



CITY OF SAN MATEO

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Agenda Report

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Section Name: {{section.name}}

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TO: City Council

FROM: Drew Corbett, City Manager

PREPARED BY: Public Works Department

MEETING DATE: August 16, 2021

SUBJECT:
Baywood High Voltage Project – Fixture Recommendation

RECOMMENDATION:

Confirm staff recommendation for the use of post top streetlight fixtures to complete the Baywood High Voltage Streetlight Conversion project.

BACKGROUND:

The use of light-emitting diode (LED) lighting helps the City meet sustainability goals and is a key component in the City's 2014 Energy Efficiency Program and Climate Action Plan. To date, the City has converted all of its streetlights to LED fixtures except for approximately 379 high voltage (HV) streetlights, which are comprised of both pedestrian- and street-scale lights that are expected to be converted as part of the HV Streetlight Conversion Program. The current City standard for LED fixtures was selected with the goals of reducing energy consumption and improving overall performance towards meeting roadway lighting levels recommended by the Illuminating Engineering Society (IES). IES recommendations are not mandated but are considered best practices.

There are 88 pedestrian-scale lights within the remaining HV circuits that will be converted to LEDs. The Baywood High Voltage Streetlight Conversion Project (Baywood Project), which began construction during June 2019, includes 77 of the pedestrian-scale lights awaiting conversion. The last 11 pedestrian-scale lights are within the Dartmouth high voltage circuit scheduled to be replaced in the future. While the Baywood Project was under construction, staff provided residents within the project area the opportunity to preview the LED fixture that was going to be used to replace the HV fixtures and provide feedback through a survey.

The survey results indicated a low preference for the proposed LED fixture due to its high brightness, glare, and blue color when compared to the existing HV lights. The residents requested the City install fixtures that would more closely match the existing streetlights. At the September 3, 2019 meeting, Council directed staff to select a new standard pedestrian-scale streetlight fixture that more closely matches the existing HV fixtures in the Baywood Project area. The Council also requested staff evaluate the feasibility of converting LED pedestrian-scale fixtures installed in the past to the fixture selected for the new standard.

Based on Council direction, staff conducted a photometric study to evaluate lighting performance for several candidate fixtures. The photometric study considered lumen output, color temperature, type of globe, configuration of LED array, and lighting distribution as factors. Staff was able to identify several LED fixtures with qualities similar to the existing HV fixtures while still improving street lighting over the existing HV fixtures.

PILOT LIGHTING DEMONSTRATION

Staff selected six new fixtures and one existing fixture for inclusion in a pilot lighting demonstration to obtain resident feedback. As shown in Attachment 1, the fixtures used in the pilot lighting demonstration had various combinations of the following elements:

1. Color temperature (2,700 or 3,000 Kelvin (K)),
2. Rippled or frosted globes, and
3. An LED array either mounted on a column or a flat panel located in the top of the fixture.

Four of the demonstration fixtures were variations of the same model as the City's current standard, which is identified by the manufacturer as "K118." Two of the fixtures were a different model (K137), which was selected to provide aesthetic variety for residents. As a point of reference, the current City standard fixture, which residents disliked during the 2019 pilot, was also included in the demonstration.

The demonstration fixtures were installed on existing poles just outside of the Baywood Project area as shown in Attachment 2. Fixtures were numbered 1 through 7, but no additional information was provided except that the current City standard fixture had a sign indicating it was the fixture residents were shown in 2019. Residents were asked to answer questions using an online survey that could be accessed online at home or locally via a mobile device by scanning a QR code included on each sign.

Residents and owners of properties within the Baywood Project area were notified about the demonstration by postcard, the project webpage, and door hangers were distributed within the demonstration area. On April 26th, the demonstration began and the online survey went live. On May 7th, residents and owners of properties within the Baywood Project area were sent a second postcard and the demonstration ended on May 23rd after four weeks.

NEIGHBORHOOD SURVEY

Residents were asked eight questions that they answered on a scale of one to five with one being the least favorable opinion, three being a neutral opinion, and five being the most favorable opinion. Two questions gauged the respondents' general opinion about the adequacy of the existing HV fixtures and six questions gauged residents' opinion on different characteristics of individual light fixtures included in the pilot demonstration.

There were 43 responses to the survey, which is more than double the 20 responses received in 2019. The survey results show that the respondents have a generally positive opinion about the lighting provided by the existing HV fixtures. The average rating of the responses to the first two questions about the existing HV fixtures are shown in Table 1.

Table 1 - Average Response Ratings to Questions About High Voltage Fixtures

Question	Average Rating
On a scale of 1 - 5 do you feel the current lighting level in your neighborhood is sufficient?	3.8
On a scale of 1 - 5 how strongly do you agree with this statement: "The existing lighting in my neighborhood is sufficient for walking at night."	3.8

Attachment 3 summarizes the questions and average response ratings to the questions about the demonstration fixtures. The survey results show that the respondents prefer two of the demonstration fixtures. Fixtures 1 and 6 scored the highest overall ratings, with average ratings of 3.7 and 3.6, respectively. The LED array, color temperature, and globe characteristics of Fixtures 1 and 6 were identical and the fixtures' only difference was their exterior style. For comparison, Fixture 7, the City's current standard, received an average rating of 1.8.

Residents were given an opportunity to provide other general feedback about the streetlights in their neighborhood. Twenty-four residents provided additional feedback that mostly expressed positive opinions about the existing HV streetlights and a desire to retain the look of the fixtures and match the quality of the lighting. Lastly, residents were asked if they felt the survey process gave them an opportunity to provide sufficient feedback to the City; over 80% of respondents answered “yes” to this question.

CITYWIDE PEDESTRIAN-SCALE STREETLIGHT REPLACEMENT CONSIDERATION

Staff reviewed the possibility of converting approximately 1,300 existing, pedestrian-scale streetlights within the City to Fixture 1 and determined the entire fixture must be replaced at an approximate cost of \$3,000 per fixture for an approximate overall replacement cost of \$3.9 million. Additionally, the current City standard LED fixtures were selected after a thorough engineering evaluation process with the goal of improving lighting towards the IES-recommended levels while reducing energy consumption. Fixture 1 provides less than half the amount of illumination as the current City standard fixture and does not meet the City’s goal of improving lighting toward the IES-recommended levels. However, Fixture 1 maintains, if not exceeds, the current lighting output compared to the existing HV fixtures in the Baywood area. Therefore, Fixture 1 may be suitable for select lighting applications where lighting aesthetic is prioritized over achieving IES-recommended levels.

SUMMARY OF FINDINGS AND RECOMMENDATION

Based on the pilot lighting demonstration and survey results, the recessed, flat-panel LED array and frosted globe resulted in less perceived glare and the warmer, 2700K temperature made the light more visually appealing. Accordingly, staff recommends the following.

- Select Fixture 1, which is the City’s standard K118 fixture model with the flat panel LED array, frosted globe, and color temperature of 2700K, for use in replacing the pedestrian-scale lights on the Baywood Project.
- Use Fixture 1 on local roads within the remainder of the High Voltage Streetlight Conversion program, which equates to three fixtures on the Dartmouth high voltage circuit.
- For replacement of pedestrian-scale lighting fixture performed as part of routine maintenance in other areas of the City, replace fixtures with the current City standard.

Where Fixture 1 is installed per the above recommendations, future replacements as part of routine maintenance would be in-kind. Fixture 1 can also be used in future projects where the lighting aesthetic is prioritized over improving lighting toward IES-recommended levels.

BUDGET IMPACT:

Construction of the Baywood High Voltage Streetlight Conversion project is funded by the High Voltage Conversion Program project. Selection of the new fixture is not expected to result in an increase in the cost of the project. However, the cost to complete the project is expected to increase as a result of the delay that occurred while staff worked on selecting a new fixture. The cost increase is due to contractor remobilization and increased labor and material costs. The increase is expected to fall within the existing contingency amount so no new funds will need to be allocated to the project.

ENVIRONMENTAL DETERMINATION:

This fixture recommendation is categorically exempt from CEQA as an “existing facility,” because it consists of the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of use. (CEQA Guidelines Section 15301.)

NOTICE PROVIDED

All meeting noticing requirements were met.

ATTACHMENTS

Att 1 – Demonstration Fixture Details

Att 2 – Demonstration Area Map

Att 3 – Summary of Survey Results

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