


CITY OF LOS ANGELES
INTER-DEPARTMENTAL CORRESPONDENCE

Date: February 5, 2020

To: Honorable City Council
c/o City Clerk, Room 395, City Hall
Attention: Honorable Mike Bonin, Chair, Transportation Committee

From:  Seleta J. Reynolds, General Manager
Department of Transportation

Subject: **TRAFFIC SIGNAL PRIORITY FOR METRO EXPOSITION "E" LIGHT RAIL LINE (CF 19-1236)**

SUMMARY

This report outlines the progress that the Los Angeles Department of Transportation (LADOT) has made in maximizing traffic signal priority for the Exposition "E" Line where it operates in street-running mode.

RECOMMENDATIONS

1. DIRECT LADOT, in cooperation with LA Metro, to expand the enhanced transit priority, tested at Exposition Boulevard and Normandie Avenue, throughout the street-running section of the Exposition "E" Line, with the goal of reducing end-to-end travel times and achieving at least 90% travel time reliability.
2. DIRECT LADOT to report back in 60 days on the progress the Department has made and the benefits the changes have achieved.

BACKGROUND

LADOT is committed to prioritizing transit along City streets. LADOT provides transit priority at all of the signalized intersections where trains operate in street-running mode, in which train operators follow the traffic signal indications. This transit priority provides an early green or an extended green to help trains move through the corridor with minimal delay. Transit priority accomplishes this by reducing the green allotted to other movements, typically by up to 12 seconds, or 10% of the 120-second signal cycle. The Transit Priority System tracks arriving trains and passes information ahead to upcoming traffic signals to help trains proceed through intersections without stopping or with minimal delay. When trains cannot arrive within the programmed progression window, and this window cannot be adjusted through transit priority, trains must wait until the next signal cycle, typically about 70 seconds.

Following the expansion of the Exposition "E" Line (Expo Line) to Santa Monica in 2016, the line's ridership has exceeded Metro's forecasts. With more passengers boarding and alighting at stations, trains require additional time at stations, which has impacted the times when trains arrive at signalized intersections.

DISCUSSION

In reviewing the street-running section of the Expo Line, LADOT identified that many trains were delayed between Vermont Avenue and Western Avenue. At the mid-point along this segment, LADOT selected the intersection of Exposition Boulevard and Normandie Avenue to focus initial efforts toward alleviating train delay and improving reliability.

At the Normandie Avenue crossing, the current design of the intersection dedicates a significant portion of the signal cycle to provide safe crossings for people walking across wide streets. As such, there are only six available seconds to reallocate from other movements to help provide an early green or an extended green. Under current design, LADOT found that on average only 58% of trains were able to travel through the signal at Normandie without stopping.

LADOT also observed longer than expected boarding times at stations upstream of the Normandie Avenue crossing. Over 11 days, the average time each day that trains are stopped at the station ranged between 25 and 40 seconds.

Based on these findings, LADOT adjusted the signal progression within the corridor to account for the additional time trains are loading at stations allowing signal timing to better match actual train arrival and travel times. LADOT engineers also developed a new application of transit priority that has the effect of allowing the signal controller to reach into future signal cycles to borrow time to extend the window for an approaching train, thus creating a new type of enhanced transit priority. Combined, these strategies have reduced the average delay at Normandie from 27 to 17 seconds and have allowed an average of 79% of trains to travel through the signal without stopping.

Additional detail on the evaluation at Exposition and Normandie can be found in Attachment A.

Next Steps

Based on the results of this initial study, LADOT recommends expanding the enhanced transit priority, tested at Exposition and Normandie Avenue, throughout the street-running section of the Expo Line. If this strategy proves to be equally effective, the average delay for trains will be further reduced. This, in turn, may decrease the average train travel time through the corridor and increase the overall travel time reliability. Working in cooperation with LA Metro, LADOT's goal is to achieve end-to-end travel time reliability of at least 90% across the street-running portion of the Expo Line within the City of Los Angeles.

FISCAL IMPACT STATEMENT

There is no impact to the General Fund as a result of the recommended action.

SJR:bc

ATTACHMENT AExposition Boulevard and Normandie Avenue Evaluation

To assess the impact that current ridership levels may be having on train schedules under the current signal priority plan, LADOT conducted a study of station dwell times at Western Avenue and at Vermont Avenue, along with the average length of time trains were spending at Normandie Avenue. This study entailed the collection of train passage data over an 11-day period. We then conducted an analysis of this data to determine:

- (a) current average and statistical variance of dwell times at each station for various times of day and days of week
- (b) correlation between dwell times and the likelihood of a train subsequently clearing Normandie Avenue without stopping
- (c) when trains failed to clear, the average stop time trains would wait before proceeding
- (d) if there is a correlation between dwell times and train headways so that we may adjust our train arrival prediction algorithm accordingly.

Findings

We have compiled data of the current conditions and summarized the results as follows:

- (a) Over the 11 day study period, the average dwell time was 29 seconds. Individual daily average dwell times ranged between 25 seconds and 40 seconds, varying significantly between days, direction, and individual trains.
- (b) Trains with station dwell times of less than 30 seconds were 37% more likely to cross Normandie without stopping. On an average weekday, approximately 58% of all trains cleared Normandie.
- (c) When trains failed to clear, the average stop time was 69 seconds.
- (d) A significant portion of delay was due to the high degree of variability of dwell times at stations. Thus, there was no correlation between dwell times and headways that could improve the analysis.

To serve as an initial study reliability indicator, we compared the rate of trains forced to stop at Normandie Avenue along with the daily average delay times before and after implementing these adjustments. The results after the changes were the following:

- percentage of trains that clear Normandie without stopping increased from 58% to 79%
- daily average delay at the intersection decreased from 27 seconds to 17 seconds.