

City Manager's Weekly Report

Friday, October 27, 2017

Department:

Administration – City Manager

We held several meetings this week which required advanced preparation and consumed a sizable portion of my time. We held a regular Council meeting on Monday night, the “Business Breakfast” outreach meeting on the stormwater utility on Wednesday morning, a field meeting with a resident, DelDOT, and Councilman Clifton regarding the Florida-T on Wednesday evening, and the coastal zone act interview on Thursday (I will expand on this below). Additionally, we began the formal interview process for replacing Director Vitelli this Friday with interviews continuing into early next week. I also assisted Deputy Manager Haines with final CWA negotiations which were very productive and will be presented to Council soon.

The coastal zone act interview on Thursday was very beneficial to my understanding of the process forward for developing regulations per the recently enacted legislation. It is my takeaway from the process that the goal of the interview process is to develop a framework that can be presented to DNREC and the public at a public meeting (complete with public participation) on the best way to move forward with the regulation development process. The interview was done by representatives from the Consensus Building Institute (CBI), primarily Patrick Field, who assisted DNREC when they developed the previous CZA regulations in the late 90's. I was accompanied by Planning and Development Director Gray, Lieutenant Aniunas of the Newark Police Department, and Acting Public Works and Water Resources Director Filasky, each of which was able to provide beneficial feedback during the interview. The stated goal of the interview process was to capture our interests, opportunities, and concerns about the process to develop new regulations. Below is a summary of the topics of discussion and my general impressions:

Stated concerns as were provided to me ahead of time:

1. The interview stakeholder selection process was not open, who made decisions about who was and wasn't included? For example, Valorie Longhurst was not included.
 - a. Potential interviewees were identified first by those who were signatories on the 1999 regulations and second by those who gave testimony on the new regulations during the legislative process. This list was provided to DNREC who winnowed the list down to a manageable size. It was emphasized that the interviewees were not necessarily pre-selected to be on the final regulatory advisory Commission (RAC) when it is formed during 2018 to develop the actual regulations. Additionally, they indicated that if the City had a specific legislator they would like to have interviewed, we could make that request and it would likely be granted (Ms. Longhurst for example).

2. Concerns about additional hazardous material being transported through Newark and the fact that we have limited information on what is and will be transported via rail or truck through town.
 - a. They appreciated this concern and noted that it would be appropriate to include as part of the permitting process a requirement to estimate the impact on transportation networks (rail, boat, and truck). We recommended they include WILMAPCO as a potential participant in the regulation development process to help facilitate this goal and they were in agreement that WILMAPCO would make sense to include.
3. Newark would like to see the state develop a state-wide response plan for derailments including potentially hazardous materials. Alternately, the state could provide financial assistance to municipalities and the county to develop our own plans and host regular tabletop exercises. We recommended they reach out to Dave Carpenter, the NCC emergency manager and include him in the process.
 - a. They felt this was a reasonable request and seemed particularly interested in including Mr. Carpenter.
4. What was the thought process behind the interview process?
 - a. In addition to what I explained above, the goal is to develop a report that can be presented in draft form to DNREC and the public that would outline a starting point for discussion on the process forward including the RAC process, format, and potential stakeholders. The public and DNREC can comment and provide feedback on the draft report, they will take that feedback into consideration and finalize the report which will be provided to DNREC who can choose to implement or not implement the recommendations within the report. They anticipate RAC candidates being self-nominated for consideration by DNREC.
5. What is the path forward/timeline?
 - a. The draft report will be issued in early 2018 with the RAC formed shortly thereafter. The legislation required that regulations be in place by October 2019 and the current goal for the earliest they could realistically be complete is April of 2019.
6. Can applications for reclassifications be made before the regulations are complete?
 - a. Yes but there are no known pending applications at this time. If one is made, DNREC will have to use their best judgement to review and address the application. DNREC would prefer not to have to do that though.
7. We would like to see meetings be held in several locations as opposed to just Dover like what has happened during the RAC process for the new stormwater regulations. For example, hold one in Newark, Wilmington, Middletown, etc.
 - a. This was well received and they recognized that it may help improve public participation
8. Does DNREC or the State have an idea of what type of businesses they will try to attract to the sites?
 - a. They did not have a list of what they were looking for but there were specific industries that would not be allowed and are included directly in the language of the legislation like liquified natural gas and paper mills.
9. Could bulk transfers result in increased rail or truck traffic through Newark?

- a. In order to ship items out that came to a site via a bulk transfer there would have to be value added on-site. For example, they couldn't offload crude and take it via train to a refinery that isn't Delaware City. They could, however, refine it into gas and ship that out via truck, train, or boat.
10. Is the permitting process going to be an exercise in filling out forms or will the permitting process have teeth and the ability to deny poor applications?
 - a. Permits are not going to be "by-right" so the DNREC Secretary will have the ability to deny permits that are not a good fit. There is, however, a "shot clock" on permit review and approval so part of the regulation process is going to be determining where application for the CZA permit makes the most sense to not add delay or run out of time for review.

A few other CZA items that were discussed were that they are currently envisioning a RAC made up of 15 full members with alternates. They also anticipate having monthly full-day or 2x per month half day meetings for about a year to develop the regulations or at least guidelines for regulations that can be provided to DNREC to develop the actual regulations, depending on the results of the interview process. They envision RAC members falling into one of three categories: Business and Labor groups, Environmental and Environmental Justice groups, and affected communities (direct and indirect). Newark could fall into the indirect version of the third category so, depending on the will of Council, we may want to consider nominating someone to serve on the RAC when the time comes.

Administration – Deputy City Manager

Administration/HR

- Deputy City Manager Andrew Haines attended the 103rd annual ICMA Conference; Mr. Haines has provided several options/solutions to various staff on City operations for consideration. Mr. Haines intends to hold a meeting with selected staff on ideas, concepts or solutions that were seen at the sessions.
- Mr. Haines lead a final negotiation session with CWA 1036 and have a tentative agreement in place for a successor contract.
- Mr. Haines will lead with Acting Manager Coleman, Chief Tiernan and Acting PW&WR Director Filasky the initials interviews for director of electric.
- HR Manager Devan Stewart facilitated benefit matters, including:
 - o Onboarding of new IT Server Administrator Ali Abedin
 - o Coordinated the Employee's Safety Committee
 - o Provided documents and coordinated employee scheduling for onsite 2017 Biometric Screening
 - o Open Enrollment starts on Monday; Ms. Stewart completed all the necessary behind the scene work for the enroll process on ESS
- Assistant to the Managers Mark Brainard coordinated the review committee for RFP #17-05, auditing services, with final scoring and assessments completed.

Parking Division

- Parking Division contacted T2/ParkingSoft about issue where emails from and to the Parking Division were not being received when addressed from T2/ParkingSoft.
- Parking Division contacted T2/ParkingSoft about credit card issue when handling Wells Fargo debit cards. A ticket has been issued for the problem and their IT team is working towards a solution.
- Martin started her training as a part-time Parking Ambassador on Monday, October 23rd.
- Marvin Howard and Courtney Mulvanity attended the City Council meeting on Monday, October 23rd.
- Marvin Howard and Courtney Mulvanity attended the Planning Commission Parking Subcommittee meeting on Monday, October 23rd.
- Maintenance worked with ParkingSoft on updates for the pay-on-foot stations in Lot 1 and the point-of-sale system in Lots 3 and 4.
- Scott Minshall came in on Saturday, 10/21 and Sunday, 10/22 to clean up lots and fix any equipment issues over the U.D. Homecoming weekend.
- Parking Division is working with IPS Smart Meters on a parking map that has potential to become a public occupied/unoccupied map that could be use by those who park in the C.B.D.

Alderman's Court

Alderman's Court held three court sessions from 10/19/2017 to 10/25/17. These sessions included arraignments, trials, capias returns, video hearings, prisoners being transported and code violations.

Parking officers were in court on Monday and Wednesday to handle any parking appeals.

Court Sessions:

From 10/19/17 to 10/25/17 Alderman's Court handled 74 arraignments, 42 trials, 10 capias returns, 3 prisoners, 3 video hearings and 2 code violations. The court collected a total of 475 parking payments of which 281 were paid online and 194 were paid at court. The court also collected criminal/traffic fines which included 130 online payments and 48 paid at court for a total of 178 payments.

City Secretary and City Solicitor's Office

Bruce was in the office on October 23 for Council. Paul was in the office on October 26 for Court.

Bruce and Sarah staffed the Board of Adjustment meeting on October 19. Both applications were approved 3-0 – one for four variances for 18 North Street (building setback lines, rear yard setback, side yard setback and height of building) and one for one variance for 4 Madison Drive (off-street parking spaces).

Renee and Samantha met with the Assistant IT Manager on October 20 to discuss the delineation of responsibilities for the administration of the Tyler Content Management software with the transition of the Digital Records Division to Legislative from IT.

Renee did a walk-through of the Aetna Station #8 facilities on October 20 with the Acting City Manager and staff from Communications and IT to determine set up needs for the special Council meeting on the Florida T, which will be held on November 2.

Renee led a staff meeting with the Digital Records Division staff to discuss the transition for the team to the Legislative Department.

Bruce, Renee and Tara staffed the October 23 Council meeting. Item 3B (October 9 Council minutes) and an attachment to 9A (Bill 17-44 – Management title changes/reclassifications) was forwarded to Council on October 20. Follow up was completed by staff on October 24 and 25.

Renee drafted and staff finalized and posted the agenda and packet for the November 2 special Council meeting on October 26.

Tara participated in the CWA contract negotiations as part of the CWA team on October 26.

Renee and Sarah submitted the reviewed legal review proofs for recodification to the codifier on October 21 and 23. The codifier will be reviewing the City's responses and will be sending completed publication proofs for review in the upcoming months. Once the publication proofs are approved, the codifier will send a final ordinance to be introduced to and adopted by Council.

Renee drafted and circulated the October 23 Council direction sheet to staff and Council.

Mecia completed and sent invitations to City staff for the annual employee holiday luncheon hosted by Mayor and Council.

FOIA requests took some time this week. The following actions were taken on requests:

- Corresponded with requestor on an October 13 FOIA request from Susan Gibson regarding NPD financial reports and government grants
- Received and circulated to staff an October 24 FOIA request from Zoning Info regarding Colonial Gardens
- Received and circulated to staff an October 25 FOIA request from Building Evaluation Services and Technology regarding Campus Edge
- Received and circulated to staff an October 26 FOIA request from Katie Gifford regarding Council-staff emails referenced by Mayor Sierer at the October 23 Council meeting

The November 2 special Council meeting agenda was posted and forwarded to Council.

Regarding minutes, staff time was spent on the October 9 Council executive session (Renee drafted – complete), October 9 Council (Tara drafted; Renee edited – complete), October 19 Board of Adjustment (Sarah drafted – complete) and October 23 Council (Sarah drafting) minutes. The October 23 Council executive session minutes are currently in the queue.

Sarah fulfilled 9 discovery requests for upcoming Alderman’s Court cases. 334 discovery requests have been filled so far for 2017. The court calendar for November 3 was received and the 14 associated case files were prepared by Sarah for the Deputy City Solicitor. 42 court calendars with 626 associated case files have been compiled so far for 2017. Sarah also completed two plea by mail requests this week.

The office received 15 new lien certificate requests this week, which were sent to Finance for processing. 7 lien certificates were completed and sent to the requestor. So far, 423 lien certificate requests have been processed for 2017.

Documents scanned for the week are as follows:

Name	# of Documents	# of Pages	Types
Samantha	256	1,445	Miscellaneous
Sandy	195	1,909	Court documents
Fred	176	1,282	Court documents, Fire Protection large plans
Ana (part-time)	180	1,272	Court documents
Mecia (part-time)	17	649	Rezoning files
Sarah	146	4,504	Board and commissions historical documents, contracts
Total	970	11,061	

Community Relations

Newark News Brief: The latest Newark News Brief can now be viewed on City of Newark social media pages and Channel 22. This week’s video focuses on the stormwater public education sessions, the special Council meeting on the Florida-T and the Halloween Parade.

DNP Website: Megan is in the process of updating and redesigning the Downtown Newark Partnership’s website, enjoydowntownnewark.com. She is replacing the old photos with photos from the 2016-2017 events, and updating the information to reflect the revitalized Board and Committees and the new businesses that have come to Main Street this year.

Social Analytics

- **Livestream City of Newark Council Meeting 10/23/17:** 434 total views, 201 unique views, average watch time: 34:55
- **Job Posts for IT Manager:**
 - o Facebook: To date: 11,529 people reached, 62 reactions, comments & shares, 730 post clicks (Post boosted through 10/31 for \$30).
 - o Twitter: 492 impressions, 15 total engagements

- o LinkedIn: 144 impressions, 3 likes

Creative Design/Web Updates

- Designed full page ad for Stormwater Public Education Sessions; flyer for Stormwater Utility Estimator tool; City of Newark Holiday Heroes Blood Drive flyer to be 24"x36" compatible
- Created TV22 Slideshow video for Parks and Recreation's Fall events
- Posted Halloween Parade News Flash and City of Newark Stormwater Utility Implementation News Flash
- Scheduled weekly public meeting notices
- Updated Charitable Solicitation form on the City website; Stormwater Utility webpage; Budget Central webpage

Press Releases/Media Inquiries

- City of Newark Announces Search for IT Manager: <http://bit.ly/2zS2xDK>
- City of Newark Implements Stormwater Utility: <http://bit.ly/2y68nUK>
- Newark to Host 70th Annual Halloween Parade and Trick-or-Treat Main Street: <http://bit.ly/2yOydMi>
- City of Newark to Hold Prescription Drug Take-Back Event: <http://bit.ly/2gGzydI>
- Josh Shannon, Newark Post, inquired about the inception of the Mayor's Harvest Festival
 - o Response provided

CGI Communications – In Progress – 08/31/2018 – On Track

No new items to report.

Electric Department

Sunday, October 22nd, at 8:50 a.m., a squirrel crawled through the underground conduits containing the 34kV wires that feed the West Main 76 transformer. Once inside the high voltage compartment the squirrel cause a flash between two bushings with over 7000amps flowing. This tripped out the transformer which had two 12kV circuits feeding 1,116 customers on the northwest side of town. After line crews and engineering arrived all power was restored by switching to other transformers in the same substation by 10:18 a.m. Visible damage was done to the bushings, so after oil tests and transformer tests are complete, it will be decided if replacing the bushings is all that is needed. Miraculously, the crews found the knocked-out squirrel still alive in the high voltage compartment and when poked it woke up and ran off. All pipes have been sealed.

Transformer 41 at West main, which blew up over a year ago and was rebuilt with insurance money, passed testing and is now able to be energized. Engineering is looking for a part to make the 34kV fuses work. The old fuse holders will not work with the new bushings as is. Modifications will have to be made.

The line crews installed the last recloser Monday. In a couple weeks, engineers are coming in to program the equipment and perform testing.

The electricians worked at the Chestnut Hill Road Substation doing site work, install LED fixtures in the Police Station, and installed cameras on the outside of the municipal building.

Engineering is attending a weeklong substation design class in Wilmington. Engineering has been working on locating the hard to find bushings and adapters for the projects mentioned above and the yearly performance evaluations.

Finance – Accounting Department

The First State Community Action Network was in PUBS on October 26th providing counseling services to individuals having difficulties paying their utility bills. This is a weekly service that we now provide to residents. Appointments can be made in advance by calling the PUB office directly at (302) 366-7000. Our goal is to educate our community on how they can save on their electric bill through changing their habits. We are also planning on holding an evening Energy Conservation Workshop during the month of November. If anyone is interested in being placed on a waiting list to attend a future Energy Conservation Workshop, please call the PUB office.

The Payment and Utility Billing (PUB) group is closed on the third Thursday of each month.

We would like to remind all residents that monthly utility bills can be processed automatically via CustomerConnect. Please click on this link to set up your account today!
<https://newarkde.gov/payments>

Reminder that all electric bills on October 1st will be based on the City's "winter" rates. Residential customers will be paying 14.5 cents per kilowatt hour, versus the inclining rate structure that they pay from April 1 to September 30th. A link to the City Code can be found here:
https://library.municode.com/de/newark/codes/code_of_ordinances?nodeId=CH11EL_S11-2RESERAS

Smart City initiatives of the past are generating long-term avoidance cost savings to the City. During 2015 and 2016, the City replaced nearly 2,000 street light fixtures with LED replacements. In September of 2017, Vermont Energy Investment Corporation (VEIC) performed an analysis to determine the project's overall impact and cost-effectiveness (M&V Report). This report confirmed that the City's LED project will produce an annual cost avoidance of \$135,000 annually, and create an annual savings of 829,000 kwh. The total cost of the project was \$575,000, creating a payback on the City's outlay at just over four years. For every \$1 spent on this project, the City will save \$4.20 in avoidance costs. It is projects like this that help keep spending from climbing at a pace greater than inflation. See the attached report for details.

The Finance Director attended training on 10/24 at UD's John L. Weinberg Center for Corporate Governance. This panel discussion covered the topic of a Board's role in disclosure statements. Training was free for all who attended.

The Finance Director serves as an Alternate Director on the DEMEC board, and is a member of the Audit Committee. Training was free for all who attended. On 10/26, the Audit Committee met with DEMEC staff and their auditors to begin the kickoff of their upcoming annual audit.

Accounting staff continues to work on the rollout of our tax billing software from CityView to Munis.

2018 Budget – In Progress – 12/01/2017 – On Track

The 2018-2022 CIP has been provided to Council a week earlier to allow for more time for review prior to our first budget workshop on 11/6. We are also currently working on the Operating Budget, and its supporting documentation. OPEX information will be available 10/30.

All Budget information can be found on Budget Central: <http://newarkde.gov/1007/Budget-Central>.

Parks and Recreation Department

Director: Attended the Subdivision Advisory Committee meeting on the Park N Shop; reviewing safety manual for comments, working with Delaware Department of Natural Resources about the Redd Park Trail connection design; working on employee evaluations; conducted parks maintenance meeting to discuss upcoming projects and work orders; met with Paula about upcoming activities and 2018 50th Anniversary of Parks and Recreation Department; and updated some of the 2018 CIP information.

Recreation Superintendent: Worked with Tyler and Devan on possible ways to complete the new Federal requirements for background checks for child care staff; met with Megan regarding the DNP events and the 50 Days of Fun schedule for 2018 in celebration of the department's 50th Anniversary; met with Joe regarding the possible ideas for the final schedule of the 50 Days of Fun; attended manager's training on Interpersonal skills; completed Comcast Newsmakers promotional segment; compiled information for previous year's Mayor's events; conducted staff meeting with recreation staff and reviewed the department's budget and its process.

Recreation Supervisor of Athletics: Completed annual after care inspection at West Park with licensing specialist from the Office of Child Care Licensing, continues collecting items for staff files to complete compliance, new background check requirements from the Office of Childcare Licensing will be in effect for 2018, working with Paula and Devan to determine how best to complete these as the process will be significantly more tedious, particularly for staff who are from out of state, completed staff schedule for November; flag football demo class was held at West Park after care, parent newsletters were sent out; held skills night for Jump Shot, Elementary and Junior basketball leagues, volunteer coaches are being recruited and teams being formed; conducted Adult Volleyball captains meeting.

Coordinator of GWC and Volunteers: Interviewed potential candidates for the CATCH program, hosted an orientation for CATCH staff and prepared for the start of the CATCH program with a total of 16 participants; provided information to Paula for a grant provided by Walmart; created a staff and activity schedules for the upcoming School's Out, Kids Day Off; finalized the November staff schedule for GWC attendants; continued to prepare for the Halloween Party scheduled for Thursday, October 26 at the George Wilson Center; continued to prepare for Winter/Spring and 50 Days of Fun Programs; continued to recruit volunteers for upcoming Fall events; continued reaching out to sponsors in preparation for the Thanksgiving Day Breakfast .

Recreation Specialist: Updated after care emergency call list, entered before/after care staff schedule for November; input volunteer hour information from Fall Community Clean Up; contacted and confirmed two food vendors for Mayor's Movie Night; purchased supplies for Friday clubs; contacted organizations about upcoming program for aftercare.

Recreation Supervisor of Community Events: Working on items for upcoming events, including the Halloween Parade, NewBark PawLooza, Turkey Trot and Winterfest. Halloween Parade lineup positions have been sent to participants and new registrations continue to come in, currently 63 groups are registered; Cinemark Movies from Christiana has come in as a sponsor for the NewBark PawLooza and we are looking forward to partnering with them to make the event fit for the stars with contests and settings with a Hollywood flair. Donations from local businesses for all of the upcoming fall events continue to come in with over \$4,000 worth of prizes already being collected; working on many programs and activities for the 50 Days of Fun as well as regularly scheduled winter and spring programs.

Parks Superintendent: Completed proposed planting plan and cost estimate for stormwater basin at the old transfer station site for Public Works, started working on proposed design for planting the open air atrium area at City Hall, met with representatives from Davey Resource Group and Asplundh Tree Service concerning tree/shrub pruning/removal of wooded area between Olan Thomas Park and substation at Kershaw Park, met with representative from CSX concerning hole cut in fence at Lumbrook Park, oversaw selective removal/thinning of trees at East Park Place Open Space, attended Perennial Plant Conference at Swarthmore College, attended supervisor training at City Hall, had a phone meeting with representative of the Smyrna Delaware Tree Board concerning writing of tree pruning/removal contracts including utility line pruning as well as giving public notification of utility line pruning to be done, inspected site at Folk Park for release of 5% retainage from contract to install new shelter and ADA walkway, updated for review by Parks Director/Aetna Fire Company and State Community Forestry Coordinator Community Wildfire Protection Plan (CWPP) for Newark, and assisted Water Division of Public Works on replacement planting issue at private residence.

Parks Supervisor: Attended "Drug Training" workshop, oversaw completion of new footbridge and topdressing of trail in north end of trail system in Redd Park, assigned field staff daily and assisted as needed and attended supervisor training at City Hall.

Parks/Horticulture: Staff continue on mowing and bed maintenance operations, watering of planters and one new tree along Main Street, did a selective removal/thinning of trees at East

Park Place Open Space and treated stumps, completed footbridge installation and topdressing of trail/turf area repair at north end of Redd Park, did interior bed maintenance at City Hall, preparation of both soccer fields for league play, raked off/leveled all horseshoe pit areas throughout park system, blew off tennis court areas as needed, did trash removal throughout park system as needed, applied fungicide application to three White Spruce/Douglas Fir trees for Stigmina Needlecast in Folk Park, replaced vandalized plant material in planters along Main Street, continued on work orders as assigned, and planted up pots with fall seasonal color for placement at City Hall and Wilson Center. Networks (student work training program with Christina School District) applied wood carpet safety surfacing under play/swing units at Fairfield Crest Park.

Project Update: Halloween Parade

The Halloween Parade is ready to step onto Main Street at 3:00 p.m. on Sunday. Currently 63 groups are registered for the event. Following the parade the road will be closed for families to enjoy Trick-or-Treat Main Street.

Planning and Development Department

Code Enforcement

- Property Maintenance Inspectors were on patrol last weekend for Homecoming. The Inspectors issued 13 citations and 30 warnings. The Inspectors also assisted with one unconscious person and spoke to 20 individuals about property issues. The Inspectors also spoke to managers at Deer Park Tavern, Grotto Pizza, Catherine Rooney's, Klondike Kate's, and Arena's Deli on crowd control. Overall, while several areas were busy, they did not report any major issues.
- The building permit for Preston's Playground was issued.
- Façade renovations at College Square Shopping Center are ongoing.
- Construction is ongoing at Cleveland Avenue.
- The foundation and steel work on South Main Street for the next phase of Chimney Ridge is ongoing.
- The building and site work is ongoing for the new hotel at 400 Ogletown Road.
- The structural steel work for the new building on STAR Campus is completed. Work on the exterior should begin shortly, as well as the new atrium space. We have completed the initial review of the construction plans for the new six-story lab at the site, as well as the new office/lab plans. Foundation and site work is expected to begin this fall on both buildings. Test piles were poured for the new NIMBL building.
- Staff continues to update data on older building permits and code cases in anticipation of the CityView replacement project.

Planning/Land Use

- Planning and Development Director Mary Ellen Gray worked on administrative issues regarding the Planners4Health Grant.
- Director Gray attended MUNIS end user training for Business Licenses.
- Director Gray worked with staff and prepared for and attended the October 23 Council meeting. Planning and Development agenda items included:
 - o Planning Commission 2017 Annual Report, 2018 Work Plan, Election of Officers, and Rules of Procedure (Consent Agenda);
 - o Sustainable Newark Grant and Steering Committee (Special Report). As indicated below, Council approved the members of the Steering Committee;
 - o Recommendations on Activities Proposed for 44th year (July 1, 2018 – June 30, 2019) Community Development Block Grant and 2017 (January 1, 2018-December 31, 2018) Revenue Sharing Program. As indicated below, Council approved both the CDBG budget, with the Department recommended change, and the Revenue Sharing Program.
- Director Gray prepared for and attended the Planning Commission Parking Subcommittee meeting on October 25. Meeting materials are posted on the City of Newark's website under Parking Requirements Subcommittee on the Planning and Development website. <https://newarkde.gov/1022/Parking-Requirements-Subcommittee>. The next meeting is scheduled for Thursday, November 16, 2017, 2:00 - 4:00 p.m., in the Council Chamber in the Newark Municipal Building.
- Director Gray met with representatives of the West Branch Civic Association to discuss civic association related issues.
- Director Gray continued to work on plan review and related reports.
- On October 19 the Board of Adjustment approved the following:
 - o The appeal of Todd Ladutko, owner of the property at 18 North Street (RM Zoning District), for the following variances:
 - Sec. 32-11(c)(5)c - Building setback Lines – Code requires a 25 foot setback from all exterior lot lines. The plan shows the new structure is set back from the west lot line at 11 feet and from the north lot line at 19 feet. The applicant is requesting variances of 14 feet and 6 feet from the west and north sides.
 - Sec. 32-11(c)(6) – Rear yards – Code requires a rear yard of 25 feet for apartments. The plan shows the new structure's rear lot line at 19 feet. The applicant is requesting a 6-foot variance.
 - Sec. 32-11(c)(7)b – Side yards – Code requires apartments to have a minimum side yard of 20 feet. The plan shows the new structure has a side yard of the west lot line of 11 feet. The applicant is requesting a 9-foot variance.
 - Sec. 32-11(c)(4) – Height of building – height of building shall not exceed three stories or 35 feet. The applicant indicated that the height of the structure proposed is 35 feet, 6 inches. The applicant is requesting a 6-inch variance.
 - o The appeal of Liping Hu, property owner at 4 Madison Drive, for the following variance.
 - Sec 32-47(j) – Existing single family type rental dwelling - Code requires two off-street parking spaces per unit. The applicant has zero off-street parking spaces and is requesting a variance of two off-street parking spaces.

- Planner Tom Fruehstorfer met with a representative of the Newark Center for Creative Learning (NCCL) School about their facilities on Phillips Avenue. The representative indicated they may be growing out of their space and wanted to talk about alternative locations within the City of Newark. Options for expanding their current location were discussed, but if those don't work out the school may still be looking for a possible new location.
- Tom Fruehstorfer represented Newark at the WILMAPCO Public Advisory Committee (PAC) meeting on October 23.
- Planner Mike Fortner analyzed the Parking Priorities Survey results and created a report for the Planning Commission's Parking Subcommittee.
- Mike Fortner presented the Community Development/Revenue Sharing Advisory Committee's recommendation and the Planning and Development Department recommendation on the CDBG program to Council on Monday, October 23. Council approved both the CDBG budget, with the Department recommended change, and the Revenue Sharing program.
- Mike Fortner also prepared the agreement between the City of Newark and the DNREC Division of Energy and Climate, for the Newark Community Sustainability Plan. Council approved the members of the Steering/Advisory Committee at their meeting on October 23.
- The following was also completed this week:
 - o 4 Deed Transfer Affidavits
 - o 46 Building Permit Reviews
 - o 3 Certificates of Completion/Occupancy

Land Use Projects Currently Under Review (*updates in italics*)

- **1119 South College Avenue (PR#16-06-01):** On June 6, 2016, the Planning and Development Department received a sketch plan review for the proposed redevelopment of the property at 1119 South College Avenue, the present location of the Red Roof Inn. The application and plans for the proposed major subdivision and special use permit were received on November 20, 2016. Revised plans were received February 8, 2017. The proposal calls for demolition of the existing structure at the site and construction of a 4-story hotel and convenience store with gas pumps, with associated parking. Staff comments were sent to the applicant on March 9, 2017.
- **0 Independence Way, Village of Chestnut Hill (PR#16-06-02):** The Planning and Development Department received plans for an annexation, rezoning, and major subdivision of the property located at 0 Independence Way on June 30, 2016. The plans calls for a 45-unit townhouse community at the site. Plans were reviewed by the Subdivision Advisory Committee (SAC) at an October 13, 2017 meeting. *SAC comments are being prepared and will be sent out to the applicant in the near future.*
- **30 Benny Street and 155 South Chapel Street (PR#16-08-01):** Plans for a Comprehensive Development Plan amendment, rezoning, and major subdivision with site plan approval for the property located at 30 Benny Street were received on October 3, 2017. The plan includes demolition of existing structures on the site and construction of six townhouse-style apartments on Benny Street and five townhouse-style apartments on South Chapel Street. Plans were distributed to the Subdivision Advisory Committee on October 4, 2017.

- **36 Benny Street (PR#17-01-02):** On January 30, 2017, the Department received plans for a Comprehensive Development plan amendment, rezoning, and major subdivision with site plan approval for the property located at 36 Benny Street. The plan calls for the demolition of the existing single family home and two-car detached garage at the site and construction of seven townhouse-style apartments. The Planning Commission recommended approval of the project at its October 11, 2017 meeting.
- **65 South Chapel Street, Continental Court Apartments (PR#17-04-03):** The Planning and Development Department received a sketch plan review for the proposed redevelopment of the property at 65 South Chapel Street on April 19, 2017. The proposal calls for the demolition of the existing apartment building and construction of a 74-unit, 5-story high-rise apartment building at the site.
- **275 South Main Street, Park N Shop (PR#17-06-02):** Plans for a Comprehensive Development Plan amendment, rezoning, major subdivision, special use permit, and parking waiver for the Park N Shop shopping center at 275 South Main Street were received on June 2, 2017. The plans include a mixed-use building with commercial space on the ground floor and 12 apartments on the second and third floors. Plans were reviewed by the Subdivision Advisory Committee (SAC) at an October 18, 2017 meeting. SAC comments are being prepared and will be sent to the applicant in the near future.
- **92 East Main Street (PR#17-09-01):** The Planning and Development Department received plans for a major subdivision, special use permit, and parking waiver for the property located at 92 East Main Street on September 7, 2017. The plans call for a mixed-use building with commercial space on the ground floor and 15 apartments on the second, third and fourth floors. The proposal appears to remove seven parking spaces from Municipal Lot 3, but includes transfer of the remaining parking lot to City of Newark ownership. The proposal was reviewed by the Downtown Newark Partnership Design Committee on October 3, 2017. Plans were reviewed by the Subdivision Advisory Committee (SAC) on October 10, 2017. *SAC comments were sent to the applicant on October 20, 2017.*
- **550 South College Avenue, STAR Campus (PR#17-09-02):** Plans for an administrative subdivision for the property located at 500 South College Avenue on the STAR Campus were received on September 21, 2017. The plan calls for a lease line on the property and a two- and three-story structure with labs and offices. Plans were reviewed by the Subdivision Advisory Committee and letters mailed to adjacent property owners notifying them of the plans for the site. No objections were received regarding the requested subdivision. Final approval was issued by the Planning and Development Director and Acting City Manager, and plans submitted to New Castle County for recordation.
- **0/1365 Marrows Road, College Square, Section 1 (PR#17-09-03):** The Planning and Development Department received plans for a minor subdivision of Section 1 of the College Square shopping center on September 22, 2017. The plan includes 2,500 square feet of commercial space. Plans were distributed to the Subdivision Advisory Committee and are in the process of being reviewed.

Police Department

Auxiliary Services:

- On 10/24/2017 a major CAD upgrade was implemented with little affect to operations.
- Captain Van Campen is working with Millennium Strategies for upcoming SALLE/EDIE funding opportunities. Applications will seek equipment and advanced training in support of the Street Crimes Unit and Traffic Unit.

Administration Division:

- The first day of the Gentlemen's/Ladies' Club at Downes Elementary is scheduled for 10/26/17. This is the second year of this program, which involves officers meeting with approximately 50 students on a monthly basis at the school. The students will be taught various aspects of policing and get to go on a tour of the police department.
- Cpl. Walker and IT are putting the finishing touches on a crime mapping program that will be released to the public shortly. It will show a map of most of the crimes in the City starting from 1/1/17 to present and it will be updated on a weekly basis.
- The Awards Committee met on 10/19/17 to discuss award nominations for the third quarter of 2017. The following officers/civilians will be receiving awards from the police department:
 - **Officer Matthew Coughlin and Officer Jon Lee** – Letter of Commendation for their investigation and apprehension of a domestic violence and DUI offender. On 8/16/17 both officers responded to a domestic assault at a residence in the 200 block of W. Chestnut Hill Road. The suspect fled prior to the officers' arrival, however, a relative reported that the suspect was planning on returning once the officers left the area. Officers Lee and Coughlin hid their vehicles nearby and positioned themselves at the house where they could not be seen. The suspect returned a short time later and resisted arrest. The suspect was eventually taken into custody after being tased and was found to be under the influence of marijuana and acid. He was charged with Assault 2nd, DUI, Offensive Touching of a Law Enforcement Officer, and several other offenses. Their actions may have prevented the victim from being assaulted for a second time in one night.
 - **Corporal Peter Barnes, Officer Brian Whitehead, Corporal/3 Ritchie (Delaware State Police), Benjamin Baffone, and Grant Jeppe** – Lifesaving Award for their combined efforts in providing medical attention/assistance to a 64 year old male who experienced sudden cardiac arrest. On 7/16/17 the victim was driving on E. Cleveland Avenue when he experienced a sudden cardiac arrest. The victim's wife was able to safely steer the vehicle off of the roadway and bring it to a stop. Jeppe and Baffone were driving by when they observed the victim's wife yelling for help. Both Jeppe and Baffone stopped to assist. Baffone called 911 and relayed CPR instructions to Jeppe while awaiting the arrival of the police and EMS personnel. Barnes and Whitehead arrived a short time later, as did Ritchie who just happened to be driving by the scene. They removed the victim from the vehicle, began chest compressions, and placed the AED pads on the victim. A shock from the AED was administered and officers continued CPR until EMS personnel arrived. The

victim was eventually taken to the hospital and he was later released. The officers' and witnesses' actions reportedly led to the victim being able to survive this event.

- **Corporal Joseph Kendrick and Corporal Kenneth Odom** – Nowinski Award for a drug investigation that started with anonymous tips from a caller reporting drug deals being conducted in the parking lot of Villa Belmont Condominiums in late 2015. In July 2017, officers searched four residences and recovered a large amount of raw and packaged heroin and crack cocaine. Five people were arrested that were linked to a drug organization that distributes drugs to Pennsylvania, Maryland, and Delaware.
- **Private First Class Nate Graber, Officer Andrew Vari, Corporal Taras Gerasimov, Master Corporal Blake Potocki, Corporal Brandon Walker, Sergeant Gregory Micolucci** – Unit Citation for their efforts in safely taking into custody a barricaded suicidal subject. On 8/5/17 Graber, Micolucci, and Vari responded to the 1000 block of Wharton Drive for a subject who had barricaded himself in his bedroom. Upon arrival the victim's mother reported that her adult son had threatened to harm himself the day before with a knife. She stated that she tried to speak to him today about getting mental health assistance and he proceeded to lock himself in his room. She stated that she then heard things breaking inside of the room and believed he had broken a mirror on the floor. She felt that her son would be combative with the police based on previous interactions. Gerasimov responded to the scene with a shield to assist as well as Potocki and Walker who are both members of the Crisis Negotiations Team. Officers attempted to communicate with the subject for several hours using various techniques and eventually convinced the subject to exit his room and surrender without incident.
- **Corporal Daniel Bystricky** – Knights of Columbus Officer of the Quarter for three investigations that he handled in his capacity as a general investigator for the Criminal Investigations Division. On 7/29/17 Bystricky was assigned as the lead investigator in an attempted robbery and shooting that occurred in Suburban Plaza. Bystricky was able to use area surveillance cameras and other investigative techniques to identify the suspect who shot the victim. Bystricky eventually obtained an arrest warrant for the suspect and he was arrested without incident. On 9/19/17 Bystricky was assigned to follow up on a death investigation at an apartment in the 300 block of E. Main Street. Bystricky located the victim's next of kin, some of whom live out of state and some of whom live out of the country. Bystricky was able to properly inform the family as to what was going on by Skyping with them. According to Newark Police Department's Victim's Services Coordinator, Bystricky was extremely patient with the family and spent a lot of time with them to help assist them in this difficult time. On 9/22/17 Bystricky was assigned as the lead investigator in a murder that occurred at a residence in the unit block of Westfield Drive. The investigation was extensive and led him to New York City in order to conduct follow up on the case. Bystricky was able to quickly identify and arrest the murder suspect.

Criminal Investigations Division:

- The Criminal Investigations Unit (CIU) continues to clear assigned robbery investigations by arrest, clearing 17 of the 25 assigned robbery investigations in 2017 (68%). Additionally, 11 of the 25 of the assigned burglary investigations have been cleared to date (44%). CIU's

statistics are well above the national average of clearance rates compiled by the FBI in 2016. The national FBI statistics show burglary clearance rates are at 13% while the robbery clearance rate is 29%.

- On Wednesday, 10/25/17, Lt. Rieger, Sgt. Watson and Mrs. Pennachi will attend training in Middletown for the Sexual Assault Kit Initiative (SAKI). SAKI awarded the Delaware Criminal Justice Council (CJC) a grant of nearly \$1.2 million, which it will use to convene a multidisciplinary team of experts to enhance the criminal justice system's response to sexual assault in Delaware. The Delaware CJC and SAKI working group plan to inventory all unsubmitted SAKs and test those that are deemed eligible.
- On Thursday, 10/19/17, the Street Crimes Unit identified a female advertising on Backpage.com in the Newark area. A subsequent investigation revealed the female was operating as a prostitute out of a local hotel within the jurisdiction of the City of Newark. The female suspect, later identified as Kendra Davis, was contacted by an undercover officer and arrested by SCU for prostitution. Incident to her arrest, she was found to be in possession of a Tier 1 quantity of cocaine. The defendant was arraigned through Justice of the Peace Court #11 and released from police custody on \$2,101 unsecured bond pending a later court date.

Patrol Division:

- Cpl. Burgess and Ofc. Golden attended Characteristics of an Armed Gunman training on Monday, 10/23.
- Lt. Rubin continues to conduct AED/CPR/Naloxone training for all NPD personnel.
- The fall range qualifications continue and should be completed by November 7th.
- The Wilmington Resident Officer of the FBI is conducting Terrorism Awareness for First Responder training for all NPD officers.
- Cpl. LaRue and Ofc. Vari attended the Delaware State Police Homicide Conference.

Special Enforcement Division:

- On Tuesday, 10/24, Sgt. D'Elia assisted with patrol coverage for range qualifications.
- During the week, MCpl. Conover met with loss prevention personnel from various local businesses in preparation of the Special Operations Unit's holiday theft prevention project.
- MCpl. Conover also met with a local Girl Scout Troop to plan a women in law enforcement program hosted by NPD.
- On Wednesday, 10/25, Lt. Aniunas and Sgt. D'Elia will be interviewing officers interested in serving in the Special Operations Unit.
- Special Operations Unit officers will be conducting various order maintenance details over the weekend due to Halloween parties.
- MCpl. Keld attended Characteristics of Armed Persons training on Monday, 10/23.
- Officers from the Traffic Unit are conducting final preparations for the Halloween parade.

Public Works and Water Resources Department

DeIDOT will be completing soil borings on Main Street over the weekend for signal pole design associated with the Pave and Rehab of Main Street slated for 2018. Notification to affected residents and businesses is being hand delivered.

Also this weekend, our contractor will be performing CCTV inspection of the sewer lines on Main Street in support of the sewer point repair contract. Actual repairs will be scheduled shortly after the inspections are complete.

Stormwater Utility – In Progress – 12/31/2017 – On Track

In conjunction with the affirmative vote to implement the stormwater utility, staff has been working with our consultant, Black and Veatch on the implementation and billing plan. We have also held two public information sessions, one for residents on Wednesday, October 18 and one for the 50 most impacted parcels on Wednesday, October 25. We will continue our outreach efforts with two additional meetings on Thursday, November 9 and Wednesday, November 15. An advertisement for the remaining meetings will be placed in the Newark Post and broadcast over social media. More information can be found at the following link to our webpage: <https://newarkde.gov/CivicAlerts.aspx?AID=1007>

Water Main Rehabilitation (E. Park Place & Dallam Road) – In Progress – 11/03/2017 – On Track

The contractor will be finishing the major work associated with the water main replacement on Dallam Road by the end of next week. Minor touch up and punchlist items will be completed as necessary.

10/22/2017 to 10/28/2017

Delaware Municipal Electric Corporation (DEMEC)

LED Street Lighting Conversion Project

2016 M&V Report

Prepared for: Delaware Municipal Electric Corporation (DEMEC)

Submitted by: Vermont Energy Investment Corporation (VEIC)

September 7, 2017

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1. Executive Summary

The following report provides a comprehensive overview of the evaluation services provided by the Vermont Energy Investment Corporation (VEIC) to the Delaware Municipal Electric Corporation (DEMEC) of the LED Streetlight Conversion Project installed in 2016. This project was initiated in 2014 by DEMEC to help provide member communities with an opportunity to purchase LED street lighting fixtures at a group discounted price. In early 2015 DEMEC issued a public request for proposal (RFP) and conducted an evaluation of bidder submissions—ultimately selecting Rumsey Electric of Coshocton, PA to be the group lighting supplier. DEMEC did not require municipalities to purchase lights directly from Rumsey Electric, nor did they require any specific lighting fixtures or provide guidelines for the project. Rather any qualifying¹ LED luminaire purchase was permissible to be installed by the participating municipality.

Following the installation of fixtures across a total of five municipalities in 2016, this follow up evaluation provides a review and back-check of the installed equipment, project economics and overall energy savings achieved at the following five cities and towns in Delaware: Lewes, Newark, Seaford, Smyrna, and Dover. It also summarizes specific lessons learned related to the project process as well as opportunities for improvement should this project be considered for wider application.

Per DEMEC's request the following report provides numeric outputs and supporting narrative of the project's impact and cost-effectiveness. While in-depth analysis and details regarding the specific calculations and methodologies used to support the results can be found in subsequent sections of this report, Table 1.1 provides a high level overview of the total impact delivered by the installation of LED streetlights through conversion projects at the five aforementioned locations:

Total Project Impact	
Total Annual Energy Savings (kWh) ²	1,093,329
Total Lifetime Energy Savings (kWh) ³	19,679,913
Annual Avoided Energy Costs ⁴	\$75,013
Operations & Maintenance (O&M) Savings ⁵	\$1,785,156
Total Project Cost ⁶	\$818,418
Total Project Lifetime Benefit ⁷	\$3,135,395

¹ All LED street light fixtures used in this project were qualified products as listed by the DesignLights Consortium (DLC)
<http://staging.designlights.org/content/about>.

² The total annual energy savings is calculated as the sum of claimable savings as a result of the lighting upgrades made in Lewes, Seaford, Smyrna, Dover, and Newark in 2016.

³ The total lifetime savings is the total annual energy savings for the anticipated life of the new fixture--18 years.

⁴ The annual avoided energy cost is the total annual kWh savings multiplied by the avoided costs for the residential sector as specified in the 3 February 2017 memorandum from Optimal Energy to the EEAC and subsequently approved at the February Council meeting--which is \$68.61 per MWh for 2016

⁵ Lifetime O&M savings is calculated based on the knowledge that if not for this project, the municipalities would have continued their current practice of replacing lamps and ballasts and fixtures as they failed. Therefore, the O&M savings calculation uses a deemed per fixture per year amount of \$41.

⁶ The total project costs include the material cost of the fixtures and photo cells, the cost of in-house labor to install the fixtures, and the cost incurred by DEMEC (\$13,500) for the engineering and consulting work completed by DEDC in support of this project.

⁷ The total lifetime benefit is the avoided energy cost for the life of the project plus the lifetime O&M savings using current (2016) rates and costs.

Total Resource Benefit (TRB) ⁸	\$1,237,032
Net Present Value (NPV) ⁹	\$1,835,894
Simple Payback (SPB) without O&M ¹⁰	10.9 years
Simple Payback (SPB) with O&M	4.7 years
Benefit to Cost Ratio (BCR) ¹¹	3.8:1

Table 1.1 Total Project Impact

It is important to note that the total project cost illustrated in Table 1.1 above also includes the cost incurred by DEMEC (\$13,500) for the engineering and consulting work completed by DEDC LLC in support of the LED Streetlight conversion project. For individual communities the total project cost would reflect a proportional share (\$1,500) of this value.

Finally, in addition to the above cost-effectiveness analysis, the evaluation of the project's total societal impact/benefits—calculated as a Greenhouse Gas benefits—was determined to equal the avoidance of 768 metric tons of CO₂ emissions annually¹² for the State of Delaware.

Considerations for Future Project Application and Impact:

The following report has been developed with the expectation that it will provide DEMEC a solid foundation for establishing a state-compliant savings record of the LED street-lighting conversion project. The evaluation methodology used in this report follows the International Performance Measurement and Verification Protocol (IPMVP®) which defines standard terms and suggests best practice for quantifying the results of energy efficiency investments and increase investment in energy and water efficiency, demand management and renewable energy projects. The Protocol has become the national measurement and verification standard in the United States and many other countries and, as one of the most widely recognized and independent verification set of standards, it has helped to increase certainty and reliability for project measurement and evaluation (M&V). Specifically, the measurement and evaluation protocol recommends that all savings claims be verified in an un-ambiguous way either through direct observation and measurement or through a thorough and rigorous review of the documents that clearly demonstrate that the described implementation of energy conservation measures (ECMs) has happened.

For this project, the removal of existing fixtures or the installation of the new fixtures was not directly observed. Instead, the documentation provided by each municipality was used, followed by a site visit to confirm the veracity of the documentation and to spot-check installation and fixture counts. In some cases, inconsistencies were found between the various documents provided, and in other cases, clarifying statements made during the site visits contradicted the documents provided. Where

⁸ The total resource benefit is the present value of electric, fuel, and water savings over the lifetime of the measures based on avoided costs. The calculation uses standard Excel PV functions and represent the lifetime energy cost savings of the project.

⁹ Net Present Value (NPV) is the net of benefits minus costs; it includes not only TRB but also the measure cost and the value of Operation and Maintenance (O&M) savings. Discounting techniques for both NPV and O&M use standard Excel functions.

¹⁰ Simple Payback (SPB) is the amount of time that must pass until the energy savings alone has paid for the cost of the project (SPB=implementation cost/annual avoided cost).

¹¹ The Benefit-Cost Ratio (BCR) is an indicator that attempts to summarize the overall value for money of the project. The ratio of the benefits of a project is expressed in monetary terms, relative to its costs. BCR takes into account the amount of monetary gain realized over the life of the project by performing a project versus the amount it costs to execute the project calculation. The higher the BCR the better the investment.

¹² Source: <https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references>.

ambiguities remained, conservative assumptions were made, or those parts of the project were omitted completely. While this report's scope did not include a calculation of the associated impact that resulted from these inconsistencies, it is a defensible notion that this type of an approach—the use of the most conservative assumptions—likely resulted in a reduction of the total savings being claimed.

Moving forward, in accordance with the IPMVP® since complete and accurate documentation of project details is key to supporting the M&V process, it is recommended that DEMEC provide its member communities with standardized project implementation forms to help facilitate document consistency in all future projects. Further, while this report looks to provide the most robust, defensible and locally relevant sources to support its calculations, it is arguable that by basing the realization of kWh savings claimed for this project on deemed operating hours and not actual known operating hours has resulted in a significant reduction in claimable kWh¹³. Specifically, while the current interpretation of the Mid Atlantic Technical Reference Manual (TRM)¹⁴ deemed savings inputs for exterior LED lighting hours of operation suggests using the deemed savings value in lieu of any site-specific data, it is generally acknowledged by other utility efficiency programs that the general dawn-to-dusk operation hours of street light LEDs controlled by photo cells is considerably greater than 3,338. Again, to ensure future savings claims for this project are accurately recorded, it is strongly recommended that municipalities be encouraged to monitor or meter site specific LED operating hours so that these actual (known) input values be used instead of deemed value as provided by the TRM.

¹³ The use of 3,338 operating hours per year for this project versus the >4,000<4,300 operating hours per year value specified by NYSERDA, PG&E, GMP and Efficiency VT ISO-NE results produce a significant reduction (approximately 24%) in claimable kWh savings.

¹⁴ The Mid Atlantic TRM v.7 dated May 2017 used as the basis for energy savings calculations in this report states that “if annual operating hours are unknown, assume 3,338. Otherwise, use site specific annual operating hour information.” This is often interpreted to mean that site specific monitoring and/or metering is required to justify the use of a value other than 3,338 and that is how it is applied here.

2. Introduction and Purpose of the Study

In 2014 the Delaware Municipal Electric Corporation (DEMEC) initiated a LED streetlight conversion project to provide its member communities with an opportunity to purchase LED street lighting fixtures at a group discounted price. Supported by DEDC LLC—a multi-disciplinary engineering and design firm located at 315 South Chapel St., Newark, DE—DEMEC issued a public request for proposal (RFP) in early 2015 aimed at identifying a lighting company to support this effort.

The RFP documents provided lighting specification requirements alongside an inventory of existing luminaires from all nine DEMEC municipalities to indicate the potential size of purchases needed to support the LED conversion project. The recommended fixtures submitted for this project included the Phillips RoadFocus Luminaire and the Acuity Autobahn Luminaire¹⁵; and all of the LED fixtures subsequently installed as part of this project met the Design Lights Consortium (DLC) specification standards.

Following a full review of all RFP responses, Rumsey Electric of Coshocton, PA, was selected as the winning bidder and subsequent fixture orders were placed beginning in the fall of 2015¹⁶. Installations occurred in 2016, after which the Vermont Energy Investment Corporation (VEIC) was hired in 2017 to perform an overall evaluation of the LED street lighting conversion project, including verification of installations, fixture performance, project economics and overall energy savings achieved. To successfully complete this effort, Tim Stearns of VEIC worked alongside Scott Lynch and Shannon Maner of DEMEC to inspect sites and verify that fixtures were installed, and that these fixtures matched the invoices and other supporting data to be used in the savings calculations.

During each site visit, a brief interview was conducted with the local participants in the LED street lighting installations and overall project. The purpose of the interview was to confirm that the street lighting documents provided were accurate and installations had been completed, and to determine the best means to verify the fixture counts during the following field visits. In all cases, the local representative responsible for the installations was able to provide secondary information (handwritten notes or other) which corroborated, clarified, and confirmed purchase orders and other data previously supplied.

In all municipalities (with the exception of Newark), Mr. Stearns accompanied the local representative responsible for the installations on a guided tour of the streets where fixtures had been installed. In Newark, Mr. Stearns was supplied with a copy of a worksheet which was generated in real-time by the actual installing service technicians that documented LED fixture locations using GPS technology and included the date of installation and fixture type. Mr. Stearns then spot-checked several streets in Newark to confirm fixture installations.

Actual site inspections occurred on June 27th, 28th, and 29th, and the following report includes individual site visit notes and pictures, as well as supporting equipment invoices and data. The product specifications cut sheets that were used to determine input wattage, rated life, and to confirm warranty

¹⁵ DEDC LLC did not recommend the Leotek fixture (as submitted by Rumsey Electric Company) stating that the photo metrics did not meet all of the RFP requirements.

¹⁶ The City of Dover had previously purchased 18-Holophane post top fixtures from Wesco Distribution and also installed 16-SAT-S cobra head fixtures. These fixtures while not listed under the RFP specifications were included in the subsequent project evaluation.

of each fixture used are also attached. Existing fixture wattage was assumed based on industry accepted deemed values since the fixtures had already been removed from service prior to this evaluation process. Additional specific project details, data and other supporting documentation used to support this evaluation was provided by Mr. Lynch and as requested, this effort was carried out in compliance with energy efficiency evaluation standards established by the State of Delaware.

There were no significant challenges or roadblocks experience in performing this evaluation and the following section outlines the key analysis requested by DEMEC.

3. Analysis

Evaluation of Fixture Selection, Installation and Performance:

All of the street light fixtures used in this project were qualified products as listed by the DesignLights Consortium¹⁷ (DLC) and installed in 2016. The total number of installed products noted in the five municipalities reviewed are shown below in Table 3.1.

Total Fixture Quantities Installed by Community				
CITY	100 watt equivalent LED	150 watt equivalent LED	250 watt equivalent LED	400 watt equivalent LED
Lewes	25	75	-	-
Newark	-	802	862	239
Seaford	-	283	-	-
Smyrna	-	-	-	133
Dover	-	-	18	20

Table 3.1 Installed Fixtures by Community

The wattage of the existing fixtures and their corresponding replacement LED fixtures is shown in Table 3.2 and includes new fixture costs (including the new photocell¹⁸).

Fixture type	Fixture Model #		LED wattage	HPS replacement	HPS fixture wattage incl. ballast*
100 watt equivalent-Philips Lumec LED	RFM-72w32LED4K-T-R3M-UNIV-DMG-R-CD-W		73	100	130
	fixture+photocell cost				
	fixture+photocell+installation cost				
150 watt equivalent-Philips Lumec LED	RFM-108W32LED4K-t-R3M-UNIV-DMG-RCD		108	150	190
	fixture+photocell cost				
	fixture+photocell+installation cost				
400 watt equivalent-	RFL-241W112LED4k-T-R3M-UNIV-DMG		244	400	465
	fixture+photocell cost				
	fixture+photocell+installation cost				

¹⁷ The DesignLights Consortium™ (DLC) is a project of Northeast Energy Efficiency Partnerships (NEEP), a regional non-profit founded in 1996 whose mission is to serve the Northeast and Mid-Atlantic to accelerate energy efficiency in the building sector through public policy, program strategies and education. Over its 14 year history the DLC program has driven the lighting market towards innovation by providing information, education, tools and technical expertise for cutting edge technologies. Since 2010, the DLC has administered the Qualified Products List (QPL), a leading resource that distinguishes quality, high efficiency LED products for the commercial sector. Today, the QPL sets the bar for efficiency program incentives across the U.S. and Canada while informing manufacturer product development.

¹⁸Photo cell (sometimes termed, photo control device) costs vary based on the fixture paring, quantity purchased, and make and model of the device; for this calculation, we used the approximate cost of the photo cells purchased by the City of Newark per invoice #S4749990.003 dated 11/04/15 from Rumsey Electric--\$20 each.

Philips Lumec LED					
400 watt equivalent-Philips Lumec LED	RFL-215W96LED4k-T-R3M-UNIV-DMG		207	400	465
	fixture+photocell cost	\$436			
	fixture+photocell+installation cost	\$511			
150 watt equivalent-Leotech LED	GCJ2-20G-MV-NW-2-GY-1A		74	150	190
	fixture+photocell cost	\$174			
	fixture+photocell+installation cost	\$249			
250 watt equivalent-Leotech LED	GCM2-40F-MV-NW-2-GY-1A		138	250	295
	fixture+photocell cost	\$235			
	fixture+photocell+installation cost	\$310			
400 watt equivalent-Leotech LED	GC1-80F-MV-NW-2-GY-700		180	400	465
	fixture+photocell cost	\$370			
	fixture+photocell+installation cost	\$445			
250 watt equivalent-Holophane Postlite	WCFL2070HO4KASBKL4SHAOPCS		95	250	295
	fixture+photocell cost	\$1,360			
	fixture+photocell+installation cost	\$1,435			
400 watt equivalent-Roadwaylighting SAT-S LED	SAT-96M		200	400	465
	fixture+photocell cost	\$645			
	fixture+photocell+installation cost	\$720			
400 watt equivalent RAB FXLED Flood	FXLED150SF		150	400	465
	fixture+photocell cost	\$495			
	fixture+photocell+installation cost	\$570			

Table 3.2 LED Fixture Replacement Types

* Existing HPS fixture wattage are deemed values based on the Northeast Energy Efficiency Partnerships report published in January 2015 <http://www.neep.org/led-street-lighting-assessment-and-strategies-northeast-and-mid-atlantic>

Based on the installations recorded in Table 3.1 and above LED fixture replacements details in Table 3.2, the annual energy savings that will result from the lighting upgrade can be calculated for each community as illustrated in Table 3.3 with the supporting algorithm and specified assumptions outlined as follows.

Annual Energy Savings (kWh) savings by new LED Fixture Type and City					
CITY	100 watt equivalent LED	150 watt equivalent LED	250 watt equivalent LED	400 watt equivalent LED	Total kWh savings
Lewes	4,757	20,529	-	-	25,285
Newark	-	149,916	451,745	227,368	829,029

Seaford	-	110,525	-	-	110,525
Smyrna	-	-	-	98,114	98,114
Dover	-	-	12,017	18,359	30,376
			Total kWh savings all cities		1,093,329

Table 3.3 Annual Energy Savings (kWh) by Community

The kWh savings calculation is as follows:

$\text{KWh savings} = (\text{Existing fixture wattage} - \text{new fixture wattage}) / 1,000 \times \text{annual operating hours} \times \text{total number of fixtures},$

Where existing fixture wattage is the sum of lamp wattage and ballast wattage operating as a system in the field and,

Where new fixture wattage is the actual LED fixture wattage as specified from manufacturer's cut sheet data and,

Where annual burn hours for photo cell controlled street lighting fixtures in the absence of other data is deemed to be 3,338 hours annually, unless actual site-specific operating hours are known¹⁹.

The kWh savings assumptions are as follows:

It is assumed that the efficient outdoor area lighting, when functioning properly, will never result in coincident peak demand (kW) savings since these fixtures operate exclusively at off-peak hours i.e. at night.

It is assumed that while these LED fixtures should function properly for the next 22 years based on the 100,000 hour rated life of the fixtures, excepting any un-foreseen mechanical or catastrophic failure. For the purposes of this report the calculations will use the Mid Atlantic TRM prescribed deemed measure life value of 18 years²⁰.

Based on this 18-year measure life assumption, the lifetime and annual savings (avoided costs) of the LED fixtures is calculated as the total annual kWh savings multiplied by the avoided costs for the residential sector as specified in the 3 February 2017 memorandum from Optimal Energy to the EM&V subcommittee of the Delaware Energy Efficiency Advisory Council (EEAC) and subsequently approved at the February 2018 Council meeting--which is \$68.61 per MWh for 2016.

¹⁹ In lieu of available metered information the deemed annual operating hours from the Mid Atlantic TRM v.7.0 May 2017 is 3338 hrs. That being said, as noted, in other utility efficiency programs it is common to use a higher value, even when a known value is not available. As such, it is recommended that all communities install metering of streetlights to ensure more a robust and accurate characterization of kWh savings moving forward.

²⁰ The average rated lifetime for applicable products on the Design Lights Consortium Qualified Products List – Updated 11/21/2012 <http://www.designlights.org/solidstate.about.QualifiedProductsList_Publicv2.php> is approximately 70,000 hours. For the purposes of this characterization, it is assumed the typical equipment will operate for 60,000 hours. Assuming average annual operating hours of 3,338 (Efficiency Vermont Technical Reference Manual 2009-55, December 2008; based on 5 years of metering on 235 outdoor circuits in New Jersey), the estimated measure life is 18 years.

Taking into account these assumptions the following total annual and lifetime savings (in kWh and \$) of this project are illustrated in Table 3.4 below.

Energy Only - Annual and Lifetime Savings in 2016 Dollars				
CITY	Annual kWh savings	Avoided Energy Cost Only	TRM lifetime kWh savings	TRM lifetime \$ savings
Lewes	25,285	\$1,735	455,136	\$31,227
Newark	829,029	\$56,880	14,922,522	\$1,023,834
Seaford	110,525	\$7,583	1,989,441	\$136,496
Smyrna	98,114	\$6,732	1,766,049	\$121,169
Dover	30,376	\$2,084	546,764	\$37,514
Total	1,093,329	\$75,013	19,679,913	\$1,350,239

Table 3.4 Annual and Lifetime kWh and Dollar Savings

Evaluation of Project Economics

The cost-effectiveness of the LED street lighting conversion project can be readily provided by calculating the Simple Payback (SPB) terms and a Benefit to Cost Ratio (BCR) of the project.

SPB terms for this project can be calculated by dividing the total project cost by the annual dollar savings from energy. The result is expressed in years. This is the amount of time it will take to recover the project cost with the energy savings. The SPB for this project at each city when only considering the fixture cost is shown in Table 3.5. This table also shows the BCR that is expressed as a ratio of the project's monetary benefits to its monetary costs. A higher BCR indicates a better investment. For this calculation, the BCR represents the total value of the benefits²¹ divided by the total value of the costs over the 18-year lifetime of the project.

Total Annual and Lifetime Savings with Simple Payback and Benefit Cost Ratio--Fixture Cost Only								
Muni	Annual Savings (kwh)	Annual Avoided Energy (\$)	Annual Avoided O&M (\$)	Total Annual Savings (\$)	Lifetime Savings (\$)	Fixture Only Cost (\$)	SPB-Fixtures Only (yrs)	BCR-Fixtures Only
Lewes	25,285	\$ 1,735	\$ 4,100	\$ 5,835	\$ 105,026	\$ 24,450	4.2	4.3 : 1
Newark	829,029	\$ 56,880	\$ 78,023	\$ 134,903	\$ 2,428,248	\$ 430,548	3.2	5.6 : 1
Seaford	110,525	\$ 7,583	\$ 11,603	\$ 19,186	\$ 345,350	\$ 66,222	3.5	5.2 : 1
Smyrna	98,114	\$ 6,732	\$ 5,453	\$ 12,185	\$ 219,323	\$ 62,643	5.1	3.5 : 1
Dover	30,376	\$ 2,084	\$ 1,558	\$ 3,642	\$ 65,558	\$ 36,780	10.1	1.7 : 1
Total	1,093,329	\$ 75,013	\$100,737	\$ 175,750	\$ 3,163,505	\$ 620,643	5.2	5.1 : 1

Table 3.5 Simple Payback and Benefit Cost Analysis by Community Using Fixture Cost Only

²¹ The total energy and O&M savings over the 18 years. The savings does not exclude the cost to replace fixtures in Dover in year 15.

If the cost to install these fixtures is also included in the calculation, the SPB term increases but the results still demonstrates a cost effective project since the useful life of the fixture (18 years) is well beyond the time it takes to recover the total installed cost. Table 3.6 illustrates the SPB and BCR terms for each community with installation costs included^{22, 23, 26}.

Total Annual and Lifetime Savings with Simple Payback and Benefit Cost Ratio								
Muni	Annual Savings (kwh)	Annual Avoided Energy (\$)	Annual Avoided O&M (\$)	Total Annual Savings (\$)	Lifetime Savings (\$)	Total Project Cost (\$)	SPB (yrs)	BCR
Lewes	25,285	\$ 1,735	\$ 4,100	\$ 5,835	\$ 105,026	\$ 33,450	5.73	3.1 : 1
Newark	829,029	\$ 56,880	\$ 78,023	\$ 134,903	\$ 2,428,248	\$ 574,773	4.26	4.2 : 1
Seaford	110,525	\$ 7,583	\$ 11,603	\$ 19,186	\$ 345,350	\$ 88,947	4.64	3.8 : 1
Smyrna	98,114	\$ 6,732	\$ 5,453	\$ 12,185	\$ 219,323	\$ 74,118	6.08	2.9 : 1
Dover	30,376	\$ 2,084	\$ 1,558	\$ 3,642	\$ 65,558	\$ 41,130	11.29	1.6 : 1
Total	1,093,329	\$ 75,013	\$100,737	\$ 175,750	\$ 3,163,505	\$ 812,418	4.62	3.8 : 1

Table 3.6 Simple Payback and Benefit Cost Analysis by Community

This project also results in operational and maintenance (O&M) savings that is a coincident result of the assumed longer life of the new LED fixtures vs. the existing HPS fixtures. For all of the municipalities save Newark, the common practice has been to replace the entire lighting fixture at reported failure²⁴. Using the assumption that the most likely cause of fixture failure is the result of a burned-out HPS lamp, which has an average rated life of 24,000+ hours²⁵ and knowing that the LED replacement fixture has a rated life of 100,000 hours, it can be reasonably asserted that O&M costs would be reduced by approximately 75% over the lifetime of the LED fixture. For purposes of quantifying the O&M savings over the project's 18-year lifetime, this same assumption is applied given that the municipalities could have continued to replace their existing street lighting at fixture failure one-for-one using similar HPS technology.

Following, by using the NEEP LED Street Lighting Assessment and Strategies for the Northeast and Mid-Atlantic^{26,27} as the source for determining O&M savings, the O&M savings per fixture is calculated as \$41/year, taking into consideration a cost-adjustment factor for Delaware of 82% compared with California (which is the location of the original source data that calls out an annual \$50/fixture saving).

By applying this average O&M cost of \$41/year per fixture for Delaware the analysis also produced a total estimate of O&M savings over the 18-year life of the new fixtures. While there is no certainty when the existing fixture would have failed, this assumption allows for the avoided cost of future lamp and

²² Incremental costs assumptions used in this calculation (\$41/fixture) are supported by the (May 10, 2017) NEEP incremental cost recommendation memo to the MidAtlantic TRM v7.0 regarding commercial LED lighting <http://www.neep.org/mid-atlantic-technical-reference-manual-v7..>

²³ Total project costs include the proportional share if the \$13,500 consulting cost incurred by DEMEC for this project and not the entire fee.

²⁴ For Newark, Mr. Stearns was told that at reported outage, service technicians would replace the lamp and photo cell on the fixture as the 1st response and then replace the ballast as a 2nd response and only replace the entire fixture if response 1 and 2 failed to correct the outage. For all other municipalities, the service technicians would replace the entire fixture at reported outage.

²⁵ Rated lamp life is based on 50% survival <http://www.americanelectriclighting.com/Library/Literature/PDFs/HPS%20Servicing%20Guide.pdf>.

²⁶ The lifetime saving total does not exclude the cost to replace fixtures in Dover in year 15.

²⁷ <http://www.neep.org/led-street-lighting-assessment-and-strategies-northeast-and-mid-atlantic>. Incremental costs assumptions used in this calculation (\$41/fixture) are also supported by the (May 10, 2017) NEEP incremental cost recommendation memo to the MidAtlantic TRM v7.0 regarding commercial LED lighting <http://www.neep.org/mid-atlantic-technical-reference-manual-v7..>

ballast replacements (O&M costs) to be spread more accurately through the 18 year project period. Taking into account these O&M savings, the total project financial impacts are calculated and show in Table 3.7. These calculations also include the following assumption that some of the LED fixtures installed in Dover would need to be replaced in year 15 based on the 50,000 hour rated lifespan.²⁸

MEASURE IMPACTS						
Year	Maintenance and Fixture Costs for Baseline Equipment	Maintenance and Fixture Costs for Efficient Equipment	Net Operation & Maintenance Savings (Costs)	Annual Avoided Costs	Net Annual Cash Flow	Net Cumulative Cash Flow
0					\$(818,418)	\$(818,418)
1	\$100,737		\$100,737	\$75,013	\$175,750	\$(642,668)
2	\$100,737		\$100,737	\$75,013	\$175,750	\$(466,918)
3	\$100,737		\$100,737	\$75,013	\$175,750	\$(291,168)
4	\$100,737		\$100,737	\$75,013	\$175,750	\$(115,418)
5	\$100,737		\$100,737	\$75,013	\$175,750	\$60,332
6	\$100,737		\$100,737	\$75,013	\$175,750	\$236,082
7	\$100,737		\$100,737	\$75,013	\$175,750	\$411,832
8	\$100,737		\$100,737	\$75,013	\$175,750	\$587,582
9	\$100,737		\$100,737	\$75,013	\$175,750	\$763,332
10	\$100,737		\$100,737	\$75,013	\$175,750	\$939,082
11	\$100,737		\$100,737	\$75,013	\$175,750	\$1,114,832
12	\$100,737		\$100,737	\$75,013	\$175,750	\$1,290,582
13	\$100,737		\$100,737	\$75,013	\$175,750	\$1,466,332
14	\$100,737		\$100,737	\$75,013	\$175,750	\$1,642,082
15	\$100,737	\$28,110	\$72,627	\$75,013	\$147,640	\$1,789,722
16	\$100,737		\$100,737	\$75,013	\$175,750	\$1,965,472
17	\$100,737		\$100,737	\$75,013	\$175,750	\$2,141,222
18	\$100,737		\$100,737	\$75,013	\$175,750	\$2,316,972
TOTAL			\$1,785,156	\$1,350,234		

Table 3.7 Total Project Financial Cash Flow

In addition to the above cost-effectiveness calculations the LED streetlight conversion project can also be expressed in terms of the project's Return on Investment (ROI) and IRR (internal rate of return). Calculating these ratios that show the community's ability to translate sales dollars into profits, can also illustrates the overall impact of the project in terms of generating returns (capital or resources) that could be re-invested or re-allocated elsewhere in the future.

²⁸ While the Mid Atlantic TRM v.7.0 specifies 18 years for LED Outdoor Pole/Arm- or Wall-Mounted Area and Roadway Lighting, given the different fixture installations in Dover (post-top LED fixtures and Kirkwood BB court flood lights have a manufacturers rated life of only 50,000 hours) as compared to the other municipalities it was agreed that is not sufficient to assume one number for all LED street lighting applications and as such a separate value based on the manufacturer's specifications be used in this instance.

As a simple gauge of a project's viability the ROI can help illustrate the investment profitability. This can be calculated by essentially dividing the benefit "gain from investment less the cost" by the total cost of the investment²⁹. Following this rudimentary approach, the project ROI can be calculated as outlined here:

Return On Investment (ROI) calculation:

$$\frac{(\text{Gain from investment} - \text{cost of investment})}{\text{Cost of investment}}$$

Where: Gain from investment refers to the total lifetime benefit of the investment
 Cost refers to the total cost of the project

Using this approach the project ROI is 283%. For the individual communities the ROI is shown in Table 3.8 below:

CITY	Return on Investment (ROI)
Lewes	229%
Newark	324%
Seaford	295%
Smyrna	202%
Dover	65%

Table 3.8 Return on Investment by Community

In general a higher ROI indicates a better investment. However, given an ROI calculation does not account for the amount of time over which an investment is taking place, it is also important to consider the IRR as this calculation accounts for the differences in the value of money over time and as such provides a more realistic representation of a community's ability to measure the overall efficiency of a project in terms of generating returns based on its investment. In more specific details, the IRR on an investment illustrates the "annualized effective compounded return rate" or rate of return that sets the net present value of all cash flows (both positive and negative) from the investment equal to zero. Given this fact, and based on the assumed time and cash flow calculations of this project, the calculated internal rate of return for this project is 21%.

Further project savings are also achieved when taking into consideration the avoided costs of energy production and delivery. The avoidable marginal cost to supply electric energy or fuel to a utility customer can also be reflected as the electric energy and fuel costs typically reflect by the utility's service rate to its customers. Additional transmission and distribution (T&D) avoided costs are represented by the avoided infrastructure costs due to postponement and/or reductions in the size of new capital projects that have to be built, as a result of a reduced electric demand that needs to be delivered. The calculation

²⁹ Note for a more accurate ROI it is important to use inputs that incorporate all costs over the investment time period.

of annual avoided energy costs as explained here were based on values from the Maryland Avoided Energy (MEA) Costs Study³⁰ (inflated to 2016 dollars) that are used by the DPL in their Maryland service territory³¹. In addition to the reported MEA avoided costs values this calculation also includes a component for demand-reduction price effects (DRIPE); and the avoided cost of Renewable Energy Credits (RECs) and Solar Renewable Energy Credits (SRECs)³² that assuming a conservative \$75 fixed price per SREC and \$15 fixed price per REC. To simplify the electrical energy avoided cost into a single set of projections, the typical load shapes for residential and commercial and industrial (C&I) measures were also used.

Based on these assumptions, Table 3.9 illustrates the Net Present Value (NPV) of the project by fixture type³³.

Street Lighting Project Totals by Measure						
Measure Location	Annual Energy Savings (kWh/Yr)	Measure Cost (\$)	Annual Avoided Cost (\$/Yr)	Annual O&M Savings (\$)	Total Resource Benefits (\$)	Net Present Value (\$)
Totals	1,093,329	\$818,418	\$75,013	\$100,737	\$1,237,032	\$1,835,894
Lewes 100 watt equivalent LUMEC	4,757	\$10,400	\$326	\$1,025	\$5,382	\$9,380
Lewes 150 watt equivalent LUMEC	20,529	\$24,600	\$1,408	\$3,075	\$23,227	\$41,894
Seaford 150 watt equivalent LUMEC	110,525	\$88,662	\$7,583	\$11,603	\$125,052	\$199,494
Smyrna 400 watt equivalent LUMEC	98,114	\$73,283	\$6,732	\$5,453	\$111,010	\$114,122
Dover 250 watt equivalent post top	12,017	\$25,920	\$824	\$738	\$13,596	\$(2,163)
Dover 400 watt equivalent SAT-S	14,153	\$11,600	\$971	\$656	\$16,013	\$13,573

³⁰ Exeter Associates, 2014

³¹ DPS's service territory in Maryland and Delaware together compose a single zone as defined by PJM, the regional operator.

³² RECs and SRECs are defined by 26 Del. C. §§352(18) and (25). Specifically, in 26 Del. C. §354(a) the requirement to acquire RECs and SRECs is tied to total state electric sales, reductions in sales from efficiency programs reduce the need to acquire RECs/SRECs

³³ Total resource benefits is the present value of electric, fuel, and water savings over the lifetime of the measures based on DEMEC avoided costs. Net Present Value is also a present value but is the net of benefits minus costs, so it includes not only TRB but also the measure cost and the value of operation and maintenance savings.

Dover 400 watt equivalent Kirkwood BB court	4,206	\$2,300	\$289	\$164	\$4,759	\$4,755
Newark 150 watt equivalent LEOTEK	149,916	\$203,235	\$10,286	\$32,882	\$169,621	\$429,720
Newark 250 watt equivalent LEOTEK	451,745	\$270,688	\$30,994	\$35,342	\$511,121	\$737,867
Newark 400 watt equivalent LEOTEK	\$227,368	\$107,550	\$15,600	\$9,799	\$257,252	\$287,254

Table 3.9 Total Resource Benefits by Measure

These performance metrics can also be calculated in a similar fashion for the individual communities as illustrated in Table 3.10 below:

Street Lighting Project Totals by Community						
Municipality	Annual Energy Savings (kWh/yr.)	Project Cost (\$)	Annual Avoided Energy Cost (\$)	Annual O&M savings (\$)	Total Resource Benefits (\$)	Net Present Value (\$)
Lewes	25,285	33,000	1,735	4,100	28,609	51,273
Seaford	110,525	88,862	7,583	11,603	125,052	199,494
Smyrna	98,114	73,283	6,732	5,453	111,010	114,122
Dover	30,376	39,283	2,084	1,558*	34,368	16,165
Newark	829,029	581,453	56,880	78,023	937,994	1,454,840
totals	1,093,329	818,418	75,013	100,737	1,237,032	1,835,894

Table 3.10 Total Resource Benefits by Community

*The annual O&M savings for City of Dover does not include the allowance for the replacement of some fixtures in year 15.

Evaluation of Additional Societal Benefits

Additional benefits associated with the LED lighting project include greenhouse gas avoidance. A greenhouse gas (GHG) is any gas in the atmosphere that absorbs and emits radiation within the thermal

infrared range. This process is the fundamental cause of the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone. Human activities since the beginning of the Industrial Revolution (taken as the year 1750) have produced a 40% increase in the atmospheric concentration of carbon dioxide, from 280 ppm in 1750 to 406 ppm in early 2017.³⁴

The calculated annual CO₂ emissions avoided as a result of this project are measured at 768 metric tons. This is calculated by converting the reductions of electrical reductions (kWh) into avoided units of CO₂ by using the EPA greenhouse gas equivalency calculator³⁵. Similarly, the sum of the greenhouse gas emissions saved can also be reviewed as a Carbon Dioxide Equivalent (CO₂e) of the following GHG emissions³⁶:

- 162 passenger vehicles driven for one year or 1,841,507 miles driven, or
- 34 garbage trucks of waste or 244 tons recycled instead of landfilled.

Or the CO₂e from:

- 86,459 gallons of gasoline consumed, or
- 1,779 barrels of oil consumed, or
- 819,919 pounds of coal burned, or
- 113 homes' electricity use for one year.

It can also be expressed as the equivalent to the carbon sequestered by:

- 727 acres of U.S. forests in one year.

³⁴ Source: <https://www.esrl.noaa.gov/gmd/ccgg/trends/global.html>

³⁵ This value is calculated using the following Emission Factor 7.03×10^{-4} metric tons CO₂/kWh as found on the EPA greenhouse gas equivalencies website <https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references>

³⁶ The following equivalent units reported are calculated using the EPA greenhouse gas equivalencies calculator that supports the conversion of greenhouse gas emissions numbers into different types of units: <https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references>

4. Site Visit Reports

4.1 Lewes

Lewes is an incorporated city on the Delaware Bay in eastern Sussex County, Delaware. According to the 2010 census, the population is 2,747.

The site visit was conducted on June 27, 2017. Tim Stearns, Scott Lynch and Shannon Maner met with Lewes BPW General Manager, Darrin Gordon, and Electric Department supervisor Bob Barnes.

Bob Barnes confirmed that he personally supervised the installation of the 100 fixtures, and that these amounted to the only remaining non-LED or induction lights on “beach side” of town (beach side refers to all streets between the canal and the beachfront).

He also stated that the 100-watt equivalent fixtures were installed on “side-streets” and cul-de-sacs in this neighborhood (25 fixtures in total), while the 150-watt equivalent LEDs were installed along Bay Ave. and Cedar St. (75 fixtures in total). He also confirmed that the existing fixtures were 100-watt and 150-watt HPS respectively and were replaced one-for-one.

It was also confirmed that existing maintenance/repair was conducted by replacing the entire cobra-head HPS fixture with a new Cobra-head HPS fixture, and this was done in approximately 15 minutes with two employees and a bucket truck.

Bob escorted Tim on a tour of this “neighborhood” which consisted of the following streets:

- Savannah
- Cedar St.
- Iowa
- Bay Ave.
- N. Washington
- Illinois
- Ohio
- Massachusetts
- West Canal
- East Canal
- O St.
- Oregon
- Newark
- Houston
- Delmar
- Indiana

Tim made a physical count of the fixtures along Bay Ave. and Cedar St., and confirmed that 75 fixtures were installed. Based on that physical count, it was concluded that all 100 fixtures have been installed.



<https://www.mapquest.com/us/de/lewes-282038662>

Figure 4.1.1 Map of canal/beachfront area where LED fixtures were installed.



Figure 4.1.2 Fixture mounted along poles on Bay Ave. (typical)



Figure 4.1.3 Fixture mounted along poles on Cedar Rd. (typical)

4.2 Seaford

Seaford is a city located along the Nanticoke River in Sussex County, Delaware. According to the 2010 Census, the population of the city is 6,928.

The site visit was conducted on June 27, 2017. Tim Stearns, Scott Lynch and Shannon Maner met with The City of Seaford Electrical Engineer, Rick Garner, PE and Superintendent of Electric, Bill Bennett.

Bill Bennet confirmed that he personally supervised the installation of the 408 fixtures and that these constituted the first two phases of a three-phase installation project that would convert the entire town to LED streetlights. Bill confirmed that 34 400-watt equivalent LED streetlights were installed on Nylon St. and that all of the remaining LEDs were 150-watt equivalents installed as one-for-one replacement of existing HPS cobra heads.³⁷

He also confirmed that existing maintenance and repair was conducted by replacing the entire cobra-head HPS fixture with a new cobra-head HPS fixture and this was done in approximately 15 minutes with two employees and a bucket truck.

Bill provided the following worksheet which lists the streets where the streetlights were installed:

³⁷ Some LED fixtures (including the 400-watt equivalent LED fixtures on Nylon St.) were installed in 2015, and are not included in this project count.

Phase 1	ordered	installed	date installed	
North St from Water to Eskridge Hwy	18	16	12/7/2015	
Arch St from High St to Stein Hwy	13	13	12/9-12/10	
Pine St from High St to Stein Hwy	14	14	12/10/2015	
Bradford St from Del Ave to Stein	14	14	1/4/2016	
Hall St from dead end to Stien Hwy	15	15	1/5/2016	
Porter St from Harrington to Stein	14	14	1/4/2016	
E King St from Cedar to Poplar	12	12	1/13/2016	
Conwell ST from river to Spruce	10	10	12/31/2015	
Cannon St from river to Poplar	9	9	12/11/2015	
Locust St from De Ave to Sussex	17	17	1/13/2016	
Market St from High to Virginia Ave	24	24	12/8-12/9	
Nylon Blvd	34	34	11/20/2015	
Pearl Alley		2	12/31/2015	
New ST	2	4	1/4/2016	
Church St	2	2	12/11/2015	
Spares	3	1		
	201	200		
Bold print is done				

Tim Stearns:
We only counted
fixtures confirmed to be
installed in 2016 and
excluded all others from
this Project, including the
1 spare

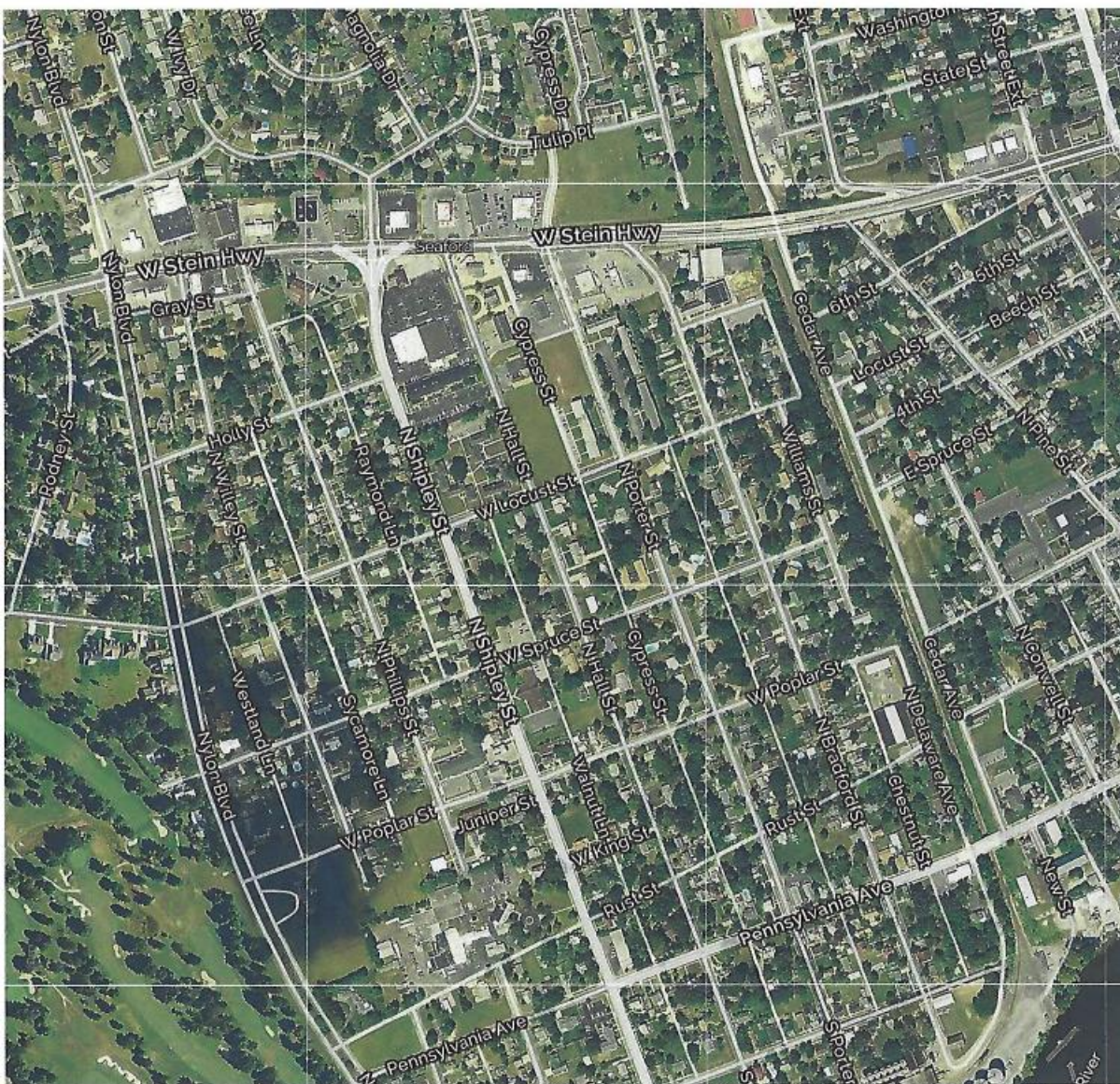
Phase 2	
Pearl St	7
Spruce St from Cedar to Pine	4
Chandler St from Eskridge to Third	9
Purnell St & Thomas St	3
Third St from Pine to the east end	12
Liberty St	4
Thompson Ct	3
Woolford St	4
Clarence St	6
Collins Ave	4
Lincoln St	2
Grant St , 3 are in Fred Douglas parking lot	5
Douglas St	3
Griffin St	1
Perkins St	4
Pond ST	2
Nutter Lane	3
Dutton Ave.	11
Locust from cedar to Pine	3
Poplar St from Cedar Ave to Middleford Rd	18
New St & Arcadia	6
fourth, fifth, sixth	10
Pennsylvania Ave from Nylon Blvd to Shipley St	4

Wahington Ave from school lane to hockey field	5
Linden St & State ST	3
School Lane	10
State St from Pine to Market	3
Washington St from Pine to Market	5
Dover St	5
Spruce St from De Ave to Golf Course	7
Poplar St from De Ave to Nylon Blvd	7
Holly St from Shipley to Nylon Blvd	3
Elm ST, S Phillips, S Willey, Alley	4
Juniper, Phillips & Alleys	10
Delaware Ave, Williams and Holly	18
	208

Table 4.2.1 Fixture Counts by Street

Bill escorted Tim on a tour of the streets where LEDs were installed. Tim counted fixtures on Pearl St., Hall St., and Nylon St. to confirm the counts and locations. Based on that representative physical count, it was concluded that all 283 fixtures were installed in 2016.³⁸

³⁸ There have been additional LED streetlights installed in Seaford both before and since 2016—these were not counted as part of this project.



<https://www.mapquest.com/us/de/seaford-282033251>

Figure 4.2.1 Map of south side of town where Phase 1&2 fixtures were installed



Figure 4.2.2 Fixtures installed on Hall St. (typical)



Figure 4.2.3 Fixtures installed on Pearl St. (typical)

4.3 Smyrna

Smyrna is a town in Kent and New Castle counties in Delaware. It is part of the Dover, Delaware Metropolitan Statistical Area. According to 2010 Census, the population of the town is 10,023.

The site visit was conducted on June 28, 2017. Tim Stearns, Scott Lynch, and Shannon Maner met with The City of Smyrna Electric Department Operations Manager, Buck Smith and Director of Public Works & Electric Director, Bill Evans.

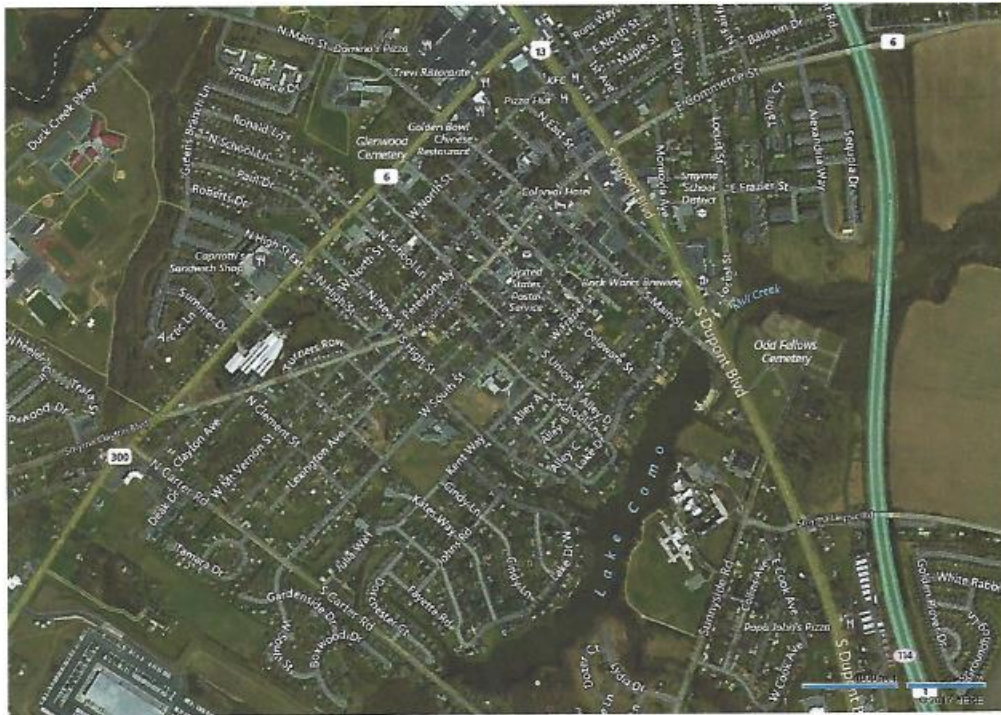
Buck Smith provided Tim with a handwritten copy of his working list of streets where LED fixtures have been installed. The list contains street names of installations for both 2016 and 2017, and includes streets where no streetlights previously existed but now have LED streetlights. All of these LED fixtures were 400-watt HPS equivalents, although some of the streets previously have 175-watt HPS (See Figure 4.3.1 below).

LED Lights in Town		
4	Lincoln St	175
(88)	Carter Rd	400
27	Bike Path	175
10	Rt. 300	(New) in 2017
7	Monrovia	175
(16)	Comm. St	400
(24)	N. MAIN St MAIN ST.	400
37	Glennwood AVE	175
2	P.W. Yard	(New)
(19)	H.W.Y.	400
(2)	Behind Townhall	400
	Total	232
counts. 2016 and 2017		
↳ 133 99		

Figure 4.3.1 Fixture Counts by Street Location

Buck clarified that they initially concentrated on replacing the 400-watt HPS lights in 2016, and that at least 149 fixtures were installed to replace 400-watt HPS on Carter Rd., Commerce St., North and South Main St.; and along Highway 13. Invoices submitted as part of this project indicate that 133 fixtures were shipped to Smyrna in late 2015 and 2016. Based on these invoices, savings will only be claimed for 133 fixtures.

Tim confirmed the quantity of installed fixtures on Carter Rd., Commerce Rd., and along North and South Main St.; and along Highway 13.



<https://www.bing.com/maps?&ty=18&q=Smyrna%2c%20DE&vdpid=5490454192206118913&m...> 7/10/2017
Figure 4.3.2 Map of the center of the Town of Smyrna



Figure 4.3.3 LED fixtures on Carter St.



Figure 4.3.4 LED fixtures on S. Main St.



Figure 4.3.5 LED fixtures along Hwy 13.

4.4 Dover

Dover is the capital and second-largest city in Delaware. It is the principal city of the Dover, DE, Metropolitan Statistical Area. According to the 2010 Census, the city had a population of 36,047.

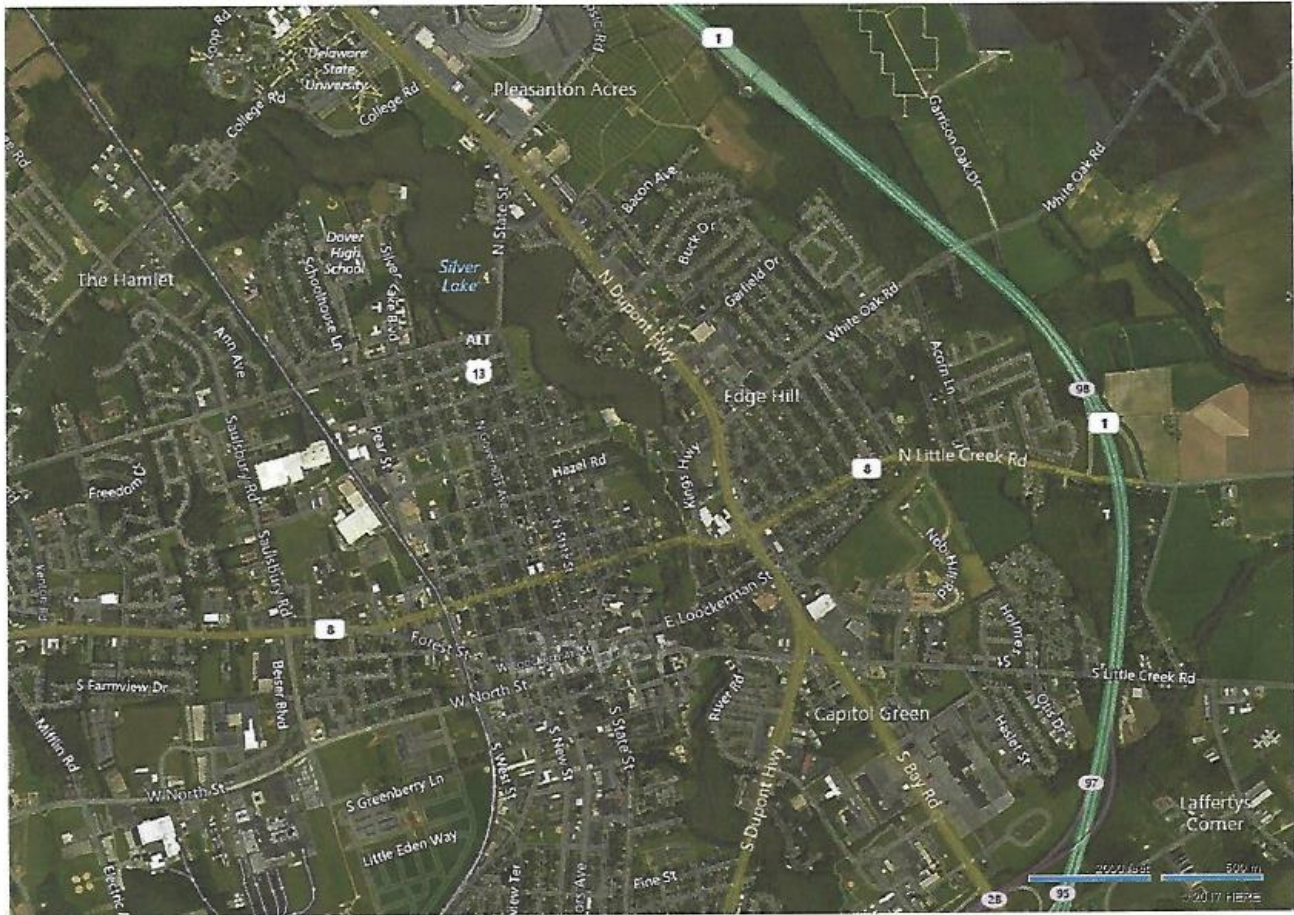
The site visit was conducted on June 28, 2017. Tim Stearns, Scott Lynch, and Shannon Maner met with The City of Dover Electric Engineering Services and System Operations Superintendent, Paul Waddell, and Plant Operations Manager, Daniel Corrigan.

Paul previously provided information on its streetlights to Scott via e-mail on May 25, 2017, and this e-mail was reviewed to clarify and confirm the information.

Paul confirmed the following:

- Existing HPS cobra head streetlights were replaced whenever an outage was reported. The cost of the HPS fixture (materials only) was \$152.90.
- Cost (materials only) for the new LED flood lights at the basketball courts was confirmed to be \$495.
- Existing fixtures at the basketball courts were 400-watt HPS flood lights
- The 95-watt LED post top fixtures were replacing 18 of the existing 250-watt HPS
- Replacement 200-watt LEDs (along RT. 13-Dupont Hwy) were replacing 400-watt HPS

Paul stated that he confirmed the installation of all fixtures with site visits to all locations. He provided Tim with a guided tour to the locations where fixtures were installed.



<https://www.bing.com/maps?&ty=18&q=Smyrna%2c%20DE&vdpid=5490454192206118913&m...> 7/10/2017

Figure 4.4.1 Map of the center of the City of Dover



Figure 4.4.2 Post Top LED fixtures on S. New St.

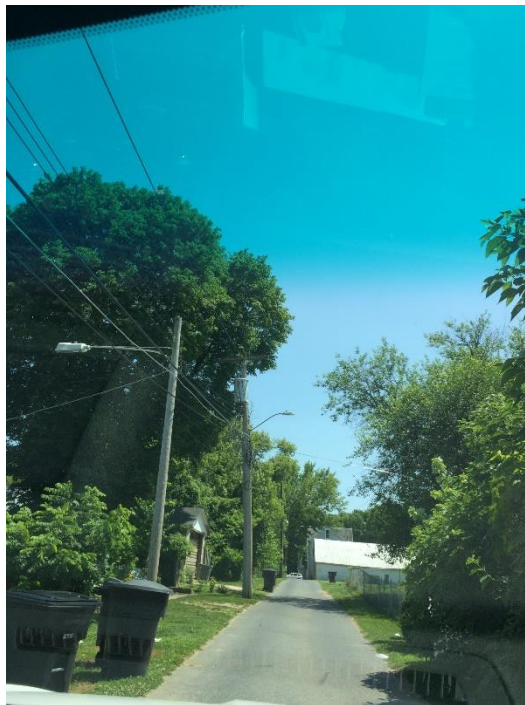


Figure 4.4.3 LED fixture in alley near S. New St.



Figure 4.4.4 LED fixture on street near S. New St.



Figure 4.4.5 LED fixture along Rt. 13



Figure 4.4.6 Flood light LED fixture at Kirkwood basketball courts

4.5 Newark

Newark is a city in New Castle County, Delaware. According to the 2010 Census, the population of the city is 31,454.

The site visit was conducted on June 29, 2017. Tim Stearns, Scott Lynch, and Shannon Maner met with The City of Newark's Director of Electric, Rick Vitelli, and Assistant Electric Utilities Director, Sam P. E. Sneeringer. Sam confirmed that repair and replacement of existing HPS cobra heads was conducted as follows:

1. In response to first call of streetlight outage: replace lamp and Photo cell. Estimate material cost was \$16
2. In response to second call of streetlight outage: replace lamp and ballast
3. In response to third call of streetlight outage: replace entire cobra head. Current material cost was \$90-\$140

He stated that replacing the entire fixture was rarely done.

Sam confirmed the repair or replace values he originally provided to Scott on May 23, 2017. The average time to repair/replace a fixture was 45 minutes for two employees, and the cost was calculated to be \$60 for in-house labor. This did not include the cost of the truck or overhead. The 45 minutes included travel time to and from the fixture location. For consistency with the other municipalities, this travel time was not included in maintenance savings calculations.

Sam confirmed that the intent of the project was to finalize the conversion of all of the city's streetlights to LEDs. The city had some LED streetlights installed already, but it was not clear how many of these there were.

Sam also stated in an e-mail on May 25, 2017 to Scott that there had only been 11 customer complaints from residents regarding the new lights being too bright. These were in neighborhoods where 100-Watt lights were upgraded to 150-watt LED equivalents. The lights were replaced with 100-watt equivalents or a field side shield was installed.

The city provided a link to a Google Earth LED Fixture Locations Map. kmz file, which showed where each LED fixture was located. The map was created with GPS tracking of all LED fixtures and was plotted in real time during the installation of these LED fixtures. A Screenshot of the map is shown below.

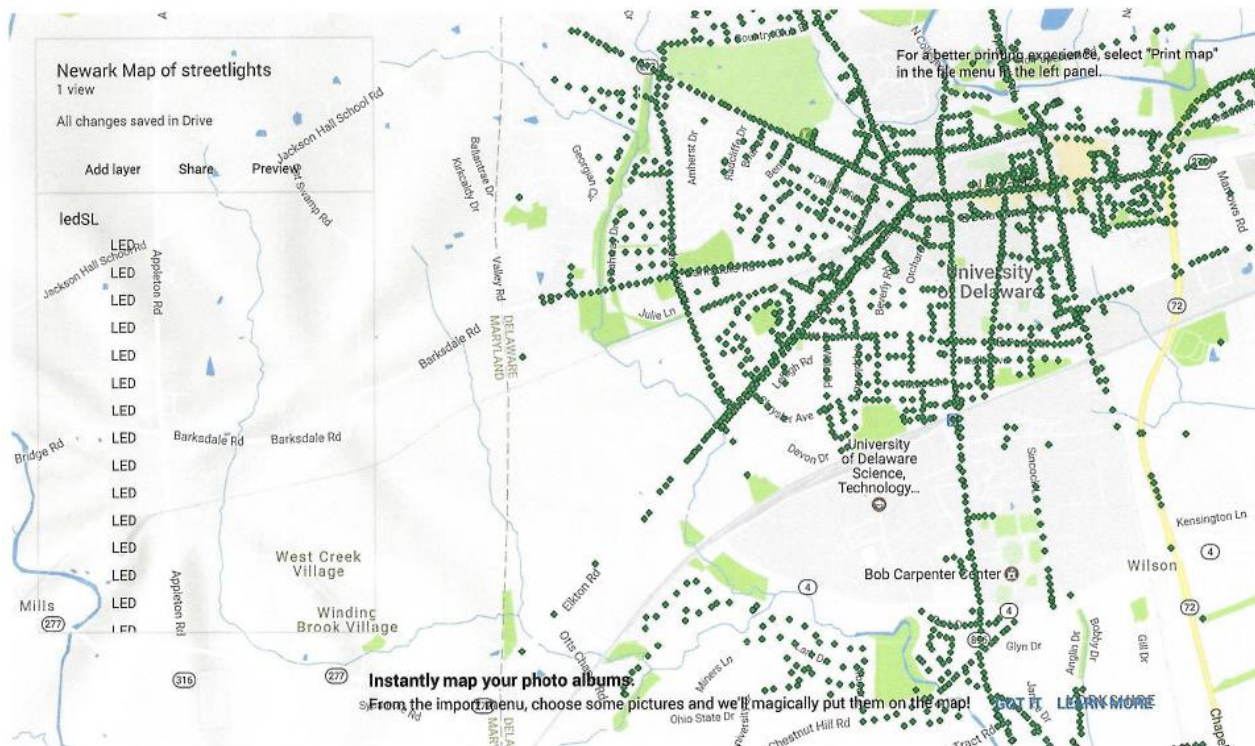


Figure 4.5.1 Map Locations of Installed LED Fixtures

During the site visit, Anthony Hanna from the Newark Electric Department accessed the excel file that was created during this mapping process and shared it with Tim via e-mail. That worksheet lists a total of 1,977 LED fixtures installed. Using that worksheet, and listed by LED replacement, reveals the following:

- 802 LED fixtures were installed replacing 150-watt HPS fixtures
- 936 LED fixtures were installed replacing 250-watt HPS fixtures
- 239 LED fixtures were installed replacing 400-watt HPS fixtures

Tim confirmed with Anthony via e-mail that this map and worksheet represents the LED fixtures that were installed in 2016. Anthony further clarified that 74 of the 250-watt equivalent LED fixtures were installed in 2015 or earlier. These 74 were not counted in the 2016 savings totals.

Tim also confirmed with Anthony that the city did not specifically count the number of 100-watt HPS fixtures compared to the 150-watt HPS fixtures that were replaced with 150-watt equivalent LED fixtures. Anthony stated that “most” of the existing fixtures were 100-watt HPS, but there was no way to be certain how many of each fixture type was replaced with 150-watt LED equivalents. Due to this, a conservative savings calculation was made based on the assumption that all 150-watt LED equivalents replaced 100-watt HPS fixtures.

Newark provided an order acknowledgement for 1,450 fixtures and also an invoice for 506 more fixtures (the order acknowledgement and invoice were created using different customer numbers, which presumable indicates that these are not duplicate orders). It is presumed that other invoices exist, but these were not provided.

Based on order acknowledgement and invoice documents, it was noted that the wattages of the new LED fixtures—as input into the GPS mapping software and imported into the excel worksheet—did not match the cut sheet data. The discrepancy is noted below:

- 862 138-watt LED fixtures replacing 250-watt HPS fixtures were listed as 137-watt in the worksheet, and 74 were listed as 143-watts
- 180-watt LED fixtures replacing 400-watt HPS were listed as 183-watt in worksheet.



Figure 4.5.2 LED fixture at Library and Main St.



Figure 4.5.3 LED fixture on Veterans Lane



Figure 4.5.4 LED fixtures along S. Main St.



Figure 4.5.5 LED fixtures along S. Main St.



Figure 4.5.6 LED fixtures in Municipal building parking lot

5. Purchase Orders and Documentation of Installed Fixtures

5.1 Lewes



**** INVOICE ****

35208 HUDSON WAY Phone: 610-832-9097
 REHOBOTH BEACH, DE 19971-4419 Fax: 610-941-8183
 Phone: 302-644-1900 Fax: 302-644-0292

APPROVED BY:

APPROVED BY:

INVOICE DATE	INVOICE NUMBER
10/28/15	S4697261.001
REMIT TO:	PAGE NO.
RUMSEY - REHOBOTH P.O. BOX 824429 PHILADELPHIA, PA 19182-4429	1 of 1

BILL TO:
 LEWES BOARD OF PUBLIC WORK
 107 FRANKLIN AVE
 LEWES, DE 19958-1413

SHIP TO:
 LEWES BOARD OF PUBLIC WORKS BLDG
 216 SCHLEY AVENUE
 ATTN: BOB BARNES
 LEWES, DE 19958-1400

CUSTOMER NUMBER		CUSTOMER ORDER NUMBER		RELEASE NUMBER		SALESPERSON			
10548		181							
WRITER		SHIP VIA		TERMS		SHIP DATE		ORDER DATE	
MICHAEL DECK		BW - BEST WAY		Net 30 Days		10/28/15		08/06/15	
LN	DESCRIPTION			ORDER QTY	SHIP QTY	NET UNIT PRICE		NET AMOUNT	
1	LUMEC RFM-72W32LED4K-T-R3M-UNIV-DMG-R CD-W C10-GY3 **NS**			25	25	214.00ea		5350.00	
2	LUMEC RFM-108W32LED4K-T-R3M-UNIV-DMG- RCD- WC10-GY3 **NS**			75	75	228.00ea		17100.00	
RECEIVED NOV 02 2015 BY:									
						Subtotal		22450.00	
						S&H CHGS		0.00	
						Sales Tax		0.00	
						Amount Due		22450.00	
						S4697261.001			

Payment is due by 11/27/15

Refer to www.Rumsey.com/contactus/creditapp for Terms and Conditions

Past due accounts are subject to a 1.5% per month service charge.

Payment is due by 11/27/15
 Refer to www.Rumsey.com/contactus/credittapp for Terms and Conditions
 Past due accounts are subject to a 1.5% per month service charge.

5.2 Seaford



**** INVOICE ****

35208 HUDSON WAY Phone: 610-832-9097
 REHOBOTH BEACH, DE 19971-4419 Fax : 610-941-8183
 Phone: 302-644-1900 Fax: 302-644-0292

INVOICE DATE	INVOICE NUMBER
11/06/15	S4707428.002
REMIT TO: RUMSEY - REHOBOTH P.O. BOX #24429 PHILADELPHIA, PA 19182-4429	PAGE NO. 1 of 1

BILL TO:
 CITY OF SEAFORD
 414 HIGH STREET
 PO BOX 1100
 SEAFORD, DE 19973-3914

SHIP TO:
 CITY OF SEAFORD
 8000 HERRING RUN ROAD
 MUST CALL 302-629-9841 24HRS PRIOR
 SEAFORD, DE 19973-5753

CUSTOMER NUMBER		CUSTOMER ORDER NUMBER		RELEASE NUMBER		SALESPERSON			
3797		16-00516				RICK GARNER			
WRITER		SHIP VIA		TERMS		SHIP DATE		ORDER DATE	
MICHAEL DECK		BW - BEST WAY		Net 30 Days		11/06/15		08/21/15	
LN	DESCRIPTION			ORDER QTY	SHIP QTY	NET UNIT PRICE		NET AMOUNT	
1	LUMEC RFL-215W96LED4K-T-R3M-HVU-DMG-R CD-P H9-WC10-GY3 **NS**			35	35	416.00ea		14560.00	
						Subtotal		14560.00	
						S&H CHGS		0.00	
						Sales Tax		0.00	
						Amount Due		14560.00	
						S4707428.002			

Payment is due by 12/06/15

Refer to www.Rumsey.com/contactus/creditapp for Terms and Conditions

Past due accounts are subject to a 1.5% per month service charge.

Payment is due by 12/06/15

Refer to www.Rumsey.com/contactus/creditapp for Terms and Conditions
 Past due accounts are subject to a 1.5% per month service charge.



**** INVOICE ****

35208 HUDSON WAY
 REHOBOTH BEACH, DE 19971-4419 Phone: 610-832-9097
 Phone: 302-644-1900 Fax : 610-941-8183
 Fax: 302-644-0292

INVOICE DATE	INVOICE NUMBER
11/23/15	S4707428.004
REMIT TO: RUMSEY - REHOBOTH P.O. BOX 924429 PHILADELPHIA, PA 19182-4429	PAGE NO. 1 of 1

BILL TO:
 CITY OF SEAFORD
 414 HIGH STREET
 PO BOX 1100
 SEAFORD, DE 19973-3914

SHIP TO:
 CITY OF SEAFORD
 8000 HERRING RUN ROAD
 MUST CALL 302-629-9841 24HRS PRIOR
 SEAFORD, DE 19973-5753

CUSTOMER NUMBER	CUSTOMER ORDER NUMBER	RELEASE NUMBER	SALESPERSON
3797	16-00516		RICK GARNER
WRITER	SHIP VIA	TERMS	SHIP DATE
MICHAEL DECK	BW - BEST WAY	Net 30 Days	11/23/15
LN	DESCRIPTION	ORDER QTY	SHIP QTY
1	LUMEC RFM-72W32LED4K-T-R3M-UNIV-DMG-R CD-W C10-GY3 **NS**	166	166
NET UNIT PRICE	NET AMOUNT		
214.00ea	35524.00		

Payment is due by 12/23/15

Refer to www.Rumsey.com/contactus/creditapp for Terms and Conditions
 Past due accounts are subject to a 1.5% per month service charge.

Subtotal	35524.00
S&H CHGS	0.00
Sales Tax	0.00
Amount Due	35524.00
	S4707428.004

5.3 Smyrna



**** INVOICE ****

1251 COLLEGE PARK DRIVE
DOVER, DE 19904-8713
Phone: 302-735-3300 Fax: 302-735-3303

Phone: 610-832-9097
Fax : 610-941-8183

TOWN OF SMYRNA

OCT 3-2016

RECEIVED

BILL TO:
TOWN OF SMYRNA
220 ARTISAN DRIVE
PO BOX 307
SMYRNA, DE 19977-3715

SHIP TO:
TOWN OF SMYRNA
220 ARTISAN DRIVE
PO BOX 307
SMYRNA, DE 19977-3715

INVOICE DATE	INVOICE NUMBER
09/30/16	S4956746.001
REMIT TO:	PAGE NO.
RUMSEY - DOVER BRANCH P.O. BOX 824429 PHILADELPHIA, PA 19182-4429	1 of 1

CUSTOMER NUMBER		CUSTOMER ORDER NUMBER		RELEASE NUMBER		SALESPERSON	
7696		PER BILL EVANS				BILL EVANS	
WRITER		SHIP VIA		TERMS		SHIP DATE	ORDER DATE
MICHAEL DECK		BW - BEST WAY		Net 10 Days		09/30/16	09/06/16
LN	DESCRIPTION			ORDER QTY	SHIP QTY	NET UNIT PRICE	NET AMOUNT
1	LUMEC RFL-241W112LED4K-T-R3M-UNIV-DMG -RCD -WC10-GY3 **NS** <						

Payment is due by 10/10/16

Refer to www.Rumsey.com/contactus/creditapp for Terms and Conditions
Past due accounts are subject to a 1.5% per month service charge.



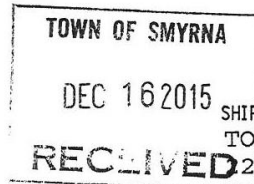
**** INVOICE ****

1251 COLLEGE PARK DRIVE
DOVER, DE 19904-8713
Phone: 302-735-3300 Fax: 302-735-3303

Phone: 610-832-9097
Fax : 610-941-8183

INVOICE DATE	INVOICE NUMBER
12/14/15	S4725337.005
REMIT TO:	PAGE NO.
RUMSEY - DOVER BRANCH P.O. BOX 824429 PHILADELPHIA, PA 19182-4429	1 of 1

BILL TO:
TOWN OF SMYRNA
220 ARTISAN DRIVE
PO BOX 307
SMYRNA, DE 19977-3715



SHIP TO:
TOWN OF SMYRNA
220 ARTISAN DRIVE
PO BOX 307
SMYRNA, DE 19977-3715

CUSTOMER NUMBER		CUSTOMER ORDER NUMBER		RELEASE NUMBER		SALESPERSON			
7696		email bill				bill evans			
WRITER		SHIP VIA		TERMS		SHIP DATE		ORDER DATE	
ROBERT JARRE		BW - BEST WAY		Net 10 Days		12/14/15		10/06/15	
LN	DESCRIPTION			ORDER QTY	SHIP QTY	NET UNIT PRICE		NET AMOUNT	
1	LUMEC RFL-241W112LED4K-T-R3M-UNIV-DMG -RCD -WC10-GY3 **NS**			15	15	451.00ea		6765.00	
TOWN OF SMYRNA APPROVED FOR PAYMENT 12/16/15 43 VENDOR NO: 6942 ACCOUNT NO: AMOUNT 0911520631743 \$6765.00									

Payment is due by 12/24/15

Refer to www.Rumsey.com/contactus/creditapp for Terms and Conditions
Past due accounts are subject to a 1.5% per month service charge.

Subtotal	6765.00
S&H CHGS	0.00
Sales Tax	0.00
Amount Due	6765.00
S4725337.005	



**** INVOICE ****

1251 COLLEGE PARK DRIVE
DOVER, DE 19904-8713
Phone: 302-735-3300 Fax: 302-735-3303

Phone: 610-832-9097
Fax : 610-941-8183

INVOICE DATE	INVOICE NUMBER
12/10/15	S4725337.003
REMIT TO: RUMSEY - DOVER BRANCH P.O. BOX 824429 PHILADELPHIA, PA 19182-4429	PAGE NO. 1 of 1

TOWN OF SMYRNA

DEC 14 2015

RECEIVED

BILL TO:
TOWN OF SMYRNA
220 ARTISAN DRIVE
PO BOX 307
SMYRNA, DE 19977-3715

SHIP TO:
TOWN OF SMYRNA
220 ARTISAN DRIVE
PO BOX 307
SMYRNA, DE 19977-3715

CUSTOMER NUMBER		CUSTOMER ORDER NUMBER		RELEASE NUMBER		SALESPERSON			
7696		email bill 4953				bill evans			
WRITER		SHIP VIA		TERMS		SHIP DATE		ORDER DATE	
ROBERT JARRE		BW - BEST WAY		Net 10 Days		12/10/15		10/06/15	
LN	DESCRIPTION			ORDER QTY	SHIP QTY	NET UNIT PRICE		NET AMOUNT	
1	LUMEC RFL-241W112LED4K-T-R3M-UNIV-DMG -RCD -WC10-GY3 **NS**			84	69	451.00ea		31119.00	
TOWN OF SMYRNA APPROVED FOR PAYMENT 12-15-15 43 VENDOR NO 6942 ACCOUNT NO AMOUNT 02115006317413 \$31119.06									
Lights - Money from DEMAC									
						Subtotal		31119.00	
						S&H CHGS		0.00	
						Sales Tax		0.00	
						Amount Due		31119.00	
84725337.003									

Payment is due by 12/20/15

Refer to www.Rumsey.com/contactus/creditapp for Terms and Conditions

Past due accounts are subject to a 1.5% per month service charge.

Payment is due by 12/20/15

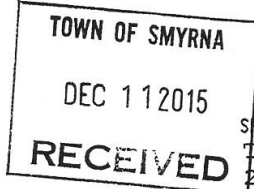
Refer to www.Rumsey.com/contactus/creditapp for Terms and Conditions
Past due accounts are subject to a 1.5% per month service charge.



**** INVOICE ****

1251 COLLEGE PARK DRIVE
DOVER, DE 19904-8713
Phone: 302-735-3300 Fax: 302-735-3303

Phone: 610-832-9097
Fax : 610-941-8183



BILL TO:
TOWN OF SMYRNA
220 ARTISAN DRIVE
PO BOX 307
SMYRNA, DE 19977-3715

SHIP TO:
TOWN OF SMYRNA
220 ARTISAN DRIVE
PO BOX 307
SMYRNA, DE 19977-3715

INVOICE DATE	INVOICE NUMBER
12/09/15	S4725337.001
REMIT TO:	PAGE NO.
RUMSEY - DOVER BRANCH P.O. BOX 824429 PHILADELPHIA, PA 19182-4429	1 of 1

CUSTOMER NUMBER	CUSTOMER ORDER NUMBER	RELEASE NUMBER	SALESPERSON		
7696	email bill		bill evans		
WRITER	SHIP VIA	TERMS	SHIP DATE	ORDER DATE	
ROBERT JARRE	BW - BEST WAY	Net 10 Days	12/09/15	10/06/15	
LN	DESCRIPTION	ORDER QTY	SHIP QTY	NET UNIT PRICE	NET AMOUNT
1	LUMEC RFL-241W112LED4K-T-R3M-UNIV-DMG -RCD -WC10-GY3 **NS**	95	11	451.00ea	4961.00
** Reprint ** Reprint ** Reprint					

Payment is due by 12/19/15
Refer to www.Rumsey.com/contactus/creditapp for Terms and Conditions
Past due accounts are subject to a 1.5% per month service charge.

Subtotal	4961.00
S&H CHGS	0.00
Sales Tax	0.00
Amount Due	4961.00
	S4725337.001

5.4 Dover



SOLD TO:
37771 MB 0419 E0315X 10569 01794601121 S2 P3389279 0001.0001

CITY OF DOVER
ELECTRICAL DEPT.
860 BUTTNER PL
DOVER DE 19904-2405

ORIGINAL

CUSTOMER NUMBER	INVOICE DATE	PACKING SLIP NO.	INVOICE NUMBER
20032-00	07/07/2016	76165901	767174
BRANCH CODE	CUSTOMER ORDER NUMBER		PAGE
1763	AREN WRIGHT 5/11/16		1 of 1

REMIT TO:
WESCO RECEIVABLES CORP.
LOCKBOX #771751
1751 SOLUTIONS CENTER DR
CHICAGO IL 60677-1007

SHIP TO:
CITY OF DOVER
ELECTRICAL DEPT.
860 BUTTNER PLACE
DOVER, DE 19904

S. New St

INVOICE		***INVOICE***		***INVOICE***		RETURN MATERIAL WILL NOT BE ACCEPTED WITH- OUT AUTHORIZATION
SHIPPING DATE & ROUTING	FOB	SHIPPING TERMS	NO. OF INVOICES	B/L	INV. REQ.	
06/30/2016 BEST WAY	P/S	PREPAID-NO CHARGE	1	N	Y	

LINE NO.	CATALOG NUMBER AND DESCRIPTION	I.D. NUMBER	QUANTITY		UNIT PRICE	U/M	SELLING PRICE		EXTENSION
			QUANTITY SHIPPED	BALANCE DUE			DISCOUNT		
D10	HOLOPHAN***WFCL2 070HO 4K AS BK L4 S H AO PCS	763519	16	0	1,340.430	E	0.00	0.00	24,127
	SUB TOTAL								24,127

S. New St Lights *EE1652*

UNLESS THERE ARE DIFFERENT OR ADDITIONAL TERMS AND CONDITIONS
CONTAINED IN A MASTER AGREEMENT THAT NOTIFY WESCO'S STANDARD
TERMS BUYER AGREES THAT THE ACKNOWLEDGEMENT AND ACCEPTANCE
OF THIS INVOICE WILL BE GOVERNED BY WESCO'S TERMS AND CONDITIONS
AVAILABLE AT [HTTP://WWW.WESCO.COM/TERMS](http://www.wesco.com/terms) AND CONDITIONS OF SALE
PDF AS SUCH TERMS MAY BE UPDATED FROM TIME TO TIME, WHICH ARE
INCORPORATED HEREIN BY REFERENCE AND MAKE PART HEREOF. PLEASE
CONTACT THE SELLER IDENTIFIED ON THIS INVOICE IF YOU REQUIRE A
PRINTED COPY

TERMS	YOU MAY DEDUCT IF PAID WITHIN 10 DAYS - NET 30 DAYS	0.00	TOTAL	24,127.
PAST DUE ACCOUNTS SUBJECT TO CHARGE OF 1.5% OR MAXIMUM PERMITTED BY LAW				



**** INVOICE ****

Kirkwood Court

1251 COLLEGE PARK DRIVE Phone: 610-832-9097
DOVER, DE 19904-8713 Fax : 610-941-8183
Phone: 302-735-3300 Fax: 302-735-3303

INVOICE DATE	INVOICE NUMBER
02/03/16	S4741589.001
REMIT TO: RUMSEY DOVER BRANCH P.O. BOX 824429 PHILADELPHIA, PA 19182-4429	PAGE NO. 1 of 1

BILL TO:
CITY OF DOVER ELECTRICAL DEPT
860 BUTNER PLACE
DOVER, DE 19904

SHIP TO:
CITY OF DOVER ELECTRICAL DEPT
860 BUTNER PLACE
DOVER, DE 19904

CUSTOMER NUMBER		CUSTOMER ORDER NUMBER		RELEASE NUMBER		SALESPERSON	
68192		KIRKWOOD BALL COURT		STEVE MOXLEY		STEVE MOXLEY	
WRITER		SHIP VIA		TERMS		SHIP DATE ORDER DATE	
BRYAN SMITH		WC - WILL CALL		Net 30 Days		02/03/16 01/28/16	
LN	DESCRIPTION			ORDER QTY	SHIP QTY	NET UNIT PRICE	NET AMOUNT
1	RAB FXLED150SF **NS**			4	4	475.00ea	1900.00
2	RAB GDFXLED78W WIRE GUARD FXLED78 WITH STAINLESS STEEL SCREWS **NS**			4	4	22.00ea	88.00
3	RAB GDFXLED78P POLYCARBONATE SHIELD FXLED78 GUARD W SS SCREWS **NS**			4	4	22.00ea	88.00
4	RAB BULL2 BRACKET BULLHORN TWO LIGHT **NS**			2	2	92.00ea	184.00
5	RAB BWC12 **NS**			2	2	75.00ea	150.00
City of Dover Approved [Signature] Signature Date Police Acct [Redacted] JFC Funding Grant \$3216.05 TOTAL							
						Subtotal	2410.00
						S&H CHGS	0.00
						Sales Tax	0.00
						Amount Due	2410.00
						S4741589.001	

Payment is due by 03/04/16

Refer to www.Rumsey.com/contactus/creditapp for Terms and Conditions

Past due accounts are subject to a 1.5% per month service charge.

Payment is due by 03/04/16
Refer to www.Rumsey.com/contactus/creditapp for Terms and Conditions
Past due accounts are subject to a 1.5% per month service charge.

5.5 Newark

** ACKNOWLEDGEMENT **



QUALITY & SERVICE - SINCE 1895

ORDER DATE	ORDER NUMBER
11/11/15	S4763788
ORDERED FROM: RUMSEY - DOVER BRANCH 1251 COLLEGE PARK DRIVE DOVER, DE 19904-0713	
Phone: 302-735-3300 Fax: 302-735-3303	Pg 1 of 1

SOLD TO:

DELAWARE MUNICIPAL ELECTRIC CORP.
22 ARTISAN DRIVE
SMYRNA, DE 19977-3711

SHIP TO:

DELAWARE MUNICIPAL ELECTRIC CO
CITY OF NEWARK
CENTRAL STORES, 406 PHILLIPS A
NEWARK, DE 19701

CUSTOMER NUMBER	CUSTOMER ORDER NUMBER	RELEASE #/JOB NAME	SALESPERSON	ORDERED BY
77812	HOLD FOR RELEASE		MMONTELL	
INSIDE SALES	SHIP VIA	TERMS	SHIP DATE	FREIGHT ALLOWED
RJARRELL	BW - BEST WAY	Net 30 Days	12/11/15	Yes
LW	ORDER QTY	DESCRIPTION	UNIT PRICE	NET AMOUNT
		***** HOLD FOR RELEASE ORDER ONLY ***** DO NOT SHIP UNTIL WRITTEN CONFIRMATION OF RELEASE FROM MIKE MONTELLA OR ROB JARRELL ONLY *****		
1	738ea	LEOTEK GCM2-40F-MV-NW-2-GY-1A 250W EQUIVALENT LED COBRAHEAD STREET LIGHT.		
2	472ea	LEOTEK GCJ2-20G-MV-NW-2-GY-1A ROADWAY FIXTURE, 150W EQUIV LED COBRAHEAD W/ PE RECEPT ***NS**		
3	240ea	LEOTEK GC1-80F-MV-NW-2-GY-700 LED COBRAHEAD 400W EQUIV. ***NS**		
4	1400ea	LITHONIA DLL127F1.5CULJ50 DARK TO LIGHT PHOTOCONTROL 50 PACK BUT UNIT PRICING ***NS**		
5	48ea	LITHONIA DLL127F1.5CULJ12 DARK TO LIGHT PHOTOCONTROL 12 PACK BUT UNIT PRICING. ***NS**		
			Subtotal	348394.00
			S&H CHGS	0.00
			Sales Tax	0.00
			Amount Due	348394.00



**** INVOICE ****

1251 COLLEGE PARK DRIVE
DOVER, DE 19904-8713
Phone: 302-735-3300 Fax: 302-735-3303

Phone: 610-832-9097
Fax : 610-941-8183

INVOICE DATE	INVOICE NUMBER
11/30/15	S4749990.005
REMIT TO: RUMSEY - DOVER BRANCH P.O. BOX 824829 PHILADELPHIA, PA 19182-4829	PAGE NO. 1 of 1

BILL TO:
CITY OF NEWARK
220 ELKTON ROAD
NEWARK, DE 19711-4594

SHIP TO:
CITY OF NEWARK
406 PHILLIPS AVENUE
NEWARK, DE 19711-5165

CUSTOMER NUMBER		CUSTOMER ORDER NUMBER		RELEASE NUMBER		SALESPERSON			
2509		20150980-00		REQ 00014591-00					
WRITER		SHIP VIA		TERMS		SHIP DATE		ORDER DATE	
ROBERT JARRE		BW - BEST WAY		Net 30 Days		11/30/15		10/26/15	
LN	DESCRIPTION			ORDER QTY	SHIP QTY	NET UNIT PRICE		NET AMOUNT	
1	LEOTEK GCJ2-20G-MV-NW-2-GY-1A ROADWAY FIXTURE, 150W EQUIV LED COBRAHEAD W/ PE RECEPT **NS**			371	371	154.00ea		57134.00	
2	LEOTEK GCM2-40F-MV-NW-2-GY-1A 250W EQUIVALENT LED COBRAHEAD STREET LIGHT. **NS**			110	110	215.00ea		23650.00	
3	LEOTEK GC1-80F-MV-NW-2-GY-700 LED COBRAHEAD 400W EQUIV. **NS**			25	25	370.00ea		9250.00	
20150980 CT 90,034.00 da ll									
						Subtotal		90034.00	
						S&H CHGS		0.00	
						Sales Tax		0.00	
						Amount Due		90034.00	
								84749990.005	

Payment is due by 12/30/15

Refer to www.Runsey.com/contactus/creditapp for Terms and Conditions

Past due accounts are subject to a 1.5% per month service charge.

Payment is due by 12/30/15

Refer to www.Runsey.com/contactus/creditapp for Terms and Conditions
Past due accounts are subject to a 1.5% per month service charge.

6. Energy Savings Calculation Tables

The following is the calculation methodology used to calculate kWh savings. Methodology is prescribed per the MID-ATLANTIC TECHNICAL REFERENCE MANUAL VERSION 7.0/May 2017. LED Outdoor Pole/Arm- or Wall-Mounted Area and Roadway Lighting

Effective Date: June 2017

Measure Description

This measure relates to the installation of an LED outdoor pole/arm- or wall-mounted luminaire for parking lot, street, or general area illumination in place of a high-intensity discharge light source. Eligible applications include new construction and time of sale applications.

Definition of Baseline Condition

The baseline condition is defined as an outdoor pole/arm- or wall-mounted luminaire with a high intensity discharge light-source. Typical baseline technologies include metal halide (MH) and high pressure sodium (HPS) lamps. For the purposes of this characterization, standard metal halide fixtures are the assumed baseline technology.

Definition of Efficient Condition

The efficient condition is defined as an LED outdoor pole/arm- or wall-mounted luminaire. Eligible fixtures must be listed on the DesignLights Consortium Qualified Products List.

Annual Energy Savings Algorithm

$$\Delta kWh = ((WattsBASE - WattsEE) / 1000) * HOURS$$

Where:

WattsBASE = Actual Connected load of baseline fixture

WattsEE = Actual Connected load of the LED fixture

HOURS = Average hours of use per year

Summer Coincident Peak kW Savings Algorithm

$$\Delta kW = ((WattsBASE - WattsEE) / 1000) * CF$$

Where:

CF = Summer Peak Coincidence Factor for measure

= 0³⁹

Measure Life

³⁹ It is assumed that efficient outdoor area lighting, when functioning properly, will never result in coincident peak demand savings.

The measure life is assumed to be 18 years.

Operation and Maintenance Impacts.

Due to differences in costs and lifetimes of fixture components between the efficient and baseline cases, there are significant operation and maintenance impacts associated with this measure. Estimated O&M savings and the component cost and lifetime assumptions are presented in the table below.⁴⁰

Lewes

KWH savings calculation is $(\text{existing wattage} - \text{new wattage}) / 1000 \times \text{annual burn hours} \times \text{total number of fixtures}$

Fixture type	Fixture Model #	LED wattage	HPS replaceme	HPS fixture wattage incl.
100 watt equal Philips Lumec LED	RFM-72W32LED4K-T-R3M-UNIV-DMG-R-CD-W	73	100	130
	fixture cost is \$234			
150 watt equal Philips Lumec LED	RFM-108W32LED4K-t-R3M-UNIV-DMG-RCD	108	150	190
	fixture cost is \$248			

Lighting Installed			annual kWh
	Item	count	savings
	100wHPS	25	6,242
	150wHPS	75	26,937
			\$33,179

light fixture costs				
item	count	material cost	labor	total
100 watt equa	25	\$5,850	\$ 1,875	\$7,725
150 watt equa	75	\$18,600	\$ 5,625	\$24,225
	total	\$24,450	\$ 7,500	\$31,950

Table 6.1 Lewes- Energy Savings

⁴⁰ Net present value calculation is based on avoided costs methodology as recommended in the Memorandum the Delaware EEAC from Optimal Energy, EEAC Consultant, dated January 10, 2017. Subject: Avoided costs for use in cost-effectiveness analysis

Seaford

KWH savings calculation is (existing wattage - new wattage)/1000 X annual burn hours X total number of fixtures

Fixture type	Fixture Model #		LED wattage	HPS replacem	HPS fixture wattage incl.
100 watt equal Philips Lumec LED	RFM-72w32LED4K-T-R3M-UNIV-DMG-R-CD-W		73	150	190
	fixture cost is \$234				
Tim Stearns: while this fixture is generally thought of as a 100 watt HPS equivalent, Seaford installed these to replace 150 watt HPS					

Lighting Installed		annual kWh savings
	Item	
	count	
	150wHPS	283
		283

light fixture costs				
item	count	Fixture cost	labor	total
100 watt equal Phi	283	\$66,222	\$ 21,225	\$87,447
	total	\$66,222	\$ 21,225	\$87,447

Table 6.2 Seaford- Energy Savings

Smyrna

KWH savings calculation is (existing wattage - new wattage)/1000 X annual burn hours X total number of fixtures

Fixture type	Fixture Model #		LED wattage	HPS replaceme	HPS fixture wattage
400 watt equal Philips Lumec LED	RFL-241W112LED4k-T-R3M-UNIV-DMG		244	400	465
	fixture cost is \$471				
Lighting Installed			annual kWh		
	Item	count	savings		
	400wHPS	15	14,520		
	400wHPS	69	66,791		
	400wHPS	38	36,783		
	400wHPS	11	10,648		
		133	128,741		
			light fixture costs		
			item	count	Fixture Cost
			400 watt equal Philip	133	\$62,643
				total	\$62,643
					Labor
					Total
					\$ 9,975
					\$72,618
					\$ 9,975
					\$72,618

Table 6.3 Smyrna- Energy Savings

Dover									
KWH savings calculation is (existing wattage - new wattage)/1000 X annual burn hours X total number of fixtures									
Fixture type	Fixture Model #			LED wattage	HPS replacement	HPS fixture wattage incl.			
Holophane washington Postlite	WCFL2070HO4KASBKL4SHAOPCS			95	250	295			
	fixture cost is \$1,360								
LED Roadwaylighti ng SAT-S	SAT-96M			200	400	465			
	fixture cost is \$645								
RAB FXLED Flood	FXLED150SF			150	400	465			
	fixture cost is \$495								
Lighting Installed			annual kWh	light fixture costs					
	Item	count	savings	item	count	Fixture Cost	Labor	Total	
	250w HPS	18	15,768	Holophane washin	18	\$24,480	\$ 1,350	\$25,830	
	400HPS	16	18,571	LED Roadwaylight	16	\$10,320	\$ 1,200	\$11,520	
	400wHPS	4	5,519	RAB FXLED Flood	4	\$1,980	\$ 300	\$2,280	
		38	39,858		total	\$36,780	\$ 2,850	\$39,630	

Table 6.4 Dover- Energy Savings

Newark

KWH savings calculation is (existing wattage - new wattage)/1000 X annual burn hours X total number of fixtures

Fixture type	Fixture Model #		LED wattage	HPS replaceme	HPS fixture wattage incl.
150 watt equal Leotech LED	GCJ2-20G-MV-NW-2-GY-1A		74	100	130
	fixture cost is \$174				
250 watt equal Leotech LED	GCM2-40F-MV-NW-2-GY-1A		138	250	295
	fixture cost is \$235				
400 watt equal Leotech LED	GC1-80F-MV-NW-2-GY-700		180	400	465
	fixture cost is \$370				

Tim Stearns:
we are using 100 watt HPS as the baseline fixture since we can't determine for sure how many were 100 watt HPS and how many were 150w HPS

Lighting Installed		annual kWh savings	light fixture costs				
Item	count		item	count	cost	labor	total
100wHPS	802	196,715	150 watt equa	802	\$139,548	\$ 60,150	\$199,698
250 wHPS	862	592,763	250 watt equa	862	\$202,570	\$ 64,650	\$267,220
400wHPS	239	298,344	400 watt equa	239	\$88,430	\$ 17,925	\$106,355
	1903	1,087,821	total		\$430,548	\$ 142,725	\$573,273

Tim Stearns:
fixture counts are from the GPS tracking worksheet. We are excluding for this project (74) of the 143 watt LEDs included on that worksheet as we believe that these were installed outside of this project.

Table 6.5 Newark- Energy Savings

7. Fixture Specifications and Cut Sheet Data



Project: _____
 Location: _____
 Cat.No: _____
 Type: _____
 Lamps: _____ Qty: _____
 Notes: _____

The Philips Lumec RoadFocus LED Cobra Head luminaires feature a sleek design that provides seamless replacement of existing HID luminaires. RoadFocus is available in three sizes, offers multiple lumen packages, and a complete array of optical distributions, making it an outstanding solution for all types of roadway applications.

Ordering guide

Example: RFM-72W32LED4K-T-R2S-UNIV-DMG-AST-FAWS-RCD-SP2-WC10-GY3

Luminaire	LED Module	Optical System	Voltage	Driver and Dimming	Wattage Switch	Twist-Lock Receptacle	Surge Protection	Warranty	Finish
RFM								WC10	
RFM RoadFocus Medium	72W32LED4K-T or 108W32LED4K-T ^{2,4} or 108W48LED4K-T or 160W48LED4K-T ^{2,4}	R2S Type II Short R2M Type II Medium R3S Type III Short R3M Type III Medium S Type V	UNIV 120-277VAC HVU 347-480VAC	Standard: DMG⁵ Dimmable driver 0-10V Optional: AMPD^{3,4,5,6} Amplight Dimming DynaDimmer Economy Profile CDMGE25^{5,6,8,9} CDMGE50^{5,6,8,9} CDMGE75^{5,6,8,9} DynaDimmer Median Profile CDMGM25^{5,6,8,9} CDMGM50^{5,6,8,9} CDMGM75^{5,6,8,9} DynaDimmer Safety Profile CDMG525^{5,6,8,9} CDMG550^{5,6,8,9} CDMG575^{5,6,8,9} DALI^{3,4,5,6} Digitally Addressable Lighting Interface DMG-AST^{2,4} Adjustable Startup Time DMG-CLO^{2,4,5} Constant Light Output DMG-OTL^{2,4} Over The Life *Includes 0-10v Dimming	FAWS ⁵ Field Adjustable Wattage Selector (optional)	Standard: RCD^{7,7} Receptacle for twist-lock photocell or shunting cap, 5-pin (standard) Optional: RCD^{7,7} Receptacle for twist-lock photocell or shunting cap, 7-pin (optional)	SP2 ⁸ 20kV / 20kA Surge Protector (optional)	WC10 ¹ 10-year limited warranty (standard)	BK Black Finish BR Bronze Finish GY3 Gray Finish WH White Finish

1. Please note these integrated features come standard with RoadFocus luminaires.

2. Denotes programmable driver option. Not available with HVU (347-480VAC). Not available with 1050 mA versions (108W32LED, 160W48LED).

3. Use of photoelectric cell or shunting cap is required to ensure proper illumination.

4. Not available with HVU (347-480VAC).

5. FAWS not available with AMPD, CDMG options, DALI or CLO.

6. Dimming choices: Select either DMG or AMPD or one of the CDMG options or DALI.

7. When RCD7 option is selected you will get 7-pin instead of standard RCD 5-pin.

8. When SP2 option is selected you will get SP2 instead of standard SP1.



RFM RoadFocus LED Cobrahead, Medium

72, 108, and 160W

Accessories (must be ordered as separate line items - quickly and easily installed in the field)

ACC-RFS-RFM-RFL-PH9* Shorting cap	ACC-RFS-RFM-RFL-UNIV-SPC^{9,10} Starsense twist-lock photoelectric cell & antenna node, UNIV (120-277VAC).
ACC-RFS-RFM-RFL-HS House side shield, 1 per 16 LED light engine.	ACC-RFM-RFL-HVU-SPC^{9,10} Starsense twist-lock photoelectric cell & antenna node, HVU (347-480VAC).
ACC-RFS-RFM-RFL-UNIV-PH8* Twist-lock Photoelectric Cell, UNIV (120-277VAC).	ACC-RFS-RFM-RFL-UNIV-SPCD^{9,10} Starsense dimmable twist-lock photoelectric cell & antenna node, UNIV (120-277VAC).
ACC-RFM-RFL-PH8/347* Twist-lock Photoelectric Cell, HVU 347VAC.	
ACC-RFM-RFL-PH8/480* Twist-lock Photoelectric Cell, HVU 480VAC.	
ACC-RFS-RFM-RFL-UNIV-PH8XL* Twist-lock Photoelectric Cell, extended life, UNIV (120-277VAC).	

9. Use of photoelectric cell or shorting cap is required to ensure proper illumination.

10. Please note that more hardware as well as software are required - please contact the quotations department for help with putting together the entire control system.

LED Wattage and Lumen Values

LED = Philips Lumileds LUXEON T, CRI = 70, CCT = 4000K (+/- 350K)

System (LED + driver) rated life = 100,000 hrs¹¹

LED Module	Typical Delivered Lumens	Typical System Wattage (W) ¹²	LED Current (mA)	Typical System Current (A) @						Efficacy (Lm/W)	BUG Rating
				120V	208V	240V	277V	347V	480V		
72W32LED4K-T-R2S	8,330	73	700	0.62	0.36	0.31	0.28	0.21	0.15	114	B2-U0-G1
72W32LED4K-T-R2M	8,140	73	700	0.62	0.36	0.31	0.28	0.21	0.15	112	B2-U0-G2
72W32LED4K-T-R3S	8,085	73	700	0.62	0.36	0.31	0.28	0.21	0.15	111	B1-U0-G2
72W32LED4K-T-R3M	8,178	73	700	0.62	0.36	0.31	0.28	0.21	0.15	112	B2-U0-G2
108W32LED4K-T-R2S	11,169	108	1050	0.91	0.53	0.47	0.41	N/A		103	B2-U0-G2
108W32LED4K-T-R2M	10,914	108	1050	0.91	0.53	0.47	0.41			101	B2-U0-G2
108W32LED4K-T-R3S	10,841	108	1050	0.91	0.53	0.47	0.41			100	B1-U0-G1
108W32LED4K-T-R3M	10,965	108	1050	0.91	0.53	0.47	0.41			102	B2-U0-G2
108W48LED4K-T-R2S	12,507	106	700	0.93	0.53	0.46	0.40	0.32	0.23	118	B3-U0-G2
108W48LED4K-T-R2M	12,222	106	700	0.93	0.53	0.46	0.40	0.32	0.23	115	B2-U0-G2
108W48LED4K-T-R3S	12,140	106	700	0.93	0.53	0.46	0.40	0.32	0.23	115	B2-U0-G2
108W48LED4K-T-R3M	12,279	106	700	0.93	0.53	0.46	0.40	0.32	0.23	116	B2-U0-G2
160W48LED4K-T-R2S	16,778	161	1050	1.34	0.76	0.66	0.58	N/A		104	B3-U0-G2
160W48LED4K-T-R2M	16,396	161	1050	1.34	0.76	0.66	0.58			102	B3-U0-G3
160W48LED4K-T-R3S	16,285	161	1050	1.34	0.76	0.66	0.58			101	B2-U0-G3
160W48LED4K-T-R3M	16,472	161	1050	1.34	0.76	0.66	0.58			102	B3-U0-G3
Type V (5) IES files for all LED modules pending.											

11. L₉₀ >100,000 hrs (at ambient temperature = 25°C).

12. System wattage or total luminaire wattage includes the LED module and the LED driver.

Note: Due to rapid and continuous advances in LED technology, LED luminaire data is subject to change without notice and at the discretion of Philips.

**PHILIPS
LUMEC**

Roadway

RoadFocus

145, 180, 215 and 241W RFL



Project: _____
Location: _____
Cat.No: _____
Type: _____
Lamps: _____ Qty: _____
Notes: _____

The Philips Lumec RoadFocus LED Cobra Head luminaires feature a sleek design that provides seamless replacement of existing HID luminaires. RoadFocus is available in three sizes, offers multiple lumen packages, and a complete array of optical distributions, making it an outstanding solution for all types of roadway applications.

Ordering guide

Example: RFL-145W64LED4K-T-R2S-UNIV-DMG-OTL-RCD7-SP2-WC10-GY3

Luminaire	LED Module	Optical System	Voltage	Driver and Dimming	Wattage Switch	Twist-Lock Receptacle	Surge Protection	Warranty	Finish
RFL								WC10	
RFL RoadFocus Large	145W64LED4K-T or 180W80LED4K-T or 215W96LED4K-T or 241W112LED4K-T	R2S Type II Short R2M Type II Medium R3S Type III Short R3M Type III Medium S Type V	UNIV 120-277VAC HVU 347-480VAC	Standard: DMG ^{1A} Dimmable driver 0-10V Optional: AMPD ^{2AAA} Amplight Dimming DynaDimmer Economy Profile CDMG25 ^{2AAA} CDMG50 ^{2AAA} CDMG75 ^{2AAA} DynaDimmer Median Profile CDMG25 ^{2AAA} CDMG50 ^{2AAA} CDMG75 ^{2AAA} DynaDimmer Safety Profile CDMG50 ^{2AAA} CDMG75 ^{2AAA} DALI ^{3AAA} Digitally Addressable Lighting Interface DMG-AST ^{4A} Adjustable Startup Time DMG-CLO ^{5AAA} Constant Light Output DMG-OTL ^{6A} Over The Life ^A Includes 0-10V Dimming	FAWS ⁵ Field Adjustable Wattage Selector (optional)	Standard: RCD ^{7A7} Receptacle for twist-lock photocell or shorting cap, 5-pin (standard) Optional: RCD7 ⁷⁷ Receptacle for twist-lock photocell or shorting cap, 7-pin (optional)	SP2 ⁸ 20kV / 20kA Surge Protector (optional)	WC10 ¹ 10-year limited warranty (standard)	BK Black Finish BR Bronze Finish GY3 Gray Finish WH White Finish

1. Please note these integrated features come standard with RoadFocus luminaires.

2. Denotes programmable driver option. Not available with HVU (347-480volt).

3. Use of photoelectric cell or shorting cap is required to ensure proper illumination.

4. Not available with HVU (347-480volt).

5. FAWS not available with AMPD, CDMG options, DALI or CLO.

6. Dimming choices: Select either DMG or AMPD or one of the CDMG options or DALI.

7. When RCD7 option is selected you will get 7-pin instead of standard RCD 5-pin.

8. When SP2 option is selected you will get SP2 instead of standard SP1.



RFL RoadFocus LED Cobrahead, Large

145, 180, 215, and 241W

Accessories (must be ordered as separate line items – quickly and easily installed in the field)

ACC-RFS-RFM-RFL-PH9⁹ Shorting cap	ACC-RFS-RFM-RFL-UNIV-SPC^{9,10} Starsense twist-lock photoelectric cell & antenna node, UNIV (120-277VAC).
ACC-RFS-RFM-RFL-HS House side shield, 1 per 16 LED light engine.	ACC-RFM-RFL-HVU-SPC^{9,10} Starsense twist-lock photoelectric cell & antenna node, HVU (347-480VAC).
ACC-RFS-RFM-RFL-UNIV-PH8⁹ Twist-lock Photoelectric Cell, UNIV (120-277VAC).	ACC-RFS-RFM-RFL-UNIV-SPCD^{9,10} Starsense dimmable twist-lock photoelectric cell & antenna node, UNIV (120-277VAC).
ACC-RFM-RFL-PH8/347⁹ Twist-lock Photoelectric Cell, HVU 347VAC.	
ACC-RFM-RFL-PH8/480⁹ Twist-lock Photoelectric Cell, HVU 480VAC.	
ACC-RFS-RFM-RFL-UNIV-PH8XL⁹ Twist-lock Photoelectric Cell, extended life, UNIV (120-277VAC).	

9. Use of photoelectric cell or shorting cap is required to ensure proper illumination.

10. Please note that more hardware as well as software are required – please contact the quotations department for help with putting together the entire control system.

LED Wattage and Lumen Values

LED = Philips Lumileds LUXEON T, CRI = 70, CCT = 4000K (+/- 350K)

System (LED + driver) rated life = 100,000 hrs¹¹

LED Module	Typical Delivered Lumens	Typical System Wattage (W) ¹²	LED Current (mA)	Typical System Current (A) @						Efficacy (lm/W)	BUG Rating
				120V	208V	240V	277V	347V	480V		
145W64LED4K-T-R2S	16,349	137	700	1.15	0.66	0.58	0.51	0.41	0.31	119	B3-U0-G2
145W64LED4K-T-R2M	16,046	137	700	1.15	0.66	0.58	0.51	0.41	0.31	117	B3-U0-G3
145W64LED4K-T-R3S	15,763	137	700	1.15	0.66	0.58	0.51	0.41	0.31	115	B2-U0-G3
145W64LED4K-T-R3M	15,697	137	700	1.15	0.66	0.58	0.51	0.41	0.31	115	B3-U0-G2
180W80LED4K-T-R2S	20,444	174	700	1.46	0.86	0.76	0.69	0.52	0.39	117	B3-U0-G2
180W80LED4K-T-R2M	20,065	174	700	1.46	0.86	0.76	0.69	0.52	0.39	115	B3-U0-G3
180W80LED4K-T-R3S	19,711	174	700	1.46	0.86	0.76	0.69	0.52	0.39	113	B2-U0-G3
180W80LED4K-T-R3M	19,628	174	700	1.46	0.86	0.76	0.69	0.52	0.39	113	B3-U0-G3
215W96LED4K-T-R2S	24,538	207	700	1.74	1.01	0.89	0.80	0.62	0.46	119	B3-U0-G2
215W96LED4K-T-R2M	24,084	207	700	1.74	1.01	0.89	0.80	0.62	0.46	116	B3-U0-G3
215W96LED4K-T-R3S	23,658	207	700	1.74	1.01	0.89	0.80	0.62	0.46	114	B3-U0-G4
215W96LED4K-T-R3M	23,559	207	700	1.74	1.01	0.89	0.80	0.62	0.46	114	B3-U0-G3
241W112LED4K-T-R2S	28,633	248	700	2.03	1.17	1.02	0.91	0.72	0.53	115	B4-U0-G3
241W112LED4K-T-R2M	28,102	248	700	2.03	1.17	1.02	0.91	0.72	0.53	114	B3-U0-G4
241W112LED4K-T-R3S	27,606	244	700	2.03	1.17	1.02	0.91	0.72	0.53	113	B3-U0-G4
241W112LED4K-T-R3M	27,490	244	700	2.03	1.17	1.02	0.91	0.72	0.53	113	B3-U0-G4

Type V (5) IES files for all LED modules pending.

11. L₉₀ > 100,000 hrs (at ambient temperature = 25°C).

12. System wattage or total luminaire wattage includes the LED module and the LED driver.

Note: Due to rapid and continuous advances in LED technology, LED luminaire data is subject to change without notice and at the discretion of Philips.

FXLED150SF

Kirkwood Basketball Court



Ultra high output, high efficiency LED floodlight with wide NEMA type 6H x 6V beam spread. Patent Pending airflow technology ensures long LED and driver lifespan. Use for general and security lighting for large areas, building facades, signs and landscapes.

Color: Bronze

Weight: 25.0 lbs

Project:

Type:

Prepared By:

Date:

Driver Info

Type:	Constant Current
120V:	1.31A
208V:	0.80A
240V:	0.69A
277V:	0.60A
Input Watts:	154W
Efficiency:	97%

LED Info

Watts:	150W
Color Temp:	5000K
Color Accuracy:	72 CRI
L70 Lifespan:	100000
Lumens:	18755
Efficacy:	122 LPW

Technical Specifications

Listings

UL Listing:

Suitable for wet locations. Suitable for ground mounting.

IESNA LM-79 & LM-80 Testing:

RAB LED luminaires have been tested by an independent laboratory in accordance with IESNA LM-79 and LM-80, and have been received the Department of Energy "Lighting Facts" label.

DLC Listed:

This product is on the Design Lights Consortium (DLC) Qualified Products List and is eligible for rebates from DLC Member Utilities.
DLC Product Code: P0000173K

LED Characteristics

Lifespan:

100,000-hour LED lifespan based on IES LM-80 results and TM-21 calculations.

LEDs:

Multi-chip, high-output, long-life LEDs

Color Consistency:

7-step MacAdam Ellipse binning to achieve consistent fixture-to-fixture color.

Color Stability:

LED color temperature is warranted to shift no more than 200K in CCT over a 5 year period.

Color Uniformity:

RAB's range of CCT (Correlated Color Temperature) follows the guidelines of the American National Standard for Specifications for the Chromaticity of Solid State Lighting (SSL) Products, ANSI C78.377-2015.

Construction

IP Rating:

Ingress Protection rating of IP66 for dust and water

Maximum Ambient Temperature:

Suitable for use in 104° F (40°C) ambient temperatures

Effective Projected Area:

EPA = 2

Cold Weather Starting:

Minimum starting temperature is -40° F (-40° C)

Thermal Management:

Superior thermal management with external Air-Flow fins.

Housing:

Die-cast aluminum housing and door frame

Mounting:

Heavy-duty Slipfitter for 2 3/8"OD pipe.

Reflector:

Specular, vacuum-metalized polycarbonate

Gaskets:

High-temperature silicone gaskets

Finish:

Formulated for high-durability and long lasting color.

Green Technology:

Mercury and UV free. RoHS compliant components. Polyester powder coat finish formulated without the use of VOC or toxic heavy metals.

Electrical

Drivers:

Two Drivers, Constant Current, Class 2, 2000mA, 100-277V, 50-60Hz, Power Factor 99%

THD:

4.9% at 120V, 13.9% at 277V

Power Factor:

99.5% at 120V, 93.7% at 277V

Optical

NEMA Type:

NEMA Beam Spread of 6H x 6V

Replacement:

Replaces 400W Metal Halide

Sensor Characteristics

Field & Beam Angles:

Horizontal Beam Angle (50%): 91.8°, Vertical Beam Angle (50%): 73.5° Horizontal Field Angle (10%): 121.0°, Vertical Field Angle (10%): 108.0°

Other

California Title 24:

See FXLED150SF/D10, FXLED150SF/BL, FXLED105SF/PCT for a 2013 California Title 24 compliant product. Any additional component requirements will be listed in the Title 24 section under technical specifications on the product page.

FXLED150SF



Technical Specifications (continued)

Other

Warranty:

RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish.

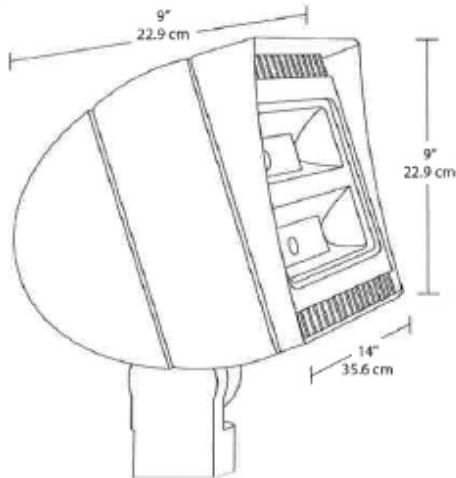
Patents:

The design of FXLED150 is protected by patents pending in US, Canada, China, Taiwan and Mexico.

American Bureau of Shipping (ABS) :

For use on Mobile Offshore Drilling Units (MODU) and shipping vessels.

Dimensions



Features

- 66% energy cost savings vs. HID
- NEMA Type - 6H x 6V
- Air-Flow technology heat dissipation
- 100,000-hour LED lifespan
- 5-year warranty

Ordering Matrix

Family	Watts	Mount	Color Temp	Finish	Dimming	Voltage	Photocell	Bi-Level
FXLED	150 = 150W	T = Trunnion SF = Slipfitter	Blank = 5000K (Cool) Y = 3000K (Warm) N = 4000K (Neutral)	Blank = Bronze W = White	Blank = No Dimming /D10 = Dimmable	Blank = 120-277V /480 = 480V	Blank = No Photocell /PCT = 120-277V Twistlock Photocell /PCS = 120V Swivel /PCT4 = 480V Twistlock Photocell	Blank = No Bi-Level /BL = Bi-Level

SATELLITE™ SERIES: SPECIFICATIONS

SAT-S



Housing: Single piece, die-cast A360 aluminum
 Operating Temperature: -40°C to +60°C (-40°F to +140°F)
 Mounting: 1.625" - 2.375" (42 - 60 mm) O.D. Tenons
 Weight: 18 lb (8.2 kg)
 EPA Rating: <0.509 ft² (< 0.047 m²)
 Lens Material: Acrylic
 Finish: Durable polyester powdercoat topcoat
 Available Colors:

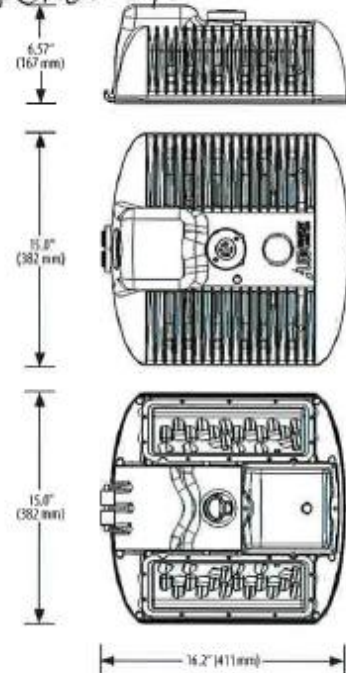
WHITE (RAL 9005)

BRONZE (RAL 7022)

BLACK (RAL 9005)



RT. 13 Roadways



ELECTRICAL	SAT-24S (24 LEDs)					SAT-48S (48 LEDs)				
Currents (mA)	280 mA	350 mA	450 mA	525 mA	600 mA	280 mA	350 mA	450 mA	525 mA	600 mA
Power Consumption* (W)	22 W	28 W	36 W	44 W	50 W	43 W	55 W	72 W	88 W	100 W
Input Voltage* (V)	Universal Driver 120 - 240V AC, 277 - 347V AC, and 12 - 24V DC drivers available upon request.									
Surge Protection	10kV/10kA per ANSI C62.41.2-2002									
Power Factor	>0.90									
OPTICS & PERFORMANCE	SAT-24S (24 LEDs)					SAT-48S (48 LEDs)				
Photometry (Distribution Types)	Type II, Type II Medium, Type II Wide, Type II U, Type III, ANZ, EW (Type III), EN (Type II)									
Color Temperature* (CCT)	5000K (Standard), 4000K, & 4500K (Optional)									
Color Rendering Index* (CRI)	~70									
Drive Currents (mA)	280 mA	350 mA	450 mA	525 mA	600 mA	280 mA	350 mA	450 mA	525 mA	600 mA
Fixture Efficacy* (Lm/W)	102 Lm/W	96 Lm/W	93 Lm/W	90 Lm/W	86 Lm/W	99 Lm/W	95 Lm/W	93 Lm/W	88 Lm/W	84 Lm/W
Fixture Output* (Lm)	2,150 Lm	2,550 Lm	3,200 Lm	3,750 Lm	4,150 Lm	4,200 Lm	5,100 Lm	6,550 Lm	7,600 Lm	8,400 Lm
LED L70 (Hours)	> 100,000 hours (@ 350mA)									
PHOTOCELL & CONTROLS	SAT-24S (24 LEDs)					SAT-48S (48 LEDs)				
Photocell Options	20-year life photocell available.									
Control & Monitoring	LRL offers a complete range of control and monitoring solutions.									

* NOTES: VALUES SHOWN ARE SUBJECT TO ±1% TOLERANCE. COLOR TEMPERATURE, STANDARD IS 5000K. BASED ON 5000 KCT AND TYPE J DISTRIBUTION. ILLUSTRATED ABOVE: SAT-S (SIM GRAY (RAL 9005)). 1. NOT ALL MODEL CONFIGURATIONS ARE FULLY QUALIFIED - CONSULT FACTORY FOR DETAILS. ALL INFORMATION PROVIDED IS SUBJECT TO CHANGE WITHOUT NOTICE.

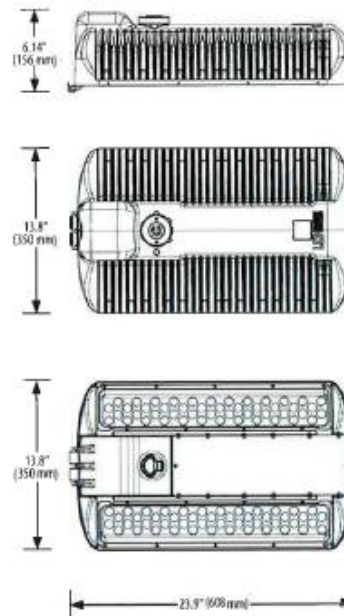
SATELLITE™ SERIES: SPECIFICATIONS

SAT-M



Housing: Single piece, die-cast A360 aluminum
 Operating Temperature: -40°C to +60°C (-40°F to +140°F)
 Mounting: 1.625" - 2.375" (42 - 60 mm) O.D. Tenons
 Weight: 25 lb (11.4 kg)
 EPA Rating: <0.699 ft² (< 0.065 m²)
 Lens Material: Acrylic
 Finish: Durable polyester powdercoat topcoat
 Available Colors:

BRONZE (RAL 7022) BLACK (RAL 9005)



ELECTRICAL	SAT-72M (72 LEDs)					SAT-96M (96 LEDs)				
Currents (mA)	280 mA	350 mA	450 mA	525 mA	600 mA	280 mA	350 mA	450 mA	525 mA	600 mA
Power Consumption* (W)	65 W	83 W	107 W	131 W	150 W	86 W	110 W	143 W	175 W	200 W
Input Voltage* (V)	Universal Driver 120 - 240V AC, 277 - 347V AC, 480V AC, and 12 - 24V DC drivers available upon request.									
Surge Protection	10kV/10kA per ANSI C62.41.2-2002									
Power Factor	>0.90									
OPTICS & PERFORMANCE	SAT-72M (72 LEDs)					SAT-96M (96 LEDs)				
Photometry (Distribution Types)	Type II, Type II Medium, Type II Wide, Type II U, Type III, EW (Type III), EN (Type II), EL (Type II), EM (Type II)									
Color Temperature* (CCT)	5000K (Standard), 4000K, & 4500K (Optional)									
Color Rendering Index* (CRI)	~70									
Drive Currents (mA)	280 mA	350 mA	450 mA	525 mA	600 mA	280 mA	350 mA	450 mA	525 mA	600 mA
Fixture Efficacy* (Lm/W)	97 Lm/W	93 Lm/W	87 Lm/W	84 Lm/W	80 Lm/W	96 Lm/W	92 Lm/W	86 Lm/W	81 Lm/W	78 Lm/W
Fixture Output* (Lm)	6,200 Lm	7,500 Lm	9,300 Lm	10,800 Lm	11,800 Lm	8,250 Lm	10,000 Lm	12,250 Lm	14,100 Lm	15,500 Lm
LED L70 (Hours)	> 100,000 hours (@ 350mA)									
PHOTOCELL & CONTROLS	SAT-72M (72 LEDs)					SAT-96M (96 LEDs)				
Photocell Options	20-year life photocell available.									
Control & Monitoring	LRL offers a complete range of control and monitoring solutions.									

* NOTES: VALUES SHOWN ARE SUBJECT TO ±5% TOLERANCE. COLOR TEMPERATURE SHOWN IS ±500K. BASED ON SUBJECT AND TYPE II DISTRIBUTION. ILLUSTRATED ABOVE: SAT-M96M (RAL 9005). † NOT ALL MODEL CONFIGURATIONS ARE AVAILABLE. CONSULT FACTORY FOR DETAILS. ALL INFORMATION PROVIDED IS SUBJECT TO CHANGE WITHOUT NOTICE.



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 Nova Scotia, Canada, B3S 1B3

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 info@ledroadwaylighting.com



ORDER #:	1
TYPE:	2
DRAWN: F	4
DATE: 1	
DWG #:	111

Performance Data.

LED Package	Distribution	System Watts	3K (3000K, 70 CRI)					4K (4000K, 70 CRI)					5K (5000K, 70 CRI)				
			Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G
035HO	L2	47	3,705	79	1	0	1	4,163	89	1	0	1	4,287	91	1	0	1
	L3	47	3,879	83	1	0	1	4,358	93	1	0	1	4,488	95	1	0	1
	L4	47	3,804	81	1	0	1	4,274	91	1	0	1	4,402	94	1	0	1
	L5	47	4,181	89	2	0	1	4,698	100	2	0	1	4,838	103	2	0	1
053HO	L2	70	5,397	77	1	0	1	6,064	87	1	0	1	6,244	89	1	0	1
	L3	70	5,651	81	1	0	1	6,349	91	1	0	1	6,538	93	1	0	1
	L4	70	5,542	79	1	0	1	6,227	89	1	0	1	6,412	92	1	0	1
	L5	70	6,090	87	3	0	1	6,843	98	3	0	1	7,047	101	3	0	1
070HO	L2	95	6,904	73	2	0	2	7,757	82	2	0	2	7,988	84	2	0	2
	L3	95	7,229	76	2	0	2	8,122	85	2	0	2	8,364	88	2	0	2
	L4	95	7,089	75	2	0	2	7,966	84	2	0	2	8,203	86	2	0	2
	L5	95	7,791	82	3	0	2	8,754	92	3	0	2	9,015	95	3	0	2
105HO	L2	145	9,724	67	2	0	2	10,926	75	2	0	2	11,251	78	2	0	2
	L3	145	10,181	70	2	0	2	11,439	79	2	0	2	11,780	81	2	0	2
	L4	145	9,985	69	2	0	2	11,219	77	2	0	2	11,553	80	2	0	2
	L5	145	10,973	76	4	0	2	12,330	85	4	0	2	12,697	88	4	0	2

Use these factors to determine relative lumen output for average ambient temperatures from 0 - 40°C (32 - 104°F)

Average Lumen Ambient Temperature (LAT) Multipliers			
°C	°F	Lumen Multiplier	LED Packages
0	32	1.06	035HO, 053HO, 070HO, 105HO
5	41	1.05	
10	50	1.03	
15	59	1.02	
20	68	1.01	
25	77	1.00	
30	86	0.99	
35	95	0.98	
40	104	0.97	

Data references the extrapolated performance projections for the platforms noted in a 25°C ambient, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Lumen Maintenance - LLD (same for all LED packages)							
Hours	0	25,000	36,000	50,000	60,000	75,000	100,000
Factor	1	0.933	0.912	0.885	0.867	0.84	0.797

The *italicized data* is extrapolated beyond the TM-21 standard.

$E = (LM) \times (CU) \times ((LAT) \times (LLD))$ - LM and CU are obtained from published photometry.

Utility Washington Postlife®
Series Luminaire
Full Cutoff LED 2

DECORATIVE
OUTDOOR



THIS DRAWING, WHEN APPROVED, SHALL BECOME THE COMPLETE SPECIFICATION FOR THE MATERIAL TO BE FURNISHED BY HOLOPHANE. IT IS THE POLICY OF HOLOPHANE TO PROVIDE THE BEST QUALITY MATERIALS AND WORKMANSHIP AT ALL TIMES. HOLOPHANE SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE TO OR LOSS OF MATERIALS OR WORKMANSHIP CAUSED BY THE USER OR OTHERS. HOLOPHANE SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE TO OR LOSS OF MATERIALS OR WORKMANSHIP CAUSED BY THE USER OR OTHERS. HOLOPHANE SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE TO OR LOSS OF MATERIALS OR WORKMANSHIP CAUSED BY THE USER OR OTHERS.

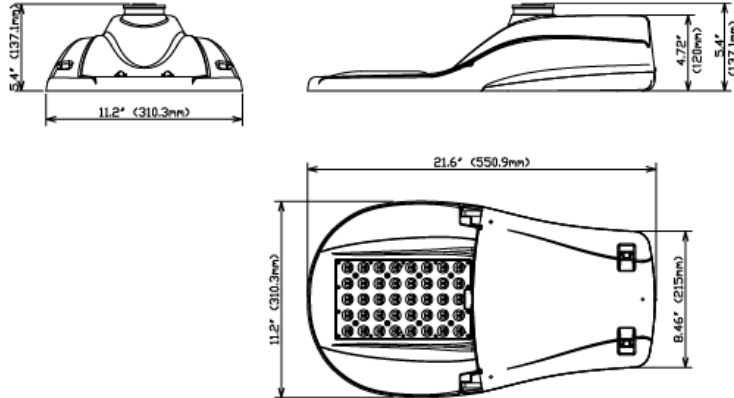
ORDER #:	
TYPE:	
DRAWN:	RAF
DATE:	11/15/2016
DWG #:	LUM_WFCL2

2 OF 4

GreenCobra® Midsize LED Street Light GCM F-Series

Luminaire Data

Weight 10 lbs [4.6 kg]
EPA 0.44 ft²



Ordering Information

Sample Catalog No. GCM1 30F MV NW 2 GY 700 PCR7 WL

Product	LED No. & Type	Voltage	Color Temperature	Distribution	Finish	Drive Current ¹	Options
GCM1 30F@ 350 to 700mA	30F	MV 120-277V HV 347-480V	WW 3000K NW 4000K CW 5000K	2 Type 2 3 Type 3	GY Gray DB Dark Bronze BK Black	350 ² 350mA 530 ² 530mA 700 700mA 1A ³ 1A	FDC ⁴ Fixed Drive Current LPCR Less Photocontrol Receptacle PCR5 ⁵ ANSI 5-wire Photo-control Receptacle PCR7 ⁵ ANSI 7-wire Photo-control Receptacle PCR5-CR ⁶ Control Ready 5-wire PC Receptacle PCR7-CR ⁶ Control Ready 7-wire PC Receptacle WL Utility Wattage Label 4B 4-Bolt Mounting Bracket DSC Door Safety Cable RWG Rubber Wildlife Guard
GCM2 30F@ 700mA to 1A, 40F @ 700mA to 1A	40F						

Notes:

- 1 Factory set drive current, field adjustable standard. Refer to Performance Data Table. Consult factory if wattage limits require a special drive current.
- 2 350mA and 530mA drive current available with GCM1 only.
- 3 1A drive current available with GCM2 only.
- 4 Non-field adjustable, fixed drive current. Specify required drive current. Not available with PCR5-CR or PCR7-CR options.
- 5 Field adjustable current selector included. Wireless node dimming is disabled, field changeable connectors included to enable dimming with PCR5/7.
- 6 Control-ready wiring at factory for wireless node dimming. Default maximum drive current (700mA or 1A) must be specified.
- 7 Flush mounted house side shield. Shield cuts light off at 1/2 mounting height behind luminaire.
- 8 Flush mounted cul-de-sac shield. Shield cuts light off at 1/2 mounting height behind luminaire and 1-1/2 mounting height on either side of luminaire.
- 9 Specify Color (GY, DB, BK)
- 10 Specify MV (120-277V) or HV (347V-480V)

Accessories*

HSS ⁷	House Side Shield, Snap-On*
CSS ⁸	Cul-De-Sac Side Shield, Snap-On*
SPB ⁹	Square Pole Horizontal Arm Bracket
RPB ⁹	Round Pole Horizontal Arm Bracket
PTB ⁹	Pole Top Tenon Horizontal Arm Bracket
WB ⁹	Wall Horizontal Arm Bracket
BSK	Bird Deterrent Spider Kit
PC ¹⁰	Twist Lock Photocontrol
LLPC ¹⁰	Long-Life Twist Lock Photocontrol
SC	Twist Lock Shorting Cap

*Accessories are ordered separately and not to be included in the catalog number. For factory installed HSS, CSS specify as option in luminaire catalog number.

Luminaire Specifications

Housing

Die cast aluminum housing with universal two-bolt slip fitter mounts to 1-1/4" to 2" (1-5/8" to 2-3/8" O.D.) diameter mast arm. One-piece aluminum housing provides passive heat-sinking of the LEDs and has upper surfaces that shed precipitation. Four-bolt mounting bracket is available. Mounting provisions meet 3G vibration per ANSI C136.31-2001 Normal Application, Bridge & Overpass. Mounting has leveling adjustment from ± 5° in 2.5° steps. Electrical components are accessed without tools via a high-strength, non-conductive polycarbonate door with quick-release latches. Polycarbonate material meets UL 746C for outdoor usage. Available rubber wildlife guard (RWG option) conforms to mast arm with no gaps.

Light Emitting Diodes

Hi-flux/Hi-power white LEDs produce a minimum of 90% of initial intensity at 100,000 hours of life based on IES TM-21. LEDs are tested in accordance with IES LM-80 testing procedures. LEDs have correlated color temperature of 3000K (WW), 4000K (NW), or 5000K (CW) and 70 CRI minimum. LEDs are 100% mercury and lead free.

Optical Systems

Micro-lens optical systems produce IESNA Type 2 or Type 3 distributions and are fully sealed to maintain an IP66 rating. Luminaire produces 0% total lumens above 90° (BUG Rating, U=0). Optional house side shield cuts light off at 1/2 mounting height behind luminaire. Cul-de-sac shield provides back and side light control for end of cul-de-sac applications. Both shields are field installable without tools.

Electrical

Rated life of electrical components is 100,000 hours. Uses isolated power supply that is 1-10V dimmable. Power supply is wired with quick-disconnect terminals. LED drive current can be changed in the field to adjust light output for local conditions (not available with PCR5-CR or PCR7-CR options). Power supply features a minimum power factor of .90 and <20% Total Harmonic Distortion (THD). EMC meets or exceeds FCC CFR Part 15. Terminal block accommodates 6 to 14 gauge wire. Surge protection complies with IEEE/ANSI C62.41 Category C High, 20kV/10kA.

Controls

3-Wire photocontrol receptacle is standard. ANSI C136.41 5-wire (PCR5) or 7-wire (PCR7) photocontrol receptacles are available. All photocontrol receptacles have tool-less rotatable bases. Wireless control module is provided by others.

Finish

Housing receives a durable, fade-resistant polyester powder coat finish. Finish tested to withstand 3000 hours in salt spray exposure per ASTM B117. Finish tested 500 hours in UV exposure per ASTM G154 and meets ASTM D523 gloss retention.

Listings/Ratings/Labels

Luminaires are UL listed for use in wet locations in the United States and Canada. DesignLights Consortium™ qualified 120-277V product. International Dark Sky Association listed.² Luminaire is qualified to operate at ambient temperatures of -40°C to 40°C. Assembled in the U.S.A.

Photometry

Luminaires photometrics are tested by certified independent testing laboratories in accordance with IES LM-79 testing procedures. IES files for all CCTs are available at leotek.com.

Warranty

10-year limited warranty is standard on luminaire and components.

Performance Data: 4000K (NW) and 5000K (CW)

All data nominal. IES files for all CCTs are available at leotek.com.

No. of LEDs & Type	Drive Current (mA)	System Wattage (W)	Delivered Lumens (lm)	Efficacy (lm/W) ¹	Type 2	Type 3
					BUG Rating	BUG Rating
GCM1 30F	350	36	3900	108	B1 U0 G1	B1 U0 G1
	530	53	5620	106	B1 U0 G1	B2 U0 G2
	700	69	7000	100	B2 U0 G2	B2 U0 G2
GCM2 30F	700	69	7000	100	B2 U0 G2	B2 U0 G2
	1000	104	9200	88	B2 U0 G2	B2 U0 G2
GCM2 40F	700	88	9000	102	B2 U0 G2	B2 U0 G2
	1000	138	12000	87	B2 U0 G2	B2 U0 G2

Performance Data: 3000K (WW)

All data nominal. IES files for all CCTs are available at leotek.com.

No. of LEDs & Type	Drive Current (mA)	System Wattage (W)	Delivered Lumens (lm)	Efficacy (lm/W) ¹	Type 2	Type 3
					BUG Rating	BUG Rating
GCM1 30F	350	36	4100	114	B1 U0 G1	B1 U0 G1
	530	53	5600	106	B1 U0 G1	B2 U0 G2
	700	69	6950	101	B2 U0 G2	B2 U0 G2
GCM2 30F	700	69	6950	101	B2 U0 G2	B2 U0 G2
	1000	107	9100	85	B2 U0 G2	B2 U0 G2
GCM2 40F	700	94	9400	100	B2 U0 G2	B2 U0 G2
	1000	137	11750	86	B2 U0 G2	B2 U0 G2

Notes:

¹ Nominal lumens. Normal tolerance ± 10% due to factors including distribution type, LED bin variance, and ambient temperatures.

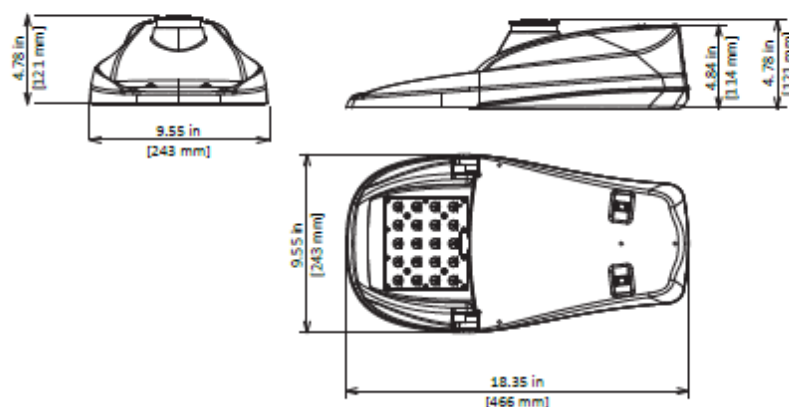
² Not all versions DLC qualified. Consult qualified product list at www.designlights.org for latest product listing.

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GreenCobra™ Jr. LED Street Light GCJ

Luminaire Data

Weight 7 lbs [3.2 kg]
EPA 0.59 ft²



Ordering Information

Sample Catalog No. GCJ1 20G MV NW 2 GY 580

Product	LED No. & Type	Voltage	Color Temperature	Distribution	Finish	Drive Current ¹	Options
GCJ1 350mA to 700mA	20G	MV 120-277V	WW 3000K NW 4000K CW 5000K	2 Type 2 3 Type 3	GY Gray DB Dark Bronze BK Black	350 ² 350mA 580 ² 580mA 700 700mA 1A ³ 1A	FDC ⁴ Fixed Drive Current LPCR Less Photocontrol Receptacle PCR5 ⁵ ANSI 5-wire Photocontrol Receptacle PCR7 ⁵ ANSI 7-wire Photocontrol Receptacle PCR5-CR ⁶ Control Ready 5-wire PC Receptacle PCR7-CR ⁶ Control Ready 7-wire PC Receptacle WL Utility Wattage Label 4B 4-Bolt Mounting Bracket DSC Door Safety Cable RWG Rubber Wildlife Guard
GCJ2 700mA to 1A							

Notes:

- 1 Factory set drive current, field adjustable standard. Refer to Performance Data Table. Consult factory if wattage limits require a special drive current.
- 2 350mA and 580mA drive current available with GCJ1 only.
- 3 1A drive current available with GCJ2 only.
- 4 Non-field adjustable, fixed drive current. Specify required drive current. Not available with PCR5-CR or PCR7-CR options.
- 5 Field adjustable current selector included. Wireless node dimming is disabled, field changeable connectors included to enable dimming with PCR5/7.
- 6 Control-ready wiring at factory for wireless node dimming. Default maximum drive current (700mA or 1A) must be specified.
- 7 Flush mounted house side shield. Shield cuts light off at 1/2 mounting height behind luminaire.
- 8 Flush mounted cul-de-sac shield. Shield cuts light off at 1/2 mounting height behind luminaire and 1-1/2 mounting height on either side of luminaire.
- 9 Specify Color (GY, DB, BK)

Accessories*

HSS ⁷	House Side Shield, Snap-On*
CSS ⁸	Cul-De-Sac Side Shield, Snap-On*
SPB ⁹	Square Pole Horizontal Arm Bracket
RPB ⁹	Round Pole Horizontal Arm Bracket
PTB ⁹	Pole Top Tenon Horizontal Arm Bracket
WB ⁹	Wall Horizontal Arm Bracket
BSK	Bird Deterrent Spider Kit
PC	Twist Lock Photocontrol
LLPC	Long-Life Twist Lock Photocontrol
SC	Twist Lock Shorting Cap

*Accessories are ordered separately and not to be included in the catalog number. For factory installed HSS, CSS specify as option in luminaire catalog number.

Luminaire Specifications

Housing

Die cast aluminum housing with universal two-bolt slip fitter mounts to 1-1/4" to 2" (1-5/8" to 2-3/8" O.D.) diameter mast arm. One-piece aluminum housing provides passive heat-sinking of the LEDs and has upper surfaces that shed precipitation. Four-bolt mounting bracket is available. Mounting provisions meet 3G vibration per ANSI C136.31-2001 Normal Application, Bridge & Overpass. Mounting has leveling adjustment from ± 5° in 2.5° steps. Electrical components are accessed without tools via a high-strength, non-conductive polycarbonate door with quick-release latches. Polycarbonate material meets UL 746C for outdoor usage. Available rubber wildlife guard (RWG option) conforms to mast arm with no gaps.

Light Emitting Diodes

Hi-flux/Hi-power white LEDs produce a minimum of 90% of initial intensity at 100,000 hours of life based on IES TM-21. LEDs are tested in accordance with IES LM-80 testing procedures. LEDs have correlated color temperature of 3000K (WW), 4000K (NW), or 5000K (CW) and 70 CRI minimum. LEDs are 100% mercury and lead free.

Optical Systems

Micro-lens optical systems produce IESNA Type 2 or Type 3 distributions and are fully sealed to maintain an IP66 rating. Luminaire produces 0% total lumens above 90° (BUG Rating, U=0). Optional house side shield cuts light off at 1/2 mounting height behind luminaire. Cul-de-sac shield provides back and side light control for end of cul-de-sac applications. Both shields are field installable without tools.

Electrical

Rated life of electrical components is 100,000 hours. Uses isolated power supply that is 1-10V dimmable. Power supply is wired with quick-disconnect terminals. LED drive current can be changed in the field to adjust light output for local conditions (not available with PCR5-CR or PCR7-CR options). Power supply features a minimum power factor of .90 and <20% Total Harmonic Distortion (THD). EMC meets or exceeds FCC CFR Part 15. Terminal block accommodates 6 to 14 gauge wire. Surge protection complies with IEEE/ANSI C62.41 Category C High, 20kV/10kA.

Controls

3-Wire photocontrol receptacle is standard. ANSI C136.41 5-wire (PCR5) or 7-wire (PCR7) photocontrol receptacles are available. All photocontrol receptacles have tool-less rotatable bases. Wireless control module is provided by others.

Finish

Housing receives a durable, fade-resistant polyester powder coat finish. Finish tested to withstand 3000 hours in salt spray exposure per ASTM B117. Finish tested 500 hours in UV exposure per ASTM G154 and meets ASTM D523 gloss retention.

Listings/Ratings/Labels

Luminaires are UL listed for use in wet locations in the United States and Canada. DesignLights Consortium™ qualified 120-277V product.2 International Dark Sky Association listed. Luminaire is qualified to operate at ambient temperatures of -40°C to 40°C. Assembled in the U.S.A.

Photometry

Luminaire photometrics are tested by certified independent testing laboratories in accordance with IES LM-79 testing procedures. IES files for all CCTs are available at leotek.com.

Warranty

10-year limited warranty is standard on luminaire and components.

Performance Data: 4000K (NW) and 5000K (CW)

All data nominal. IES files for all CCTs are available at leotek.com.

Product	Drive Current (mA)	System Wattage (W)	Delivered Lumens (lm) ¹	Efficacy (lm/W)	Type 2	Type 3
					BUG Rating	BUG Rating
GCI1	350	24	2400	100	B1 U0 G1	B1 U0 G1
	580	38	3700	97	B1 U0 G1	B1 U0 G1
	700	48	4400	92	B1 U0 G1	B1 U0 G1
GCI2	700	48	4400	92	B1 U0 G1	B1 U0 G1
	1000	74	5900	80	B1 U0 G2	B2 U0 G2

Performance Data: 3000K (WW)

All data nominal. IES files for all CCTs are available at leotek.com.

Product	Drive Current (mA)	System Wattage (W)	Delivered Lumens (lm) ¹	Efficacy (lm/W)	Type 2	Type 3
					BUG Rating	BUG Rating
GCI1	350	24	2400	100	B1 U0 G1	B1 U0 G1
	580	38	3650	96	B1 U0 G1	B1 U0 G1
	700	48	4300	90	B1 U0 G1	B1 U0 G1
GCI2	700	48	4300	90	B1 U0 G1	B1 U0 G1
	1000	74	5700	77	B1 U0 G1	B2 U0 G2

Notes:

- 1 Nominal lumens. Normal tolerance ± 10% due to factors including distribution type, LED bin variance, and ambient temperatures.
- 2 Not all versions DLC qualified. Consult qualified product list at www.designlights.org for latest product listing.

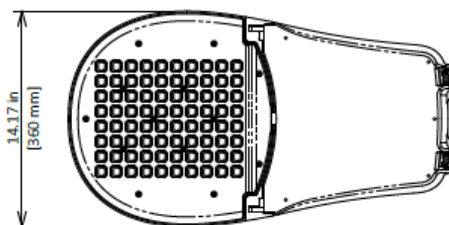
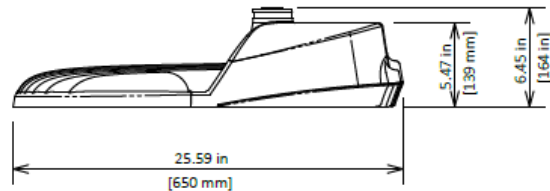


GreenCobra™ LED Street Light GC1

Project
Type
Catalog No.

Luminaire Data

Weight 21 lbs [9.5 kg]
EPA 0.9 ft²



Ordering Information

Sample Catalog No. GC1 60F MV NW 2 GY 350 BSK RPB FDC

Product	No. & Type of LEDs	Voltage ⁶	Color Temperature	Distribution	Finish ²	Drive Current ¹	Options
GC1	20F 30F 40F 60F 80F	MV 120-277V HV 347-480V	WW 3000K NW 4000K CW 5000K	2 Type 2 3 Type 3	GY Gray DB Dark Bronze BK Black	350 350mA 530 530mA 700 700mA 1A ³ 1A	HSS ⁴ House Side Shield (Factory Installed) FDC ⁵ Fixed Drive Current LPCR Less Photocontrol Receptacle PCR5 ANSI 5-wire Photocontrol Receptacle PCR7 ANSI 7-wire Photocontrol Receptacle PCR5-CR Control Ready 5-wire Photocontrol Receptacle PCR7-CR Control Ready 7-wire Photocontrol Receptacle SC PCR Shorting Cap WL Utility Wattage Label

Notes:

- 1 Factory set drive current, field adjustable standard. Refer to Performance Data Table Consult factory if wattage limits require a special drive current.
- 2 Gray, Black and Dark Bronze standard, consult factory for other finishes.
- 3 1A drive current only available with 40F.
- 4 Flush mounted house side shield factory installed. Shield cuts light off at 1/2 mounting height behind luminaire.
- 5 Non-field adjustable, fixed drive current.
- 6 MV is DLC qualified. HV is DLC qualified on request, consult factory.
- 7 Flush mounted house side shield. Shield cuts light off at 1/2 mounting height behind luminaire. Specify Model and Color.
- 8 Specify Color (GY, DB, BK)
- 9 Specify MV (120-277V) or HV (347V-480V)

Accessories*

HSS ⁷	House Side Shield
SPB ⁸	Square Pole Horizontal Arm Bracket
RPB ⁸	Round Pole Horizontal Arm Bracket
PTB ⁸	Pole Top Tenon Horizontal Arm Bracket
WB ⁸	Wall Horizontal Arm Bracket
BSK	Bird Deterrent Spider Kit
PC ⁹	Twist Lock Photocontrol
LLPC ⁹	Long-Life Twist Lock Photocontrol
SC	Twist Lock Shorting Cap

*Accessories are ordered separately and not to be included in the catalog number



Luminaire Specifications

Housing

Die cast aluminum housing with universal four-bolt slip fitter mounts to 1-1/4" to 2" (1-5/8" to 2-3/8" O.D.) diameter mast arm. Aluminum housing provides passive heat-sinking of the LEDs and has upper surfaces that shed precipitation. Mounting provisions meet 3G vibration per ANSI C136.31-2001 Normal Application, Bridge & Overpass.

Mounting has leveling adjustment from + 10° to -5° in 2.5° steps and integral bubble level standard. Electrical components are accessed without tools and are mounted on removable power door with stainless steel latches. Standard rubber wildlife guard conforms to mast arm with no gaps.

Light Emitting Diodes

Hi-flux/Hi-power white LEDs produce a minimum of 90% of initial intensity at 100,000 hours of life based on IES TM-21. LEDs are tested in accordance with IES LM-80 testing procedures. LEDs have correlated color temperature of 3000K (WW), 4000K (NW), or 5000K (CW) and 70 CRI minimum. LEDs are 100% mercury and lead free.

Optical Systems

Micro-lens optical systems produce IESNA Type 2 or Type 3 distributions and are fully sealed to maintain an IP66 rating. Luminaire produces 0% total lumens above 90° (BUG Rating, U=0). Optional house side shield cuts light off at 1/2 mounting height behind luminaire.

Electrical

Rated life of electrical components is 100,000 hours. Uses isolated power supply that is 1-10V dimmable. Power supply is wired with quick-disconnect terminals. LED drive current can be changed in the field to adjust light output for local conditions (not available with PCR5-CR or PCR7-CR options). Power supply features a minimum power factor of .90 and <20% Total Harmonic Distortion (THD). EMC meets or exceeds FCC CFR Part 15. Terminal block accommodates 6 to 14 gauge wire and is aligned for strait wire entry. Surge protection complies with IEEE/ANSI C62.41 Category C High, 20kV/10kA.

Controls

3-Wire photocontrol receptacle is standard. ANSI C136.41 5-wire (PCR5) or 7-wire (PCR7) photocontrol receptacles are available. All photocontrol receptacles have tool-less rotatable bases. Wireless control module is provided by others.

Finish

Housing receives a fade and abrasion resistant polyester powder coat finish. Finish tested to withstand 3000 hours in salt spray exposure per ASTM B117. Finish tested 500 hours in UV exposure per ASTM G154 and meets ASTM D523 gloss retention.

Listings/Ratings/Labels

Luminaires are UL listed for use in wet locations in the United States and Canada. DesignLights Consortium™ qualified 120-277V 4000K product. International Dark Sky Association listed. Luminaire is qualified to operate at ambient temperatures of -40°C to 40°C. Assembled in the U.S.A

Photometry

Luminaires photometrics are tested by certified independent testing laboratories in accordance with IES LM-79 testing procedures. IES files for all CCTs are available at leotek.com.

Warranty

10-year limited warranty is standard on luminaire and components.

Performance Data

All data nominal. IES files for all CCTs are available at leotek.com.

No. of LEDs & Type	Drive Current (mA)	System Wattage (W)	Delivered Lumens (lm) ¹	Efficacy (lm/W)	Type 2	Type 3
					BUG Rating	BUG Rating
20F	350	25	2700	108	B1 U0 G1	B1 U0 G1
	530	35	3650	104	B1 U0 G1	B1 U0 G1
	700	47	4800	102	B1 U0 G1	B1 U0 G1
30F	350	35	3800	109	B1 U0 G1	B1 U0 G1
	530	53	5400	102	B1 U0 G1	B2 U0 G1
	700	70	7000	100	B2 U0 G2	B2 U0 G2
40F	350	45	5050	112	B1 U0 G1	B2 U0 G1
	530	70	7200	103	B2 U0 G2	B2 U0 G2
	700	92	9300	101	B2 U0 G2	B2 U0 G2
	1000	132	12300	93	B3 U0 G3	B3 U0 G3
60F	350	70	7600	109	B2 U0 G2	B2 U0 G2
	530	101	10400	103	B2 U0 G2	B2 U0 G2
	700	133	13400	101	B3 U0 G3	B3 U0 G3
80F	350	85	9500	112	B2 U0 G2	B2 U0 G2
	530	133	14200	107	B3 U0 G3	B3 U0 G3
	700	180	17700	98	B3 U0 G3	B3 U0 G3

Notes:

1. All data nominal lumens for 4000K (NW) and 5000K (CW). For 3000K (WW) apply a LLF of 0.93. Normal tolerance ± 10% due to factors including distribution type, LED bin variance, and ambient temperatures.

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NEWARK POLICE DEPARTMENT

WEEK 10/15/17-10/21/17

INVESTIGATIONS

CRIMINAL CHARGES

	2016 TO <u>DATE</u>	2017 TO <u>DATE</u>	THIS WEEK <u>2017</u>	2016 TO <u>DATE</u>	2017 TO <u>DATE</u>	THIS WEEK <u>2017</u>
<u>PART I OFFENSES</u>						
a)Murder/Manslaughter	0	1	0	0	0	0
b)Attempt	0	0	0	0	0	0
Kidnap	7	1	0	4	2	0
Rape	4	5	0	3	0	0
Unlaw. Sexual Contact	6	10	0	2	2	0
Robbery	40	23	0	14	14	1
- Commercial Robberies	12	10	0	0	2	0
- Robberies with Known Suspects	2	0	0	0	0	0
- Attempted Robberies	5	2	0	2	5	0
- Other Robberies	21	11	0	12	7	1
Assault/Aggravated	22	23	2	24	21	2
Burglary	66	37	3	35	13	0
- Commercial Burglaries	15	7	1	4	3	0
- Residential Burglaries	43	21	2	24	9	0
- Other Burglaries	8	9	0	7	1	0
Theft	545	440	11	150	173	4
Theft/Auto	43	39	0	12	4	0
Arson	2	1	0	0	0	0
All Other	107	79	2	83	58	0
TOTAL PART I	842	659	18	327	287	7
<u>PART II OFFENSES</u>						
Other Assaults	270	252	5	99	115	0
Rec. Stolen Property	0	2	0	24	16	0
Criminal Michief	164	163	3	51	42	0
Weapons	9	16	1	34	32	2
Other Sex Offenses	0	0	0	0	0	0
Alcohol	209	128	3	973	231	2
Drugs	108	115	1	169	141	2
Noise/Disorderly Premise	507	693	45	231	257	9
Disorderly Conduct	129	131	3	79	137	19
Trespass	164	166	3	55	100	1
All Other	380	366	9	264	316	6
TOTAL PART II	1940	2032	73	1979	1387	41
<u>MISCELLANEOUS:</u>						
Alarm	559	243	5	0	0	0
Animal Control	463	420	22	4	3	0
Recovered Property	245	262	8	0	0	0
Service	26883	30384	642	0	0	0
Suspicious Per/Veh	457	488	17	0	0	0
TOTAL MISC.	28607	31797	694	4	3	0

	THIS WEEK <u>2016</u>	2016 TO <u>DATE</u>	THIS WEEK <u>2017</u>	2017 TO <u>DATE</u>
TOTAL CALLS	791	36,630	924	39,096



Newark Police Department
Weekly Traffic Report
10/15/17-10/21/17



TRAFFIC SUMMONSES	2016 YTD	2017 YTD	THIS WEEK 2016	THIS WEEK 2017
Moving/Non-Moving	8675	7420	73	194
DUI	151	144	5	2
TOTAL	8826	7564	78	196

TRAFFIC COLLISIONS				
Fatal	0	1	0	0
Personal Injury	189	217	3	6
Property Damage (Reportable)	1013	912	27	18
*Hit & Run	226	197	10	2
*Private Property	241	198	9	3
TOTAL	1202	1130	30	24

*Included in the total collision numbers

Note: Typically, the YTD numbers are generated by adding the current week statistics to the YTD statistics from the previous reporting period. Periodically, the numbers for this report will be generated from the beginning of the year to capture data that may have otherwise been omitted due to a processing delay or other administrative anomaly, more accurately updating the year-to-date totals.