



**DATE:** July 22, 2020

**TO:** Council Infrastructure Committee

**FROM:** Director of Public Works

**SUBJECT:** Receive an Update on the Results of Foothill Boulevard and D Street Intersection Safety Analysis and Improvements

### **RECOMMENDATION**

That the Council Infrastructure Committee (CIC) receives this status update on the Safety Analysis conducted and alternatives for the Foothill Blvd and D Street Intersection Safety Improvements.

### **SUMMARY**

The Foothill Blvd and D Street intersection Analysis was initiated following concerns received from Council and the public at various community meetings, public hearings, via e-mail, and Access Hayward. The analysis identifies and addresses key safety deficiencies while simultaneously minimizing operational impacts. The report provides two low cost improvements for the intersection. The first improvement is to convert the shared through and right-turn lane on northbound Foothill Boulevard to an exclusive right-turn only lane upstream of the Foothill Boulevard and A Street intersection. The second improvement is new signal phasing and timing for the Foothill Boulevard and D Street intersection. At this intersection, the northbound movement at Foothill Boulevard will be split phase to serve the Jackson Street and Mission Boulevard approach separately instead of concurrently to reduce weaving issues.

This item was first presented to Council as an Informational Item on June 2, 2020<sup>1</sup>. At today's meeting, staff will present an overview of the analysis methodology as well as the steps taken to implement the project in mid-July. Staff will also present early findings from the project implementation and the plan developed to provide on-going monitoring of the project corridor.

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<sup>1</sup> <https://hayward.legistar.com/LegislationDetail.aspx?ID=4548861&GUID=E18499CC-2BC2-4AF5-8C75-3A622962CF7E&Options=&Search=>

## **BACKGROUND**

The current configuration of the Foothill Blvd and D Street intersection was a byproduct of the comprehensive Route 238 Corridor Improvement Project (Route 238 Project), a regional transportation improvement project intended to alleviate crippling congestion through the City's main arterials and to facilitate regional traffic.

The existing one-way pair concept was developed following then Council's desire to find a compromise between reducing regional congestion, so that the project would remain eligible for Alameda County's Measure B funding, and containing the improvements within the existing right-of-way to minimize costs and disruption in the downtown. While the downtown one-way pair concept raised some concerns from the community, it was the only solution available that addressed future traffic congestion, without costly and disruptive grade separations, and without dramatically altering the profile of downtown by taking significant amounts of right-of-way (ROW).

The Final Environmental Impact Report for the Route 238 Project states that the project goal is "to improve traffic conditions along Foothill Boulevard and Mission Boulevard, between Interstate 580 (I-580) and Industrial Parkway." The primary City objectives were listed as:

- Reducing traffic congestion in downtown and on Foothill Blvd/Mission Blvd
- Improving traffic operations at the Mission Blvd/Foothill Blvd/Jackson Street intersection
- Constructing a facility that will accommodate current and future traffic demands as permitted by funding constraints
- Improving access to the Cal State University campus in Hayward

The final design was chosen considering the total construction costs and potential impacts to the businesses during construction. The project was completed in 2014.

## **DISCUSSION**

The intersection of Foothill Blvd and D Street has been a pain point among drivers since the completion of the Phase 1 segment (A Street to Industrial Pkwy) of the Mission Blvd Improvement Project. In this unique design configuration, three lanes of traffic from Jackson Street and three lanes of traffic from Mission Boulevard converge at the intersection of Foothill Blvd and D Street. All six lanes are then served simultaneously resulting in six lanes of through traffic entering the segment of Foothill Boulevard between D Street and C Street. In this extremely short segment of Foothill Blvd (approximately 400 ft.) drivers jockey for position in an effort to make upcoming turns at either C Street (right turns) or B Street (left turns), competing with through traffic for physical spacing.

This jockeying for position or weaving creates an uncomfortable environment for drivers who have voiced their concerns regarding potential safety implications. The difficulties navigating this segment of the corridor many times resulted in vehicles blocking the intersection prohibiting traffic from D Street from entering the intersection once they receive their “green time”. This lane configuration results in substantial merging and weaving issues. Consequently, heavy traffic congestion along the study corridor, especially during peak commute periods.

Various alternatives or fixes have been proposed over time, to address this matter. Staff was cognizant that any proposed adjustment could result in unintended consequences, thus creating an equal or more significant problem upstream or downstream of the Foothill Blvd and D Street intersection. Staff was also aware that any proposed improvement had to be cost effective. The challenge was to find an alternative that improved traffic operations at the target intersection, was cost effective, did not create significant unintended consequences, and did not require additional rights of way.

Staff began work along with its consultant team to flesh out a series of alternatives. The work began by conducting extensive field evaluations and having discussions with the Traffic Bureau at the Hayward Police Department (HPD). Given the size and complexity of the intersection and the intersections both upstream and downstream, City staff utilized drone technology to film overhead peak hour traffic operations within the corridor to gain a better understanding of overall traffic patterns.

### Analysis Results

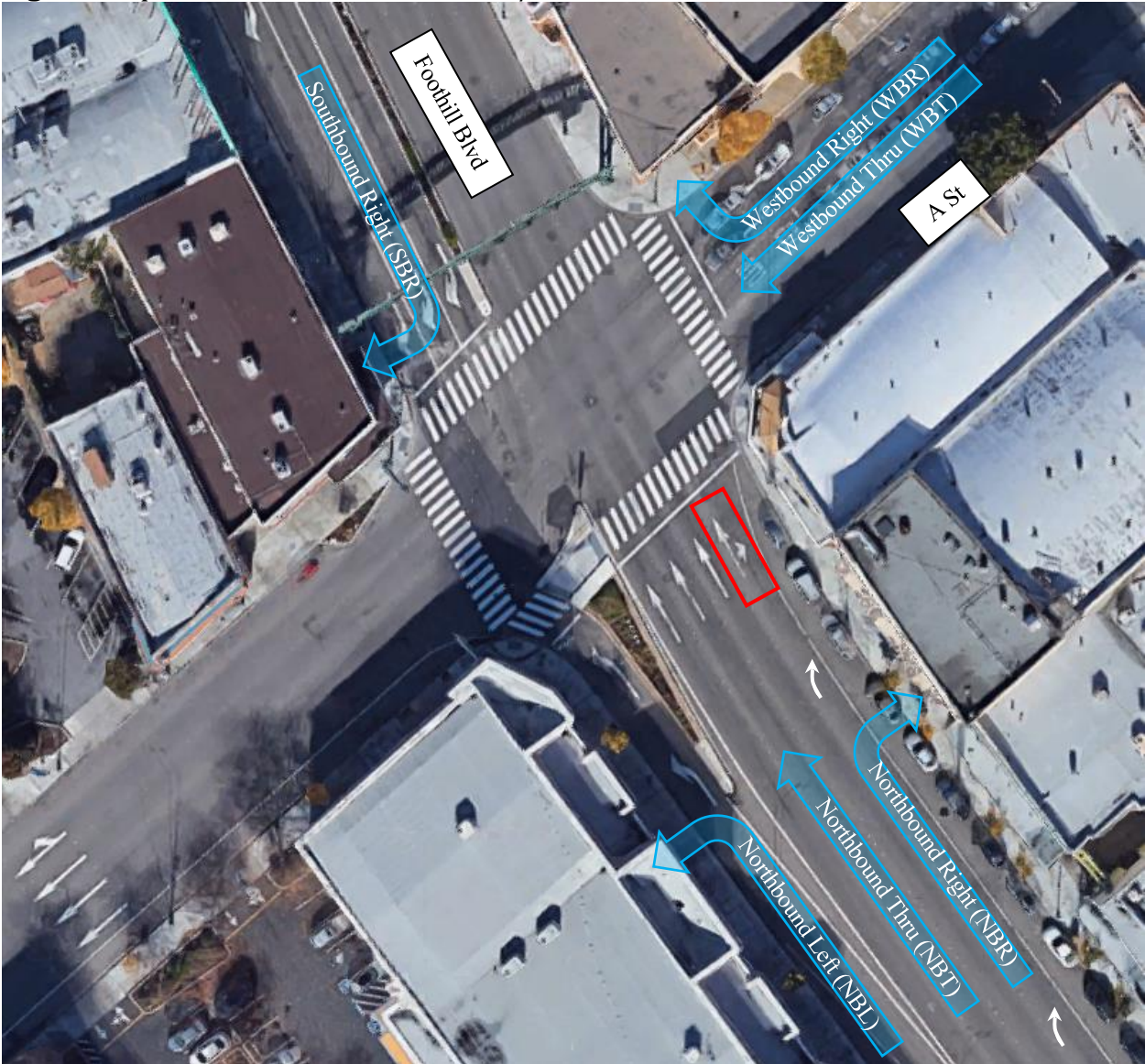
This study identified two feasible low-cost improvements that can potentially reduce the safety concerns with the existing weaving and merging issues congestion along this stretch of Mission Blvd.

1. Spot Treatment at Foothill Blvd and A Street

Based on the existing intersection turning movement counts and field review, the intersection of Foothill Blvd/A Street experienced heavy northbound right-turn traffic (approximately 900 vehicles per hour) during the a.m. and p.m. peak periods. The existing northbound Foothill Blvd lane geometry included an exclusive left-turn lane, three through-lanes, and a shared through and right turn lane. The shared through and right turn lane acted as a de facto right-turn lane under existing conditions due to heavy demand and queueing. Due to this, staff proposed to convert the shared through and right-turn lane into an exclusive right-turn trap lane as shown in Figure 1.

The results of the analysis show that converting the northbound shared through and right-turn lane has no significant impact to Level of Service (LOS) and delay at the intersection but reduces vehicle queues by approximately 200 feet during the a.m. peak period.

Figure 1. Spot Treatment at Foothill Blvd/A St intersection



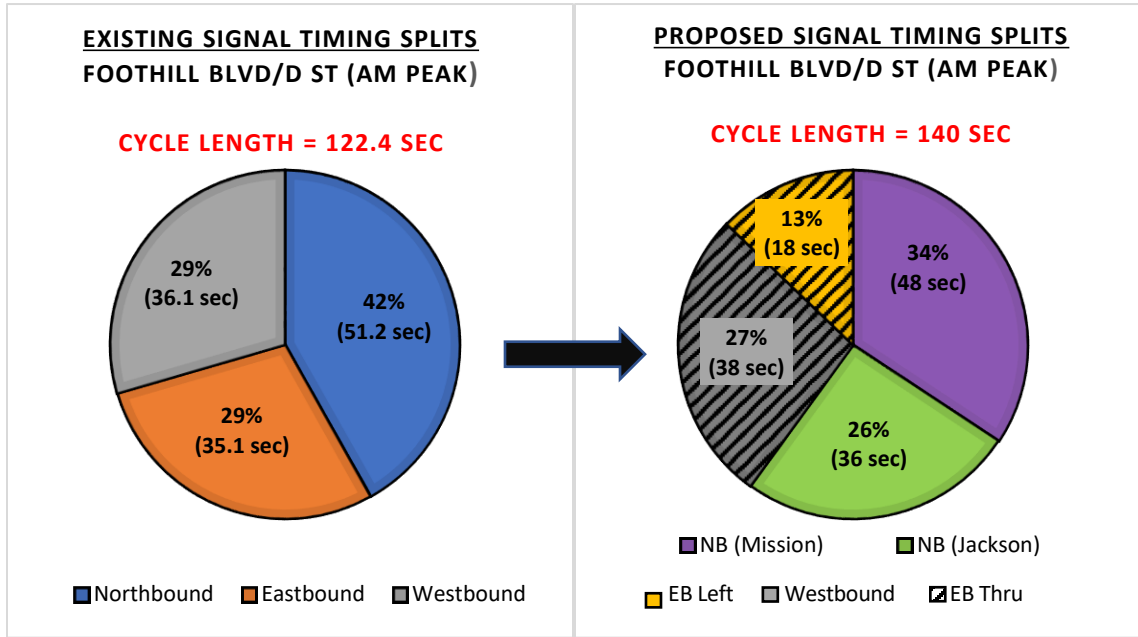
## 2. Signal Phasing and Timing Improvement at Foothill Blvd and D Street

Under existing conditions, the intersection of Foothill Blvd/D Street operated with split phasing for all movements, essentially meaning that all movements in each direction are served simultaneously as shown in Attachment II, Figure 2. Three lanes from Jackson Street and three lanes from Mission Blvd converge at the intersection of Foothill Blvd/D Street and are served simultaneously resulting in six lanes of through traffic entering the same segment and causing excessive weaving issues. It is recommended to split the northbound movements at Foothill Blvd to serve the Jackson Street approach and the Mission Blvd approach separately instead of concurrently. This will result in three lanes of traffic entering northbound Foothill Blvd instead of six lanes, reducing the weaving issues currently experienced.

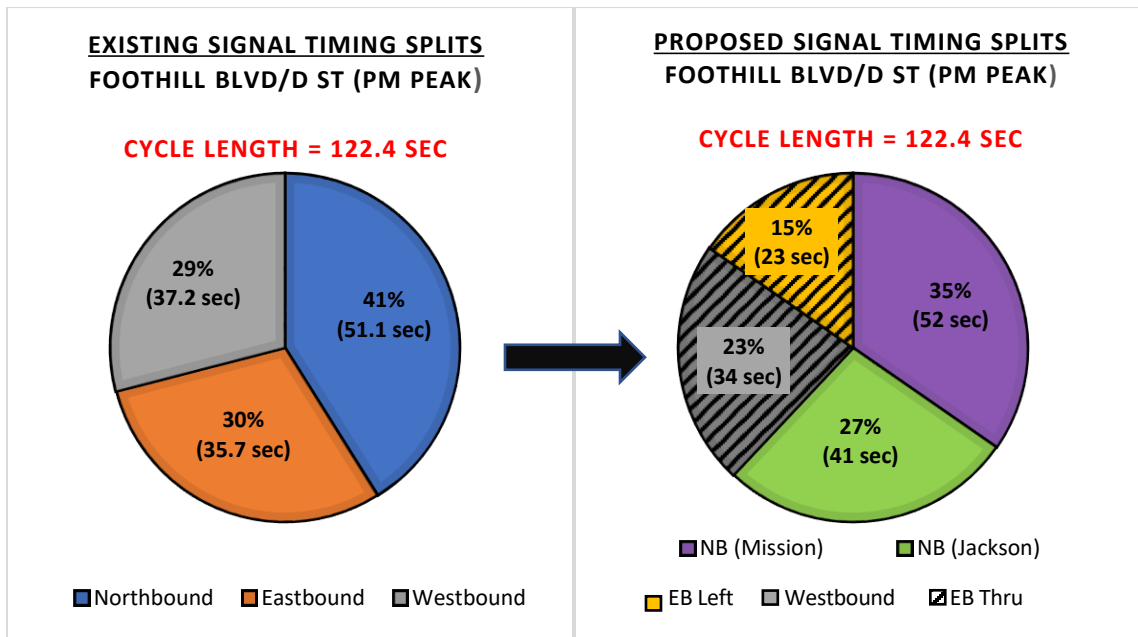
Additionally, this change would convert the existing split operation on D Street (all movements in one direction are served concurrently) to protected left turn phasing. This changes the current operation of each leg of the intersection being served separately to the westbound and eastbound left turns being served before the westbound and eastbound through lanes are served as shown in Attachment II, Figure 3.

Moreover, traffic signal cycle lengths are proposed to increase at all study intersections with an estimated 140 and 150 second cycle length for the a.m. and p.m. peak periods, respectively. The change in the signal timing splits between existing and proposed for the a.m. and p.m. peak is depicted in Figure 4 and Figure 5. For the a.m. peak, the total existing cycle length is 122.4 seconds, whereas, the total proposed cycle length is 140 seconds. For the p.m. peak, the total existing cycle length is 122.4 seconds, whereas, the total proposed cycle length is 150 seconds. Cycle lengths increased to mitigate any loss in green time due to the addition of the new phase. In summary, there is nearly no change in green time for each direction. Theoretically, an increase in the cycle length means that each direction would wait slightly longer for their own green. In this case, since confusion and weaving segments are mitigated, the resulting throughput per green cycle is increased. Basically, the trade-off of a slightly longer wait is improved safety and increased throughput per cycle.

**Figure 4.** Existing versus Proposed Signal Timing Splits (AM Peak)



**Figure 5.** Existing versus Proposed Signal Timing Splits (PM Peak)



## Implementation

On July 8, 2020, City staff separated the wires for the phases inside signal cabinet and verified the location of the spliced wires. The wires were spliced inside the traffic signal bridge in the middle of the Foothill Boulevard and D Street intersection. During this work, the traffic signals were on flashing red and Hayward Police Department (HPD) helped with managing the traffic control of the intersection. HPD detoured the eastbound and westbound traffic on D Street to reduce the vehicular traffic at the intersection. On July 15, 2020, staff installed louvers on the signal heads for the Mission Boulevard and Jackson Street approach to block the view of the signals from each other. This will help avoid confusion when the two approaches on Foothill Boulevard become split phased. With the help of the HPD to provide temporary traffic control during installation, staff segregated the old traffic signal wires that were spliced together inside the signal bridge and reprogrammed the new split phase personality onto the traffic signal controller. In the next couple of weeks, staff will also convert the striping on Foothill Boulevard from a shared through and right-turn lane to an exclusive right-turn trap lane south of the Foothill Boulevard and A Street intersection.

Following implementation, staff will monitor the traffic operations as a result of the changes that were implemented. Staff will continue to use field observation to monitor the peak hour traffic operations. The purpose of the monitoring is to insure there are no adverse unexpected consequences such as increased traffic delays or significant queuing as a result of the changes.

## **ECONOMIC IMPACT**

The proposed recommendations mitigate a pain point for drivers in the corridor and will help encourage visitors to the Downtown, who may have previously avoided this segment of the Phase 1 project. This safety and operational improvement will help increase access to regional transit, schools, downtown area, merchants, and restaurants. This will improve and help transform the City into a more multimodal-friendly community, thus creating positive economic and health benefits for the Hayward community and help in reduction of greenhouse gas emissions.

## **FISCAL IMPACT**

The goal of this project from inception was to develop low-cost, impactful recommendations that could be implemented in the short-term. The costs for the signing, striping and signal modifications are anticipated to be less than \$65,000 in its entirety.

## **STRATEGIC ROADMAP**

This agenda item supports the Strategic Priority of Improve Infrastructure. Specifically, this item relates to the implementation of the following project(s):

Project 1: Improve Access and Mobility in Downtown Hayward

## **SUSTAINABILITY FEATURES**

The project will reduce congestion and overall Greenhouse Gas (GHG) emissions within the corridor through improved traffic conditions. These improvements will enhance operations and safety for all modes of transportation. This will align improvements consistent with the City's 2040 General Plan, Complete Streets Strategic Initiative, Pedestrian and Bicycle Master Plan, Neighborhood Traffic Calming Program, and major regional improvements.

## **PUBLIC CONTACT**

The project was initiated in response to comments received from the public at various community meetings, public hearings, via e-mail, and Access Hayward portals.

## **NEXT STEPS**

The project is continuously monitoring the traffic operation to analyze the safety and operational benefits that were the outcome of the proposed improvements.

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Approved by:



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