




City of Gainesville

Office of the City Manager

City Manager Memorandum No. 200007

To: The Honorable Mayor and City Commissioners

From: Lee R. Feldman, ICMA-CM, City Manager 

Date: February 6, 2020

Re: Smart Streetlight Updates

Overview – Streetlights in Gainesville

The City of Gainesville owns and maintains 13,082 public streetlights. Gainesville Regional Utilities (GRU) has the primary responsibility for managing and replacing streetlights and the General Government (GG) pays the monthly bill associated with lights in the City and County. For example, the bill in December 2019 for streetlights and poles was \$209,216.90. All lights will be upgraded to LED over the next several years and some will get smart controls.

Staff from GRU and GG are working together to implement this mass change-out. The positive impacts of LED lights are well known and result in an approximate reduction of 450,000 KWHrs. In time, this also results in decreased revenue for GRU and staff have worked together to lay out a process that allows the utility to ease into this change. The City will also use this opportunity for targeted deployments within designated areas acting as testbeds to pilot emerging technologies.

Two years ago the City piloted connected lights at a small scale in the Midtown area. As a result of the pilot phase I and its current program¹, it is possible to verify the KWHrs reduction per month, as shown in Figure 01. Other features available are reports related to metering and reports related to failures. In the metering side, each pole reports metered power (W), Lamp burning hours, current lamp energy (KWH), among others. In the Failure report, it is possible to find information on lamp failure, lost communications, node failure, and power failure. These reports allow for rapid responses to malfunctions or anomalous situations.

¹ The control program adopted was dim to 60% from Dusk to 11:00 pm, dim to 100% from 11:00 pm to 04:30 am, dim to 60% from 04:30 am to dawn.

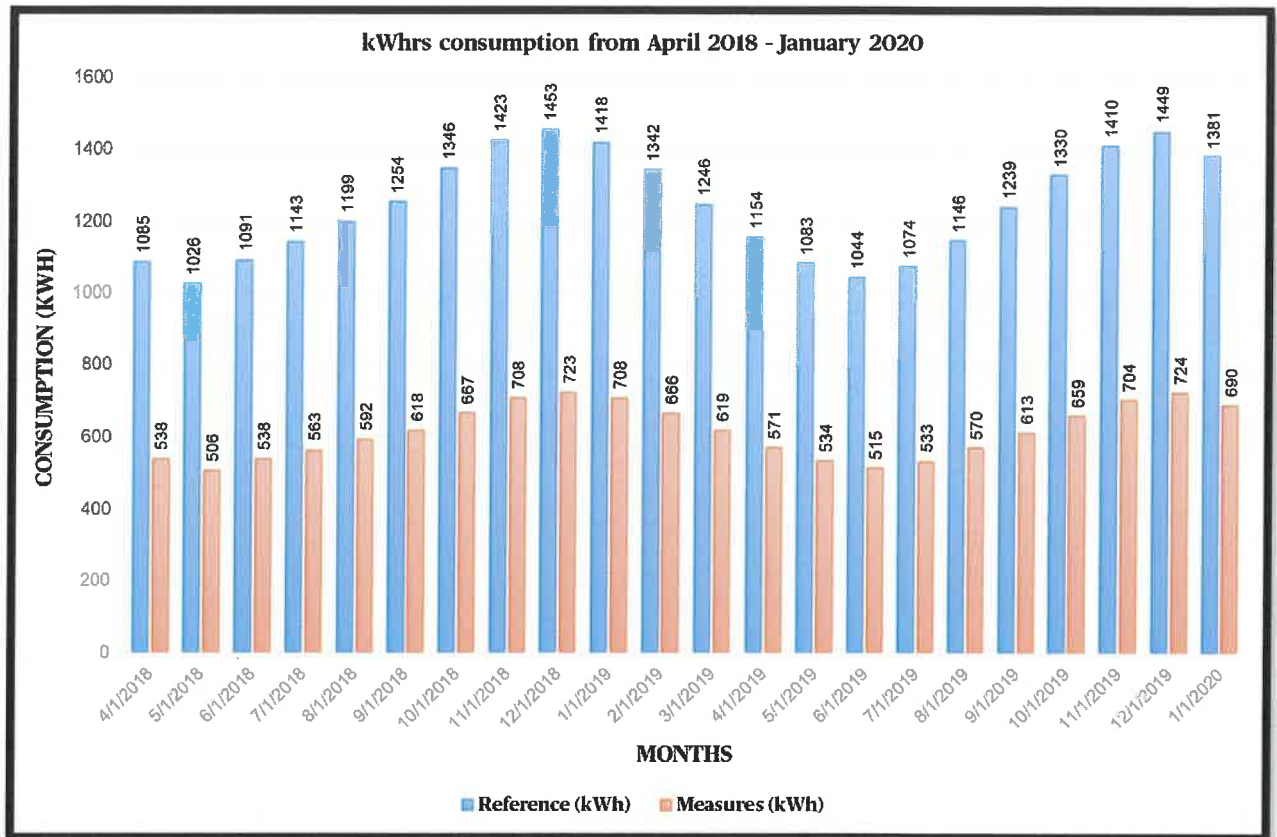


Figure 01 – kWhrs consumption from April 2018 – December 2019. The blue bars are the mean value for reference consumption in KWHrs for these 23 poles before LED and the orange bars are the mean measured consumption in KWHrs for these 23 poles after the pilot deployment.

The next proposed phase of that pilot will use smart controls and be deployed in the Duval area along NE 8th Avenue.

LED Mass Change Out

City Streetlights

On October 1, 2017, the Gainesville City Commission gave the directive to replace all streetlights to LED fixtures. GRU began the City Mass Change-Out (MCO) on December 30, 2019. Currently, the City has 2,561 lights converted to LED representing 19.6% of the total. The City MCO has been coordinated around all areas in the City with a focus on areas with either high levels of pedestrians, high crime, or both (Figures 02-04).

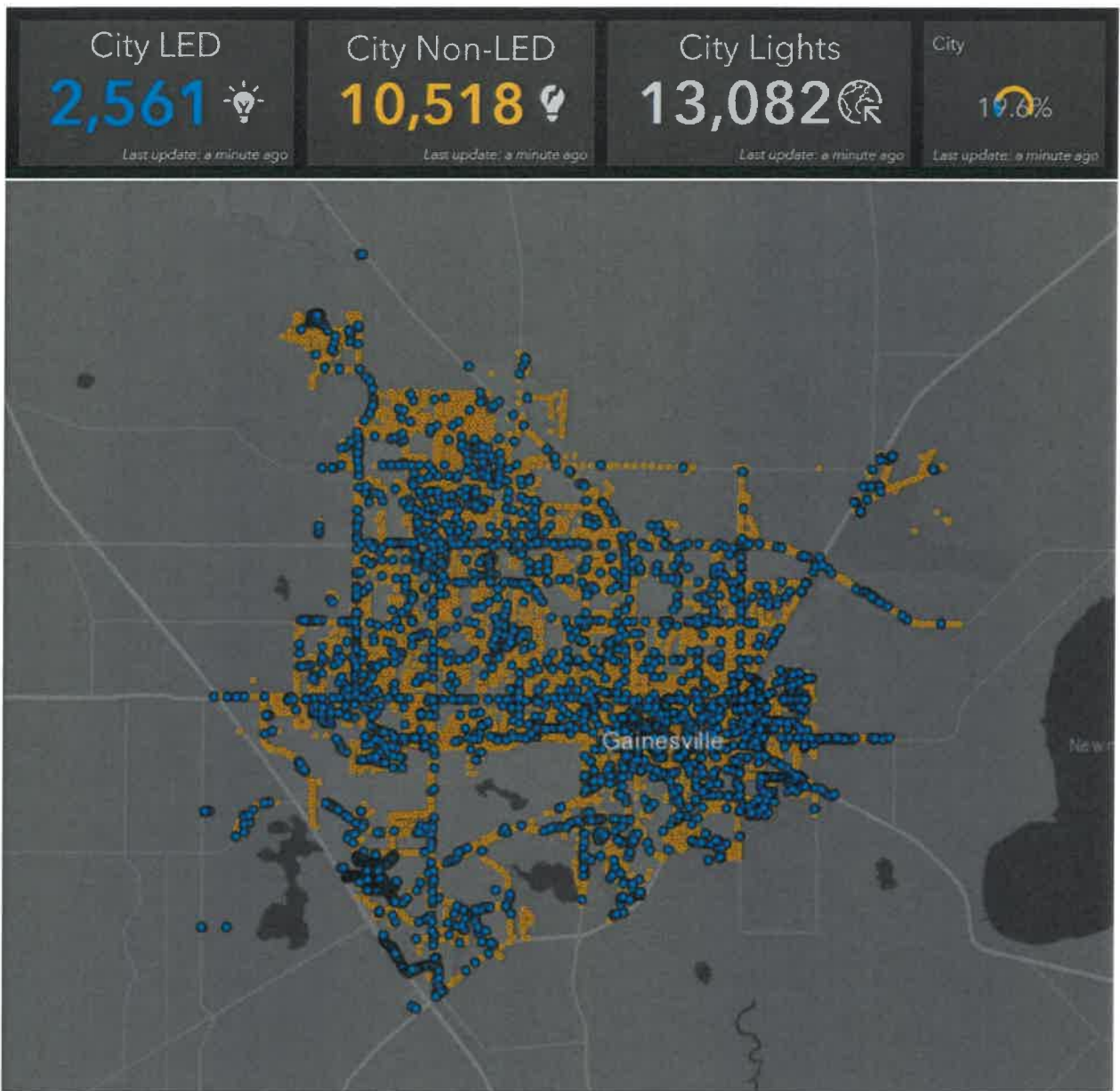


Figure 02 – LED mass change-out. The blue dots represent the LED lights, and the orange dots represent the Non-LED Lights

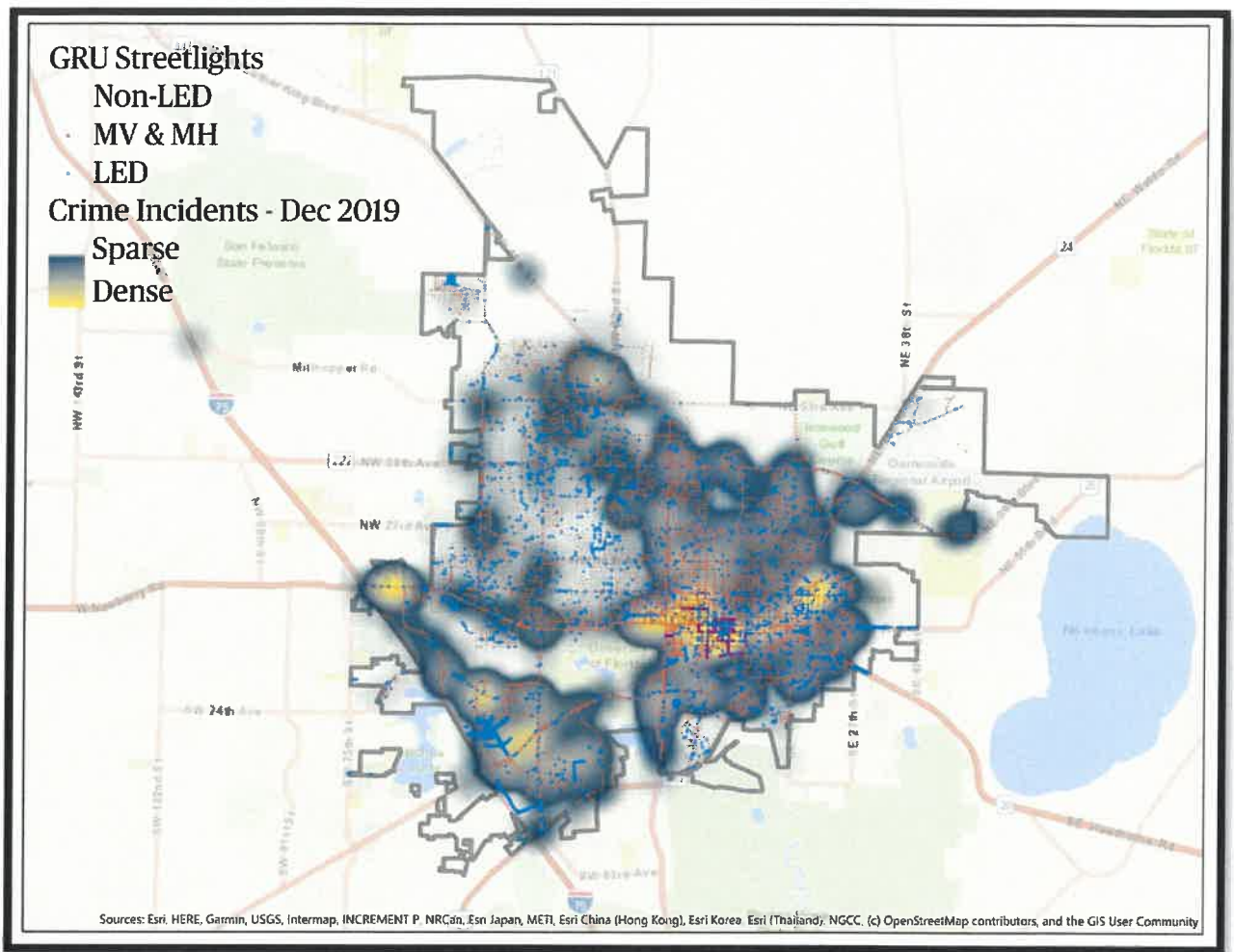


Figure 03 – Map with LED mass change-out and crime data – December 2019. Data Source: dataGNV.

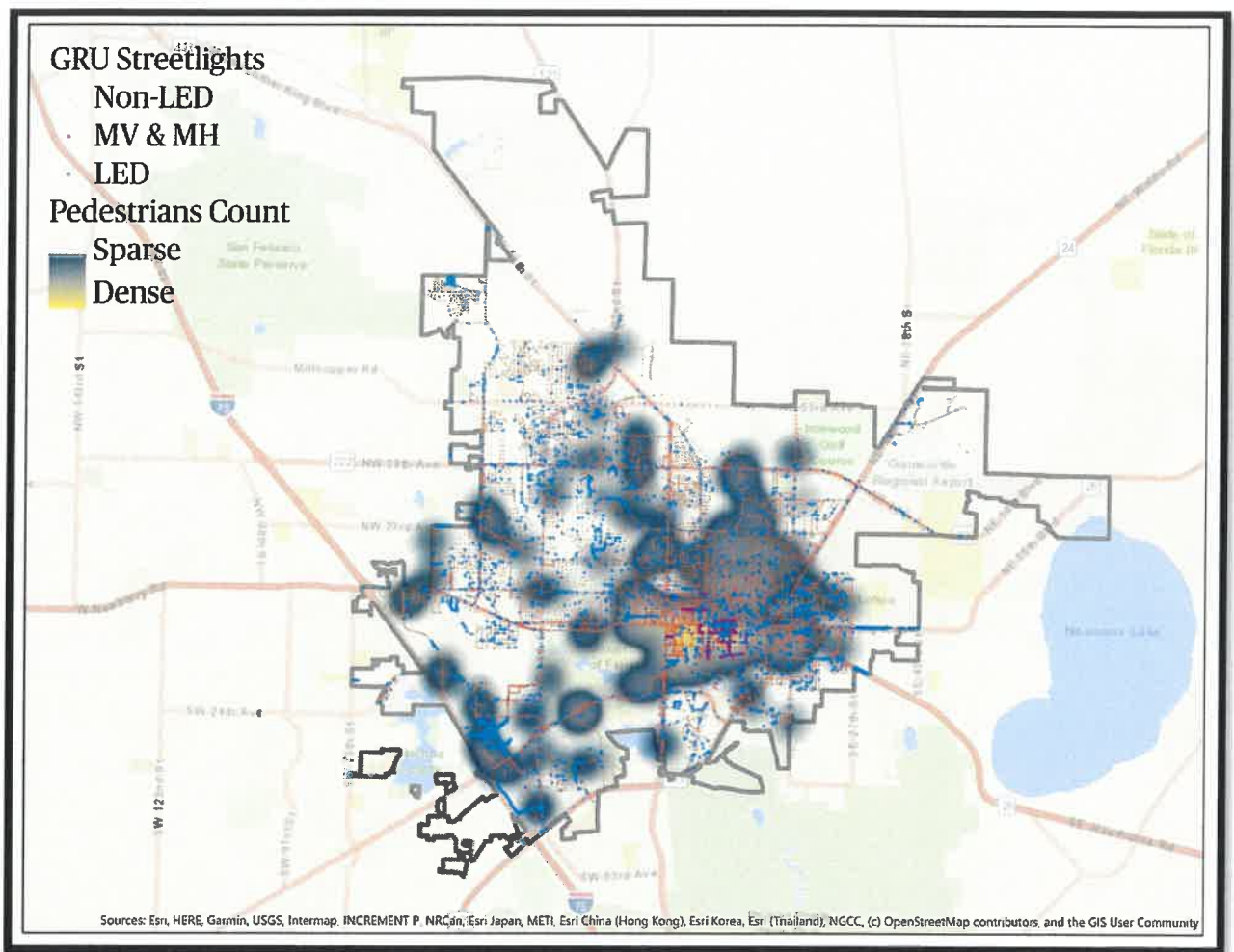


Figure 04 – Map with LED mass change-out and pedestrians count – Data source: dataGNV.

County streetlights have already been changed to LEDs. The electricity saving from those lights is already being realized, as shown in Chart 1. It is possible to verify over 40% reduction in KWHrs considering the beginning and the end of the FY2019. This was done intentionally because the City does not intend to deploy control nodes on County lights at this time.

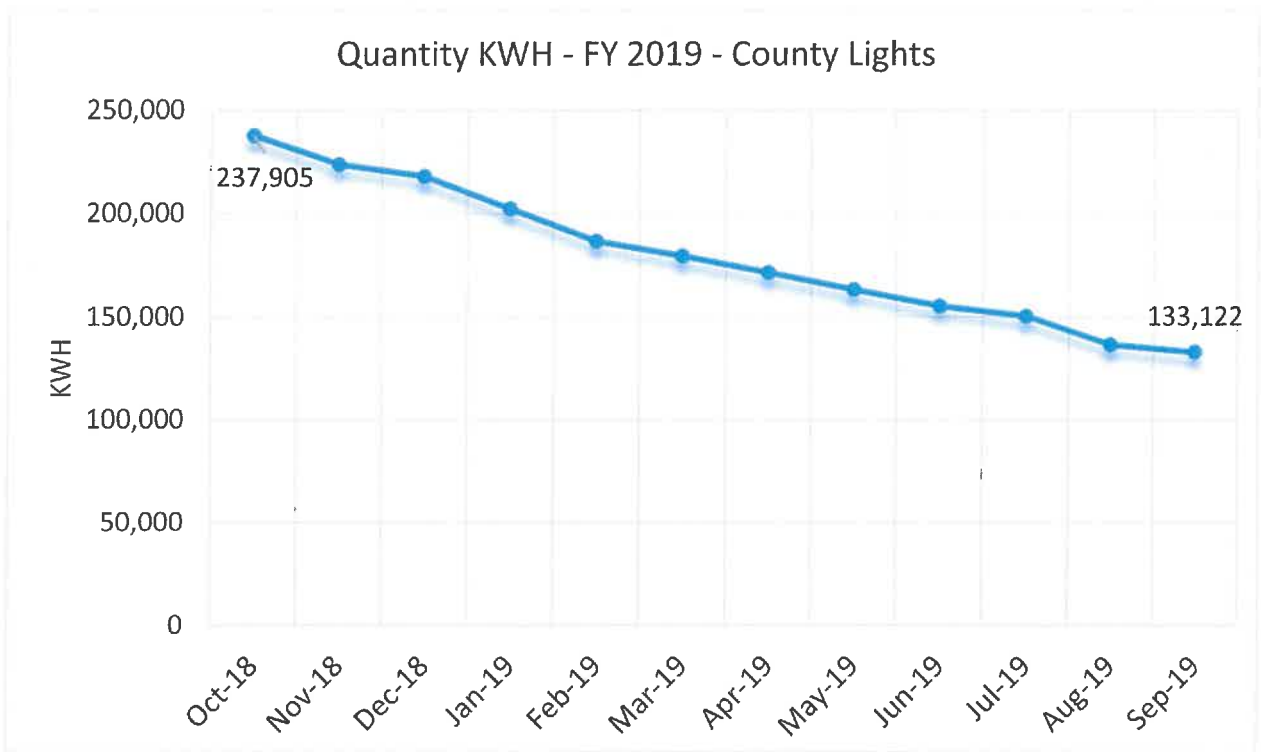


Chart 1 – Quantity in KWHrs for the County Lights – Fiscal Year 2019.

Based on the County's light billing analysis considering July 2018 (before the LED mass change-out started) and December 2019 (County Lights LED mass change-out had already finished), it was possible to see a savings of \$13,838.96 in the monthly bill which represents 18% from the period of July 2018 and December 2019. At this time, the rates that the City pays are written into ordinance and not based on actual usage.

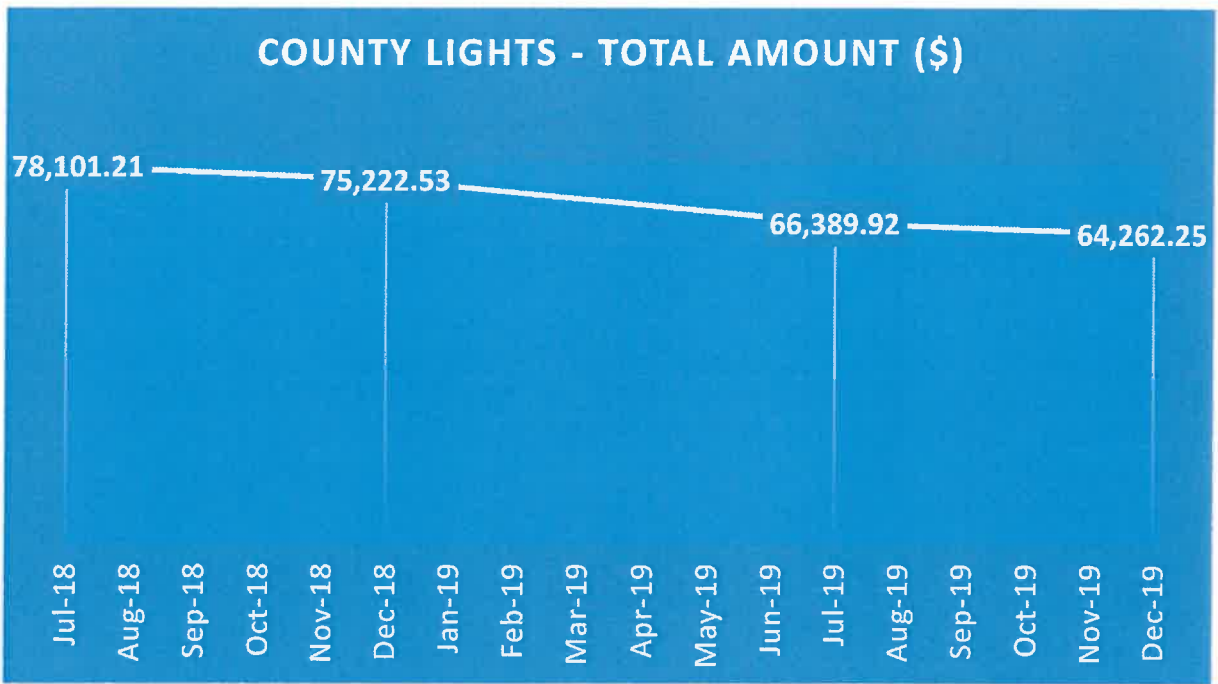


Chart 2 – Total amount - County streetlights – Fiscal Year 2019

All lights – City or County - already upgraded through the mass change-out are “smart ready.” They comply with the interim standard released by the City Manager in August 2018. The standard required all streetlight installation to include a 7-pin receptacle that is consistent with ANSI C136.41. While the empty receptacle provides no functionality at the time of installation, it’s a “plug and play” socket that will be compatible with the eventual smart city infrastructure selected.

GRU Lead Project Manager for the LED Mass change-out is Gabriel Miranda. The new Smart City Coordinator, Sheyla De Santana, as well as Public Works staff are coordinating on the GG side. The streetlight upgrades to LED need to be performed strategically to ensure that any components in the streetlight fixtures needed to support the Smart Cities effort (such as control nodes) are included in the initial installation to control installation costs whenever possible. In addition to this, it was agreed that the target areas will change the lights for one light level up and the level will be dimmed at the moment of the installation. This allows for increased lighting in emergency management situations. The street light network must be in place and tested prior to the deployment and installation of any lights that will be dimmed.

The speed of the mass change-out accelerated at around the time of the new fiscal year and at the time GRU received approval to purchase and install LED distribution type II narrow longitudinal lights. These types of lights will alleviate disturbance and light perception in the residential areas due to narrow front spread but side-to-side light spread may still be an issue. These lights have not traditionally been used and had to be ordered, but the staff felt the shift was justified to reduce light pollution and resident complaints.

Smart Control Procurement/ Pilot

A vendor has provided a proposal for a 45 light pilot. This proposal includes the smart streetlight control system, 45 control nodes, access points, and managed cloud based software. This procurement is now making its way through City processes and we intend to deploy the Phase Two pilot on NE 8th Avenue (Figure 05) by fall 2020.

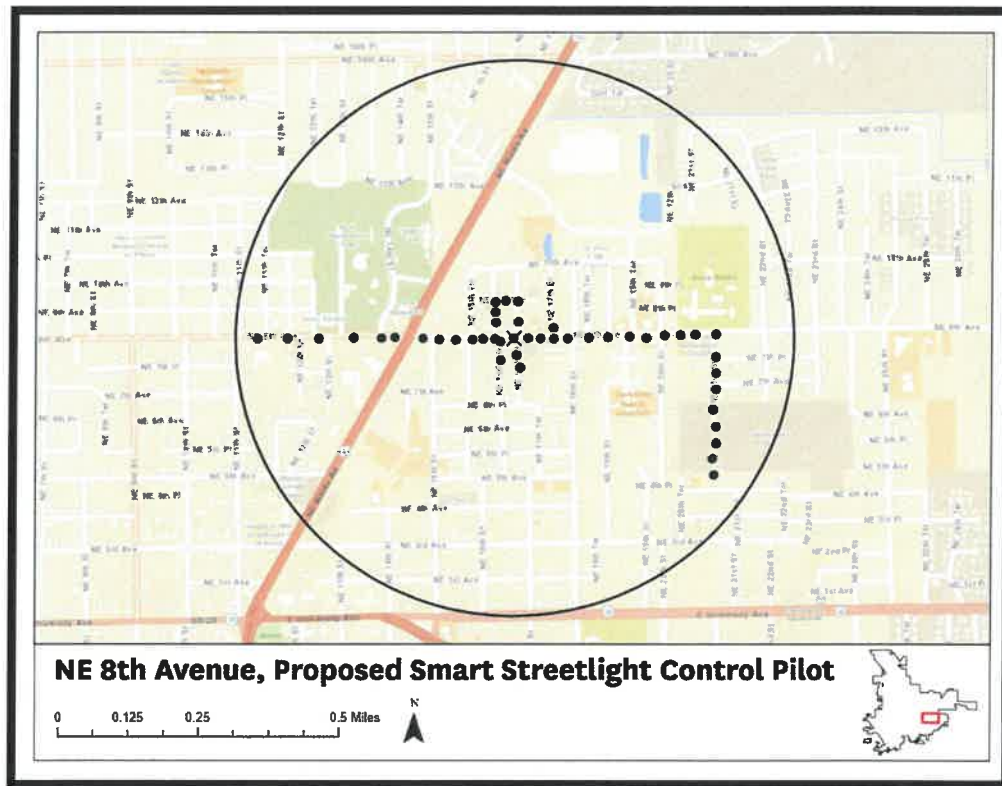


Figure 05 –Smart Streetlight Pilot Project Phase Two

Budget and Resources

The cost for the mass change-out is covered by the streetlight billing rate outlined in the ordinance. This rate is calculated to include capital costs unless the GG budget has contributed in some way to the specific light. This results in two different rates paid by GG for the wide variety of different lights deployed in the community: a contributed and a non-contributed rate. For City lights and poles, GG receives a monthly bill from GRU typically ranging between \$180,000 to 190,000 for streetlight costs. As previously noted, the City currently covers the cost of County streetlights and that is handled through a separate transaction with the County.

In the FY20 budget, a capital project was approved called "LED Streetlight Controllers." These are the control nodes that allow the City to manage the lights remotely and will enable some of the smart capabilities. The staff has discussed having GRU procure the nodes specified by the City on GG's behalf. GRU will bill GG for the modules as they are procured. Please note, the deployment of nodes does not necessarily delay the mass change-out. However, it is preferable to change out the light and install the node at the same time.

APPENDIX

Smart Street Light Case Studies

To identify the needs of the City, a GIS multi-criteria analysis was made considering the variables: population, business, EMS response, vehicle accidents, crime incidents and National Walk Index. The combination of these variables resulted in the street light index pointing out the areas that may be prioritized when deploying the smart street technology, as presented in Figure 06.

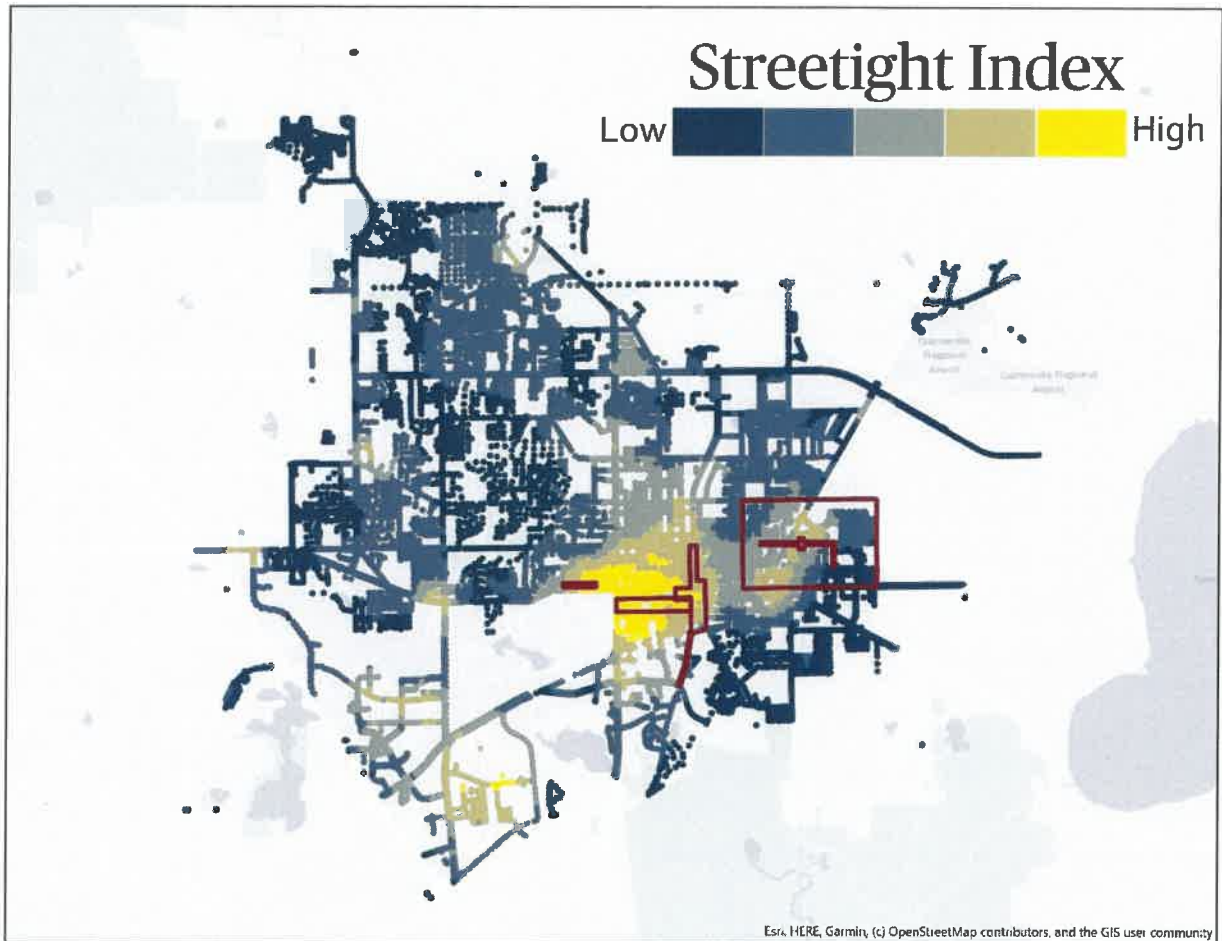


Figure 06 – Streetlight Index

Three areas were select based on different interests: Health and Safety, Cultural and Innovation/Mobility (Figure 07).

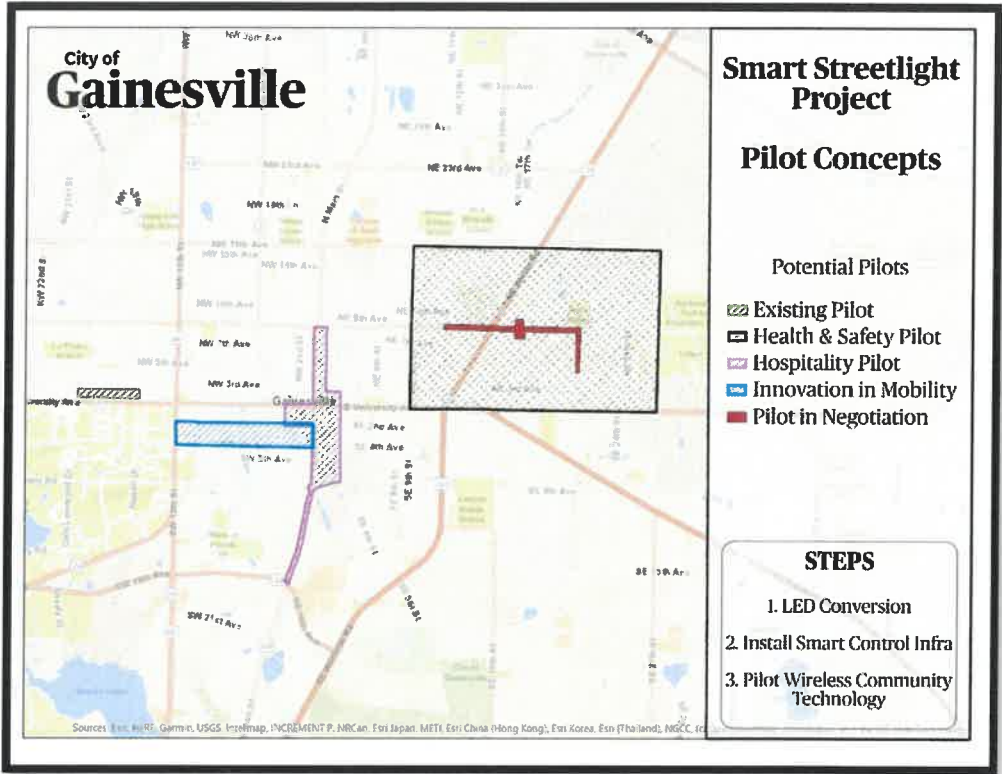


Figure 07 – Map of Smart Street Light Project Areas

Pilot Concepts

The following maps give more details on each area (Figures 08 – 10) with streetlight inventory.

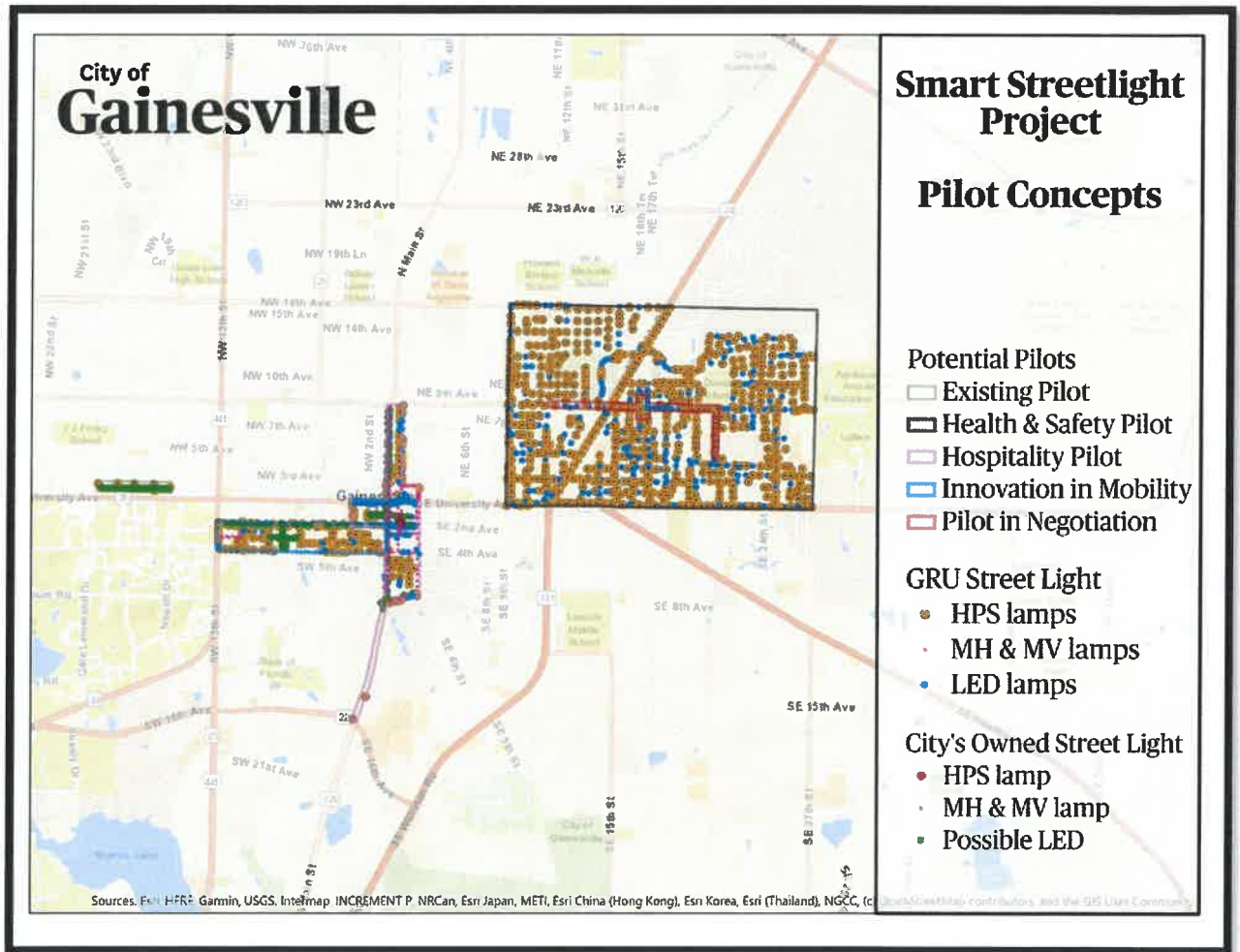


Figure 08 – Map with Streetlights inventory².

² These maps were created using the most updated streetlight GIS data from GRU and Public Works. There are some updates in progress to better identify the City's owned street lights. There is some Null information in regards to lamp type that resulted in the identification of "Possible LED" in the map since there is no clear information of the lamp type at this point.

❖ **Health and Safety Pilot**

The Health and Safety pilot has as its objective to promote the health and quality of life while developing economic opportunities. In this area, there are 4 parks, UF Health Eastside, Citizens Field and GFR Station. There is a community center, four affordable complexes, and ~130 active businesses. There are many sidewalks and bike routes.

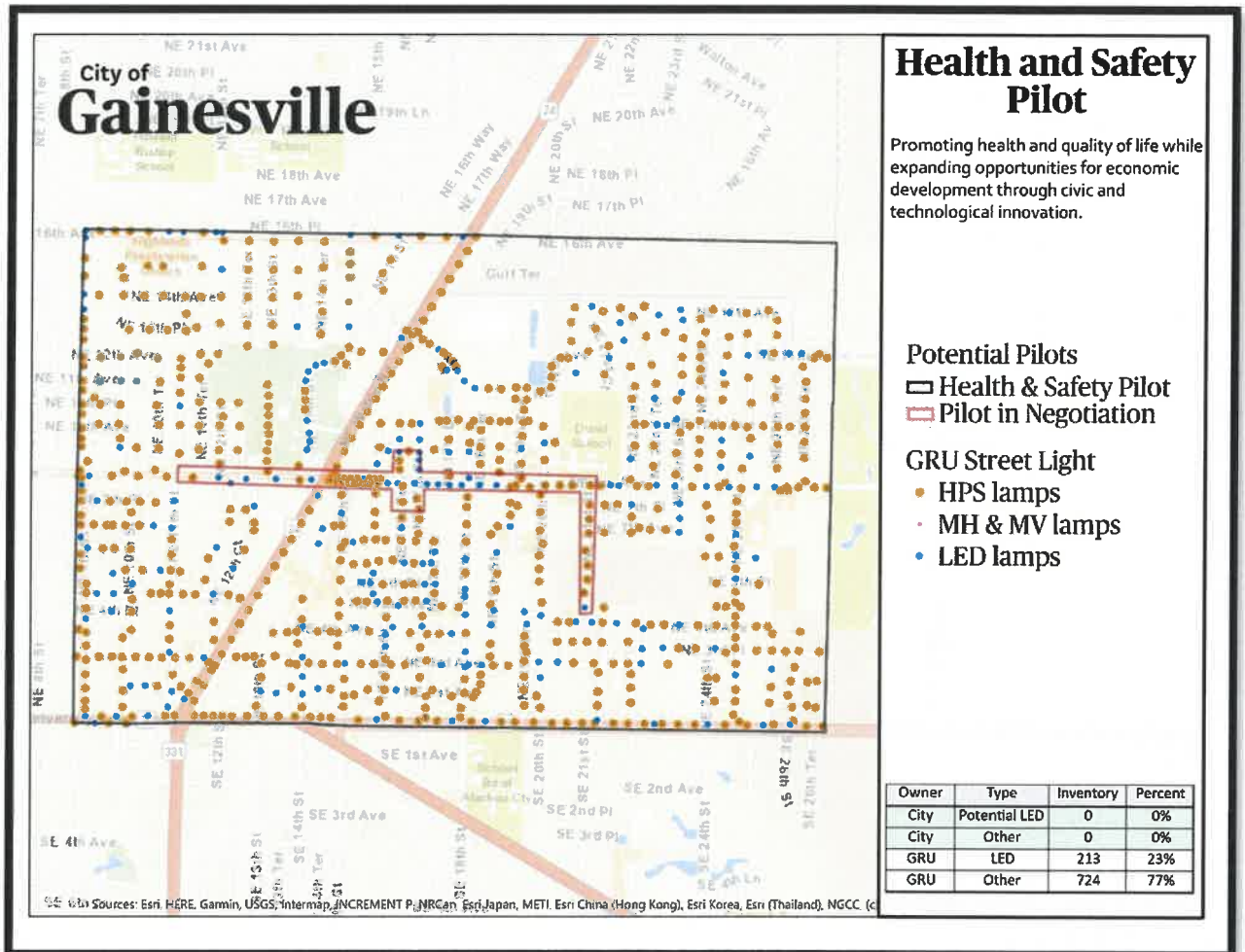


Figure 9 – Map Health and Safety Pilot

❖ Innovation in Mobility Pilot

The Innovation in Mobility Smart Pilot is located in the Innovation Square area. The downtown Parking garage is in the nearby area. The University of Florida is right next to the pilot area. Some technology - based projects focusing on traffic analysis and improvement are already in place in the surrounding area. Within Innovation Square, the City owns decorative streetlight that may need to be retrofitted.

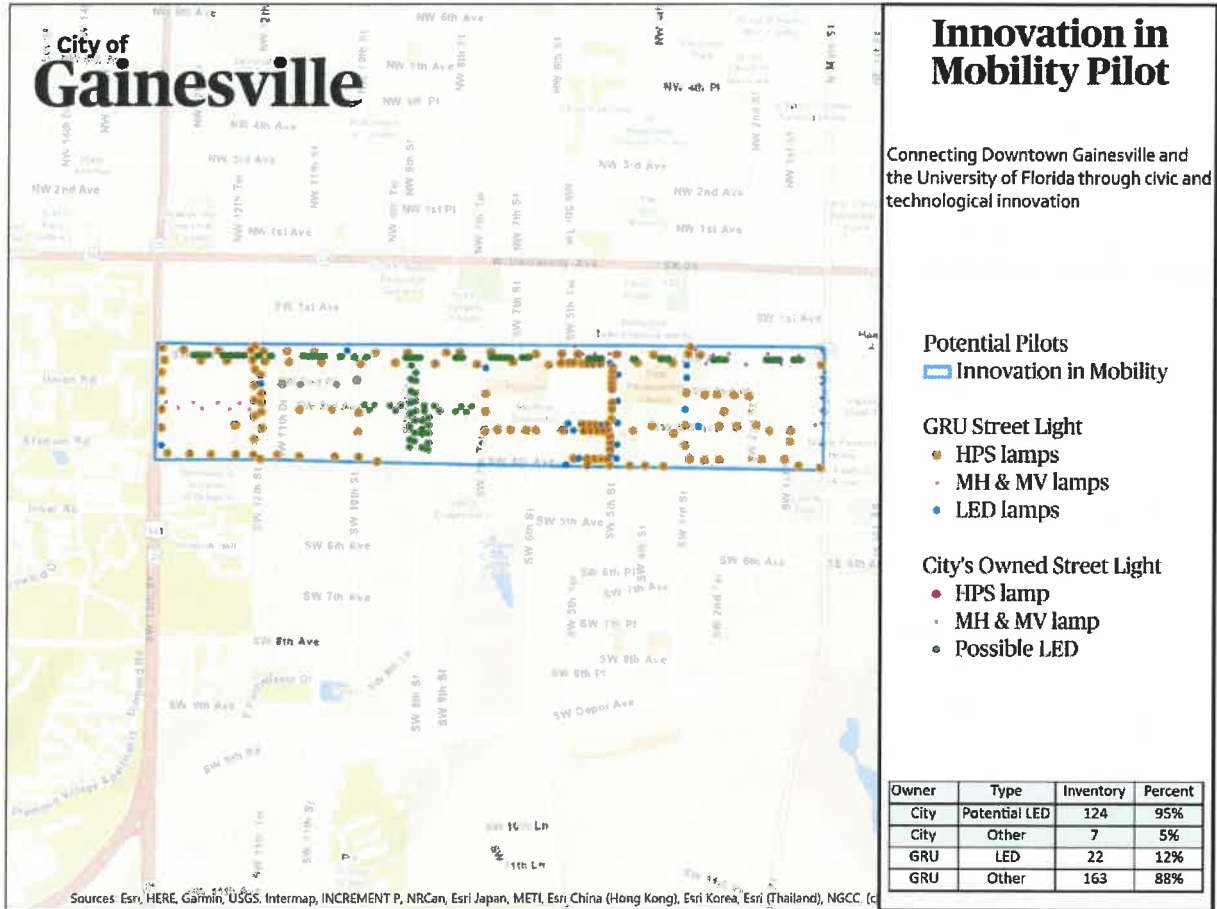


Figure 10 – Map Innovation in Mobility Pilot

The Smart Cities Initiative will identify core issues to the City of Gainesville and opportunities to address them through data collection, analytics, and technology implementations.

❖ Existing Pilot

The City is operating a smart streetlight pilot along NW 1st Ave. (Figure 11)

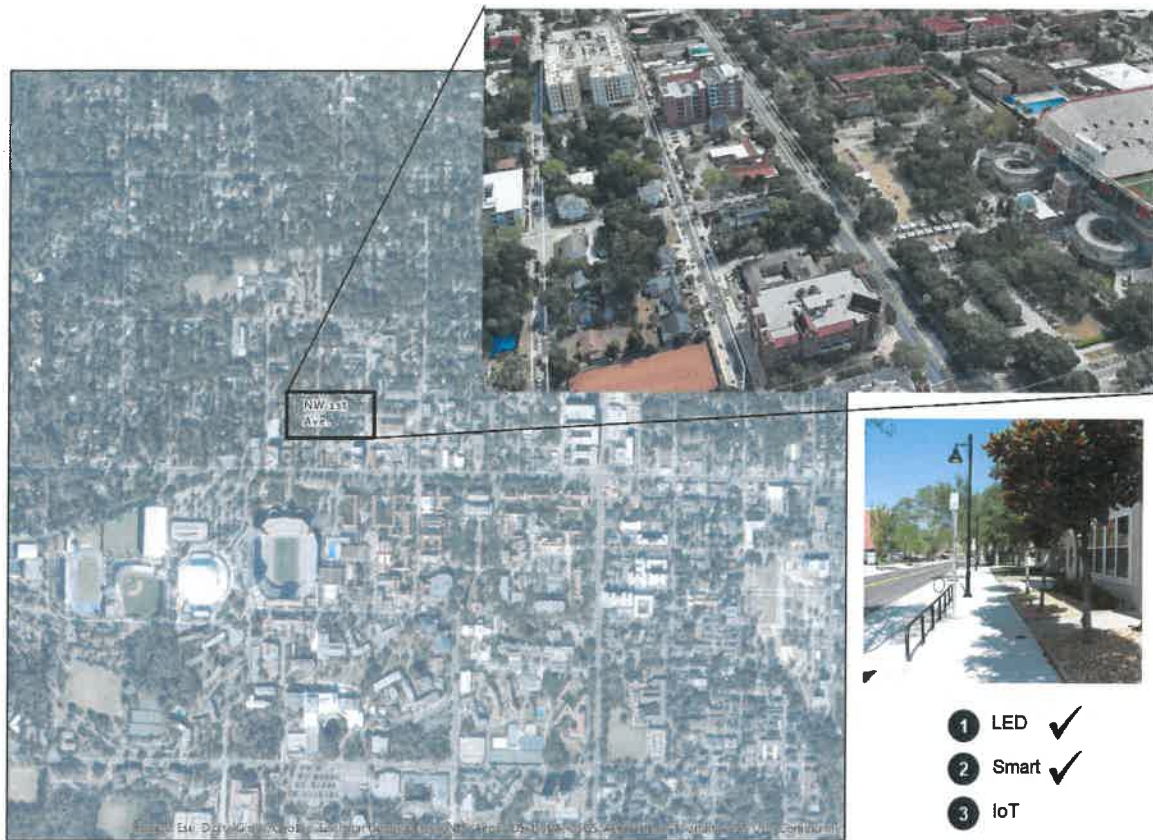


Figure 11 – Smart Street Light Deployed Pilot

In April 2018, 22 smart lighting control nodes were installed on decorative LED fixtures on NW 1st Avenue between NW 16th Street and NW 18th Street, as a pilot on the Smart Street Lights (Figure 12). These control nodes were offered by SESCO Lighting as a no - cost pilot project and allow several features including dynamic dimming to control energy consumptions and real - time outage reporting to increase system reliability. Dynamic dimming allows programmatic scheduling to adjust the lighting output based on selected parameters.

This system represents a great opportunity to engage the community, testing and promoting this smart street light initiative.

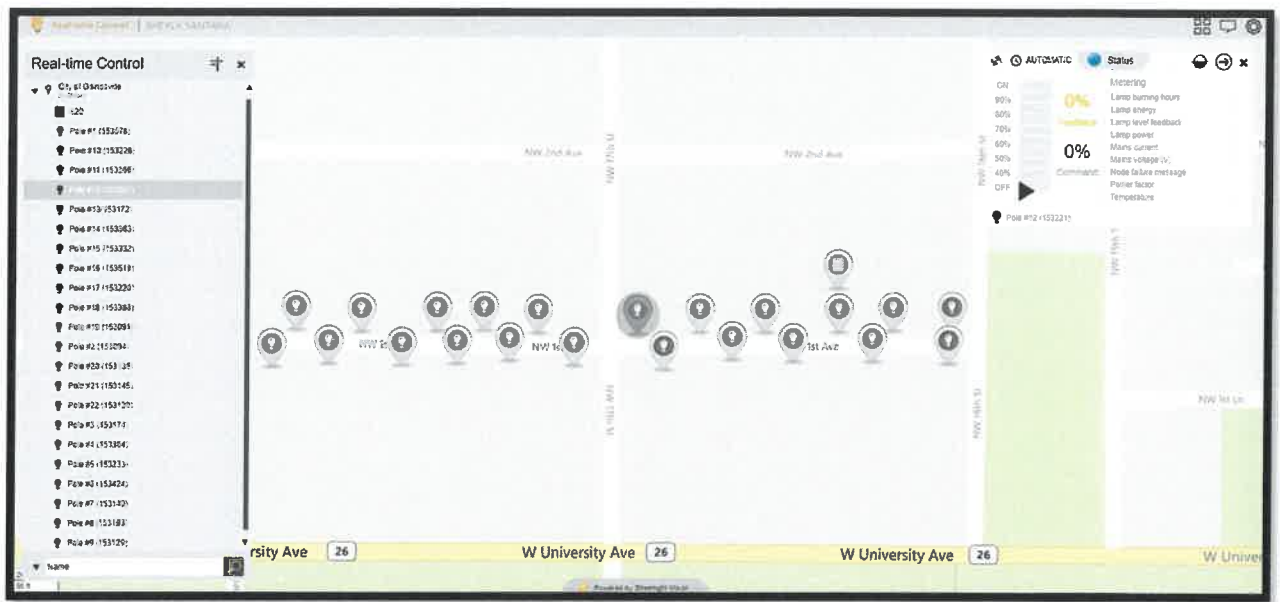


Figure 12 – Smart Street Light Deployed Pilot Dashboard

In regard to system reliability, the City and GRU are traditionally notified of light outages by neighbor reports and staff observations. This can lead to unreported outages for significant periods. This pilot system can send a notification to the City as soon as an outage occurs to enable a quick response.

Sesco lighting was flexible to negotiate the timeframe of this pilot and the system is still active.

The latest consumption report shows the energy consumption by month since the deployment of the pilot, in April 2018, Figure 13.

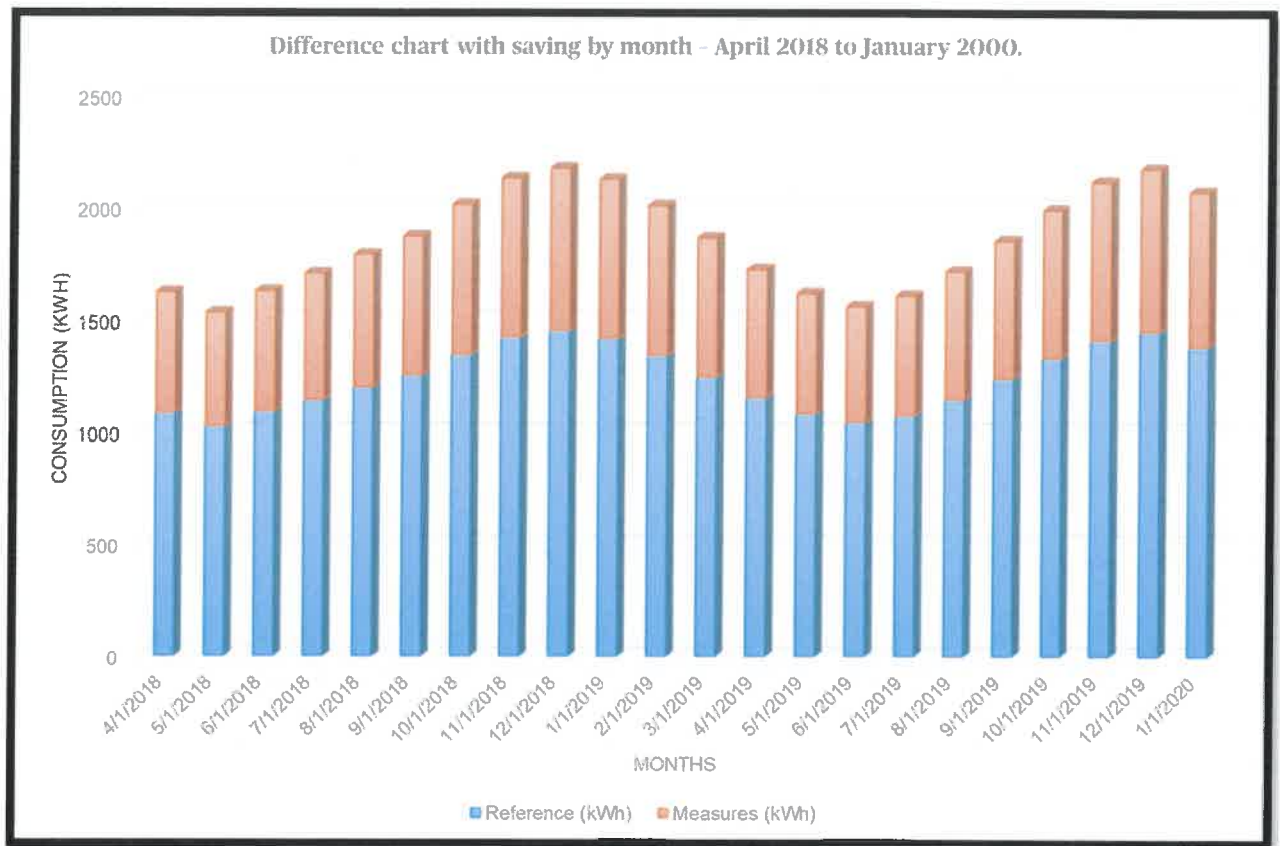


Figure 13. Difference chart with saving by month – April 2018 to December 2019. The blue bars are the mean value for reference consumption in KWHrs for these 23 poles before LED and the orange bars are the mean measured consumption in KWHrs for these 23 poles after the pilot deployment.

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