

City of Kirkwood, Missouri Street Lighting Engineering Services

July 31, 2014

Ross & Baruzzini

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Ross & Baruzzini was hired by the City of Kirkwood to analyze the current street lighting systems throughout the historic business district of the city.

All streets in the historic business district were observed and the streets we believe were good candidates to receive a street lighting upgrade were identified.

Agenda

- Project purpose and scope
- Different types of exterior lighting lamp sources
- Site investigation findings
- Pros and Cons for upgrading the current lighting system
- Questions

Streets that were surveyed

CITY OF KIRKWOOD
STREET LIGHTING ENGINEERING SERVICES

PROPOSED STREETS TO BE INCLUDED IN SURVEY

SHEET 1 OF 2

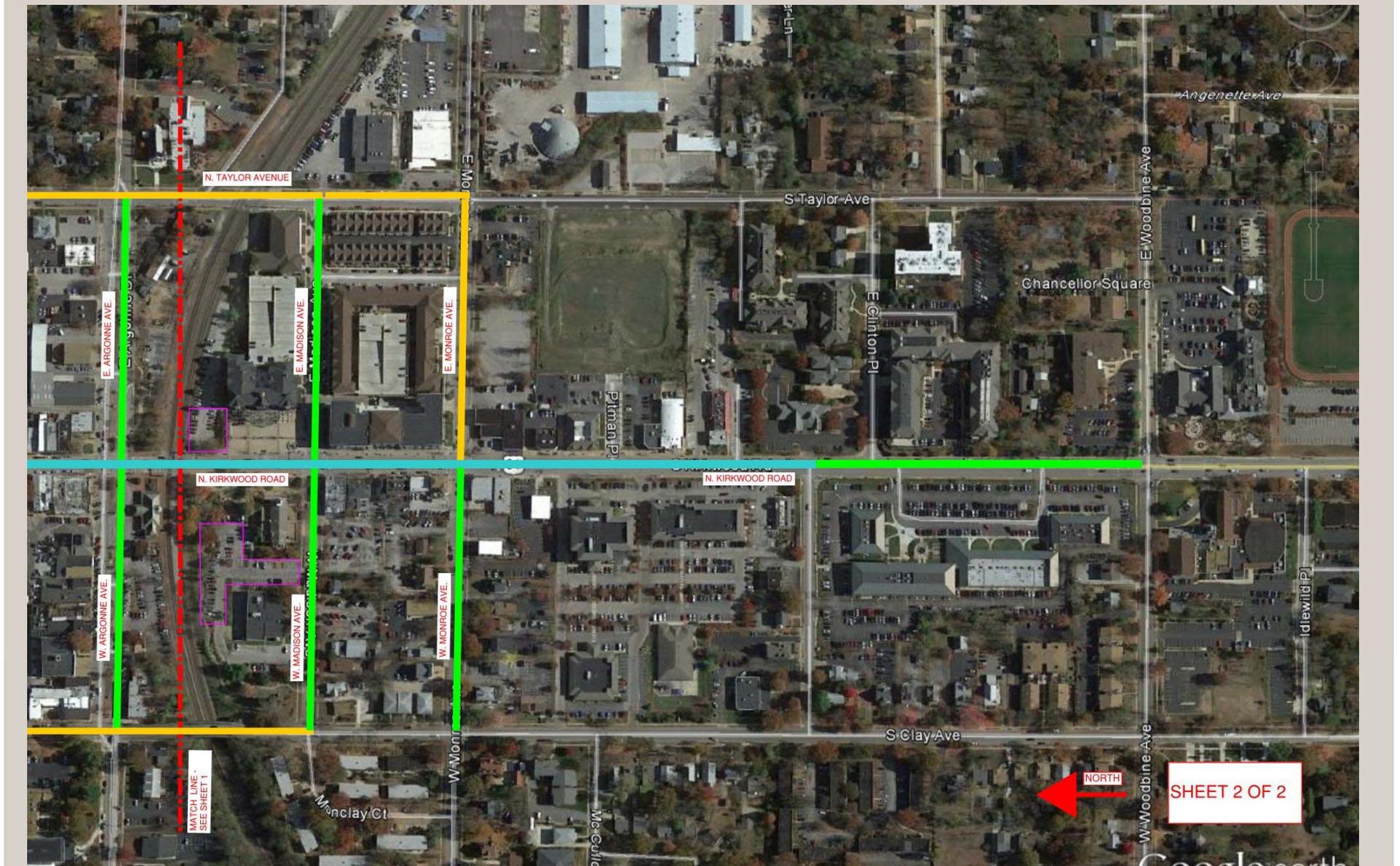
LEGEND

-  Proposed street with existing lighting to be replaced with new antique street lighting to match City standards.
-  Optional street with existing lighting to be replaced with new antique street lighting to match City standards.
-  Existing street with antique street lighting to remain. Street will be surveyed to ensure lighting poles are placed in correct locations to provide adequate lighting levels. The luminaire lamps will be reviewed and an energy analysis will be provided to verify if any energy savings can be achieved.
-  Existing parking lot to be surveyed. Existing lighting locations will be noted, illumination levels will be identified and recommendations will be given.



MATCH LINE
SEE SHEET 2

Streets that were surveyed - continued



We then surveyed all proposed streets and obtained the following data:

- Identified the current street lighting luminaire type, lamp type and mounting.
- Measured photometric levels of the existing lighting systems and compare to Illumination Engineering Society of North America (IESNA) Standards.
- Identified which lighting poles currently have banners, plant hangers, receptacles, security cameras, etc.

Different types of street lighting lamp sources:

- **Sodium-vapor lamp:** is a gas-discharge lamp that uses sodium in an excited state to produce light. There are two varieties of such lamps: *low pressure* and *high pressure*. Low-pressure sodium lamps are highly efficient electrical light sources, but their yellow light restricts applications to outdoor lighting such as street lamps. High-pressure sodium lamps have a broader spectrum of light than the low pressure, but still poorer color rendering than other types of lamps. Low-pressure sodium lamps only give monochromatic yellow light and so inhibit color vision at night.
- Average lamp life is approximately 24,000 hours.

Different types of street lighting lamp sources:

- **Metal-halide lamp:** is an electric lamp that produces light by an electric arc through a gaseous mixture of vaporized mercury and metal halides (compounds of metals with bromine or iodine). It is a type of high-intensity discharge (HID) gas discharge lamp. Developed in the 1960s, they are similar to mercury vapor lamps, but contain additional metal halide compounds in the arc tube, which improve the efficacy and color rendition of the light.
- Average lamp life is approximately 24,000 hours

Different types of street lighting lamp sources:

- **LED lamp:** is a light-emitting diode (LED) product that is assembled into a *lamp* (or *light bulb*) for use in lighting fixtures. LED lamps have a lifespan and electrical efficiency that is several times better than incandescent lamps, and significantly better than most fluorescent lamps, with some chips able to emit more than 100 lumens per watt. The LED lamp market is projected to grow more than 12-fold over the next decade, from \$2 billion in the beginning of 2014 to \$25 billion in 2023, which is a compound annual growth rate (CAGR) of 25%.
- Average lamp life is approximately 50,000 hours



High Pressure Sodium



LED

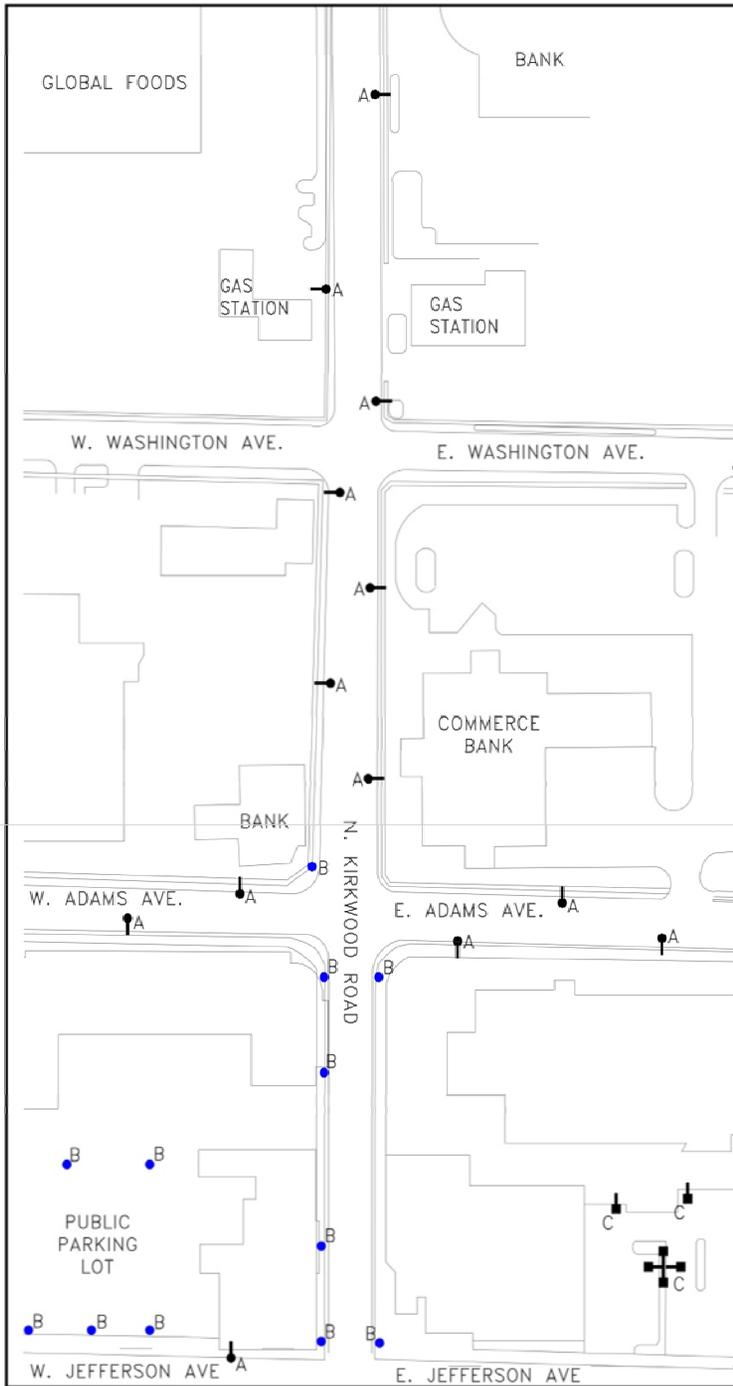


LED

Metal Halide

Site Investigation Findings

- Per the Illumination Engineering Society of North America (IESNA) Standards recommend a minimum average of .06 footcandles for pedestrian walkways and streetways.
- Light levels vary.
- Adequate light levels
 - Kirkwood Rd.
 - Adams Ave.
 - Jefferson Ave.
 - Argonne Dr.
- Inadequate light levels
 - Monroe Ave.
 - Madison Ave.
 - Washington St.
 - Clay Ave.
 - Taylor Ave.



A EXISTING UTILITY COBRAHEAD OR NEMA HEAD
SYMBOL - ●



B EXISTING STANDARD ANTIQUE PEDESTRIAN LUMINAIRE
SYMBOL - ●



C EXISTING SHOEBOX LUMINAIRE
SYMBOL - ⊕ & ⊖

PLAN NORTH
KIRKWOOD RD (WASHINGTON ST. TO JEFFERSON AVE.)



AREA SHOWN
ON THIS SHEET



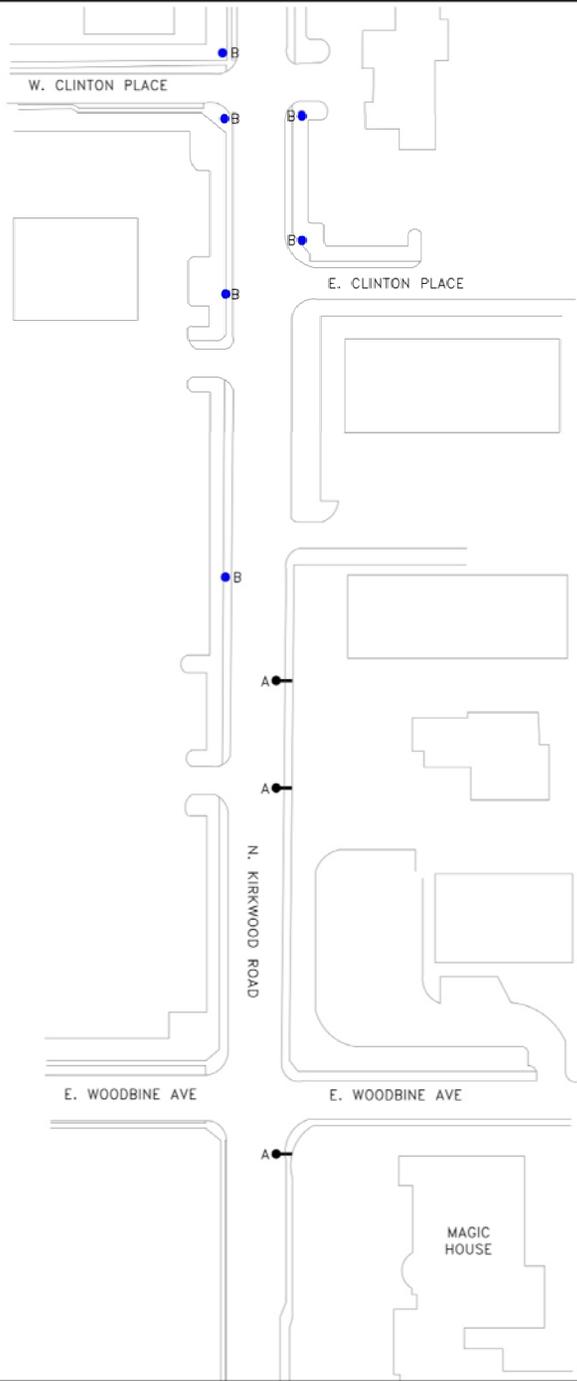
Ross Baruzzini
A PROFESSIONAL ENGINEER
LICENSE NO. 11348-0000
www.rossbaruzzini.com

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Consulted
for
City of Kirkwood
Project No. 2022-01
Date: 05/2022
Scale: AS SHOWN

REPRODUCED AT ORIGINAL
SCALE 100' HORIZ. = 1" VERT.

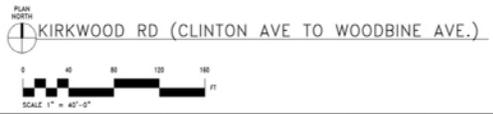
CITY OF KIRKWOOD, MISSOURI
STREET LIGHTING ENGINEERING SERVICES



(A) EXISTING UTILITY COBRAHEAD OR NEMA HEAD
SYMBOL - ●



(B) EXISTING STANDARD ANTIQUE PEDESTRIAN LUMINAIRE
SYMBOL - ●



AREA SHOWN ON THIS SHEET

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A PROFESSIONAL ENGINEERING FIRM
REGISTERED PROFESSIONAL ENGINEERS
STATE OF MISSOURI
NO. 000148

ROSS & BARUZZI
Missouri State Certificate
of Authority #000148

Consulted By: [Redacted]
Project No.: [Redacted]
Drawing No.: [Redacted]

WHEN THIS DRAWING IS
REPRODUCED AT ORIGINAL
SCALE 1" = 40'-0"

1" = 40'-0"

CITY OF KIRKWOOD, MISSOURI
STREET LIGHTING ENGINEERING SERVICES

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CHECKED BY: [Redacted]
DATE: [Redacted]
PROJECT: [Redacted]
LOCATION: [Redacted]
DESCRIPTION: [Redacted]
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DATE: [Redacted]

KIRKWOOD RD
(CLINTON AVE TO
WOODBINE AVE.)

SL5

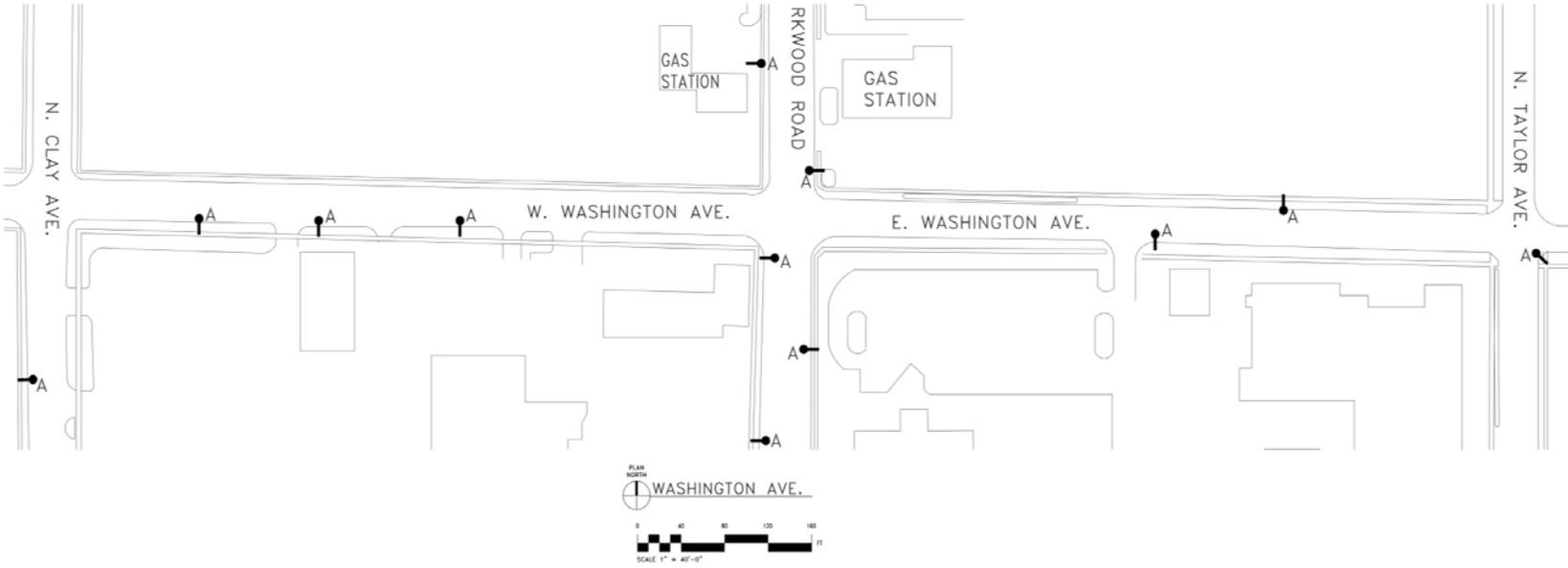
Ross & Baruzzini
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 KIRKWOOD, MISSOURI 64504
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 Electrical Engineering
 License No. 00014-B
 License Expiration Date
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CITY OF KIRKWOOD, MISSOURI
 STREET LIGHTING ENGINEERING SERVICES

DATE: 10/15/2024
 DRAWN BY: ATB/AM
 CHECKED BY: PFC
 PROJECT NO: 2024-01
 PROJECT: ST. LOUIS
 SHEET NO: 1
 WASHINGTON AVE.
 SL6

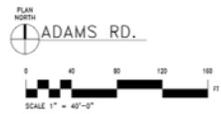
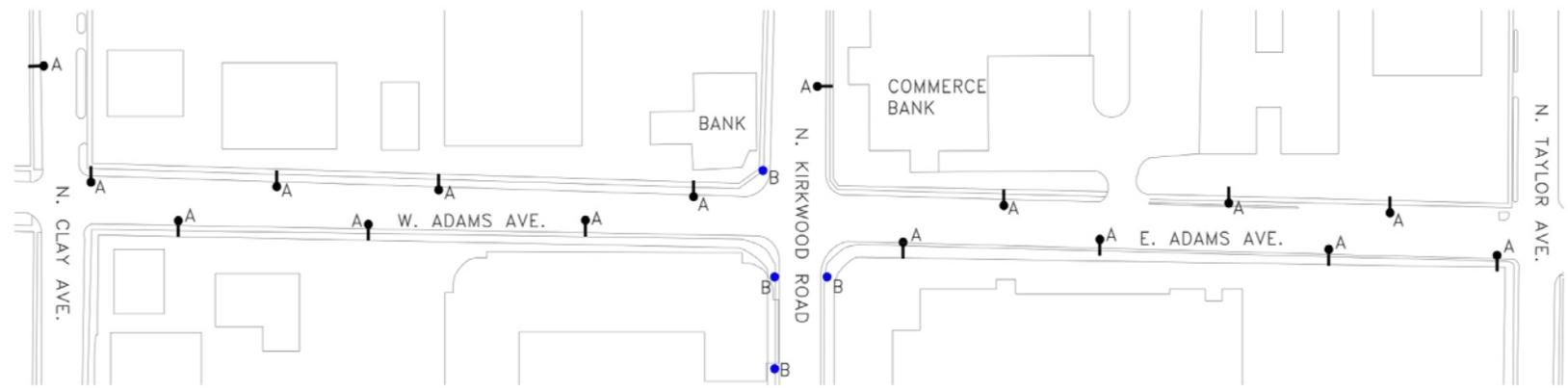


Ⓐ EXISTING UTILITY COBRAHEAD OR NEMA HEAD
 SYMBOL - ●

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CITY OF KIRKWOOD, MISSOURI
STREET LIGHTING ENGINEERING SERVICES



(A) EXISTING UTILITY COBRAHEAD OR NEMA HEAD
 SYMBOL - ●



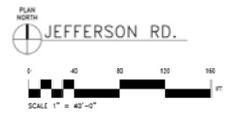
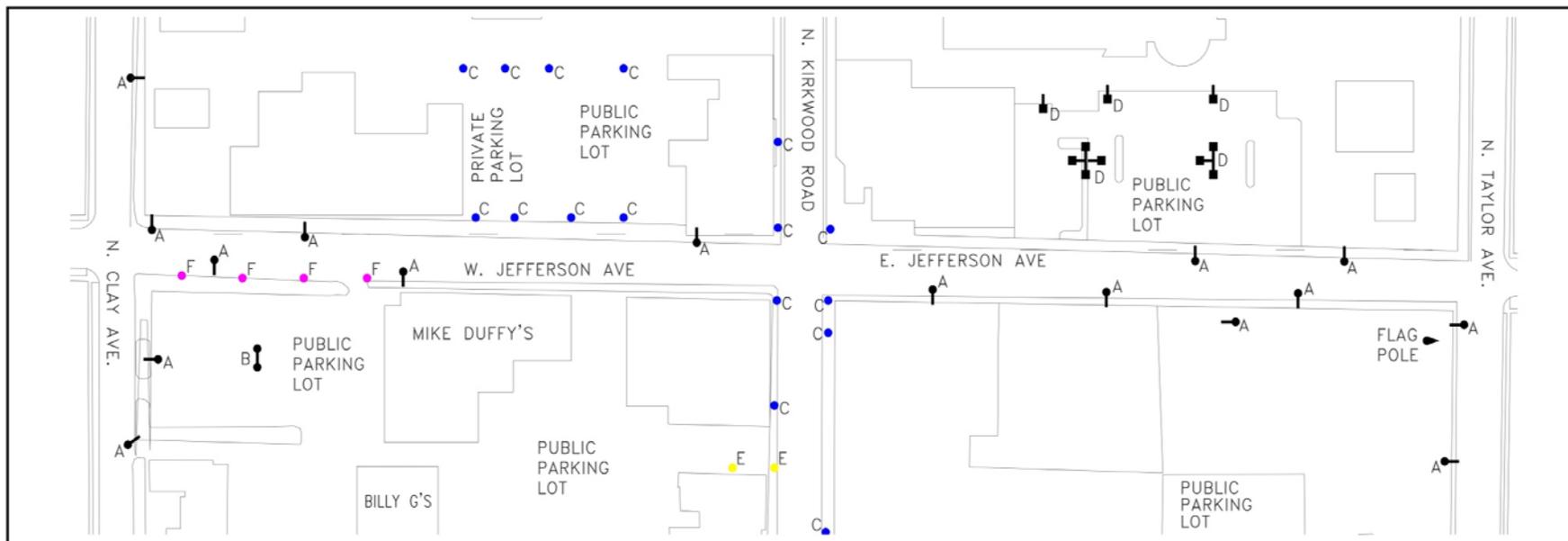
(B) EXISTING STANDARD
 ANTIQUE PEDESTRIAN LUMINAIRE
 SYMBOL - ●

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PLAN NORTH
 KEYPLAN

CITY OF KIRKWOOD, MISSOURI
STREET LIGHTING ENGINEERING SERVICES



(B) EXISTING TANDEM MOUNTED UTILITY COBRAHEAD SYMBOL - ●



(A) EXISTING UTILITY COBRAHEAD OR NEMA HEAD SYMBOL - ●



(C) EXISTING STANDARD ANTIQUE PEDESTRIAN LUMINAIRE SYMBOL - ●



(D) EXISTING SHOEBOX LUMINAIRE SYMBOL - ☒ & ☒ & ☒



(E) EXISTING NONSTANDARD ANTIQUE PEDESTRIAN LUMINAIRE SYMBOL - ●



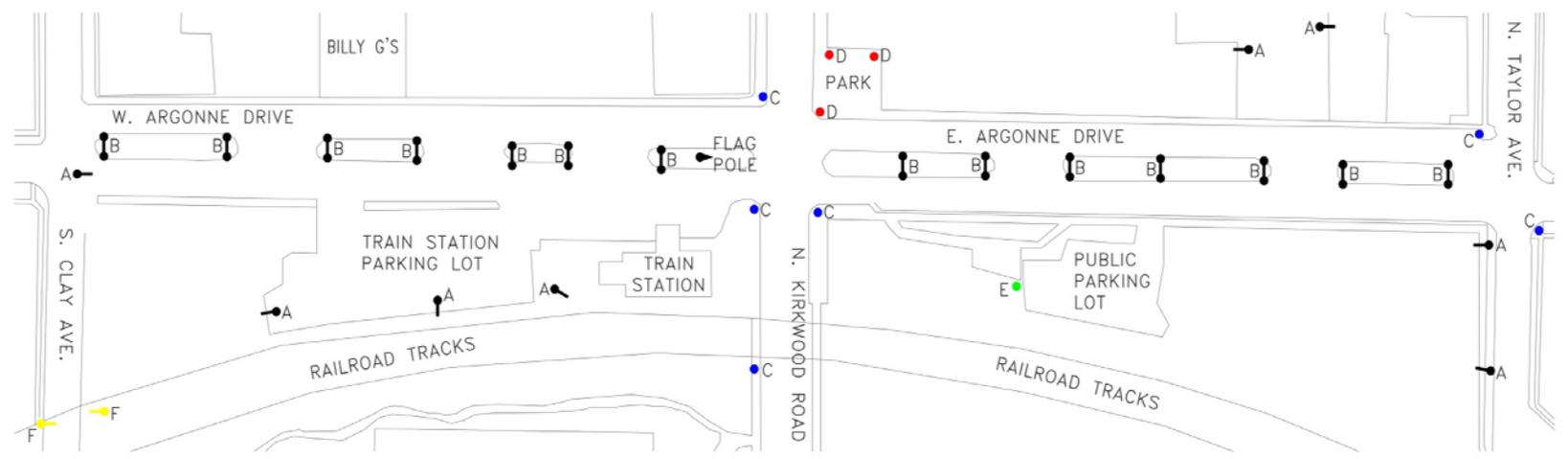
(F) EXISTING NONSTANDARD ANTIQUE PEDESTRIAN LUMINAIRE SYMBOL - ●

AREA SHOWN ON THIS SHEET



KEY PLAN

CITY OF KIRKWOOD, MISSOURI
STREET LIGHTING ENGINEERING SERVICES



(B) EXISTING TANDEM MOUNTED
 UTILITY COBRAHEAD
 SYMBOL -



(A) EXISTING UTILITY COBRAHEAD
 OR NEMA HEAD
 SYMBOL -



(C) EXISTING STANDARD
 ANTIQUE PEDESTRIAN LUMINAIRE
 SYMBOL -



(D) EXISTING NONSTANDARD
 ANTIQUE PEDESTRIAN LUMINAIRE
 SYMBOL -



(E) EXISTING NONSTANDARD
 ANTIQUE PEDESTRIAN LUMINAIRE
 SYMBOL -



(F) EXISTING ANTIQUE
 GOOSENECK LUMINAIRE
 SYMBOL -

AREA SHOWN
 ON THIS SHEET



PLAN NORTH
 KEYPLAN

Pros & Cons for Upgrading Current Lighting System

Pros

- Replaces outdated wiring and lighting systems with new more energy efficient lighting systems. Propose the use of LED luminaires with the possibility of energy saving controls.
- Provides consistent lighting levels meeting/exceeding Illumination Engineering Society of North America (IESNA) Standards.
- Provides a more secure pedestrian environment.

Pros & Cons for Upgrading Current Lighting System

Pros

- Standardizes on one type of luminaire and pole being used throughout the historic business district.
- New street lighting poles provides the City with more opportunities for banners, planters and holiday displays.
- Provides the opportunity to prepare the City for installing a future video surveillance systems by installing empty conduit systems to the new poles.
- Existing high pressure sodium lighting is not idea with video surveillance systems.

Pros & Cons for Upgrading Current Lighting System

Cons

Costs of upgrading the lighting

- Cost of upgrading a typical block is approximately:
 - Approximately \$200,000 for metal halide (current lamp source being used).
 - Approximately \$202,000 for LED. Payback is approximately 2-3 years (based off energy savings).
- Removal of sidewalks sections and curbs will be necessary for the installation of new pole bases and conduit systems.

QUESTIONS?