulating boots are required.

1. Choose HEY- Series.
2. Choose “A” from 1st page for load side.
3. Choose “W” for breakaway requirement.
4. Choose “DRLC-A” for two-pole breakaway receptacle on line side.

Complete Catalog Number: HEY-AW-DRLC-A

Insulating boots come with this catalog number.

Catalog and Specification Data

Breakaway Receptacles

Terminal Type	Conductor Data Size	*No. Per Terminal	Solid	Stranded	Catalog Symbol *Double Pole
Copper Crimp	#12 to #8	1	•	•	-DRLC-A
	#6	1	•	•	-DRLC-B
Copper Set-Screw					
	#12 to #3	1	•	•	-DRLC-J
	#12 to #3	2	•	•	-DRYC

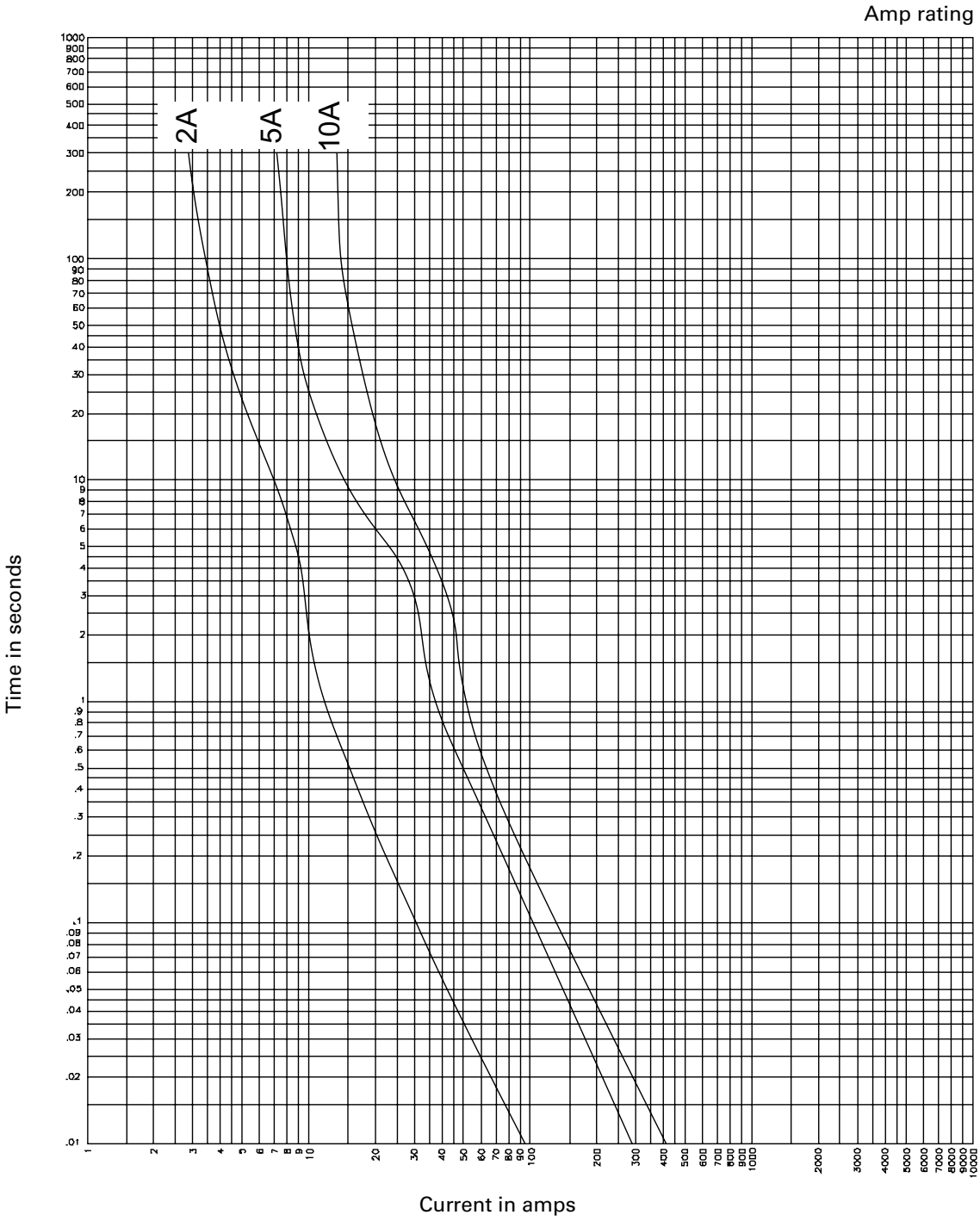
*Terminal illustration shows the end views of single-pole receptacle and one pole only of the double pole receptacles. Thus, for example, in the case of a double-pole, set-screw type receptacle with terminals that accept two conductors, a total of four conductors could be connected to the receptacle.

Ordering Information:

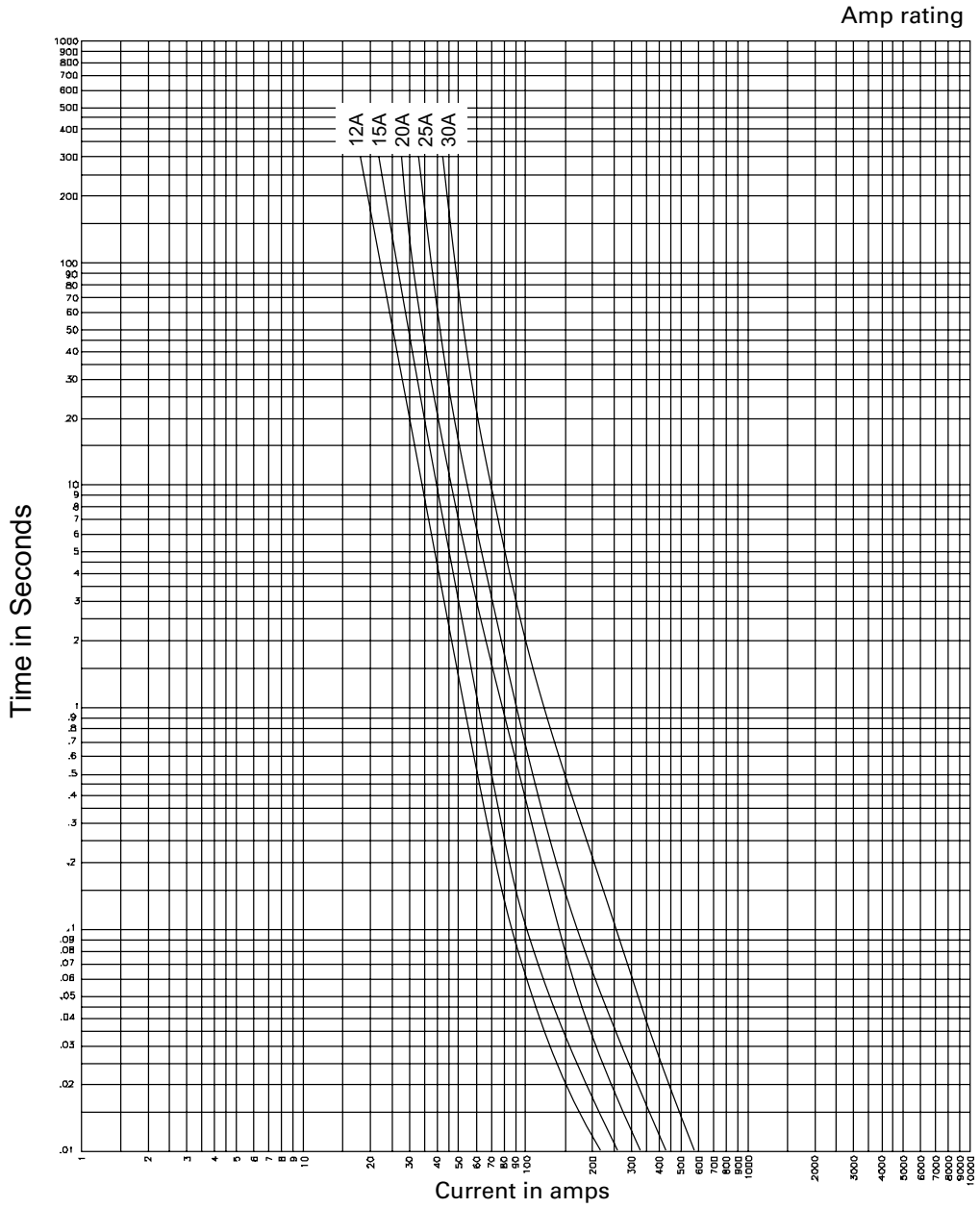
HEX / HEY	—		W	—	
		Load Terminal			Line Terminal

Recommended Torque on Coupling Nut: 10-20 in-lb.

Time-current characteristic curves – total clearing:



Time-current characteristic curves – average melt:



Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

Bussmann Division
114 Old State Road
Ellisville, MO 63021
United States
Eaton.com/bussmannseries

Printed in USA
Publication No. 2028 – BU-SB14291
December 2015

For Eaton's Bussmann series product information, call **1-855-287-7626** or visit: **Eaton.com/bussmannseries**

Follow us on social media to get the latest product and support information.

Powering Business Worldwide

Ubicell Model 2.0 **Smart Streetlight Controler**

ubicell™

Specifications

Lamp Interface	LED, CF and HID
Lamp Power	960W@480V, 554W@277V, 480W@240V, 240W@120V
On/Off	Photocell control, software programmable
Dimming Controls	PWM, 0-10V, DALI, DALI2
Dimming Range	*DIM 1* - 0-10V PWM, ability to detect stray voltage but prohibits external sensor use *DIM 2* - 0-10V PWM, ability to hardwire an external sensor, but prohibits the ability to detect stray voltage *DIM 3* - DALI enabled, ability to hardwire an external sensor, plus the ability to detect stray voltage
External Sensor Interface	DALI/DALI 2
Communication Module	LTE CAT-1
Location Based Services	GPS, WiFi traffic movement, Bluetooth info beacons
OTA Updates	Yes
Security	AES 128/256-bit encryption
Stray Voltage	Real-time detection of "energized" metal poles
Power Surge Protection	10KV/5KA
Power Supply	90V to 506V (50/60Hz)
Average Power Consumption	1W
IP Ratings	IP66
Impact Rating	IK07
Operating Temperature Range	-30C to +70C
Dimensions	Diameter: 82.5mm (3.25 in) Height: 98mm (3.86 in)
Weight	290 grams
Network Protocol	IPV4 and IPV6 network compliant

Utility Power Metering

Accuracy	ANSI C12.20 Class 0.5
Accuracy Verification	Infrared pulse
Line Voltage	90V to 506V (50/60Hz)
Line Voltage Accuracy	+/- 0.5%
Current Accuracy	+/- 0.5%
Power	Active/reactive/power factor
Energy Consumption	kWh
Sag & Swell Detection	Yes
On/Off Cycles	Cycle count and cycle variation (fault detection)
Running Hours	0-10 years

Programmable Parameters

- Customer device management
- Scheduling controls
- Alert thresholds
- Sunrise/sunset offsets
- Tilt detection
- Vibration detection
- Voltage detection
- Power detection
- Photocell levels
- Luminaire fault detection
- Last gasp after power failure
- Stray voltage detection
- Network communication failure
- Wireless network configuration

Warranty

5-Year Warranty
10-Year Optional Warranty

ubicquia®

ubicquia.com

Ubihub WiFi Access Point & Smart Streetlight Controller

ubihub™

Specifications

Dimensions	380mm x 189mm x 66mm
Weight	7kg
Power Surge Protection	20kV/10kA
Power Supply	120V to 480V
Average Power Consumption	45W
Power Source	Through NEMA Connector (ANSI C136.41)
IP Rating	IP65
Impact Rating	IK07
Ambient Operating Temperature Range	-40C to +50C
Backhaul	Regular Fiber/Ethernet/LTE CAT4/DOCSIS
External sensor connectivity	1 local PoE port
Firmware updates	OTA
Security	NIST aligned (Edge, Cloud and Connectivity), Fedramp certified (Cloud Service Provider), FIPS 140-2 encryption alignment (Edge, Cloud and Connectivity), WPA3/WPA2 WiFi Security (Edge)

Lighting Controller Specifications

Lamp Interface	LED, CF and HID
Maximum Lamp Power	1200W@120V, 2400W@240V, 2770W@277V, 4800W@480V
On/Off	Photocell control, software programmable scheduling
Dimming Controls	0-10V, DALI, DALI2
Dimming Options	0-10V PWM, ability to hardwire an external sensor
External Sensor Interface	DALI/DALI2
Dimming Range	0% to 100%
Location Based Services	GPS, WiFi traffic movement, Bluetooth info beacons

WiFi Access Point Specifications

WiFi Protocols	802.11 ax/ac/n/a/g/b
Maximum WiFi Bandwidth	4Gbps
Channel Width	160MHz/80+80MHz/40MHz/20MHz
Maximum Associated Devices	1024 for each access point connected through regular fiber, ethernet, DCOCSIS or LTE
Operation Spectrum	3 Total: 2 x 5GHz + 1 x 2.4GHz
MIMO	4 x 4 MIMO in all 3 radios
Antenna	12 integrated units
Maximum hops	3 meshed access points for each 1 cable or LTE connected access point
WiFi Network Management	Remote/Centralized/Cloud

ubicquia®

APPROVED FOR PUBLIC USE

Ubihub AP: WiFi Access Point & Smart Streetlight Controller

Power Meter Specifications

Accuracy	Class 0.5
Accuracy Verification	Infrared pulse
Line Voltage	90V to 506V (50/60Hz)
Line Voltage Accuracy	+/- 0.5%
Current Accuracy	+/- 0.5%
Power	Active/power factor
Energy Consumption	kWh
On/Off Cycles	Cycle count and cycle variation (fault detection)
Running Hour	Up to 10 years

Warranty

Up to 5-Year Warranty

Lighting Controller Programmable Parameters

- Customer device management
- Scheduling controls
- Alert thresholds
- Sunrise/sunset offsets
- Photocell thresholds
- Luminaire fault detection
- Tilt detection
- Power loss after power failure
- Network communication failure
- Voltage sag and swell detection

WiFi Access Point Features

- Optimized WiFi bandwidth
- Remote AP/Mesh management
- Remote setup and provisioning of devices
- Landing page/Captive portal – custom available on request
- Allowlist and denylist of IP ranges
- Allocation of bandwidth
- ID devices connected to the AP
- Apply group policies by devices

UbiAir Air Quality Sensor

ubiair™

Product Summary

UbiAir is a small sensor that measures, monitors, records, analyzes and communicates precise local air quality and environmental data. Mounted on a streetlight pole approximately 12-feet above the ground, the sensors sample the surrounding air and report the information to the ubivu customer portal or via APIs.

Sensor Specifications

	Minimum	Maximum	Resolution	Accuracy
Temperature (C)	-30˚	+70˚	0.01˚	+/-0.2
Humidity (RH%)	0% RH	95% RH	1% RH	+/- 2%
Pressure (Pa)	300 Pa	1100 Pa	1 Pa	+/- 0.15%
$PM_{1.0}$	0 µg/m3	1000 µg/m3	1 µg/m3	+/- 10%
$PM_{2.5}$	0 µg/m3	1000 µg/m3	1 µg/m3	+/- 10%
PM_{10}	0 µg/m3	1000 µg/m3	1 µg/m3	+/- 10%
Sulfur Dioxide ($S0_2$)	0 ppm	20 ppm	0.1 ppm	+/- 5%
Ozone (O_3)	0 ppm	5 ppm	0.01 ppm	+/- 5%
Carbon Monoxide (CO)	0 ppm	50 ppm	1 ppm	+/- 20%
Nitrogen Dioxide ($N0_2$)	0 ppm	5 ppm	0.1 ppm	+/- 5%
Noise Level (dB)	30 dB	130 dB	1 dB	+/- 10%

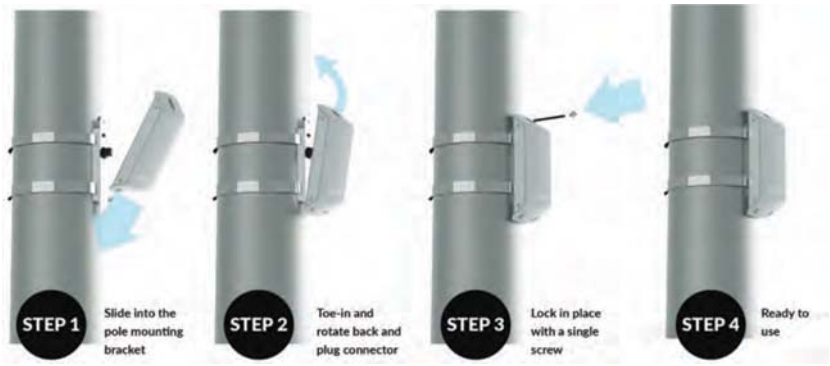
Power Meter Specifications

UbiAir Interface	Digital Addressable Lighting Interface (DALI)
DALI Power Supply	16V 70mA Max
External Power Supply	5V 200mA Max (Optional)
External Controller	UbiCell 2.0
Power Surge Protection	10kV/5kA via UbiCell 2.0
Water Ingress Prevention	Drip Loop Connection Feature and Water Tight Seals
Operating Temperature Range	-30˚C to +70˚ C
Dimensions	197mm (L) x 82mm (W) x 32mm (D)
Weight	267 grams

Warranty

1-Year Warranty

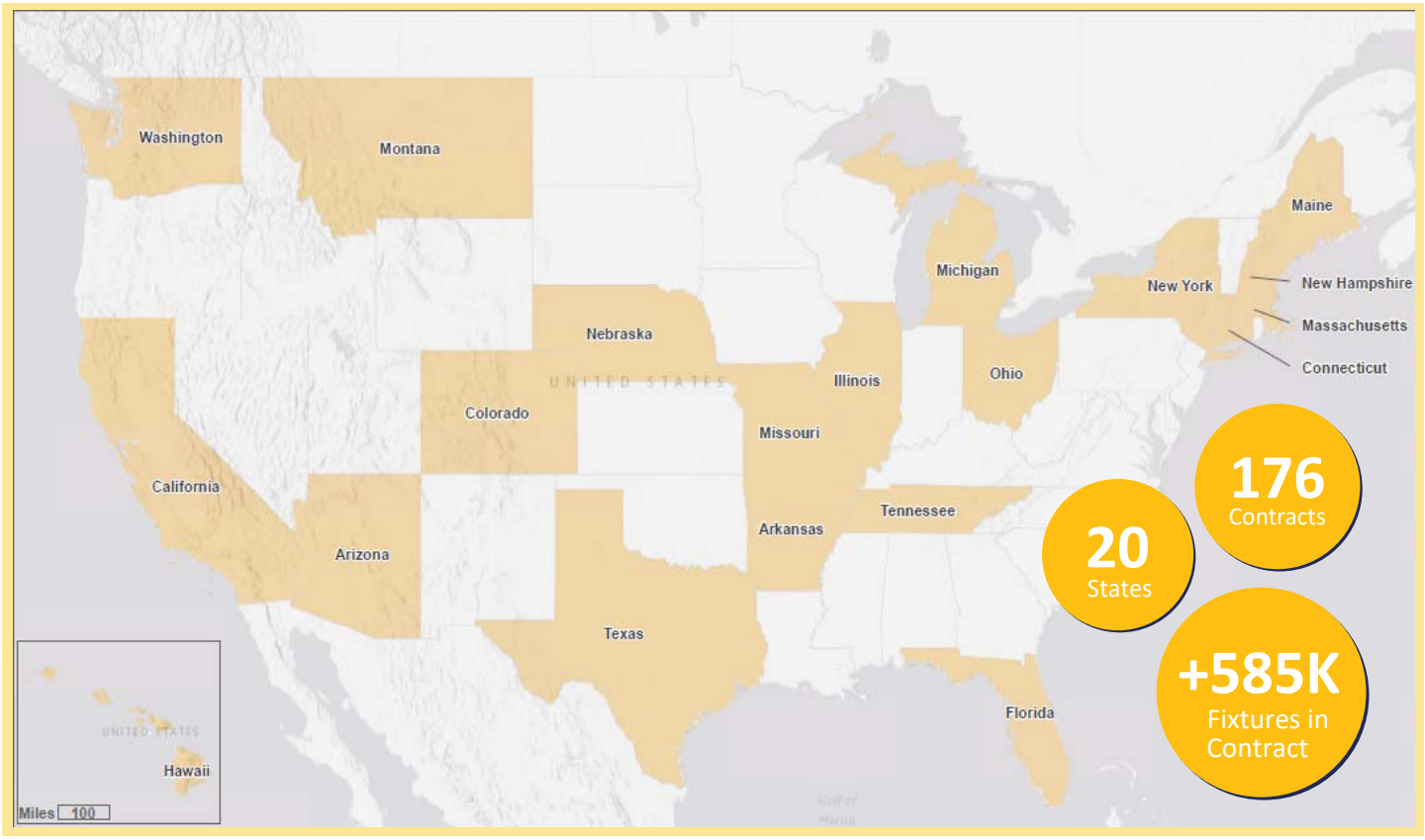
Simple Plug and Play Installation



ubicquia®

ubicquia.com

Nationwide Experience



States	Contracts	Fixtures
Arizona	1	40,000
Arkansas	1	16
California	55	264,442
Colorado	6	10,783
Connecticut	32	62,984
Florida	1	900
Hawaii	1	3,500
Illinois	1	1,800
Maine	2	840
Massachusetts	47	78,927
Michigan	1	3,300
Missouri	2	6,613
Montana	1	6,000
Nebraska	4	4,341
New Hampshire	4	803
New York	6	42,765
Ohio	4	36,359
Tennessee	2	3,349
Texas	4	11,238
Washington	1	7,000

Proven Process

Sole Focus on Municipal Streetlighting

192,000+ Streetlights Acquired

45,000+ Fixtures Maintained

California

Total Project Fixtures:		264,442	Contract Total: 55
Municipality	**Type**	**Fixture Count**	**Scope of Work**
Alameda, CA	Municipal Utility	3,200	Turnkey LED Conversion
Bakersfield, CA	City	3,000	Turnkey Decorative LED Conversion
Baldwin Park, CA	City	450	Turnkey LED Conversion
Bell, CA	City	1,600	Turnkey LED Conversion & Maintenance
Berkeley, CA (Project 1)	City	8,000	Turnkey LED Conversion
Berkeley, CA (Project 2)	City	3,200	Pole Inspection/Condition Assessment
Chino Hills, CA (Project 1)	City	4,450	Turnkey LED Conversion & Maintenance
Chino Hills, CA (Project 2)	City	1,200	Ownership Support
Claremont, CA	City	1,300	Turnkey LED Conversion
Coalinga, CA (Project 1)	City	N/A	Feasibility Analysis
Coalinga, CA (Project 2)	City	750	Ownership Support
Corona, CA	City	8,700	Material Procurement, Installation (Fixtures & Controls), and Rebate/Rate Change
Corte Madera, CA	Town	756	Turnkey LED Conversion
Cupertino, CA	City	3,000	Design Assistance and Replacement Fixtures
Fresno, CA	City	360	LED Streetlight Material and Install
Fullerton, CA	City	6,600	Turnkey LED Conversion & Maintenance
Glendora, CA	City	2,500	Ownership Support
Goleta, CA	City	1,575	Turnkey LED Conversion & Maintenance
Hayward, CA	City	7,700	Turnkey LED Conversion
La Puente, CA	City	2,100	Turnkey LED Conversion & Maintenance
La Verne, CA	City	2,500	Audit, Data Reconciliation, Design, Feasibility Analysis and Ownership Support
Lawrence Berkeley National Laboratory (Project 1)	Lab	1,400	Audit, Data Reconciliation, Specifications Development, Controls Installation (30 fixtures)
Lawrence Berkeley National Laboratory (Project 2)	Lab	300	Exterior Fixture LED Conversion and Controls Installation
Lodi, CA	Municipal Utility	7,200	Turnkey LED Conversion
Modesto, CA	Municipal Utility	9,000	Turnkey LED Conversion
Morgan Hill, CA	City	2,500	Turnkey LED Conversion
Mountain View, CA	City	3,000	Design Assistance, and LED Replacement Streetlight Fixtures
Napa, CA	City	4,500	Turnkey LED Conversion
Oakland, CA (Project 1)	City	37,000	Audit, Commissioning, Data Reconciliation
Oakland, CA (Project 2)	City	526	Turnkey LED Conversion
Orange, CA	City	4,400	Feasibility Analysis
Pico Rivera, CA	City	4,500	Turnkey LED Conversion & Maintenance
Pleasanton, CA	City	4,400	Inventory Audit, Data Reconciliation, Design, and Project Management Services
Poway, CA	City	3,600	Turnkey LED Conversion
Rancho Cordova, CA	City	6,500	Turnkey LED Conversion
Rancho Cucamonga, CA	City	15,000	Turnkey LED Conversion & Maintenance
San Bruno, CA	City	2,000	Turnkey LED Conversion
Santa Ana, CA	City	11,500	Audit, Design, Data Reconciliation, Ownership Support
Santa Clara, CA	Municipal Utility	3,000	Turnkey LED Conversion
Santa Clarita, CA	City	16,200	Pole Inspection, Turnkey LED Conversion, and Maintenance Services
Santa Cruz, CA	City	995	Ownership Support
Santa Fe Springs, CA	City	6,500	LED Pilot Installation, Finanacial and Feasibility Analysis
Signal Hill, CA	City	1,300	Audit, Data Reconciliation, Design, Feasibility Analysis and Ownership Support
Simi Valley, CA	City	8,000	Turnkey LED Conversion & Maintenance
Sonoma, CA	City	1,200	Turnkey LED Conversion
Stanton, CA	City	1,300	Turnkey LED Conversion
Sunnyvale, CA	City	7,000	Turnkey LED Conversion
Thousand Oaks, CA	City	7,900	Ownership Support and Smart City Feasibility Analysis
Tustin, CA (Project 1)	City	3,500	Turnkey LED Conversion
Tustin, CA (Project 2)	City	500	Ownership Support
Vacaville, CA	City	3,980	Inventory Audit, Data Reconciliation, and Design Services
Vallejo, CA	City	9,000	Turnkey LED Conversion
Ventura, CA	City	9,000	Ownership Support
Vista, CA	City	2,300	Turnkey LED Conversion
West Hollywood, CA	City	2,500	Audit, Data Reconciliation, Feasibility Analysis, Pilot Installations, Distribution Pole Ownership Assistance, Maintenance Services

Colorado

Total Project Fixtures:		10,783	Contract Total: 6
Municipality	**Type**	**Fixture Count**	**Scope of Work**
Centennial, CO	City	6,978	Ownership Support
Erie, CO (Project 1)	Town	N/A	Feasibility Analysis
Erie, CO (Project 2)	Town	1,827	Audit & Data Reconciliation
Erie, CO (Project 3)	Town		Ownership Support
Windsor, CO (Project 1)	Town	1,978	Feasibility Analysis
Windsor, CO (Project 2)	Town		Audit, Data Reconciliation, and Ownership Support

Connecticut

Total Project Fixtures:		62,984	Contract Total: 32
Municipality	**Type**	**Fixture Count**	**Scope of Work**
Berlin, CT	Town	2,537	Turnkey LED Conversion & Maintenance
Bristol, CT	Town	5,500	Turnkey LED Conversion
Chester, CT	Town	313	Turnkey LED Conversion & Maintenance
Darien, CT	Town	843	Turnkey LED Conversion & Maintenance
East Lyme, CT	Town	1,498	Turnkey LED Conversion & Maintenance
Farmington, CT	Town	1,728	Turnkey LED Conversion & Maintenance
Gales Ferry, CT	Town	87	Turnkey LED Conversion
Glastonbury, CT	Town	1,000	Turnkey LED Conversion
Granby, CT	Town	157	Turnkey LED Conversion & Maintenance
Groton Utilities, CT	Municipal Utility	2,256	Turnkey LED Conversion
Groton, CT	Town	1,550	Turnkey LED Conversion & Maintenance
Jewett City, CT	Borough	220	Turnkey LED Conversion
Ledyard, CT	Town	292	Turnkey LED Conversion
Mansfield, CT	Town	800	Turnkey LED Conversion & Maintenance
Meriden, CT	City	4,799	Turnkey LED Conversion & Maintenance
Middlefield, CT	Town	351	Turnkey LED Conversion & Maintenance
Middletown, CT	City	5,080	Turnkey LED Conversion
Montville, CT	Town	1,777	Turnkey LED Conversion & Maintenance
New London, CT	City	2,516	Turnkey LED Conversion
Norwich, CT	Municipal Utility	5,049	Turnkey LED Conversion
Old Lyme, CT	Town	396	Turnkey LED Conversion & Maintenance
Putnam (Spc District), CT	Town	858	Audit, Data Reconciliation
Rocky Hill, CT	Town	1,683	Audit, Data Reconciliation
South Norwalk Electric & Water, CT	Municipal Utility	1,116	Turnkey LED Conversion
Sterling, CT	Town	75	Turnkey LED Conversion
Stonington, CT	Town	1,700	Ownership Support, Turnkey LED Conversion
Suffield, CT	Town	680	Full Turnkey LED Conversion
Vernon, CT	Town	1,669	Turnkey LED Conversion & Maintenance
Waterbury, CT	City	7,250	Audit, Data Reconciliation, Design, Rebate/Rate Changes
Waterford, CT	City	1,976	Full Turnkey LED Conversion
West Hartford, CT	Town	6,500	Full Turnkey LED Conversion
Wolcott, CT	Town	728	Turnkey LED Conversion & Maintenance

Maine

Total Project Fixtures:		840	Contract Total: 2
Municipality	**Type**	**Fixture Count**	**Scope of Work**
Brewer, ME	City	600	Turnkey LED Conversion
Orono, ME	Town	240	Turnkey LED Conversion

Massachusetts

Total Project Fixtures:		78,927	Contract Total: 47
Municipality	**Type**	**Fixture Count**	**Scope of Work**
Andover, MA	Town	1,564	Turnkey LED Conversion
Ayer, MA	Town	520	Turnkey LED Conversion & Controls
Billerica, MA	Town	2,600	Turnkey LED Conversion
Boston, MA	City	4,000	Audit, Data Reconciliation of Decorative Fixtures
Bridgewater, MA	Town	1,286	Turnkey LED Conversion
Burlington, MA	City	2,400	Turnkey LED Conversion
Clinton, MA	Town	923	Turnkey LED Conversion
Dalton, MA	Town	740	Turnkey LED Conversion
Dracut, MA	Town	1,555	Turnkey LED Conversion
Dudley, MA	Town	600	Turnkey LED Conversion
Erving, MA	Town	163	Turnkey LED Conversion
Everett, MA	City	2,965	Turnkey LED Conversion
Franklin, MA	Town	1,648	Turnkey LED Conversion
Gardner, MA	City	1,532	Turnkey LED Conversion
Hanover, MA	Town	505	Turnkey LED Conversion
Hopkinton, MA	Town	563	Turnkey LED Conversion
Leominster, MA	City	3,637	Turnkey LED Conversion & Controls
Lexington, MA	Town	2,700	Turnkey LED Conversion
Longmeadow, MA	Town	1,500	Turnkey LED Conversion
Lowell, MA	City	7,000	Turnkey LED Conversion
Malden, MA	City	3,694	Turnkey LED Conversion
Manchester-by-the-Sea, MA	Town	363	Turnkey LED Conversion
Marion, MA	City	350	Turnkey LED Conversion
Medford, MA	City	4,618	Turnkey LED Conversion
Millis, MA	Town	436	Turnkey LED Conversion
Nahant, MA	Town	565	Turnkey LED Conversion
Newbury, MA	Town	500	Turnkey LED Conversion
North Andover, MA	Town	1,302	Turnkey LED Conversion
Northbridge, MA	Town	1,181	Turnkey LED Conversion
Oxford, MA	Town	945	Turnkey LED Conversion
Palmer, MA	Town	902	Turnkey LED Conversion, Controls, Maintenance
Saugus, MA	Town	2,850	Turnkey LED Conversion
Sharon, MA	Town	1,600	Turnkey LED Conversion
Somerville, MA	City	4,842	Audit, Design/Installation Management
Spencer, MA	Town	885	Turnkey LED Conversion
Sudbury, MA	Town	591	Turnkey LED Conversion
Ware, MA	Town	823	Turnkey LED Conversion & Maintenance
Warren, MA	Town	437	Turnkey LED Conversion & Maintenance
Watertown, MA	City	783	Turnkey LED Conversion
Wayland, MA	Town	714	Turnkey LED Conversion
Webster, MA	Town	1,485	Turnkey LED Conversion
Westfield Electric MUNI Utility, MA	Municipal Utility	4,000	Design and Photometrics
Westport, MA	Town	205	Turnkey LED Conversion
Weymouth, MA	Town	3,720	Turnkey LED Conversion & Controls
Williamstown, MA	Town	600	Turnkey LED Conversion
Winchendon, MA	Town	564	Turnkey LED Conversion
Winchester, MA	Town	1,571	Turnkey LED Conversion

Missouri

Total Project Fixtures:		6,613	Contract Total: 2
Municipality	**Type**	**Fixture Count**	**Scope of Work**
Ballwin, MO	City	2,113	Ownership Support
O'Fallon, MO	City	4,500	Ownership Support

Nebraska

Total Project Fixtures:		4,341	Contract Total: 4
Municipality	**Type**	**Fixture Count**	**Scope of Work**
Aurora, NE	City	200	Audit, Data Reconciliation
Kearney, NE	City	3,306	Audit, Data Reconciliation
Howells, NE	Village	200	Audit, Data Reconciliation
Nebraska Public Power District, NE	Municipal Utility	635	Audit, Data Reconciliation, Design

New Hampshire

Total Project Fixtures:		803	Contract Total: 4
Municipality	**Type**	**Fixture Count**	**Scope of Work**
Goffstown, NH	Town	460	Turnkey LED Conversion
Jaffrey, NH	Town	151	Turnkey LED Conversion
Londondery, NH	Town	143	Turnkey LED Conversion
North Stratford, NH	Town	49	Turnkey LED Conversion

New York

Total Project Fixtures:		42,765	Contract Total: 6
Municipality	**Type**	**Fixture Count**	**Scope of Work**
Buffalo, NY	City	33,000	LED Conversion/Ownership Feasibility Analysis
East Rochester, NY	City	700	Feasibility Analysis
Geneva, NY	City	1,696	Turnkey LED Conversion
Gloversville, NY	City	1,243	Feasibility Analysis, Ownership Support, Turnkey LED Conversion
Hamburg, NY	City	5,193	Audit, Data Reconcilation, Design
Ogdensburg, NY	City	933	Turnkey LED Conversion

Ohio

Total Project Fixtures:		36,359	Contract Total: 4
Municipality	**Type**	**Fixture Count**	**Scope of Work**
Athens, OH	City	1,100	Audit, Data Reconciliation, Design, Feasibility Analysis, Ownership Support
Cincinnati, OH	City	31,762	Audit, Data Reconciliation, Streetlight Repair Support
Independence, OH	City	1,000	Audit, Data Reconciliation, Design, Ownership Support, Feasibility Analysis
Zanesville, OH	City	2,497	Audit, Data Reconciliation

Tennessee

Total Project Fixtures:		3,349	Contract Total: 2
Municipality	**Type**	**Fixture Count**	**Scope of Work**
Paris, TN	City	2,541	Turnkey LED Conversion (Subcontractor to Prime)
Rockwood, TN	City	808	Turnkey LED Conversion (Subcontractor to Prime)

Texas

Total Project Fixtures:		11,238	Contract Total: 4
Municipality	**Type**	**Fixture Count**	**Scope of Work**
Corinth, TX	City	898	Ownership and Audit Support
Grapevine, TX	City	2,700	Audit, Feasibility Analysis
Keller, TX	City	3,200	Feasibility Analysis
Killeen, TX	City	4,440	Ownership and Audit Support

Various States

Total Project Fixtures:		62,516	Contract Total: 8
Municipality	**Type**	**Fixture Count**	**Scope of Work**
Carbondale, IL	City	1,800	Audit and Data Reconciliation
Chelan County Public Utility District, WA	Municipal Utility	7,000	Audit, Data Reconciliation, Design
Gilbert, AR	Town	16	Ownership Support
Kauai Island Utility Cooperative, HI	Municipal Utility	3,500	Turnkey LED Conversion & Controls
Mesa, AZ	City	40,000	Development of Street Light Master Plan
Miami Lakes, FL	City	900	Turnkey LED Conversion
Missoula, MT	City	6,000	Feasibility Analysis
Royal Oak, MI	City	3,300	Audit and Data Reconciliation

Town of Dracut

TOWN HALL
62 ARLINGTON STREET
DRACUT, MASSACHUSETTS 01826

Office of the Town Manager
(978) 452-1227
Fax: (978) 937-9885
Email: townmanager@dracutma.gov

James A Duggan
Town Manager

May 8, 2019

Cara Goodman
Metropolitan Area Planning Council
60 Temple Place, 6th Floor Reception
Boston, MA 02111

RE: Letter of Reference for Tanko Lighting for RFP #MAPC-DOER-24

Dear Ms. Goodman,

I am writing to provide a letter of reference for Tanko Streetlighting, Inc. ("Tanko") in support of the firm's proposal in response to the Metropolitan Area Planning Council's (MAPC) Request for Proposals for LED Streetlight Consulting (RFP #MAPC-DOER-24).

Tanko is serving as our consultant, assisting us with converting our existing streetlights to Light Emitting Diode (LED) fixtures.

Any concerns I had with Tanko's ability to perform their duties because they are based out of California were quickly eliminated through their ability to effectively work with multiple vendors. We found Tanko's staff to be competent, knowledgeable, accessible, and a significant asset in helping our municipality transition to more energy efficient streetlighting.

Given our experience with Tanko, I would endorse the firm for any other municipality considering an LED conversion and recommend that they be considered as a Highly Advantageous respondent to MAPC's RFP #MAPC-DOER-24.

Please feel free to reach out to me directly with any questions.

Regards,

James A. Duggan
Town Manager

Town of Franklin

Town Administrator
Tel: (508) 520-4949

Fax: (508) 520-4903

355 East Central Street
Franklin, Massachusetts 02038-1352

May 10, 2019

Cara Goodman
Metropolitan Area Planning Council
60 Temple Place, 6th Floor Reception
Boston, MA 02111

RE: Letter of Reference for Tanko Lighting for RFP #MAPC-DOER-24

Dear Ms. Goodman:

I am writing to provide a letter of reference for Tanko Streetlighting, Inc. ("Tanko Lighting") in support of the firm's proposal in response to the Metropolitan Area Planning Council's (MAPC) Request for Proposals for LED Streetlight Consulting (RFP #MAPC-DOER-24).

Tanko Lighting served as our consultant, assisting us with converting our existing streetlights to Light Emitting Diode (LED) fixtures. I found Tanko Lighting's staff to be competent, knowledgeable, accessible, and a tremendous asset in helping our municipality transition to more energy efficient street lighting. Most notably, their responsiveness and customer service to go above and beyond the regular call of duty was very important to a community our size with almost 1,800 street lights. They worked as a team to answer all of the questions and directives in a very efficient and swift manner. Any project of these sorts has many hurdles during installation and Tanko and their staff triaged every hurdle with professionalism and accuracy every time. We truly felt like they were a member of our own staff and always looking out for our best interests, as well as the taxpayers of the community.

Given our experience with Tanko Lighting, I would highly endorse the firm for any other municipality considering an LED conversion and recommend that they be considered as a Highly Advantageous respondent to MAPC's RFP #MAPC-DOER-24.

Please feel free to reach out to me directly with any questions at 508-553-4887 or jhellen@franklinma.gov

Very truly yours,

Jamie Hellen
Deputy Town Administrator
Town of Franklin

CITY OF GARDNER

ENGINEERING DEPARTMENT

50 Manca Drive - Gardner Ma 01440-2688

Chris Coughlin
City Engineer

Tel: (978) 630-8195

May 10, 2019

Cara Goodman
Metropolitan Area Planning Council
60 Temple Place, 6th Floor Reception
Boston, MA 02111

RE: Letter of Reference for Tanko Lighting for RFP #MAPC-DOER-24

Dear Ms. Goodman,

I am writing to provide a letter of reference for Tanko Streetlighting, Inc. ("Tanko Lighting") in support of the firm's proposal in response to the Metropolitan Area Planning Council's (MAPC) Request for Proposals for LED Streetlight Consulting (RFP #MAPC-DOER-24).

Tanko Lighting served as our consultant, assisting us with converting our existing streetlights to Light Emitting Diode (LED) fixtures.

I found Tanko Lighting's staff to be competent, knowledgeable & accessible.

Given our experience with Tanko Lighting, I would highly endorse the firm for any other municipality considering an LED conversion and recommend that they be considered as a Highly Advantageous respondent to MAPC's RFP #MAPC-DOER-24.

Please feel free to reach out to me directly with any questions.

Regards,

Chris Coughlin
City Engineer
ccoughlin@gardner-ma.gov

TOWN OF WARE

Town Manager

126 Main Street

Ware, MA 01082

413-967-9648 x100

May 8, 2019

Cara Goodman
Metropolitan Area Planning Council
60 Temple Place, 6th Floor Reception
Boston, MA 02111

RE: Letter of Reference for Tanko Lighting for RFP #MAPC-DOER-24

Dear Ms. Goodman,

On behalf of the Town of Ware, it is my pleasure to provide a letter of reference for Tanko Lighting in support of the firm's proposal in response to the Metropolitan Area Planning Council's (MAPC) Request for Proposals for LED Streetlight Consulting (RFP #MAPC-DOER-24). Tanko Lighting served as Ware's consultant, assisting us with converting the Town's existing streetlights to Light Emitting Diode (LED) fixtures.

Tanko Lighting's staff is extremely competent, knowledgeable, accessible, and a tremendous asset in helping our municipality transition to more energy efficient streetlighting. The staff provided technical assistance, along with much needed guidance and support. They work well with the other entities (utility, installer, funder) involved in the project to assure success.

Given the Town's experience with Tanko Lighting, I would strongly endorse the firm for any other municipality considering an LED conversion and recommend that they be considered as a Highly Advantageous respondent to MAPC's RFP #MAPC-DOER-24.

Please feel free to contact me with any questions.

Regards,

Stuart Beckley, Town Manager
Town of Ware
126 Main Street
Ware, MA 01082
sbeckley@townofware.com
(413) 967-9648 Ext. 100

Town Of Webster
Est. 1832
Massachusetts

Office of the Town Administrator
350 Main Street
Webster, MA 01570

May 10, 2019

Cara Goodman
Metropolitan Area Planning Council
60 Temple Place, 6th Floor Reception
Boston, MA 02111

RE: Letter of Reference for Tanko Lighting for RFP #MAPC-DOER-24

Dear Ms. Goodman,

I am writing to provide a letter of reference for Tanko Streetlighting, Inc. ("Tanko Lighting") in support of the firm's proposal in response to the Metropolitan Area Planning Council's (MAPC) Request for Proposals for LED Streetlight Consulting (RFP #MAPC-DOER-24). Tanko Lighting served as our consultant, assisting us with converting our existing streetlights to Light Emitting Diode (LED) fixtures.

We found Tanko Lighting's staff to be competent, knowledgeable, accessible, and a tremendous asset in helping our municipality transition to more energy efficient streetlighting. A member of Tanko's team was always very responsive to any of our needs. They managed the project very well so that I could take a hands off approach and not worry if the project was progressing.

Given our experience with Tanko Lighting, I would highly endorse the firm for any other municipality considering an LED conversion and recommend that they be considered as a Highly Advantageous respondent to MAPC's RFP #MAPC-DOER-24.

Please feel free to reach out to me directly with any questions.

Regards,

Doug Willardson

Doug Willardson
Town Administrator
Town of Webster
350 Main Street
Webster, MA 01570
dwillardson@webster-ma.gov
(508) 949-3800 Ext. 1006

Town of Weymouth

Massachusetts

Robert L. Hedlund
Mayor
75 Middle Street
Weymouth, MA 02189
Office: 781-335-8184

John A. MacLeod
Dir. Of Asset Management
Chief Procurement Officer
Office: 781-682-3666
jmacleod@weymouth.ma.us

May 10, 2019

Cara Goodman
Metropolitan Area Planning Council
60 Temple Place, 6th Floor Reception
Boston, MA 02111

RE: Letter of Reference for Tanko Lighting for RFP #MAPC-DOER-24

Dear Ms. Goodman,

I am writing to provide a letter of reference for Tanko Streetlighting, Inc. ("Tanko Lighting") in support of the firm's proposal in response to the Metropolitan Area Planning Council's (MAPC) Request for Proposals for LED Streetlight Consulting (RFP #MAPC-DOER-24).

Tanko Lighting served as our consultant, assisting us with converting our existing streetlights to Light Emitting Diode (LED) fixtures.

We found Tanko Lighting's staff to be competent, knowledgeable, accessible, and a tremendous asset in helping our municipality transition to more energy efficient streetlighting.

Tanko is extremely proficient at timely responses to any call for advice and can be counted on for frank, honest discussions on project issues.

Given our experience with Tanko Lighting, I would highly endorse the firm for any other municipality considering an LED conversion and recommend that they be considered as a Highly Advantageous respondent to MAPC's RFP #MAPC-DOER-24.

Please feel free to reach out to me directly with any questions.

Regards,

Bob O'Connor
Mayor's Representative
Asset Management / Energy
Town of Weymouth
75 Middle Street
Weymouth, MA 02189
ROconnor@weymouth.ma.us
(781)953-1169

TOWN OF HANOVER
FACILITIES DEPARTMENT
273 CEDAR STREET
HANOVER, MASSACHUSETTS 02339
781-857-5706

Robert Murray, PE
Facilities Engineering Mgr.

facilities superbia

May 13, 2019

Cara Goodman
Metropolitan Area Planning Council
60 Temple Place, 6th Floor Reception
Boston, MA 02111

RE: Letter of Reference for Tanko Lighting for RFP #MAPC-DOER-24

Dear Ms. Goodman,

I am writing to provide a letter of reference for Tanko Streetlighting, Inc. ("Tanko Lighting") in support of the firm's proposal in response to the Metropolitan Area Planning Council's (MAPC) Request for Proposals for LED Streetlight Consulting (RFP #MAPC-DOER-24).

Tanko Lighting recently served as our consultant, assisting us with converting our existing streetlights to Light Emitting Diode (LED) fixtures.

We found Tanko Lighting's staff to be competent, knowledgeable, accessible, and a tremendous asset in helping our municipality transition to more energy efficient streetlighting.

While at first I wondered about the practicality of hiring a consultant based in San Francisco, I found this to be a non-issue. The Tanko staff was always on the ball and responsive as though they were next door, responding to all inquiries and concerns right away and with expertise.

Given our experience with Tanko Lighting, I would highly endorse the firm for any other municipality considering an LED conversion and recommend that they be considered as a Highly Advantageous respondent to MAPC's RFP #MAPC-DOER-24.

Please feel free to reach out to me directly with any questions.

Sincerely,

Robert Murray, PE
Facilities Engineering Manager
Town of Hanover
273 Cedar Street
Hanover, MA 02339
robert.murray@hanover-ma.gov
(781) 857-5706

City of Chino Hills

14000 City Center Drive
Chino Hills, CA 91709
(909) 364-2600
www.chinohills.org

October 24, 2019

RE: Letter of Reference for Tanko Lighting

To Whom It May Concern,

I am writing to provide a letter of reference for Tanko Streetlighting, Inc. ("Tanko Lighting").

The City of Chino Hills recently opted to acquire its streetlight system from Southern California Edison (SCE) and convert the acquired fixtures to Light Emitting Diode (LED) to realize the benefits of financial savings, increased safety, and oversight that ownership provide.

Tanko Lighting served as our partner, assisting us initially with a GIS-based audit, data reconciliation, acquisition support, design, procurement, installation, rebate/rate changes, and reporting. We found Tanko Lighting's staff to be competent, knowledgeable, accessible, and a tremendous asset in accomplishing our project goals.

Tanko Lighting designed a custom retrofit kit for our decorative pendant fixtures that replaced our existing (low quality) LED retrofits and surpassed the existing retrofits in terms of quality and light distribution. Given this level of expertise, we were thrilled when we subsequently released a bid solicitation for streetlight maintenance services and Tanko Lighting's proposal was selected as the most qualified and cost effective response. We are currently using Tanko Lighting for our maintenance services and find them to be as equally helpful with that scope of work as they were with the LED conversions.

Given our experience with Tanko Lighting, I would highly endorse the firm for any other public agency considering a streetlight LED conversion and maintenance services.

Please feel free to reach out to me directly with any questions.

Regards,

Jarrod Manual
Facilities Maintenance Supervisor

City of Chino Hills
14000 City Center Drive
Chino Hills, CA 91709
(909) 364-2793
jmanuel@chinohills.org

CITY OF CLAREMONT

Community Services Department

1616 Monte Vista Avenue
Claremont, CA 91711-2913
FAX (909) 445-7822
www.ci.claremont.ca.us

Director • (909) 399-5432
Trees • (909) 399-5431
Maintenance • (909) 399-5431
Solid Waste • (909) 399-5431
Oak Park Cemetery • (909) 399-5487

October 17, 2019

RE: Letter of Reference for Tanko Lighting

To Whom It May Concern:

I am writing to provide a letter of reference for Tanko Streetlighting, Inc. ("Tanko Lighting").

The City of Claremont recently opted to acquire its streetlight system from Southern California Edison (SCE) and convert the acquired fixtures to Light Emitting Diode (LED) to realize the benefits of financial savings, increased safety, and oversight that ownership provide.

Tanko Lighting assisted with the initial project development, analyzing acquisition and retrofit costs with anticipated long-term financial savings due to decreased energy usage. This analysis helped to inform our City Council regarding the long-term benefits of acquiring the streetlight system. Once the project was approved, Tanko served as our partner, assisting us with a GIS-based audit, data reconciliation, acquisition support, design, procurement, installation, rebate/rate changes, and reporting. We found Tanko Lighting's staff to be competent, knowledgeable, accessible, and a tremendous asset in accomplishing our project goals.

Before we engaged Tanko Lighting, we completed a first phase LED conversion project for City-owned streetlights. Due to the complexity of facilitating the SCE acquisition, we searched for an experienced partner for the acquisition and conversion project. Tanko Lighting's experience rendered them significantly qualified. As a result, the project was successfully completed.

Given our experience with Tanko Lighting, I would highly endorse the firm for any other public agency considering a streetlight LED conversion.

Please feel free to reach out to me directly with any questions at kmikula@ci.claremont.ca.us.

Regards,

Kristin Mikula
Community Services Manager

CITY OF FULLERTON

Public Works Department – *Engineering Division*

October 28, 2019

RE: Letter of Reference for Tanko Lighting

To Whom It May Concern,

The City of Fullerton recently decided to convert the streetlight fixtures to Light Emitting Diodes (LED) to realize the benefits of financial savings, increased safety, and oversight that ownership provides. Tanko Lighting served as the City's partner, assisting with a GIS-based audit, data reconciliation, design, procurement, installation, rebate/rate changes and reporting.

Tanko Lighting's staff was competent, knowledgeable, accessible, and a tremendous asset in accomplishing the City's project goals. Tanko was also instrumental in accelerating the installation schedule to ensure that the City received all the available rebates before the program was cancelled.

The City has enjoyed a long 10-year relationship with Tanko, and the quality of service has always been superb. Given its experience with Tanko Lighting, the City highly endorses the firm to any other public agency considering a streetlight LED conversion.

Please feel free to reach out directly with any questions.

Sincerely,

Dana Huffman

Dana Huffman
Building and Facilities Supervisor
714.738.6371

R Hackman

Rya Hackman
Senior Administrative Analyst
714.738.3310

City of La Puente
15900 E. Main Street La Puente, CA 91744-4719 Telephone (626) 855-1500 Fax (626) 961-4626 www.lapuente.org

October 28, 2019

RE: Letter of Reference for Tanko Lighting

To Whom It May Concern:

This letter serves as a letter of reference for Tanko Street lighting, Inc. ("Tanko Lighting").

The City recently opted to acquire its streetlight system from Southern California Edison (SCE) and convert the acquired fixtures to Light Emitting Diode (LED) to realize the benefits of financial savings, increased safety, and oversight that ownership provides.

Tanko Lighting served as our partner, assisting us initially with a GIS-based audit, data reconciliation, acquisition support, design, procurement, installation, rebate/rate changes, reporting, and ongoing maintenance. We found Tanko Lighting's staff to be competent, knowledgeable, accessible, responsive and a tremendous asset in accomplishing our project goals.

Tanko Lighting has been providing maintenance services to the City for more than a year. We have found them to be prompt and attentive to our outage reports and particularly helpful with technical knowledge and practical recommendations for remedies to ongoing in-field matters.

Tanko Lighting is also currently assisting us with streetlight pole replacements by removing old wood poles and updating them with new, concrete poles for long-term stability. This work is particularly complex, but Tanko Lighting has provided consistent communication and support to ensure the successful completion of this phase of the project.

Further, when we needed assistance with a few unique requests – including replacing a distinct decorative fixture outside of City Hall and painting streetlight poles outside a senior center – Tanko Lighting was nimble enough to respond in an effective way.

Given our positive experience with Tanko Lighting, I would highly recommend the firm to other public agencies considering streetlight LED conversion and maintenance services.

Sincerely,

John Di Mario
Director of Development Services

CITY OF LA VERNE
CITY HALL

3660 "D" Street, La Verne, California 91750-3599
www.cityoflaverne.org

October 17, 2019

RE: Letter of Reference for Tanko Lighting

To Whom It May Concern,

I am writing to provide a letter of reference for Tanko Streetlighting, Inc. ("Tanko Lighting").

The City of La Verne recently opted to acquire its streetlight system from Southern California Edison (SCE) and convert the acquired fixtures to Light Emitting Diode (LED) to realize the benefits of financial savings, increased safety, and oversight that ownership provide.

Tanko Lighting served as our consultant, assisting us with this process from start to finish. Their experience with acquisition and conversion projects enabled them to provide sound advice about even the smallest of details. The work they performed included a GIS based audit, data reconciliation, acquisition support, design, procurement, installation, rebate/rate changes and reporting. We found Tanko Lighting's staff to be competent, knowledgeable, accessible, and a tremendous asset in accomplishing our project goals. Not only did Tanko Lighting complete the cobra head design and installations of this project, but they also assisted us with determining our options for decorative pole replacements and ensured the timely completion of this work.

Given our experience with Tanko Lighting, I would highly endorse the firm for any other public agency considering a streetlight LED conversion and maintenance services.

Please feel free to contact me if you should have any questions. I can be reached Monday through Thursday at 909-596-8741 or via email at dkeesey@cityoflaverne.org.

Sincerely,

Daniel W. Keesey
Assistant City Manager/Public Works Director
City of La Verne
3660 D St
La Verne, CA 91750

Pico Rivera Innovative Municipal Energy

Katherine Fuentes | Assistant City Manager | PRIME
562-801-4245 | kfuentes@pico-rivera.org

October 17, 2019

RE: Letter of Reference for Tanko Lighting for County of Los Angeles Notice of Request for Proposals for On-Call Light Emitting Diode Streetlight Conversion and Maintenance Services (BRC0000103)

To Whom it May Concern,

I am writing to provide a letter of reference for Tanko Streetlighting, Inc. ("Tanko Lighting"). The City of Pico Rivera is currently utilizing Tanko Lighting as our prime contractor to implement a comprehensive streetlight acquisition, LED conversion, and ongoing maintenance and operations project.

In an effort to prepare for the upcoming street light asset transfer of ownership from Southern California Edison, staff was given direction to release a Streetlight Acquisition, LED Conversion, and Ongoing Operation and Maintenance Request for Proposal (RFP). In January 2019, the City posted the RFP to which Tanko Lighting was one of the respondents. An external panel was organized to help determine the lowest, most responsive and responsible bidder for our needs according to the following evaluation criteria areas: Experience and Qualification; Project Methodology and Schedule; Cost; and, References.

Tanko Lighting is a nationally recognized firm focused solely on providing professional services for turn-key municipal energy efficiency streetlight acquisition and conversion projects. Due to their experience and extraordinary score, Tanko was selected for contract negotiations. Tanko Lighting's scope of work for our project includes assistance for our acquisition of the streetlight fixtures from Southern California Edison (SCE), as well as a comprehensive GIS audit of our existing streetlight inventory, data reconciliation, replacement design, materials procurement, installation management, commissioning, rebate/rate changes, reporting, and ongoing maintenance services.

Tanko Lighting completed the first phase – the comprehensive GIS audit of our existing streetlight inventory – and worked diligently to obtain SCE audit data for the data reconciliation. Upon the completion of the data reconciliation and true up, the City will acquire its system and convert to LED – all with Tanko Lighting's help.

It should also be noted that Tanko Lighting provided alternative maintenance pricing options that proved beneficial to the City for short-term savings and long-term stability of our soon-to-be-acquired streetlight system.

In short, we are very pleased with Tanko Lighting's approach and execution of our complex project to date and are confident that their continued assistance and involvement will ensure the success of our project. Given our experience with Tanko Lighting, I would highly endorse the firm for any other public agency considering a streetlight LED conversion and maintenance services.

Please feel free to reach out to me directly with any questions.

Regards,

Katherine Fuentes
Assistant City Manager

CITY OF RANCHO CUCAMONGA

10500 Civic Center Drive | Rancho Cucamonga, CA 91730 | 909.477.2700 | www.CityofRC.us

October 30, 2019

RE: Letter of Reference for Tanko Lighting

To Whom It May Concern:

The City of Rancho Cucamonga (City) acquired its streetlight system from Southern California Edison (SCE) in 2017 and converted the acquired fixtures to Light Emitting Diode (LED) to realize the benefits of financial savings, increased safety, and oversight that local ownership provided.

Tanko Streetlighting, Inc (Tanko Lighting) served as our partner, assisting us with this process from start to finish. Their experience with acquisition and conversion projects enabled them to provide sound advice about even the smallest of details. The work they performed included an updating of SCE's records with post installation data, acquisition support, procurement, installation, rate changes, reporting, and maintenance services. We found Tanko Lighting's staff to be competent, knowledgeable, accessible, and a tremendous asset in accomplishing our project goals.

It is important to note that we were one of the very first public agencies to acquire our streetlight fixtures from SCE. Given the level of complexity with this endeavor, it is all the more important for me to highlight how helpful Tanko Lighting was in ensuring that our acquisition process was optimized.

Given our experience with Tanko Lighting, I would highly endorse them for any other public agency considering a streetlight LED conversion and maintenance services.

Please feel free to reach out to me directly with any questions at fred.lyn@cityofrc.us or (909) 774-4035.

Sincerely,

Fred Lyn

Fred Lyn
Deputy Director of Engineering - Utilities

CITY OF SIMI VALLEY

Home of The Ronald Reagan Presidential Library

October 17, 2019

RE: Letter of Reference for Tanko Lighting

To Whom It May Concern,

I am writing to provide a letter of reference for Tanko Streetlighting, Inc. ("Tanko Lighting").

The City of Simi Valley opted to acquire its streetlight system from Southern California Edison (SCE) and convert the acquired fixtures to Light Emitting Diode (LED) to realize the benefits of financial savings, increased safety, and oversight that ownership provide.

Tanko Lighting has served as our partner through this process, assisting us with a GIS-based audit, data reconciliation, acquisition support, design, procurement, installation, rebate/rate changes, reporting, and maintenance services. We have found Tanko Lighting's staff to be competent, knowledgeable, accessible, and a tremendous asset in accomplishing our project goals.

Although this project has spanned several years (due to the SCE's processes), Tanko Lighting has always provided prompt and efficient services that have enabled us to make continued progress. Additionally, Tanko Lighting has been so helpful that we expanded their initial scope of work to also include complex decorative ("Mission Bell") fixtures – for which Tanko Lighting designed a custom retrofit kit solution at a fraction of the expected cost.

Given our experience with Tanko Lighting, I would highly endorse the firm for any other public agency considering a streetlight LED conversion and maintenance services.

Please feel free to reach out to me directly with any questions at (805) 583-6701 or bgabler@simivalley.org.

Sincerely,

Brian Paul Gabler
Interim City Manager

October 22, 2019

RE: Letter of Reference for Tanko Lighting

To Whom It May Concern,

I am writing to provide a letter of reference for Tanko Streetlighting, Inc. ("Tanko Lighting").

The City of Stanton recently opted to acquire its streetlight system from Southern California Edison (SCE) and convert the acquired fixtures to Light Emitting Diode (LED) to realize the benefits of financial savings, increased safety, and oversight that ownership provides.

Tanko Lighting serves as our partner, assisting us with a GIS-based audit, data reconciliation, acquisition support, design, procurement, installation, rebate/rate changes, and reporting services. We have found Tanko Lighting's staff to be competent, knowledgeable, accessible, and a tremendous asset in accomplishing our project goals.

We originally hired Tanko Lighting as a consultant to assist with the project's scope of work. However, upon seeing their team's effectiveness and technical understanding, we expanded the original contract to include material and installation and look forward to the final implementation phase with Tanko Lighting.

Given our experience with Tanko Lighting, I would highly endorse the firm for any other public agency considering a streetlight LED conversion and maintenance services.

Please feel free to reach out to me directly with any questions.

Regards,

Allan Rigg, P.E.
Director of Public Works
(714) 890-4203
arigg@ci.stanton.ca.us

7800 Katella Avenue
Stanton, CA 90680
Phone (714) 379-9222
Fax (714) 890-1443
www.ci.stanton.ca.us

Department of Public Works
Douglas S. Stack, P.E.
Director

July 23, 2019

RE: Letter of Reference for Tanko Lighting

To Whom It May Concern,

I am writing to provide a letter of reference for Tanko Streetlighting, Inc. ("Tanko Lighting") and streetlight acquisition in general.

The City of Tustin recently opted to acquire its streetlight system from Southern California Edison (SCE) and convert the acquired fixtures to Light Emitting Diode (LED) to realize the benefits of financial savings, increased safety, and oversight that ownership provide.

Tanko Lighting served as our consultant, assisting us with this process from start to finish. Their experience with acquisition and conversion projects put them in a position to provide sound advice about even the smallest of details. The work they performed included a GIS based audit, data reconciliation, acquisition support, design, procurement, installation, rebate/rate changes and reporting. We found Tanko Lighting's staff to be competent, knowledgeable, accessible, and a tremendous asset in accomplishing our project goals.

The project was completed per the required schedule and we are thrilled to report that the savings are very real and we are experiencing all of the expected benefits. Calls for service are being received by City staff and we are contracting for maintenance services. The majority of our service calls result in a finding of no power being supplied to the pole from our utility. The LED fixtures we selected are working very well and have been virtually maintenance free.

Tanko Lighting was the right partner to assist us with the acquisition process and LED conversion. They effectively managed the project to alleviate burden from staff and performed their services exceptionally well. As a result, the City is very happy with the final product of this project.

I highly recommend that all municipalities consider acquiring their streetlight system from SCE and endorse Tanko Lighting as an ideal partner to assist with this process.

Sincerely,

Stacey Cuevas

Stacey Cuevas
Public Works Manager

February 16, 2021

RE: Letter of Reference for Tanko Lighting

To Whom It May Concern,

I am writing to provide a letter of reference for Tanko Streetlighting, Inc. ("Tanko Lighting").

Tanko Lighting completed two streetlight-related contracts with the Town – one involving an analysis to determine the feasibility of transferring ownership of the streetlight system from the utility to the Town and converting the streetlights to Light Emitting Diode (LED) fixtures. The second contract involved a comprehensive audit of the streetlight system, including the current in-field conditions, as well as reconciliation of the audit data with utility records.

Tanko Lighting performed both contracts on time and within budget. The Town staff was impressed by Tanko Lighting's knowledge and professionalism with these projects and developed a successful working relationship with the firm.

As a result, the Town recently engaged Tanko Lighting with a third contract to assist it with pursuing ownership of the streetlight system.

Given my experience as Project Manager for the Town in experience with Tanko Lighting, I would highly endorse the firm to another municipality considering a streetlight-related project.

Please feel free to reach out to me directly with any questions.

Regards,

Tyler Kesler, Sustainability & Water Conservation Specialist
Town of Erie
PO Box 750
Erie, CO 80516
tkesler@erieco.gov

February 23, 2021

RE: Letter of Reference for Tanko Lighting

To Whom It May Concern,

I am writing to provide a letter of reference for Tanko Streetlighting, Inc. ("Tanko Lighting").

Tanko Lighting has been assisting the City with various matters related to the acquisition of our streetlight system from our utility, Xcel Energy. Tanko Lighting provided thoughtful recommendations related to options for system separation from the utility infrastructure that pragmatically balanced safety concerns, infrastructure integrity, logistics, and cost.

Tanko Lighting's extensive knowledge of municipal streetlight acquisitions, combined with its vast experience with technical aspects of streetlight infrastructure, have been incredibly helpful. The City has especially appreciated Tanko's guidance, ability to augment the City's existing resources and their professionalism while working alongside City staff.

Tanko Lighting's work, as well as its ongoing support, have also been key to a recently-filed streetlight-related rate case with the Public Utilities Commission. We have found their team to be a trusted partner with this process.

Given our experience with Tanko Lighting, I would highly endorse the firm to any other municipality considering a streetlight-related project.

Please feel free to reach out to me directly with any questions.

Regards,

Eric Eddy
Assistant City Manager
City of Centennial
13133 E. Arapahoe Rd.
Centennial, CO 80112
(303) 754-3334
eeddy@centennialco.gov