COUNCIL INFRASTRUCTURE COMMITTEE MEETING

WEDNESDAY, JANUARY 22, 2020

DOCUMENTS RECEIVED

AFTER PUBLISHED AGENDA

ITEM #6 ACT 20-019

FOOTHILL BOULEVARD AND D STREET: REVIEW AND COMMENT ON THE INTERSECTION

DATE: January 22, 2020

TO: Council Infrastructure Committee

FROM: Director of Public Works

SUBJECT: Foothill Boulevard and D Street: Review and Comment on the Intersection Safety Analysis Report

RECOMMENDATION

That the Council Infrastructure Committee reviews and provides feedback on the Intersection Safety Analysis Report and proposed 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 from 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 that may be implemented in the short-term.

If approval to proceed is received from the Council Infrastructure Committee (CIC), staff will present the analysis for Council consideration.

BACKGROUND

Route 238 Corridor Improvement Project (Route 238 Project) was a regional transportation improvement project intended to alleviate crippling congestion through the City's main arterials and to facilitate regional traffic.

The current configuration, a one-way pair concept, was developed following Council's direction to find a compromise between containing the improvements within the existing ROW and reducing regional congestion so that the project would remain eligible for Alameda County's Measure B funding. 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 adding more pavement, without a grade separation and without dramatically altering the profile of downtown by taking significant amounts of 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 project was completed in 2014.

DISCUSSION

The analysis area extends from Mission Blvd/Foothill Blvd to Foothill Blvd/A Street. This stretch of SR 238 is a one-way street in the northbound direction. Three lanes from Jackson Street (formerly SR 92) and three lanes from Mission Boulevard (formerly SR 238) converge at the intersection of Mission Blvd/Foothill Blvd resulting in a six-lane unidirectional segment.

The segment between Foothill Blvd/D Street and Foothill Blvd/C Street has a merge resulting in a lane drop beginning mid-intersection just north of D Street as shown in **Figure 1**. The length of the merge meets minimum requirements for vehicles that travel no faster than 25 mph which is the posted limit in the segment.

Moreover, motorists traveling northbound from Mission Blvd through the Foothill Blvd/D St intersection may have to switch up to five lanes of traffic to travel west on B St. Likewise, motorists traveling northbound from Jackson St through the Foothill Blvd/D St intersection may have to switch up to five lanes of traffic plus a bike lane to travel east on A or C St within short roadway segments as shown in **Figure 2**.

This lane configuration results in substantial merging and weaving issues. Consequently, heavy traffic congestion has resulted along the study corridor, especially during peak commute periods.

Figure 1. Merge on Foothill Blvd between C and D Streets

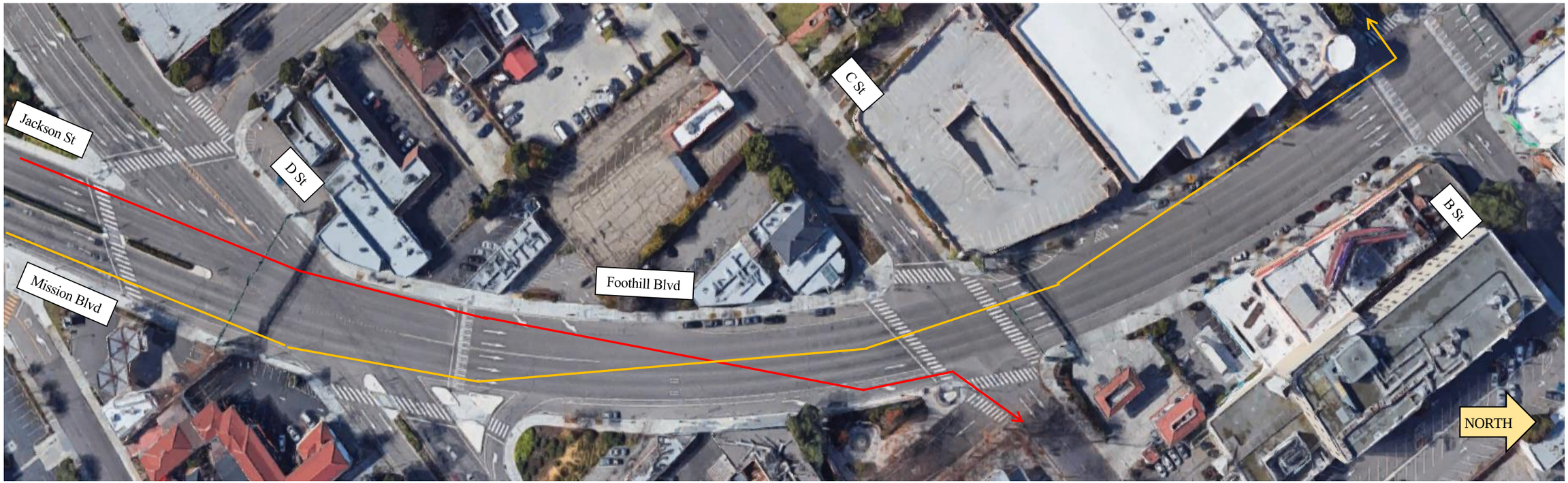

Figure 2. Foothill Blvd between B and D Streets

This study identifies 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 experiences 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 includes an exclusive left-turn lane, three through-lanes, and a shared through and right turn lane. The shared through and right turn lane acts as a de facto right-turn lane under existing conditions due to heavy demand and queueing. Due to this, staff proposes to convert the shared through and right-turn lane into an exclusive right-turn trap lane.

Figure 3. Spot Treatment at Foothill Blvd/A St intersection

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.

Table 1 summarizes the improvements in 95th percentile queue lengths with the proposed spot treatment.

Table 1. 95th Percentile Queueing Analysis (feet)

Intersection	Scenario	Peak Period	Movements					
			WBT	WBTR	NBL	NBT	NBR	SBR
Foothill Blvd/A Street	Existing Conditions	AM	1082	284	173	624	58	942
		PM	458	78	138	429	59	665
	Proposed Improvements	AM	1065	283	184	425	191	921
		PM	434	62	125	381	182	771

Note: SimTraffic 95th percentile queue lengths are reported and are an average of five simulation runs.

During field observations, frequent lane changing from the shared through and right-turn lane was observed by through bound vehicles due to the congestion experienced in this lane. By converting to a right-turn trap lane, the weaving and merging experienced can be reduced.

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

Under existing conditions, the intersection of Foothill Blvd/D Street operates with split phasing for all movements, essentially meaning that all movements in each direction are served simultaneously as shown in **Figure 4**. 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.

Staff recommends splitting 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 **Figure 5**.

Figure 4. Existing Phasing Diagram at Foothill Blvd/D St/Jackson St/Mission Blvd Intersection

Figure 5. Proposed Phasing Diagram at Foothill Blvd/D St/Jackson St/Mission Blvd Intersection

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. peak is depicted in **Figure 6.** The total existing cycle length in the a.m. peak is 122.4 seconds, whereas, the total proposed cycle length in the a.m. peak is 140 seconds. Cycle lengths would be increased to mitigate any loss in green time due to the addition of the new phase.

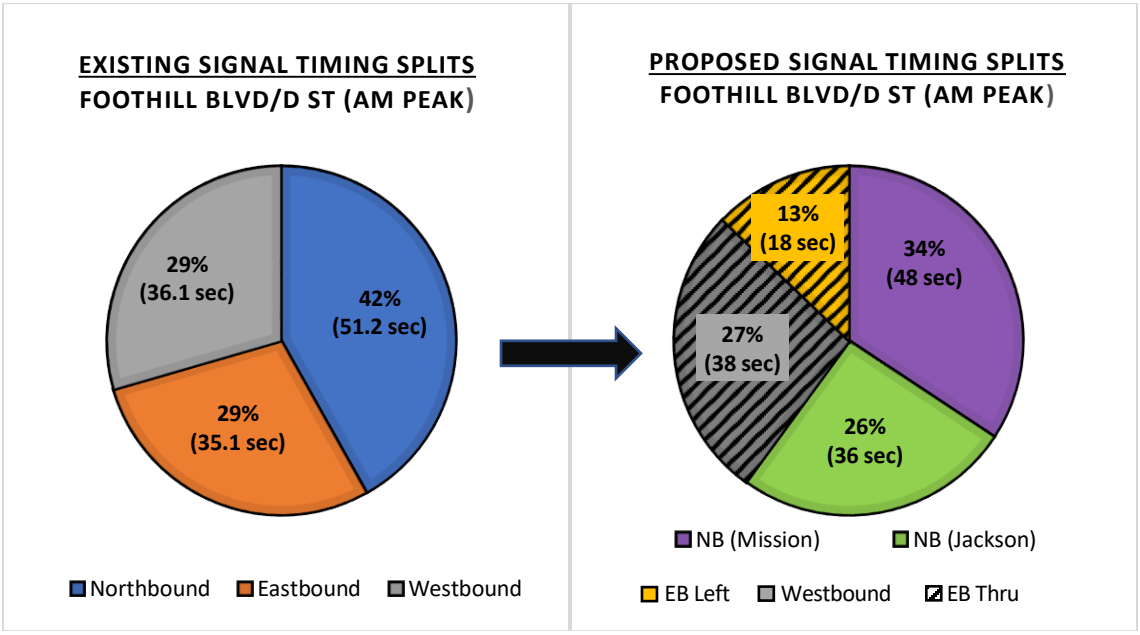

Figure 6. Existing versus Proposed Signal Timing Splits (AM Peak)

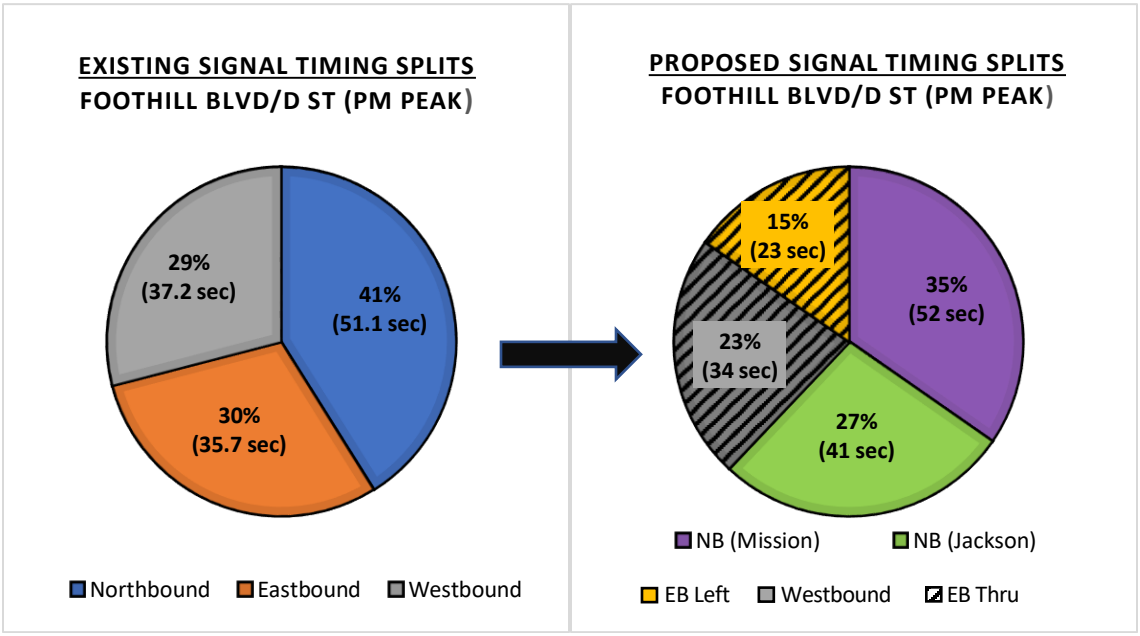

Figure 7. Existing versus Proposed Signal Timing Splits (PM Peak)

The SimTraffic microsimulation results project an improvement in Level of Service (LOS) and delay at most of the intersections within the analysis area.

Table 2. SimTraffic LOS and Delay Analysis

#	Intersection	Peak Period	Existing Conditions		NB Split Phase	
			Delay (sec)	LOS	Delay (sec)	LOS
1	Foothill Blvd/Mission Blvd	AM	38.7	D	33.5	C
		PM	41.7	D	43.1	D
2	Foothill Blvd/D St	AM	160.0	F	118.2	F
		PM	165.2	F	153.7	F
3	Foothill Blvd/C St	AM	14.2	B	8.0	A
		PM	15.6	B	12.7	B
4	Foothill Blvd/B St	AM	16.0	B	19.2	B
		PM	13.9	B	13.3	B
5	Foothill Blvd/A St	AM	19.0	B	20.9	C
		PM	10.8	B	11.3	B
6	Watkins St/Jackson St-Foothill Blvd	AM	46.4	D	52.6	D
		PM	55.2	E	113.1	F
7	Mission Blvd/Fletcher Ln	AM	67.3	E	20.4	B
		PM	68.5	E	48.1	D
8	Mission Blvd/D St	AM	56.5	E	44.6	D
		PM	71.4	E	94.0	F

Note: SimTraffic LOS and delay are an average of five simulation runs.

Although safety is significantly improved for the entire analysis area and operations are significantly improved at most of the movements, some movements result in slightly degraded LOS and queue lengths. After a comprehensive review of the benefits and impacts, staff recommends implementing the signal timing changes.

Data and traffic counts were collected for the composition of the simulation models. Staff will be using new drone technology to test and verify the simulation models to actuality, especially at the areas with merging concerns, soon.

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 $150,000 in its entirety.

STRATEGIC INITIATIVES
This agenda item supports the Complete Streets Strategic Initiative. The purpose of the Complete Streets Initiative is to build streets that are safe, comfortable, and convenient for travel for everyone, regardless of age or ability, including motorists, pedestrians, bicyclists, and public transportation riders. This item supports the following goals and objectives:

Goal 1: Prioritize safety for all modes of travel.
- Objective 3: Ensure that roadway construction and retrofit programs and projects include complete streets elements.

Goal 2: Provide Complete Streets that balance the diverse needs of users of the public right-of-way.
- Objective 1: Increase walking biking, transit usage, carpooling, and other sustainable modes of transportation by designing and retrofitting streets to accommodate all modes.

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

Model Verification with Drone	February 2020
Final Analysis Report	March 2020
City Council Meeting	April 2020
Implementation	May 2020

Prepared by: Charmine Solla, Senior Transportation Engineer

Recommended by: Alex Ameri, Director of Public Works

Approved by:

Kelly McAdoo, City Manager