Attachment XIII

PARCEL GROUP 5 ENTITLEMENTS
LOCAL TRANSPORTATION ANALYSIS

HAYWARD, CA

February 17, 2022

Inside front cover

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Parcel Group 5 Entitlements Local Transportation Analysis

Hayward, CA

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Section 1 — Executive Summary

EXECUTIVE SUMMARY

This report presents the findings and conclusions of the local transportation analysis (LTA) conducted by Kittelson & Associates for the proposed Parcel Group 5 (PG 5) project (the Project) located in Hayward, California. This report documents the non-California Environmental Quality Act (CEQA) local transportation analysis conducted for this project and complements the CEQA transportation impact analysis documented in the *Route 238 Property Development Project (Parcel Group 5 and Parcel Group 6) Transportation Impact Analysis Report* (June 2019).

Parcel Group 5 is located on the site known as Bunker Hill, which is located northwest of Harder Road, approximately 1,000 feet east of Mission Boulevard and adjacent to and southwest of California State University, East Bay (CSU East Bay). The Parcel Group 5 Project would consist of:

- 74 single-family dwelling units and 8 accessory dwelling units (ADUs);
- Approximately 10.50 acres of open space to preserve riparian areas;
- A new roadway connection from Bunker Hill Boulevard to Carlos Bee Boulevard;
- A new connection to and segment of the Hayward Foothill Trail, a 16-foot wide multi-use trail.

In June 2019, Kittelson conducted a transportation impact analysis of PG 5 in combination with PG 6 as part of the 238 Entitlements analysis. Since then, the City has requested an LTA which would include analysis and recommendations focused on pedestrian and bicyclist access and safety, vehicular access, cut-through traffic effects on adjacent residences, and strategies to reduce project-generated vehicle miles traveled (VMT). The City has also requested an update to the project trip assignment to assume that some project-generated vehicle trips may travel to/from the project through the adjacent neighborhood via Maitland Drive to Central Boulevard, and to determine if this assumption would result in unacceptable Existing Plus Project delay or queuing at the study intersections.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

The *Route 238 Property Development Project (Parcel Group 5 and Parcel Group 6) Transportation Impact Analysis Report* previously did not determine any Existing Plus Project traffic impacts resulting from PG 5 vehicle trips under Existing Plus Project conditions.

Additionally, this LTA report did not find any additional deficiencies in study area traffic operations and queuing, project access and circulation for trucks and passenger vehicles, and parking supply.

To address pedestrian, bicyclist, and transit user accessibility and conditions, the project applicant should work with the City to implement the following multimodal improvements:

- Install crossing facilities such as a rectangular rapid flashing beacon (RRFB) or a pedestrian hybrid beacon (PHB) at the planned unsignalized Bunker Hill Boulevard/Carlos Bee Boulevard intersection to give pedestrians access to the sidewalk on the north side of Carlos Bee Boulevard. Should the City install sidewalks on the south side of Carlos Bee Boulevard at a later time, then a high visibility crosswalk should be installed across Bunker Hill Boulevard at Carlos Bee Boulevard.
- Implement Class III bike routes with sharrows along Westview Way and Central Boulevard.
- Given that Class IV separated bike lanes are planned along Carlos Bee Boulevard and Harder Road and the project is expected to increase vehicle volumes at these locations, improvements should be installed at the Bunker Hill Boulevard/Carlos Bee Boulevard and Westview Way/Harder Road intersections. Recommended improvements include green conflict paint along the Harder Road bike lanes crossing Westview Way and along the Carlos Bee Boulevard bike lanes crossing

Bunker Hill Boulevard, and bikeway signage and caution signage at and approaching these intersections for all intersection legs.

- To improve sight distance for exiting vehicles at the planned Bunker Hill Boulevard/Carlos Bee Boulevard intersection, it is recommended that when the intersection is being constructed, visual obstructions such as brush and landscaping should be cleared from the sight triangle area.
- Improve the Westview Way/Central Boulevard T-intersection by adding a stop sign at the southbound approach. At the westbound approach, the westbound stop sign and stop bar should be moved approximately 35 feet closer to the intersection and the right turn tightened.
- Improve the Westview Way/Harder Road intersection by adding a dedicated right turn lane (to allow deceleration) and tightening the curb.

To manage vehicle speeds and volumes along residential roads, the project applicant should work with the City to implement traffic calming strategies along local residential streets, which can also improve multimodal conditions. Concept design plans are provided for two locations with potential traffic calming improvements also developed for a third location: Westview Way at Harder Road, Central Boulevard at Westview Way, and Central Boulevard at Belmont Avenue and Del Mar Avenue. Note, traffic calming measures and designs are subject to further Engineering review.

- **Westview Way at Harder Road**: Install a centerline, stop sign and speed limit warning signage, and sharrows. At the Westview Way/Harder Road intersection, tighten curbs, install a dedicated westbound right turn lane, and add a green bike conflict zone.
- **Central Boulevard at Westview Way**: Install a centerline and sharrows. Move the westbound stop sign and stop bar approximately 35 feet closer to the intersection and tighten the curb radius. Install warning signage. Install a stop sign and stop bar to the southbound approach.
- **Central Boulevard at Belmont Avenue and Del Mar Avenue**: Install a centerline and sharrows along Central Boulevard until Mission Boulevard along with traffic circles at both intersections, paired with striping and high-visibility continental crosswalks. Other potential traffic calming improvements that could be applied at this location include speed legends, signage, high visibility continental crosswalks, and speed lumps.
- Centerline striping and sharrows should be provided along the entirety of Westview Way as well as Central Boulevard from Westview Way to Mission Boulevard. Signage should be added along Central Boulevard near its intersection with Maitland Drive (north) warning drivers of the speed limit and upcoming stop signs; speed cushions should also be considered given the long distance between stop signs along this segment.

To reduce project-generated vehicle trips and VMT, the project applicant should contribute fair share costs to the following off-site improvements, for which cost estimates and fair share contributions are shown in the table below:

- Fill in the sidewalk gap on the north side of Harder Road between Bryn Mawr Avenue and Westview Way.
- Construct planned protected bike lanes along Harder Road between Mission Boulevard and Westview Way.
- Construct planned protected bike lanes along Carlos Bee Boulevard between Mission Boulevard and Bunker Hill Boulevard.

Table 1: Recommended VMT Reduction Measures Fair Share Contributions

Improvement	Total Cost	Project Contribution (%)	Project Fair Share Contribution ($)
Harder Road Sidewalk	$152,000	2.1%	$3,200
Harder Road Bike Lanes	$293,000	2.1%	$6,100.
Carlos Bee Boulevard Bike Lanes	$561,000	1.6%	$9,000

Section 2 — Methodologies and Existing Conditions

METHODOLOGIES AND EXISTING CONDITIONS

Parcel Group 5 is located on the site known as Bunker Hill, which is located northwest of Harder Road, approximately 1,000 feet east of Mission Boulevard and adjacent to and southwest of California State University, East Bay (CSU East Bay) and Carlos Bee Boulevard. The proposed project consists of 74 single-family dwelling units and 8 accessory dwelling units (ADUs), as well as a new roadway connection from Bunker Hill Boulevard to Carlos Bee Boulevard. The study area and project site are shown in Figure 1.

This local transportation analysis is therefore subject to the regulations and standards in place in the City of Hayward. These standards are outlined in the Hayward 2040 General Plan – Mobility Element (2014) and the City of Hayward Transportation Impact Analysis Guidelines (2020).

The analysis methodology used in this report was approved by City Transportation Staff prior to commencement of the study.

INTERSECTION LEVEL OF SERVICE STANDARDS

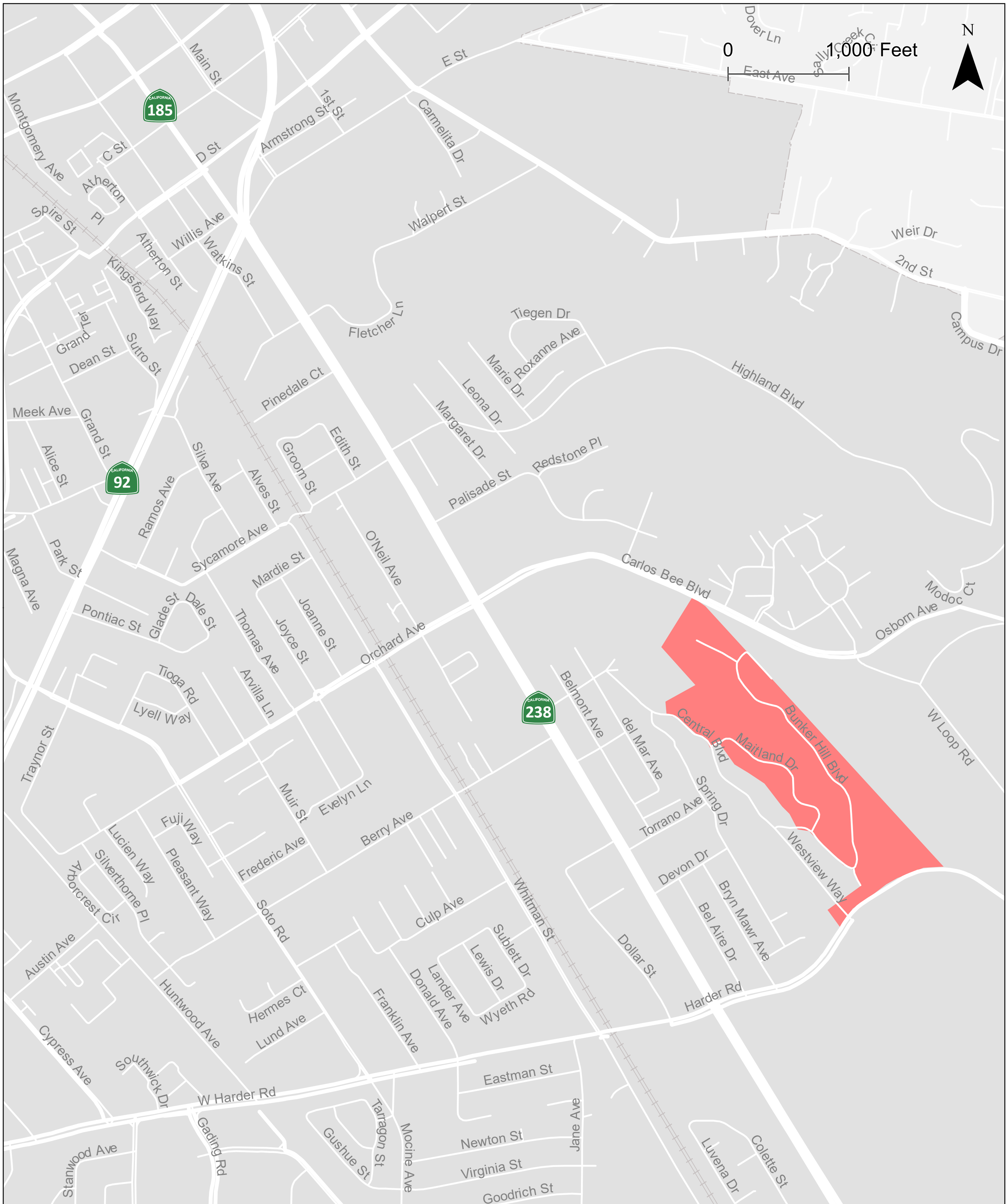
Under Senate Bill (SB) 743, a project's effect on automobile delay shall not constitute a significant environmental impact. Therefore, level of service (LOS) and other similar vehicle delay or capacity metrics may no longer serve as transportation impact metrics for California Environmental Quality Act (CEQA) impact analyses. The Governor's Office of Planning and Research (OPR) has updated the CEQA Guidelines and provided a final technical advisory in December 2018 which recommends vehicle miles traveled (VMT) as the most appropriate measure of transportation impacts under CEQA. For land use and transportation projects, SB 743-compliant CEQA analysis became mandatory on July 1, 2020.

This report documents LOS analysis considered as part of non-CEQA analysis conducted to determine any negative project effects on local roadway operations.

Goal 4 Local Circulation-M-4.3 of the City of Hayward's 2040 General Plan requires intersections to maintain a peak-hour level of service (LOS) of E or better for signalized intersections. M-4.3 describes this as follows:

> *The City shall maintain a minimum Level of Service E at signalized intersections during the peak commute periods except when a LOS F may be acceptable due to costs of mitigation or when there would be other unacceptable impacts, such as right-of-way acquisition or degradation of the pedestrian environment due to increased crossing distances or unacceptable crossing delays.*

Under SB 743, a project's effect on automobile delay shall not constitute a significant environmental impact. Therefore, LOS is included for non-CEQA purposes to determine if local intersections operate acceptably and if the project would result in any operational deficiencies on the local roadway network. This approach is consistent with the City's guidelines.



Project Site

Hayward City Boundary

Study Area and Project Site
Hayward, California

Figure
1

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Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

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SIGNALIZED INTERSECTIONS

Signalized intersection improvements should be identified if the project would degrade the AM or PM peak hour conditions from an acceptable LOS E or better under the No Project scenario to an unacceptable LOS F under the Plus Project scenario. The exception to this criterion is when LOS F is determined by the City of Hayward as acceptable due to right-of-way constraints or when there would be unacceptable impacts to other modes of travel, such as bicycle, pedestrian, or transit.

In addition, improvements should be identified at an intersection already operating at LOS F under an Existing or No Project scenario if the addition of project traffic results in an increase of 5.0 seconds or more to the intersection's average control delay.

UNSIGNALIZED INTERSECTIONS

At unsignalized intersections, the need for improvements is based on LOS and delay, and whether any of the following are met:

- Traffic signal warrant,
- Pedestrian signal warrant, or
- All-way stop warrant

Note that solely triggering a warrant does not trigger the need for an intersection improvement, but the City will at its discretion require or not require a signal be installed, where warranted.

LEVEL OF SERVICE DEFINITIONS

In this report, LOS is based on the Highway Capacity Manual (HCM) 6th edition definitions, included as Table 2 for ease of reference. The HCM methodology assigns a level of service (LOS) grade to an intersection based on the delay for vehicles at the intersection, ranging from LOS A to LOS F; LOS A signifies very slight delay with no approach phase fully utilized, while LOS F signifies very high delays and congestion, frequent cycle failures, and long queues. For signalized and all-way stop-controlled intersections, the average control delay for all vehicles is assessed; for two-way stop-controlled intersections, the intersection approach with the highest delay is utilized.

Table 2: Level of Service Standards

Level of Service	Delay Per Vehicle (Seconds)	
	Signalized Intersection	Unsignalized Intersection
A	< 10.0	< 10.0
B	> 10.0 to 20.0	> 10.0 to 15.0
C	> 20.0 to 35.0	> 15.0 to 25.0
D	> 35.0 to 55.0	> 25.0 to 35.0
E	> 55.0 to 80.0	> 35.0 to 50.0
F	> 80.0	> 50.0

SOURCE: HIGHWAY CAPACITY MANUAL

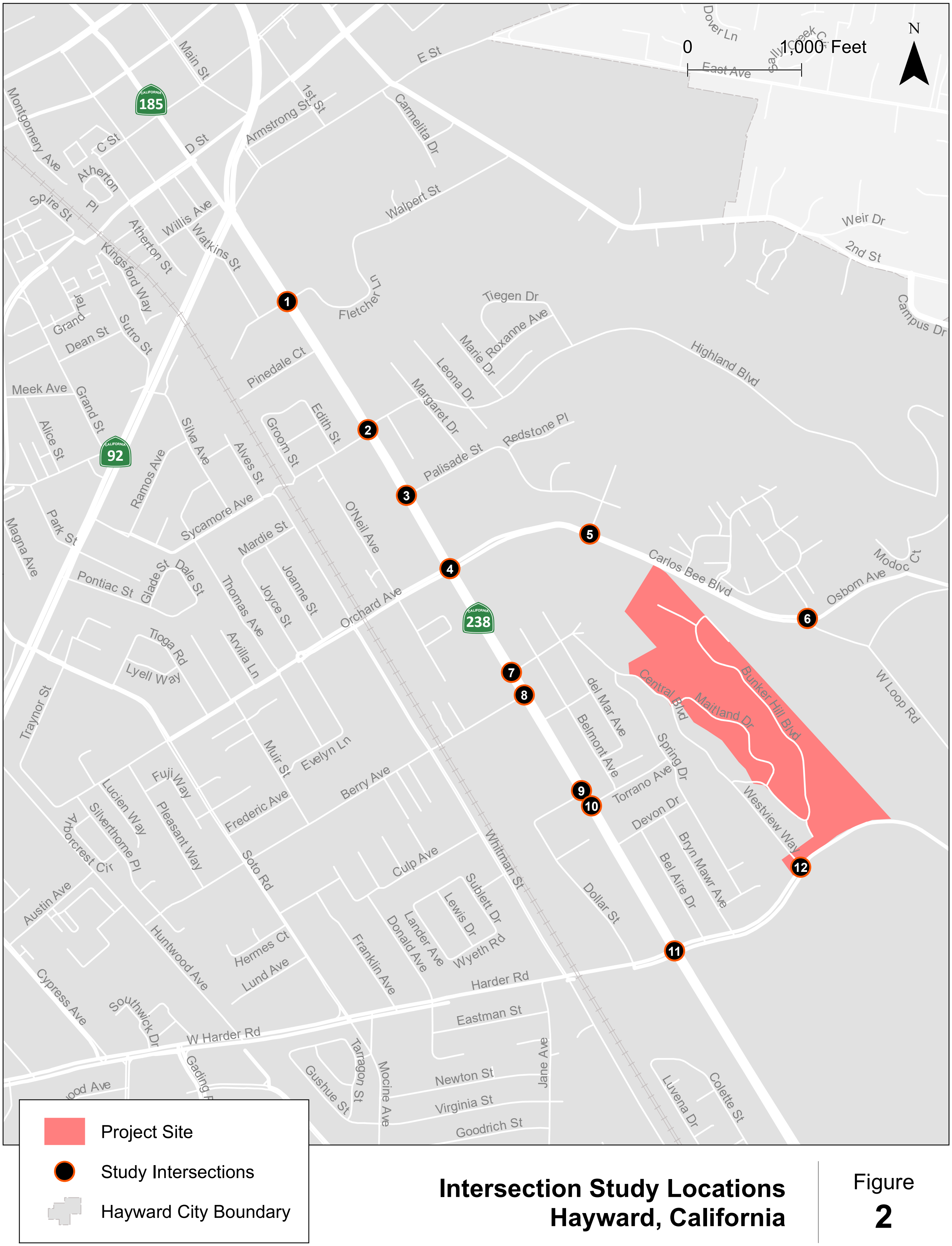
STUDY INTERSECTIONS

The June 2019 analysis examined a total of 12 study intersections (listed in Table 3 and shown in Figure 2). All study intersections are under the City of Hayward's jurisdiction. For the purposes of this LTA, these 12 intersections are included to determine if changes to the project trip assignment assumptions would result in delay or queuing deficiencies.

Table 3: Study Intersections

	Intersection	Traffic Control
1	Mission Blvd. & Fletcher Ln.	Signal
2	Mission Blvd. & Highland Blvd./Sycamore Ave.	Signal
3	Mission Blvd. & Palisade St.	TWSC
4	Mission Blvd. & Carlos Bee Blvd./Orchard Ave.	Signal
5	Overlook Ave. & Carlos Bee Blvd.	TWSC
6	Carlos Bee Blvd. & Hayward Blvd.	Signal
7	Mission Blvd. & Central Blvd.	TWSC
8	Mission Blvd. & Berry Ave.	Signal
9	Mission Blvd. & Torrano Ave. (N)	TWSC
10	Mission Blvd. & Torrano Ave. (S)	TWSC
11	Mission Blvd. & Harder Rd.	Signal
12	Westview Way & Harder Rd.	TWSC

NOTE: TWSC SIGNIFIES A TWO-WAY STOP-CONTROLLED INTERSECTION.



Intersection Study Locations
Hayward, California

Figure
2

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TRAFFIC INFUSION ON RESIDENTIAL ENVIRONMENT (TIRE)

The City has requested a TIRE analysis of local residential roads surrounding the project site. Note, this analysis was not conducted as part of the June 2019 report.

The TIRE index, developed by Donald Goodrich, Fellow of the Institute of Traffic Engineers, provides a structured basis for determining environmental capacity. According to TIRE, the environmental capacity is reached when the hourly traffic volume along a residential street increases to a level such that the people living along the street perceive that the character of the road has changed from a residential to non-residential in character. The TIRE index was applied to the streets serving the project to address the infusion of the project trips on these facilities.

TIRE is a numerical representation of a resident's perception of the effect of street traffic on activities such as walking, cycling, and playing, and on daily tasks such as maneuvering an auto out of a residential driveway. An acronym for "Traffic Infusion on Residential Environment", TIRE is expressed by index values that range from zero, representing the least effect of traffic, to five, representing the severest affect.

TIRE is based on a logarithmic association between traffic volume and residential environment and as such predicts three interesting relationships. According to TIRE, a given change in street traffic volume will cause a greater impact on residential environment on a street with low pre-existing volume than it will on a street with a higher pre-existing volume. Yet, any traffic change of 0.1 or more would be noticeable to street residents. Streets with TIRE levels above the mid-range index of three are traffic-dominated while those with indexes below three are better suited for residential activities. The TIRE index of 3.0 is normally used to determine that point at which a residential street changes character and operates as a traffic facility.

Table 4: TIRE Index Factors

Existing Volume Range (vpd)	TIRE Index	.1 Change in Index	.2 Change in Index
29-35	1.5	+6	+15
36-44	1.6	+8	+20
45-56	1.7	+10	+25
57-70	1.8	+13	+32
71-89	1.9	+17	+41
90-110	2	+22	+52
111-140	2.1	+29	+65
141-180	2.2	+40	+80
181-220	2.3	+52	+100
221-280	2.4	+65	+125
281-350	2.5	+79	+160
351-450	2.6	+94	+205
451-560	2.7	+114	+260
561-710	2.8	+140	+330
711-890	2.9	+170	+415
891-1100	3	+220	+520
1,101-1,400	3.1	+290	+650
1,401-1,800	3.2	+380	+800
1,801-2,200	3.3	+500	+1,000
2,201-2,800	3.4	+650	+1,300
2,801-3,500	3.5	+825	+1,700
3,501-4,500	3.6	+1,025	+2,200
4,501-5,600	3.7	+1,250	+2,800
5,601-7,100	3.8	+1,500	+3,500
7,101-8,900	3.9	+1,800	+4,300
8,901-11,000	4	+2,300	+5,300

Existing Volume Range (vpd)	TIRE Index	.1 Change in Index	.2 Change in Index
11,001-14,000	4.1	+3,000	+6,500
14,001-18,000	4.2	+4,000	+8,000
18,001-22,000	4.3	+5,200	+10,000
22,001-28,000	4.4	+6,600	+13,000
28,001-35,000	4.5	+8,200	+17,000
35,001-45,000	4.6	+10,000	+22,000
45,001-56,000	4.7	+12,200	+28,000
56,001-71,000	4.8	+14,800	+35,000
71,001-89,000	4.9	+18,000	+43,000

SOURCE: DONALD GOODRICH, 1975.

EXISTING NETWORK

Existing multimodal transportation facilities are discussed in this section.

ROADWAY NETWORK

The roadway system in the study area consists of arterial, collector, and local roadways as well as regional freeways that serve local and regional traffic demand. The vehicular facilities in the study area are discussed below. Signalized intersections in the study area are shown in Figure 3.

Interstate 880 (I-880) is a north-south freeway providing a connection between Oakland and San Jose as well as connectivity to Interstate 80 (I-80), State Route 92 (SR-92), and US-101. West of the study area, there are five 11- to 12-foot lanes in each direction; these consist of four general purpose lanes and one high-occupancy vehicle (HOV) (2+ persons) lane in each direction. Near the study area, access to and from I-880 is provided via A Street, Winton Avenue, and Jackson Street. The posted speed limit on I-880 is 65 mph.

Mission Boulevard is classified as a Principal Arterial and a truck route by the City of Hayward and also known as State Route 185 (SR 185) north of Foothill Boulevard and formerly as SR 238 south of Foothill Boulevard; it provides connectivity to destinations such as San Leandro, downtown Hayward, and California State University, East Bay. From A Street to Foothill Boulevard, Mission Boulevard forms the western edge of the Loop and is a one-way southbound street with four to five 11-foot through lanes and street parking. North of the Loop, there are two 12- to 18-foot through lanes in each direction, with street parking. South of the Loop, there are three 10- to 13- foot travel lanes in each direction with street parking and a median; one travel lane is reduced from each direction south of Carlos Bee Boulevard. The curb-to-curb right of way is approximately 60 feet wide north of Foothill Boulevard and 85 feet wide south of Foothill Boulevard. The posted speed limit varies between 25 and 35 mph.

Hayward Boulevard is classified as a Minor Arterial by the City of Hayward. It runs east-west between Carlos Bee Boulevard and Fairview Avenue and provides access to California State University, East Bay and to the unincorporated Fairview District. Hayward Boulevard consists of two 11- to 14-foot travel lanes in each direction with a curb-to-curb right of way of approximately 55 to 65 feet. The posted speed limit is 35 mph.

Carlos Bee Boulevard is classified as a Minor Arterial by the City of Hayward. It runs from the California State University, East Bay campus to Mission Boulevard, where it continues west as Orchard Avenue. There are two 11- to 14-foot travel lanes in each direction, with a median west of the intersection with Overlook Avenue. The curb-to-curb right of way varies from 55 to 90 feet wide. East of Mission Boulevard there is a significant uphill grade of 14% traveling eastbound. The posted speed limit is 30 mph.

Harder Road is classified as a Collector east of Mission Boulevard and a Minor Arterial west of Mission Boulevard; it is also classified as a truck route west of Mission Boulevard. There are two 11- to 16-foot travel lanes in each direction as well as a median. The curb-to-curb right of way varies from 80 to 90 feet. East of Mission Boulevard there is a significant uphill grade of 8% traveling eastbound. Trucks are prohibited on Harder Road. The posted speed limit is 35 mph.

Westview Way is classified as a local road. There are two travel lanes (one in each direction) with on-street parking. The curb-to-curb width is approximately 36 feet. The posted speed limit is 25 mph.

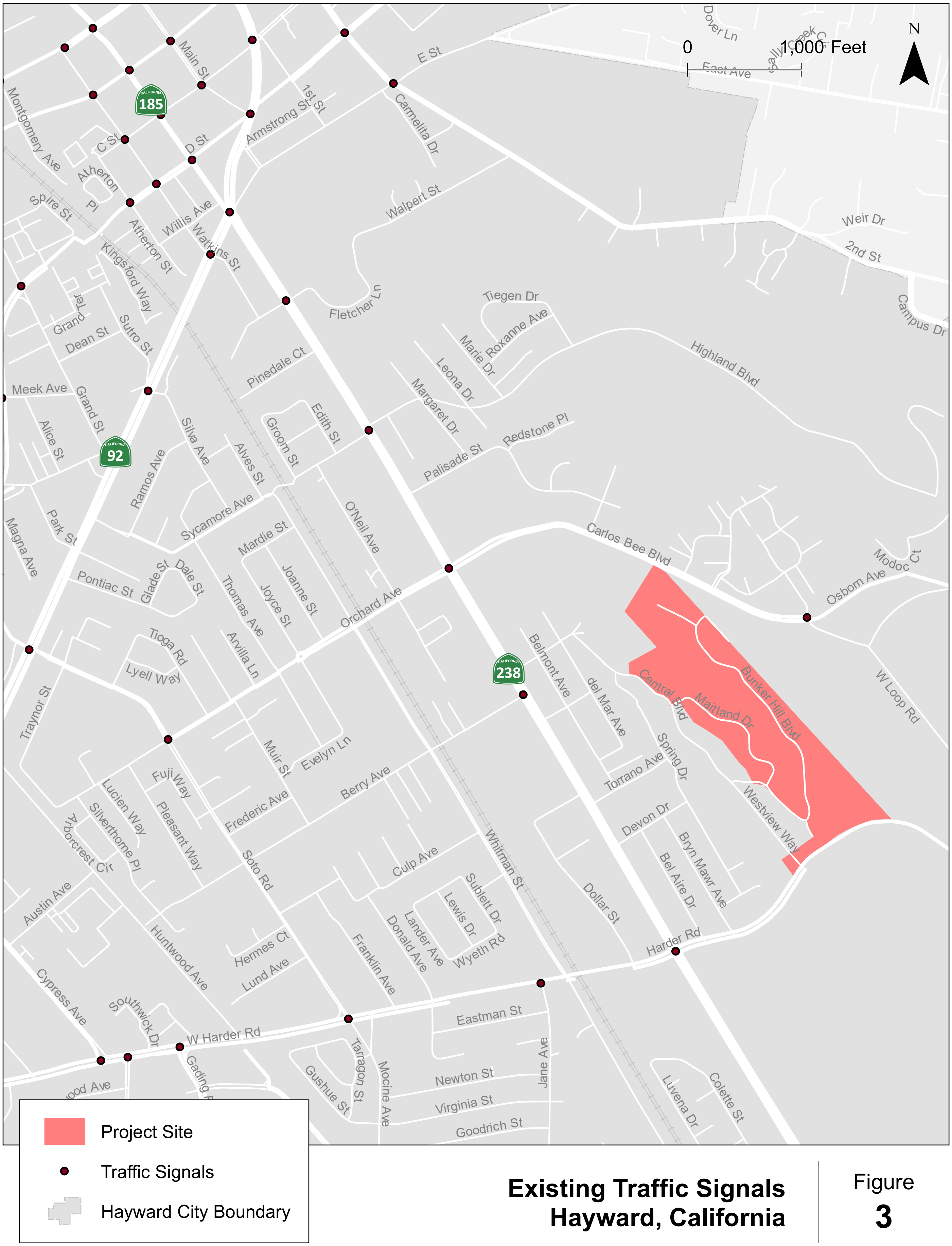
Central Boulevard is classified as a local road. There are two travel lanes (one in each direction) with on-street parking allowed on some portions. The curb-to-curb width generally varies from 28 to 36 feet. The posted speed limit is 25 mph.

Berry Avenue is classified as a local road. There is one travel lane in each direction, with on-street parking. The curb-to-curb width varies between approximately 35 and 40 feet. The posted speed limit is 25 mph.

Torrano Avenue is classified as a local road. There is one travel lane in each direction, with on-street parking. The curb-to-curb width is approximately 45 feet. Torrano Avenue forms an offset intersection with Mission Boulevard. The posted speed limit is 25 mph.

Bunker Hill Boulevard is classified as a local road. There are two travel lanes (one in each direction) with on-street parking. The paved width varies from approximately 15 to 20 feet. The speed limit is 25 mph (note, there are no posted speed limit signs). At this time, Bunker Hill Boulevard does not connect to Carlos Bee Boulevard.

Maitland Drive is classified as a local road. There are two travel lanes (one in each direction). The paved width varies from approximately 30 to 35 feet. The speed limit is 25 mph (note, there are no posted speed limit signs).



Existing Traffic Signals
Hayward, California

Figure
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Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

TRANSIT SERVICE

The transit system in the study area consists of local bus and regional rail service. The transit facilities in the study area are discussed below and shown in Figure 4. Due to the COVID-19 pandemic, transit services were reduced and are subject to change. The information in this section is updated as of June 30, 2021.

Alameda-Contra Costa Transit District

Alameda-Contra Costa Transit District (AC Transit) provides bus service in the study area. AC Transit bus routes and local bus stops are shown in Figure 4. In addition, weekday bus service near the project site is documented in Table 5. Service changes are in effect due to the COVID-19 pandemic. The following table is up to date as of June 30, 2021.

Table 5: Existing AC Transit Weekday Service

Route	Beginning and End Points		Peak / Off-Peak Frequency (in Minutes)
	North/West	South/East	
41	Hayward BART	Union Landing Transit Center	60 / 60
60	Chabot College	CSU East Bay	40 / 40
99	Hayward BART	Fremont BART	25 / 25
801	San Leandro BART	Fremont BART	N/A / 60

SOURCE: AC TRANSIT, AS OF JUNE 30, 2021.

Generally, curbside transit stops in the study area are identified with posted signs and do not include passenger amenities such as a shelter, seating, landscaping, bicycle parking, or pedestrian-scale lighting. However, there are a limited number of bus stops along Mission Boulevard that provide benches. In addition, there are a number of bus stops with covered shelters around the California State University, East Bay campus.

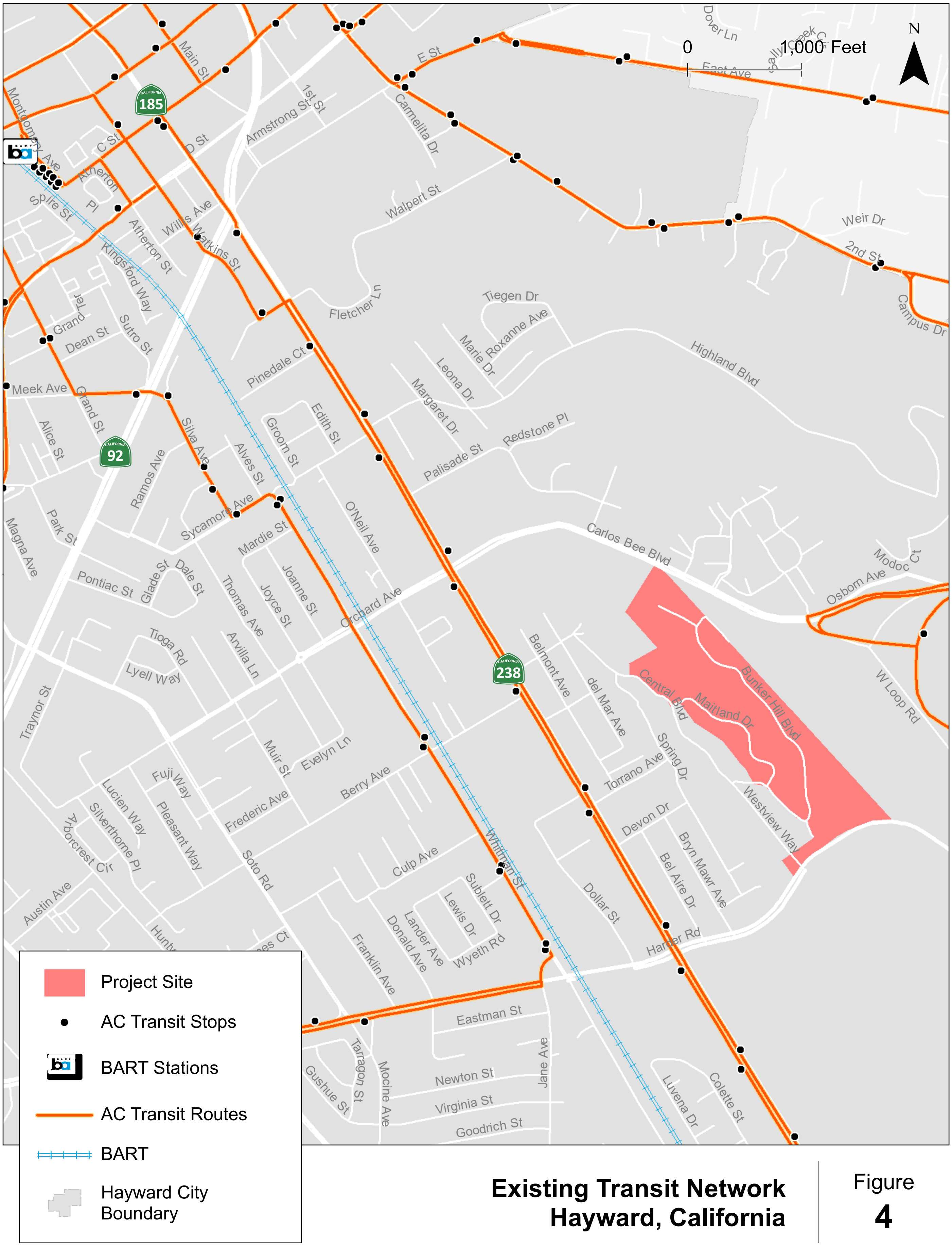
Bay Area Rapid Transit

The Downtown Hayward Bay Area Rapid Transit (BART) station serves as the location of AC Transit Intermodal Terminal, a key transfer point for BART-to-bus and bus-to-bus connections. The Intermodal Terminal currently has 20 bus bays serving 15 AC Transit routes. BART operates regional heavy rail service connecting San Francisco, San Mateo, Alameda and Contra Costa Counties. The Hayward BART station is located to the west of the study area and is part of the Berryessa-Richmond and Berryessa-Daly City lines. An additional station is located at the South Hayward BART station at Tennyson Drive that may serve travel towards Fremont and San Jose. Each line currently operates at 30-minute headways during peak periods, resulting in an average peak period frequency of 15 minutes at the Hayward and South Hayward stations. Service was reduced due to the COVID-19 pandemic.

Other Transit Services

The Hayward Amtrak station is located on A Street approximately 1.2 miles west of Foothill Boulevard. The Hayward Amtrak station is part of the Capitol Corridor operating between San Jose and Sacramento.

Additionally, the Hayward Greyhound bus station is located at the Hayward BART station.



Existing Transit Network
Hayward, California

Figure
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Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

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PEDESTRIAN FACILITIES

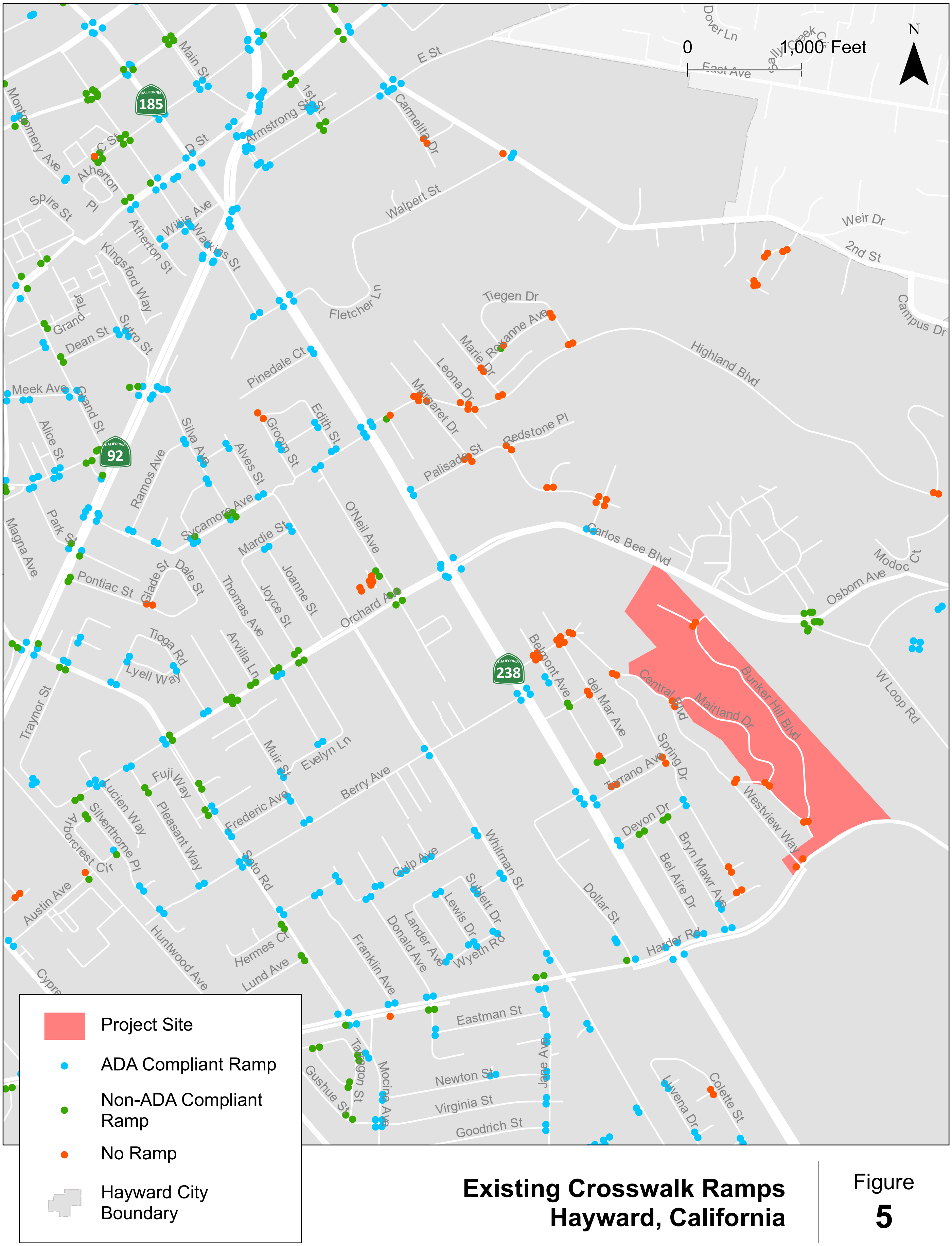
The study area offers several types of facilities and amenities that support walking. The availability and quality of pedestrian facilities can be analyzed using seven key factors as shown in Table 6.

Table 6: Pedestrian Facility Conditions

Factor	Description	Assessment
Sidewalk Availability	Sidewalk availability is core to supporting walkability and safety separating pedestrians from vehicles and other modes. In addition, it is important that sidewalks are present on both sides of the roadway and are available along the entire segment rather than end midblock.	Sidewalks are generally provided on both sides of arterial and local streets. However, a number of sidewalk coverage gaps exist, including on the south side of Carlos Bee Blvd. between Mission Blvd. and Hayward Blvd., on the north side of Hayward Blvd. between Carlos Bee Blvd. and Campus Dr., and along Harder Road east of Bryn Mawr Rd. Sidewalks are also missing along Central Blvd. southeast of Del Mar Ave. and along Westview Way, Maitland Dr., and Bunker Hill Blvd.
Sidewalk Conditions	Cracked, broken, or otherwise damaged sidewalks can pose a safety hazard and discourage walking.	Sidewalks along arterial roads are in good condition, free of cracks or uplifts. However, some local neighborhood roads may have sidewalks with cracks or other damage.
Crosswalk Availability	Marked crosswalks can safely accommodate pedestrians that need to cross streets. A lack of marked crosswalks could hinder walkability since pedestrians need to travel greater distances to reach a safe marked crossing point. Drivers may also be less likely to yield to intersections at unmarked crossings.	Crosswalks, including continental crosswalks, are consistently provided at major intersections along Mission Blvd. Crosswalks are also generally provided at other arterial intersections. At minor street intersections along arterial roadways, marked crosswalks are lacking, with the exception of continental crosswalks along Mission Blvd. As shown in Figure 5, within the study area, curb ramps are typically provided at arterial intersections. However, several residential street intersections lack curb ramps, especially those near the project site.
Shading	Shading, whether natural or artificial, can encourage walking in areas such as Southern California which are relatively warm with limited rainfall, especially in the summer.	Pedestrian shading is provided in the study area in the form of abundant tree landscaping along arterials and local residential streets.
Flat Grade	Steep hills and ravines can discourage walking, especially for pedestrians with limited mobility.	There is a substantial eastward slope along roads such as Harder Road, Carlos Bee Boulevard, and other roads east of Mission Blvd.
Buffer	Buffers which provide separation between pedestrians and moving vehicles can help improve the walking experience, and can include	Along arterials and local roads, buffers primarily consist of parked vehicles. Within residential neighborhoods in the study area, buffers in the form of street landscaping are also present.

Factor	Description	Assessment
	landscaping, parked vehicles, and bulbouts, which serve to both reduce pedestrian crossing distances at intersections and as a traffic calming measure.	
Amenities	In addition to physical facilities that accommodate walking, useful or interesting amenities along sidewalks create a more friendly walking environment and increase pedestrian comfort. Amenities can include sidewalk-adjacent retail and restaurants, landscaping, and street furniture.	Pedestrian amenities primarily consist of street landscaping. Some pedestrian-facing retail is present along portions of Mission Blvd.

SOURCE: KITTELSON AND ASSOCIATES, INC., 2021.



Existing Crosswalk Ramps
Hayward, California

Figure
5

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KITTELSON & ASSOCIATES

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

BICYCLE FACILITIES

The study area contains a bicycle facilities network that consists of both dedicated and shared street space for bicyclists. Figure 6 displays the existing designated bicycle facilities in the study area.

Bicycle facilities are categorized into four types, as described below:

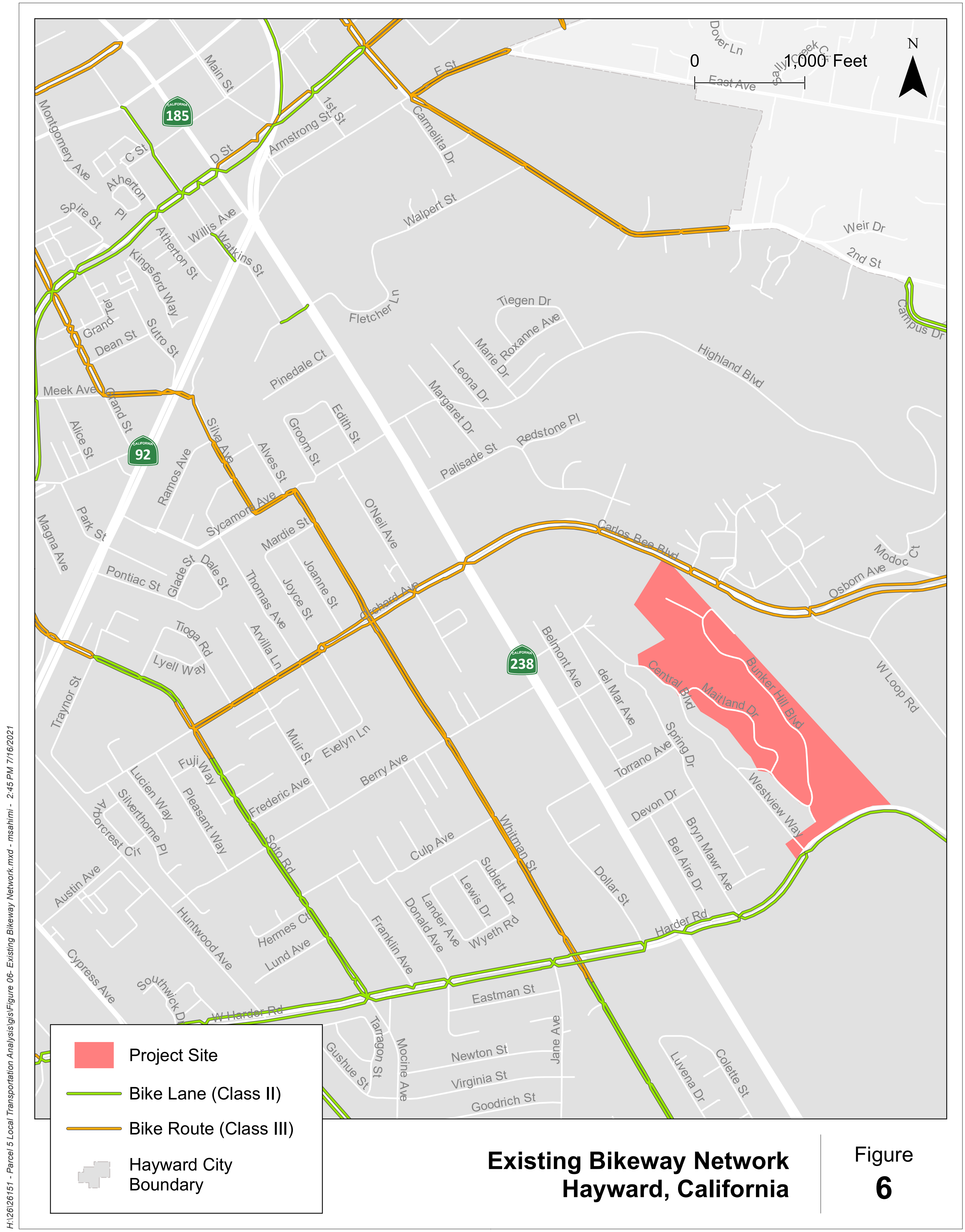
- **Class I Bikeway (Bike Path).** Also known as a shared path or multi-use path, a bike path is a paved right-of-way for bicycle travel that is completely separate from any street or highway.
- **Class II Bikeway (Bike Lane).** A striped and stenciled lane for one-way bicycle travel on a street or highway. This facility could include a buffered space between the bike lane and vehicle lane and the bike lane could be adjacent to on-street parking.
- **Class III Bikeway (Bike Route).** A signed route along a street where the bicyclist shares the right-of-way with motor vehicles. This facility can also be designated using a shared-lane marking (sharrow).
- **Class IV Bikeway (Separated Bike Lane).** A bikeway for the exclusive use of bicycles including a separation required between the separated bikeway and the through vehicular traffic. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

As shown in Figure 6, the existing bicycle facilities near the project site include:

- Class II bike lanes on Harder Road, west of West Loop Road (eastbound-only bike lane between Westview Way and West Loop Road).
- Class II bike lanes on Whitman Street, south of Harder Road
- Class II bike lanes on Campus Drive, between 2nd Street and Highland Boulevard.
- Class III bike routes on Whitman Street (north of Harder Road) and on Carlos Bee Boulevard

The City of Hayward Bicycle & Pedestrian Master Plan (BPMP) includes the following bicycle improvements in the study area, as shown in Figure 7:

- Class IV separated bike lanes along Mission Boulevard, Harder Road (west of W. Loop Road), Carlos Bee Boulevard (between Mission Boulevard and Hayward Boulevard), Hayward Boulevard, and Whitman Street
- Class II bike lanes along Orchard Avenue (west of Mission Boulevard), Harder Road (east of W. Loop Road), W. Loop Road, and E. Loop Road.
- Class I bike path
- Railroad-adjacent Class I bike path parallel to Whitman Road
- Hayward Foothill Trail, which will be a Class I multi-use path east of Bunker Hill Boulevard



Existing Bikeway Network
Hayward, California

Figure
6

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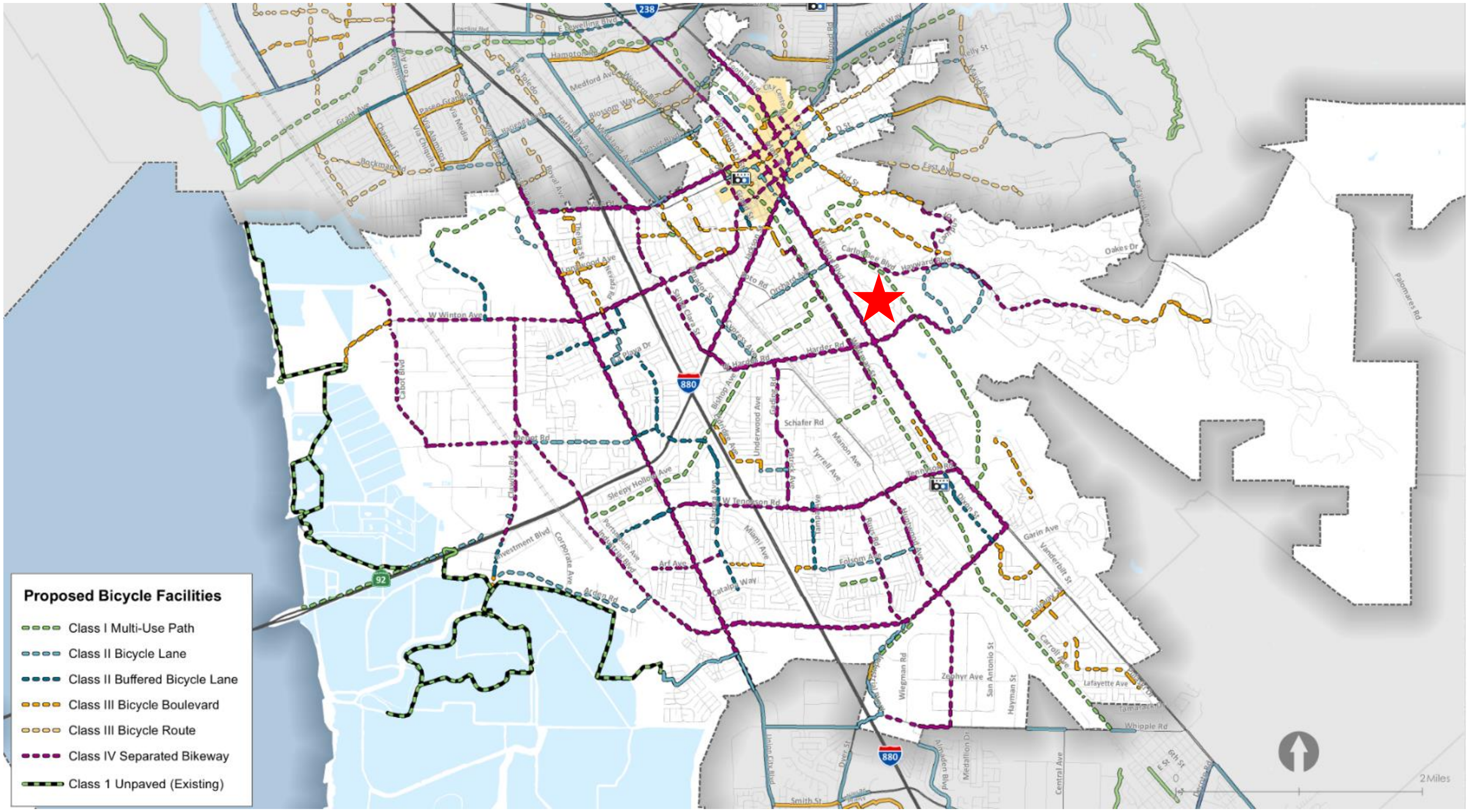
Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

Figure 7: Recommended Bicycle Network (BPMP)



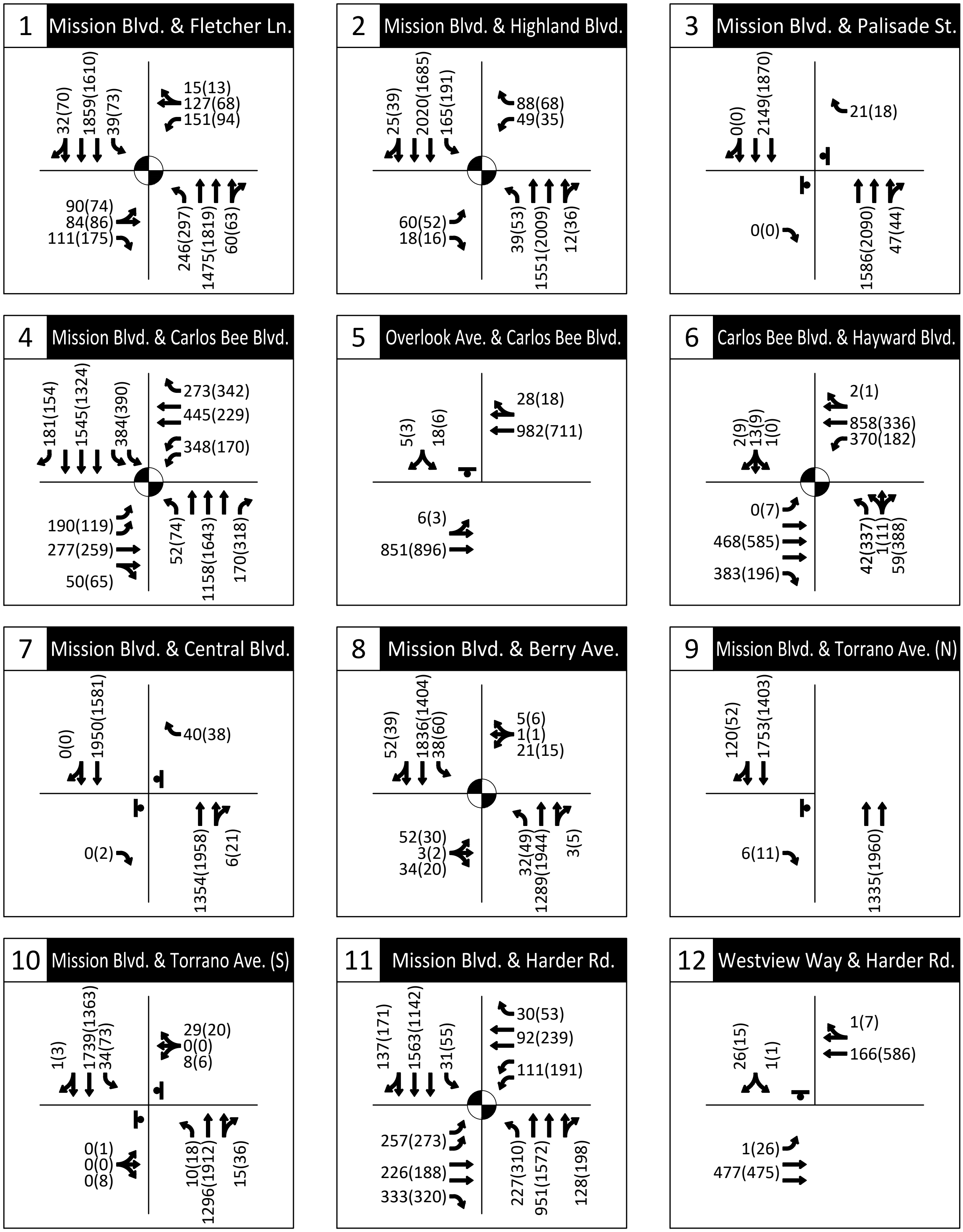
★ Project Location

EXISTING TRAFFIC VOLUMES

Automobile Traffic Volumes

As part of the June 2019 analysis, automobile turning movement counts at the 12 study intersections were collected in the field in May 2018 and April 2019 during the weekday morning (7:00 AM to 9:00 AM) and evening (4:00 PM to 6:00 PM) peak periods. The weather conditions that day were clear, and no rain or accidents were observed. Due to Covid conditions, the traffic counts are still considered current, so no further adjustments were made.

Figure 8 shows the existing automobile peak hour volumes at the study intersections. Intersection control (i.e., signalized or stop-controlled) and lane geometries are also shown. Field-collected count sheets are provided in the appendix to this report.



AM(PM) - Traffic Volume

STOP - All-Way Stop

- Stop Sign

- Traffic Signal

Existing Automobile Peak Hour Volumes
Hayward, California

Figure
8

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Pedestrian and Bicycle Volumes

Pedestrian and bicycle volumes were also collected at the study intersections as part of the data collection effort for the June 2019 analysis. Table 7 and Table 8 present the pedestrian and bicycle volume data for the weekday AM and weekday PM peak hours, respectively. Generally, the study area experienced higher levels of bicycle and pedestrian activity during the PM peak hour.

Table 7: Pedestrian and Bicycle Volumes (Weekday AM Peak Hour)

Intersection		Pedestrian Crossings (by intersection leg)				Northbound Bicycles			Southbound Bicycles			Eastbound Bicycles			Westbound Bicycles		
		N	S	E	W	L	T	R	L	T	R	L	T	R	L	T	R
1	Mission Blvd. & Fletcher Ln.	5	4	8	11	1	1	1	0	0	0	1	0	0	0	0	0
2	Mission Blvd. & Highland Blvd./Sycamore Ave.	0	18	12	4	0	1	0	0	1	0	0	0	0	0	0	1
3	Mission Blvd. & Palisade St.	1	0	6	9	0	2	0	0	3	0	0	0	0	0	0	0
4	Mission Blvd. & Carlos Bee Blvd./Orchard Ave.	9	1	5	0	0	1	0	0	0	1	0	0	0	0	1	0
5	Overlook Ave. & Carlos Bee Blvd.	12	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0
6	Carlos Bee Blvd. & Hayward Blvd.	3	0	3	9	0	0	0	0	0	0	0	0	0	0	0	0
7	Mission Blvd. & Central Blvd.	0	0	0	7	0	2	0	0	3	0	0	0	0	0	0	0
8	Mission Blvd. & Berry Ave.	2	9	6	4	0	1	0	0	1	0	0	0	0	0	0	0
9	Mission Blvd. & Torrano Ave. (N)	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0
10	Mission Blvd. & Torrano Ave. (S)	0	0	2	0	0	1	0	0	1	0	0	0	0	0	0	0
11	Mission Blvd. & Harder Rd.	0	3	2	3	0	0	0	0	0	1	0	0	1	0	0	0
12	Westview Way & Harder Rd.	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SOURCE: QUALITY COUNTS MANUAL TURNING MOVEMENT COUNTS (MAY 2018 AND APRIL 2019).

Table 8: Pedestrian and Bicycle Volumes (Weekday PM Peak Hour)

	Intersection	Pedestrian Crossings (by intersection leg)				Northbound Bicycles			Southbound Bicycles			Eastbound Bicycles			Westbound Bicycles		
		N	S	E	W	L	T	R	L	T	R	L	T	R	L	T	R
1	Mission Blvd. & Fletcher Ln.	4	5	10	6	0	3	0	0	1	0	0	0	1	0	0	0
2	Mission Blvd. & Highland Blvd./Sycamore Ave.	1	12	15	8	0	1	0	0	2	0	0	1	0	0	0	0
3	Mission Blvd. & Palisade St.	0	0	7	6	0	4	0	0	5	0	0	0	0	0	0	0
4	Mission Blvd. & Carlos Bee Blvd./Orchard Ave.	5	0	10	6	0	3	0	0	5	0	1	0	0	0	0	0
5	Overlook Ave. & Carlos Bee Blvd.	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Carlos Bee Blvd. & Hayward Blvd.	5	5	5	39	0	0	0	0	0	0	0	1	0	0	0	0
7	Mission Blvd. & Central Blvd.	0	0	5	4	0	3	0	0	5	0	0	0	0	0	0	0
8	Mission Blvd. & Berry Ave.	2	0	2	3	0	0	0	0	2	0	0	0	0	0	1	0
9	Mission Blvd. & Torrano Ave. (N)	0	0	0	3	0	1	0	0	0	1	0	0	0	0	0	0
10	Mission Blvd. & Torrano Ave. (S)	4	0	0	6	0	1	0	0	0	0	0	0	0	0	0	0
11	Mission Blvd. & Harder Rd.	3	2	0	42	0	1	0	0	2	0	0	0	0	0	1	0
12	Westview Way & Harder Rd.	1	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SOURCE: QUALITY COUNTS MANUAL TURNING MOVEMENT COUNTS (MAY 2018 AND APRIL 2019).

EXISTING TRAFFIC OPERATIONS AND PERFORMANCE

Traffic Signal Warrants

Traffic signal warrants are standards that provide guidelines in the determination of the need for a traffic signal. A traffic signal should not be installed if no warrants are met, since the installation of traffic signals may increase delays for the majority of through traffic and may increase the potential for accidents.

As stated in the FHWA/Caltrans 2014 California Manual of Uniform Traffic Control Devices (CA-MUTCD), "An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location. The investigation of the need for a traffic control signal shall include an analysis of the applicable factors contained in the following traffic signal warrants and other factors related to existing operation and safety at the study location:

- Warrant 1, Eight-Hour Vehicular Volume.
- Warrant 2, Four-Hour Vehicular Volume.
- Warrant 3, Peak Hour.
- Warrant 4, Pedestrian Volume.
- Warrant 5, School Crossing.
- Warrant 6, Coordinated Signal System.

- Warrant 7, Crash Experience.
- Warrant 8, Roadway Network.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

This local transportation assessment did not evaluate the full panoply of warrants for traffic signals, but instead focused on the peak hour warrant. The peak hour warrant is being used in this study as an "indicator" of the likelihood of an existing or future unsignalized intersection warranting a traffic signal. Intersections that fail to exceed the peak hour warrant are considered (for the purposes of this impact analysis) to be unlikely to meet one or more of the other signal warrants (such as the 4-hour or 8-hour warrants). However, this does not mean that a signal is definitely unwarranted. A signal may be warranted by other criteria, some of which cannot be known until the intersection is constructed and operational. This peak hour analysis is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction.

As discussed earlier in this report, the need for improvements at unsignalized intersections is based on LOS and delay, and whether any of the following are met:

- Traffic signal warrant,
- Pedestrian signal warrant, or
- All-way stop warrant

Note that solely triggering a warrant does not trigger the need for an intersection improvement, but the City will at its discretion require or not require a signal be installed, where warranted.

Regardless of intersection control, per City guidelines, improvements would be required at an intersection already operating at LOS F under an Existing or No Project scenario if the addition of project traffic results in an increase of 5.0 seconds or more in the intersection's average control delay. Unsignalized intersections were evaluated using the Peak Hour Volume Warrant (Warrant No. 3) in the CA-MUTCD. Even if the Peak Hour Volume Warrant is met, a more detailed signal warrant study is recommended before a signal is installed. The more detailed study should consider volumes during the daily peak hours of roadway traffic, pedestrian traffic, and collision histories.

None of the six unsignalized study intersections meet peak hour traffic signal warrants under existing conditions for either the AM or PM peak hour. Existing traffic signal warrant worksheets are provided in the appendix to this report.

Automobile Level of Service

As part of the June 2019 report, LOS at the study intersections were evaluated based on the HCM 6th Edition methodology,[1] as implemented in the Synchro 10 software package. LOS analysis was performed for the weekday AM and PM peak hours using traffic counts and peak hour factors collected in the field. Table 9 provides a summary of the existing automobile level of service from the June 2019 report. As shown in the table, all intersections except for the intersection of Mission Blvd. & Torrano Ave. (S) operate acceptably (LOS E or better) during the AM and PM peak hours. The Existing Conditions LOS worksheets for the study intersections are provided in the appendix to this report.

[1] Note, HCM 2000 was used for the intersection of Mission Blvd. & Berry Ave. due to its unique signal phasing.

Table 9: Automobile Level of Service, Existing Conditions

Intersection		Traffic Control	Weekday AM		Weekday PM	
			Delay (sec)	LOS	Delay (sec)	LOS
1	Mission Blvd. & Fletcher Ln.	Signal	27.8	C	24.4	C
2	Mission Blvd. & Highland Blvd./Sycamore Ave.	Signal	11.0	B	12.4	B
3	Mission Blvd. & Palisade St.	TWSC	19.9	C	28.3	D
4	Mission Blvd. & Carlos Bee Blvd./Orchard Ave.	Signal	41.3	D	37.6	D
5	Overlook Ave. & Carlos Bee Blvd.	TWSC	48.7	E	25.7	D
6	Carlos Bee Blvd. & Hayward Blvd.	Signal	29.5	C	29.4	C
7	Mission Blvd. & Central Blvd.	TWSC	16.0	C	23.4	C
8	Mission Blvd. & Berry Ave.	Signal	14.4	B	13.1	B
9	Mission Blvd. & Torrano Ave. (N)	TWSC	20.8	C	15.8	C
10	Mission Blvd. & Torrano Ave. (S)	TWSC	**143.0**	**F**	**611.0**	**F**
11	Mission Blvd. & Harder Rd.	Signal	45.3	D	46.7	D
12	Westview Way & Harder Rd.	TWSC	9.2	A	11.6	B

SOURCE: KITTELSON & ASSOCIATES, INC. 2021
BOLD SIGNIFIES UNACCEPTABLE OPERATIONS. TWSC DELAY IS BASED ON THE WORST APPROACH DELAY

Queue Storage

As part of the June 2019 report, the 95th percentile queues at the study intersections were reviewed for informational purposes to identify locations where these may exceed the available storage. The 95th percentile queue lengths represent queues that have only a 5% probability of occurring within the analyzed peak hour. This measure is typically used in traffic engineering as a conservative measure of queuing. The average driver would experience shorter queue lengths than the reported 95th percentile queues.

For through movements and turning movements without a dedicated lane, the available storage is assumed to be the distance from the stop bar to the departure point of the nearest upstream stop-controlled or signalized intersection. For turning movements with an exclusive turn lane, the length of the turn bay is assumed to be the available storage. Table 10 details the movements which were found to queue beyond their available storage capacity at the 95th percentile demand level under Existing Conditions.

Table 10: Queue Lengths in Excess of Capacity, Existing Conditions

#	Intersection	Movement	Peak Hour	Description
1	Mission Blvd. & Fletcher Ln.	NBL	PM	This movement spills back beyond the length of its exclusive turn lane during the PM peak hour. However, the queue does not spill back to adjacent intersections.
		WBL	AM	This movement spills back beyond the length of its lane during the AM peak hour.
2	Mission Blvd. & Highland Blvd./Sycamore Ave.	WBT/R	PM	This movement spills back to the adjacent intersection during the PM peak hour.
		SBL	AM & PM	This movement spills back beyond the length of its exclusive turn lane during the AM and PM peak hours. However, the queues do not spill back to adjacent intersections.
4	Mission Blvd. & Carlos Bee Blvd./Orchard Ave.	WBL	AM	This movement spills back beyond the length of its lane during the AM peak hour. However, the queue does not spill back to adjacent intersections.

#	Intersection	Movement	Peak Hour	Description
6	Carlos Bee Blvd. & Hayward Blvd.	WBL	AM	This movement spills back beyond the length of its lane during the AM peak hour. However, the queue does not spill back to adjacent intersections.
11	Mission Blvd. & Harder Rd.	EBL	AM & PM	This movement spills back beyond the length of its exclusive turn lane during the AM and PM peak hours. However, the queues do not spill back to adjacent intersections. Extending the length of turn lanes to accommodate the 95th percentile queues at this location is not feasible due to the proximity with the westbound left-turn lane pocket at the intersection of Dollar St. & Harder Rd.

SOURCE: KITTELSON & ASSOCIATES, INC. 2021.

EXISTING RESIDENTIAL STREET ENVIRONMENT

Existing TIRE index factors for three residential streets as requested by the City are shown in the table below. Note, this analysis was not previously conducted as part of the June 2019 report.

Daily vehicle volumes were estimated by multiplying existing PM peak hour volumes along the segments by 10. Given that counts are not available along Bunker Hill Boulevard, it was conservatively assumed that the street has the lowest index factor, given that there are few dwelling units currently in the roadway segment's vicinity.

Table 11: Existing TIRE Index

Roadway	Daily Volume (approximate)	Index	Category
Central Boulevard	590	2.8	Residential
Westview Way	490	2.7	Residential
Bunker Hill Boulevard	N/A	1.5	Residential

SOURCE: KITTELSON & ASSOCIATES, INC. 2021.

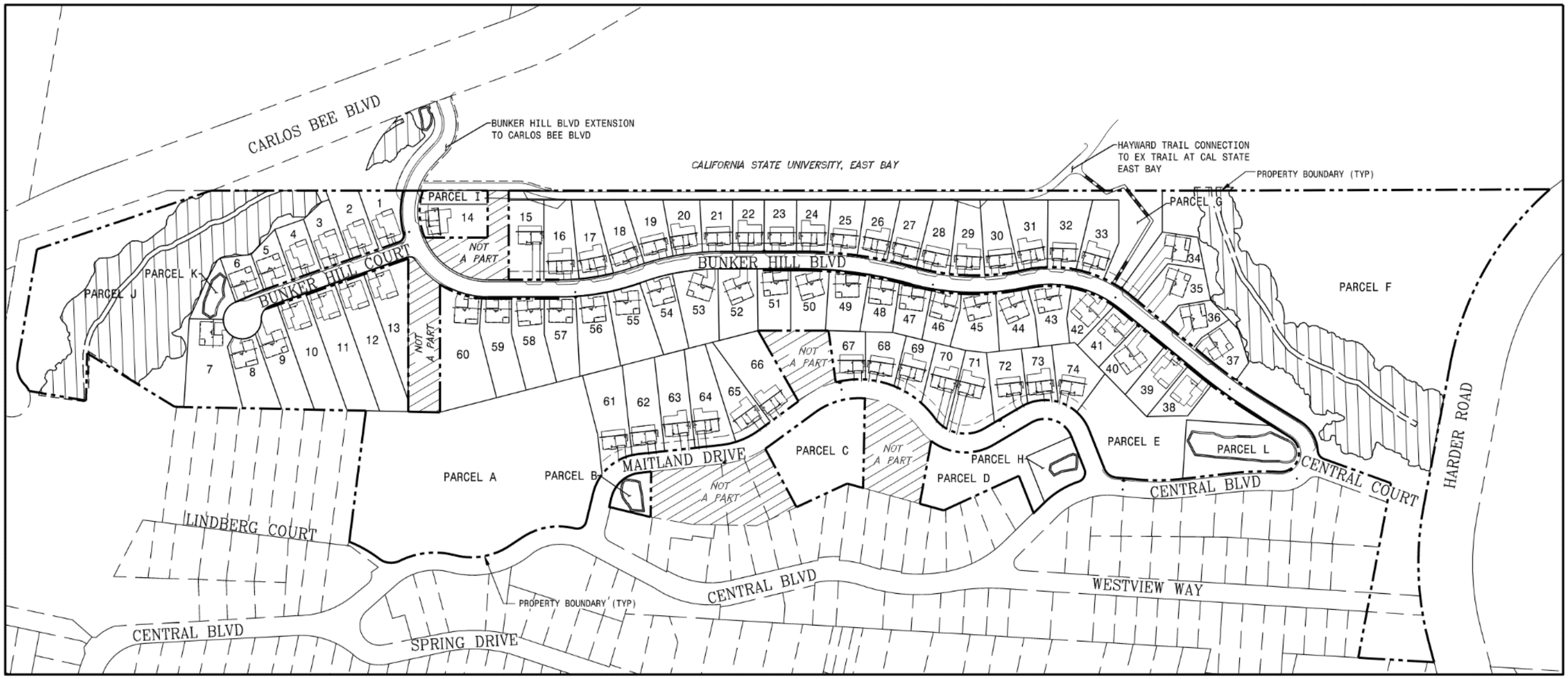
Section 3 — Project Description

PROJECT DESCRIPTION

The Parcel Group 5 Project will consist of up to 74 single-family dwelling units and 8 accessory dwelling units (ADUs). The single-family homes will each have four bedrooms, and the ADUs will be a mix of studios and one-bedroom units. A total of 406 parking spaces will be provided, consisting of 100 on-street spaces, 148 driveway spaces, and 158 garage spaces.

Additional project elements include approximately 10.50 acres of open space to preserve riparian areas, a new roadway connection from Bunker Hill Boulevard to Carlos Bee Boulevard, a new segment of the Hayward Foothill Trail, and additional street improvements such as curbs, gutters, sidewalks, on-street parking bulb-outs, utilities, and lighting. The proposed site plan is shown in Figure 9.

Figure 9: Project Site Plan



Source: MacKay & Somps
Dated May 12, 2021; Received May 18, 2021

Section 4 — Project Trip Generation/ Distribution/Assignment

PROJECT TRIP GENERATION/ DISTRIBUTION/ASSIGNMENT

This section provides the vehicle trip generation and distribution estimates for the proposed project from the June 2019 report as well as modifications for this LTA.

TRIP GENERATION

In the June 2019 report, project trip generation was estimated for the following three time periods, as shown in Table 12:

- Weekday daily
- Weekday AM peak hour
- Weekday PM peak hour

Trip generation for the project was conservatively estimated using rates for the Single-Family Detached Housing (Code 210) in the ITE Trip Generation Manual, 10th Edition, for all 82 dwelling units including the ADUs. This LTA will remain consistent with the 2019 report's trip generation assumptions. As shown in the table, the project is expected to generate 866 weekday daily vehicle trips, 63 weekday AM peak hour vehicle trips, and 84 weekday PM peak hour vehicle trips.

Table 12: Project Trip Generation Estimate

Trip Generation Rates								
Land Use	Rate	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Single-Family Detached Housing (ITE Code 210)	Per unit	Ln(T)=0.92* Ln(X)+2.71	25%	75%	T=0.71(X) +4.80	63%	37%	Ln(T)=0.96* Ln(X)+0.20
Trip Generation Estimates								
Land Use	**Size**	**Daily**	**AM Peak Hour**			**PM Peak Hour**		
			In	**Out**	**Total**	**In**	**Out**	**Total**
Single-Family Detached Housing (ITE Code 210)	82 units	866	16	47	63	53	31	84

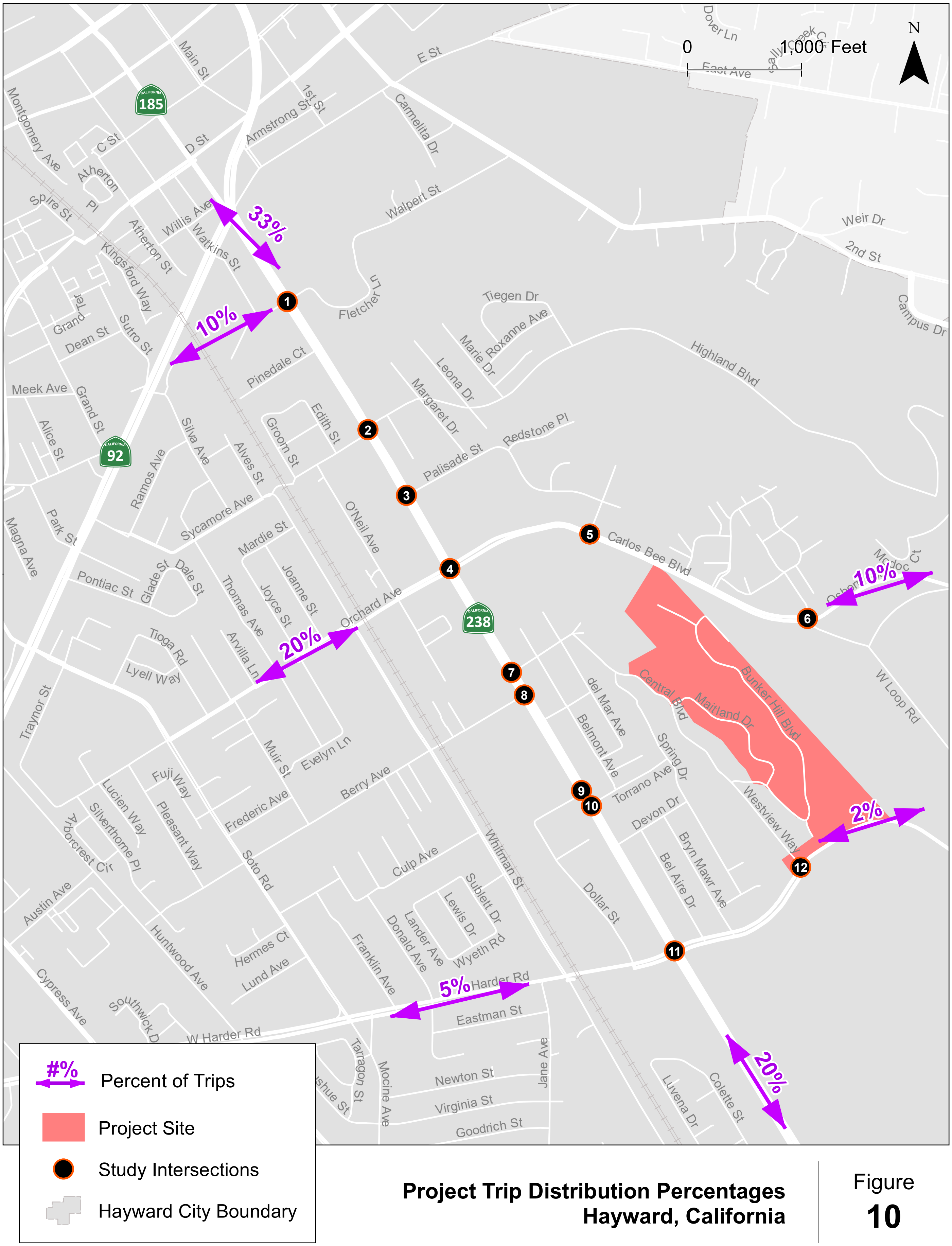
SOURCE: KITTELSON AND ASSOCIATES, INC., 2021; INSTITUTE OF TRANSPORTATION ENGINEERS, 2017.

TRIP DISTRIBUTION AND ASSIGNMENT

Project trip distribution was developed for the June 2019 report using the City of Hayward General Plan Update travel demand model. The project trip distribution is based on the model's distribution of trips in and out of the traffic analysis zone (TAZ) representing the project site, as well as adjustments to reflect local travel patterns and circulation conditions. The project trip distribution and intersection count locations are shown in Figure 10.

Figure 11 presents the weekday AM and PM project-only turning movements that were derived from the trip generation and trip distribution discussed in this section. In the June 2019 report, it was assumed that 100% of all project trips to/from the south would utilize Westview Way and Harder Road to access the site, while 100% of project trips to/from the north would utilize Bunker Hill Boulevard and Carlos Bee Boulevard. For this LTA, the City has also requested an update to the project trip assignment to assume that some project-generated vehicle trips may travel to/from the project through the adjacent neighborhood via

Maitland Drive to Central Boulevard. Therefore, the trip assignment has been updated for this LTA so that 50% of trips to/from the north would utilize streets such as Central Boulevard, Berry Avenue, and Mission Boulevard. The trip assignments for project trips to/from the south has remained unchanged, since neighborhood streets would not provide a direct or logical path of travel.



Project Trip Distribution Percentages
Hayward, California

Figure
10

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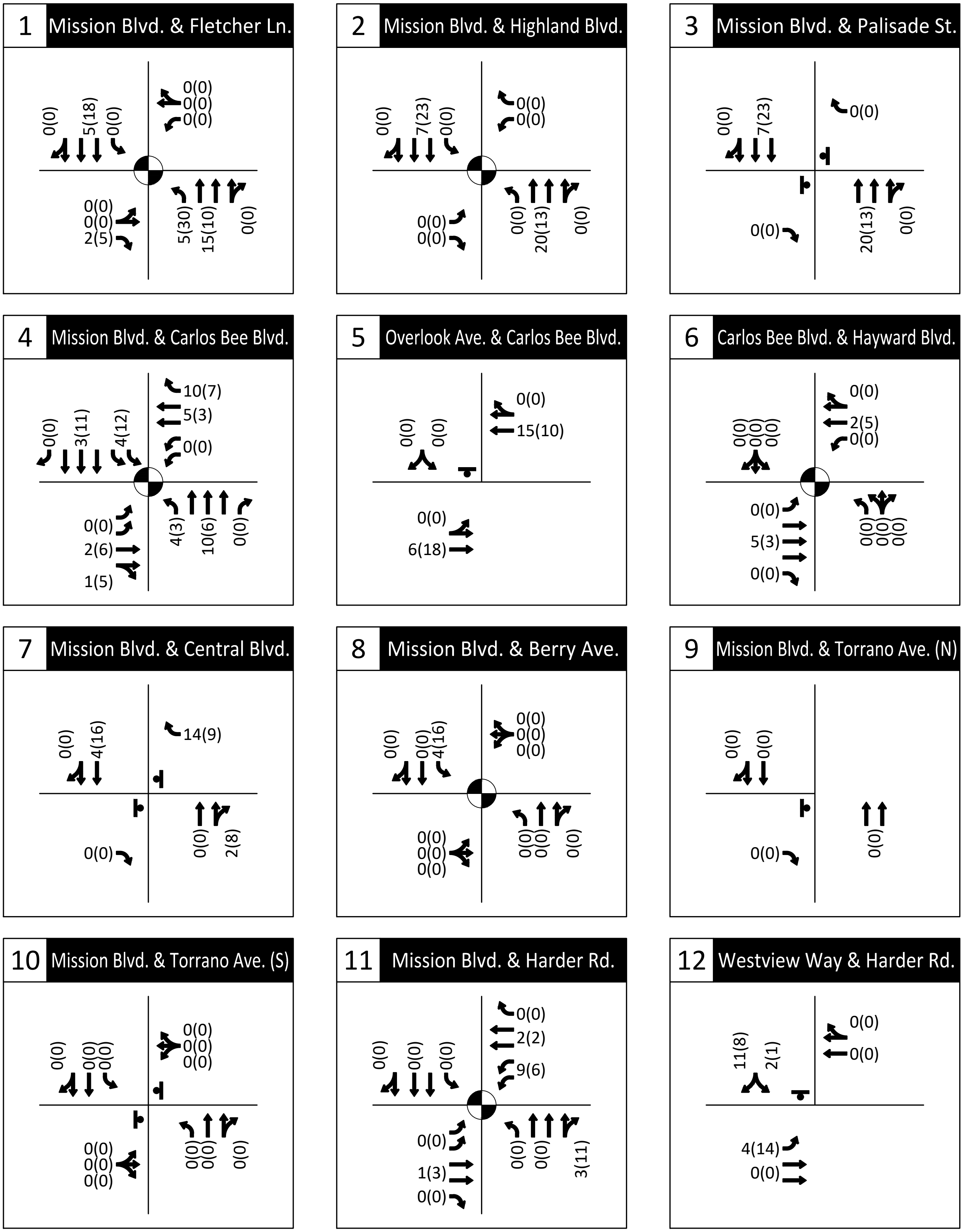
KITTELSON & ASSOCIATES

Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet



AM(PM) - Traffic Volume

- All-Way Stop
- Stop Sign
- Traffic Signal

Project-Only Trips (Updated)
Hayward, California

Figure
11

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Section 5 — Existing Plus Project Traffic Conditions

EXISTING PLUS PROJECT TRAFFIC CONDITIONS

This chapter discusses the results of the Existing Plus Project traffic operations analysis, which has been updated from the June 2019 report to reflect the updated trip assignment.

EXISTING PLUS PROJECT AUTOMOBILE LEVEL OF SERVICE

The automobile turning movement counts for the Existing Plus Project scenario were updated to reflect the sum of the Existing Conditions turning movement counts (Figure 8) and the updated Project Only turning movements (Figure 11). Figure 12 presents the updated Existing Plus Project turning movements.

Table 13 presents the Existing Conditions and Existing Plus Project delays and LOS for the study intersections from the June 2019 report. As shown in the table, the June 2019 report concluded that:

- Intersection #10 (Mission Blvd. & Torrano Ave. S) operates unacceptably at LOS F during the AM and PM peak hours under Existing conditions. No increase in delay is expected under Existing Plus Parcel Group 5 conditions. Therefore, no operational improvements were recommended.
- Intersection #5 (Overlook Ave. & Carlos Bee Blvd.) degrades from an acceptable LOS E to an unacceptable LOS F during the AM peak hour, based on the worst approach delay. However, peak hour signal warrants are not met. Therefore, no operational improvements were recommended.
- All other study intersections continue to operate acceptably with the addition of project trips. Therefore, no operational improvements were recommended.

Table 14 presents the updated Existing Plus Project delays and LOS for the study intersections to reflect the changes in the project trip assignment. Note, updated delay and LOS are only shown for study intersections which experienced changes in project trips. As shown in the table, results do not differ from the June 2019 report and therefore no operational improvements are recommended.

Table 13: Automobile Level of Service, Existing Plus Project Conditions (June 2019 Report)

	Intersection	Traffic Control	Peak Hour	Existing		Existing Plus Project		Change in Delay
				Delay (sec)	LOS	Delay (sec)	LOS	
1	Mission Blvd. & Fletcher Ln.	Signal	AM	27.8	C	28.1	C	0.3
			PM	24.4	C	24.6	C	0.2
2	Mission Blvd. & Highland Blvd./Sycamore Ave.	Signal	AM	11.0	B	11.0	B	0.0
			PM	12.4	B	12.4	B	0.0
3	Mission Blvd. & Palisade St.	TWSC	AM	19.9	C	20.2	C	0.3
			PM	28.3	D	28.6	D	0.3
4	Mission Blvd. & Carlos Bee Blvd./Orchard Ave.	Signal	AM	41.3	D	42.1	D	0.8
			PM	37.6	D	38.9	D	1.3
5	Overlook Ave. & Carlos Bee Blvd.	TWSC	AM	48.7	E	**52.7**	**F**	4.0
			PM	25.7	D	27.1	D	1.4
6	Carlos Bee Blvd. & Hayward Blvd.	Signal	AM	29.5	C	29.6	C	0.1
			PM	29.4	C	29.4	C	0.0
7	Mission Blvd. & Central Blvd.	TWSC	AM	16.0	C	16.0	C	0.0
			PM	23.4	C	23.4	C	0.0
8	Mission Blvd. & Berry Ave.	Signal	AM	14.4	B	14.4	B	0.0
			PM	13.1	B	13.0	B	-0.1
9	Mission Blvd. & Torrano Ave. (N)	TWSC	AM	20.8	C	20.8	C	0.0
			PM	15.8	C	15.8	B	0.0
10	Mission Blvd. & Torrano Ave. (S)	TWSC	AM	**143.0**	**F**	**143.0**	**F**	0.0
			PM	**611.0**	**F**	**611.0**	**F**	0.0
11	Mission Blvd. & Harder Rd.	Signal	AM	45.3	D	45.7	D	0.4
			PM	46.7	D	47.0	D	0.3
12	Westview Way & Harder Rd.	TWSC	AM	9.2	A	10.1	B	0.9
			PM	11.6	B	12.1	B	0.5

SOURCE: KITTELSON & ASSOCIATES, INC. 2021
BOLD SIGNIFIES UNACCEPTABLE OPERATIONS. TWSC DELAY IS BASED ON THE WORST APPROACH DELAY.

Table 14: Automobile Level of Service, Existing Plus Project Conditions (Updated)

	Intersection	Traffic Control	Peak Hour	Existing		Existing Plus Project		Change in Delay
				Delay (sec)	LOS	Delay (sec)	LOS	
4	Mission Blvd. & Carlos Bee Blvd./Orchard Ave.	Signal	AM	41.3	D	41.8	D	0.5
			PM	37.6	D	38.4	D	0.8
5	Overlook Ave. & Carlos Bee Blvd.	TWSC	AM	48.7	E	**50.9**	**F**	2.2
			PM	25.7	D	26.6	D	0.9
7	Mission Blvd. & Central Blvd.	TWSC	AM	16.0	C	16.6	C	0.6
			PM	23.4	C	24.5	C	1.1
8	Mission Blvd. & Berry Ave.	Signal	AM	14.4	B	14.7	B	0.3
			PM	13.1	B	14.4	B	1.3

SOURCE: KITTELSON & ASSOCIATES, INC. 2021
BOLD SIGNIFIES UNACCEPTABLE OPERATIONS. TWSC DELAY IS BASED ON THE WORST APPROACH DELAY

EXISTING PLUS PROJECT QUEUE STORAGE

The 95th percentile queues at the study intersections were reviewed in the June 2019 report to identify locations where these may exceed the available storage. Table 15 details the movements which were found to queue beyond their available storage capacity at the 95th percentile demand level under Existing Plus Project conditions in the June 2019 report.

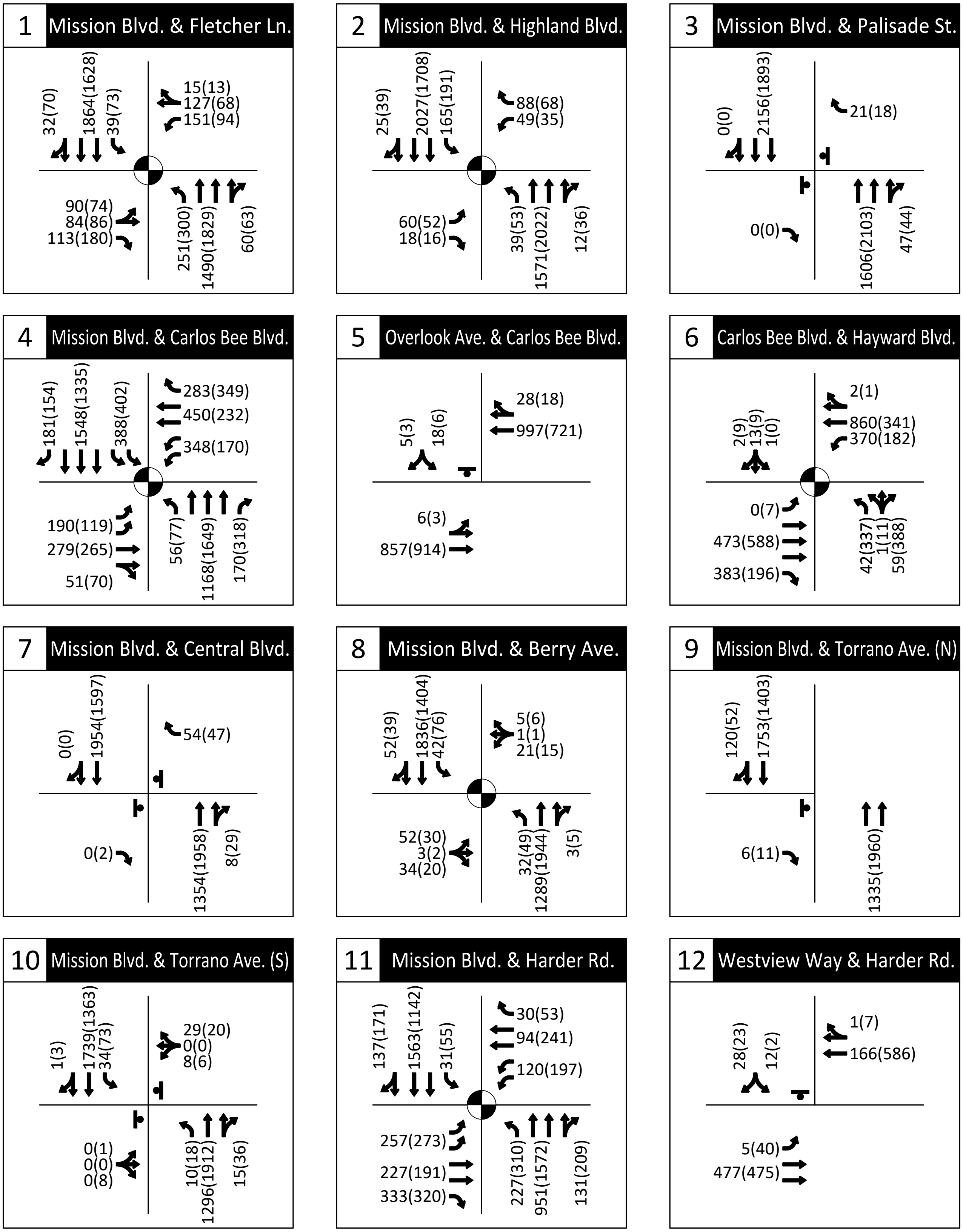
Table 15: Queue Lengths in Excess of Capacity, Existing Plus Project Conditions (June 2019 report)

#	Intersection	Movement	Peak Hour	Description
1	Mission Blvd. & Fletcher Ln.	NBL	PM	This movement, which was already over capacity in the No Project scenario, continues to spill back beyond the length of its exclusive turn lane during the PM peak hour. With the addition of Parcel Group 5 trips, this queue is estimated to increase by three feet (less than one car).
		WBL	AM	This movement, which was already over capacity in the No Project scenario, continues to spill back beyond the length of its lane during the AM peak hour. With the addition of Parcel Group 5 trips, this queue is not estimated to increase.
2	Mission Blvd. & Highland Blvd./Sycamore Ave.	WBT/R	PM	This movement, which was already over capacity in the No Project scenario, continues to spill back to the adjacent intersection during the PM peak hour. With the addition of Parcel Group 5 trips, this queue is estimated to increase by nine feet (less than one car).
		SBL	AM & PM	This movement, which was already over capacity in the No Project scenario, continues to spill back beyond the length of its exclusive turn lane during the AM and PM peak hours. With the addition of Parcel Group 5 trips, these queues are not estimated to increase.
4	Mission Blvd. & Carlos Bee Blvd./Orchard Ave.	WBL	AM	This movement, which was already over capacity in the No Project scenario, continues to spill back beyond the length of its lane during the AM peak hour. With the addition of Parcel Group 5 trips, this queue is not estimated to increase.
6	Carlos Bee Blvd. & Hayward Blvd.	WBL	AM	This movement, which was already over capacity in the No Project scenario, continues to spill back beyond the length of its lane during the AM peak hour. With the addition of Parcel Group 5 trips, this queue is not estimated to increase.
11	Mission Blvd. & Harder Rd.	EBL	AM & PM	This movement, which was already over capacity in the No Project scenario, continues to spill back beyond the length of its exclusive turn lane during the AM and PM peak hours. However, the queues do not spill back to adjacent intersections. With the addition of Parcel Group 5 trips, these queues are not estimated to increase.

Source: Kittelson & Associates, Inc. 2021.

Of the five intersections in Table 15 that experienced excess queuing under Existing Plus Project conditions in the June 2019 report, one intersection (#4 Mission Boulevard & Carlos Bee Boulevard/Orchard Avenue) has updated trip assignment and Existing Plus Project volumes for this LTA. However, the change in project trip assignment does not change the Existing Plus Project queuing results for that intersection; the westbound left turn queuing continues to exceed capacity in the AM peak hour, with no increase in queue length anticipated due to the addition of project trips. Updated queuing spreadsheets are provided in the appendix to this report.

Figure 12: Existing Plus Project Turning Movement Forecasts (Updated)



AM(PM) - Traffic Volume

STOP - All-Way Stop

- Stop Sign

- Traffic Signal

Existing Plus Project Turning Movement Forecasts (Updated)
Hayward, California

Figure
12

KITTELSON & ASSOCIATES

NEW CARLOS BEE BLVD./BUNKER HILL BLVD. INTERSECTION

As detailed in the project description, the project will include a new roadway connection from Bunker Hill Boulevard to Carlos Bee Boulevard (a new side-street stop-controlled intersection). The June 2019 report assessed Existing Plus Project LOS and queuing at this intersection. According to the June 2019 report, operations would be acceptable at the new intersection during both peak hours, and queues would not exceed available storage.

Figure 13 shows the updated Existing Plus Project AM and PM peak hour volumes at the intersection, to reflect this LTA's update to the project trip assignment.

Table 15 and Table 16 show the updated LOS and queuing results for this intersection. As shown in the tables, delay decreases at the intersection and queues are expected to remain below 25 feet, since the update LTA trip assignment reduces the number of project trips using this intersection.

Figure 13: Existing Plus Project Peak Hour Volumes (Carlos Bee Blvd./Bunker Hill Blvd.)

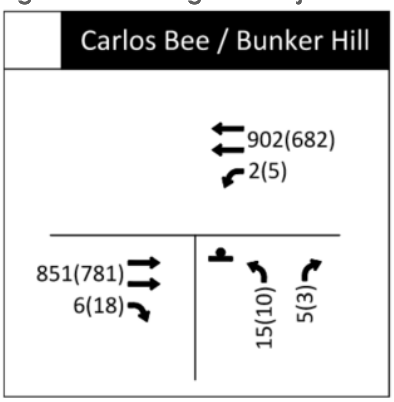


Table 16: Automobile Level of Service, Carlos Bee Blvd./Bunker Hill Blvd. Intersection

Scenario	AM Peak Hour		PM Peak Hour	
	Delay (sec)	LOS	Delay (sec)	LOS
Existing Plus Project (June 2019 Report)	17.4	C	15.8	C
Existing Plus Project (Updated LTA Trip Assignment)	16.1	C	14.9	B

SOURCE: KITTELSON & ASSOCIATES, INC. 2021

Table 17: 95th Percentile Queues, Carlos Bee Blvd./Bunker Hill Blvd. Intersection

Scenario	Northbound Left Queue (feet)		Northbound Right Queue (feet)	
	AM	PM	AM	PM
Existing Plus Project (June 2019 Report)	< 25	< 25	< 25	< 25
Existing Plus Project (Updated LTA Trip Assignment)	< 25	< 25	< 25	< 25

SOURCE: KITTELSON & ASSOCIATES, INC. 2021

RESIDENTIAL STREET ENVIRONMENT

Table 18 shows the existing TIRE index along local residential streets as well as the change resulting from the addition of daily project trips along the segments; note, this analysis was not previously conducted as part of the June 2019 report. As shown in the table, all three segments are expected to experience a traffic change of 0.1 or more, which would be noticeable to street residents. However, all three segments would continue to operate as residential streets. Given the traffic increase would be noticeable to existing residents, traffic calming strategies are recommended. Additional information on recommended traffic calming treatments for the study area is provided in Section 9.

Table 18: Existing Plus Project TIRE Index

Roadway	Existing			Existing Plus Project				
	Daily Volume	Index	Category	Daily Project Trips	Total Daily Volume	Index Change	New Index	Category
Central Boulevard	590	2.8	Residential	273	863	0.1 to 0.2	2.9	Residential
Westview Way	490	2.7	Residential	234	724	0.1 to 0.2	2.9	Residential
Bunker Hill Boulevard	N/A	1.5	Residential	359	359	greater than 0.2	2.6	Residential

SOURCE: KITTELSON & ASSOCIATES, INC. 2021.

Note, there are few occupied residences along Bunker Hill Boulevard at this time. Since traffic data was not collected along this road, existing daily volume is not available. However, the existing daily volume along Bunker Hill Boulevard is expected to be fewer than 30 daily vehicles (based on the expected existing trip generation). Thus, the estimated index change for Bunker Hill Boulevard is a function of it transitioning from a low-use road serving three existing houses, to a road serving as the primary vehicular facility for this new development.

Section 6 — Pedestrian, Bicycle, and Public Transit Assessment

PEDESTRIAN, BICYCLE, AND PUBLIC TRANSIT ASSESSMENT

This section discusses potential project effects on pedestrians, bicyclists, and public transit, as well as overall multimodal accessibility for project users.

PEDESTRIAN ASSESSMENT

As previously discussed, the implementation of the Parcel Group 5 project includes a new segment of the Hayward Foothill Trail, a 16-foot wide multi-use trail, running along the northern boundary of the project site, connecting to the CSUEB campus and then extend south along Bunker Hill Boulevard to terminate at Harder Road. The trail would consist of a 16-foot wide multi-use trail to accommodate pedestrians and bicyclists. In addition, street improvements such as curbs, sidewalks, on-street parking bulb-outs, and lighting will be included along the project roadways. Parcel Group 5 improvements would also include 10.50 acres of dedicated open space located around the drainages at the northern and southern portions of the project site along with tree-lined streets with sidewalks would provide north/south connections throughout the project site. The new access at Bunker Hill Boulevard would be improved to a four-foot wide sidewalk on one side of the roadway and landscaped planting strips on both sides of the roadway. In some locations, bulbouts would be provided.

Outside of the project site, there are limited sidewalks on local residential roads, which are characterized by narrow right-of-way and steep grades. For example, there are no sidewalks (and accompanying facilities such as crosswalks and curb ramps) along Westview Way and along Central Boulevard southeast of Del Mar Avenue. Given the narrow curb-to-curb width, it would not be feasible to install sidewalks along these roads without removing on-street residential parking.

The new project access point along Carlos Bee Boulevard allows people walking to and from the project from the north to avoid local residential roads that do not have pedestrian facilities. However, it may not be the most direct walking route to and from destinations along Mission Boulevard and to the south of the project site. In addition, there are no sidewalks on the south side of Carlos Bee Boulevard. Given that this would serve as a key access point, the project applicant should consider installing crossing facilities such as a rectangular rapid flashing beacon (RRFB) or a pedestrian hybrid beacon (PHB) at the new intersection to give pedestrians access to the sidewalk on the north side of Carlos Bee Boulevard. Should the City install sidewalks on the south side of Carlos Bee Boulevard at a later time, then the project should contribute toward including a high visibility crosswalk across Bunker Hill Boulevard at Carlos Bee Boulevard.

In addition to project users, existing residents may continue to walk along these local residential streets that do not have pedestrian facilities, which would experience increased vehicle volumes due to the project. Since it would not be feasible to add sidewalks along these roads, traffic calming measures should be implemented along Westview Way and along Central Boulevard (southeast of Del Mar Avenue) to reduce vehicle speeds. Specific traffic calming recommendations and concept plans are detailed in Section 9 of this report.

Central Boulevard west of Del Mar Avenue may be used by project users to walk to and from Mission Boulevard. In addition, project trips may result in increased traffic along this segment, affecting existing pedestrians along this segment. Currently, there are sidewalks along this segment as well as a continental crosswalk at the intersection with Mission Boulevard. Improved and additional crosswalks should be implemented in combination with traffic calming measures. Additional information is provided in Section 9 of this report.

The Westview Way/Harder Road intersection would serve as a key access point for pedestrians traveling to and from the south, and serves as an existing route for pedestrians to and from existing houses in the study area. Traffic calming measures described in Section 9 can address the pedestrian experience along Westview Way.

BICYCLE ASSESSMENT

As previously discussed, existing bike facilities near the project include Class II bike lanes on Harder Road west of West Loop Road (eastbound-only bike lane between Westview Way and West Loop Road). Planned bikeways include Class IV separated bike lanes along Mission Boulevard, Harder Road (west of W. Loop Road), and Carlos Bee Boulevard (between Mission Boulevard and Hayward Boulevard).

The conditions for bicyclists navigating the residential roads within and adjacent to the project site are similar to the pedestrian conditions described earlier in this section. There are currently no dedicated bike facilities along streets such as Westview Way and Central Boulevard. Existing residents as well as project users accessing the project on a bike would need to navigate narrow steep residential roads. Installing bike lanes on these roads would likely be infeasible due to the narrow curb-to-curb width as well as the presence of on-street parking. However, given the relatively low volumes and speeds on these roads, bicyclists can be accommodated by implementing Class III bike routes along Westview Way and Central Boulevard, with the appropriate signage and shared lane markings (sharrows). Bike routes should be implemented alongside traffic calming measures to manage vehicle speeds; more information is provided in Section 9 of this report.

Given that Class IV separated bike lanes are planned along Carlos Bee Boulevard and Harder Road and the project is expected to increase vehicle volumes at these locations, improvements should be installed at the Bunker Hill Boulevard/Carlos Bee Boulevard and Westview Way/Harder Road intersections. Recommended improvements include green conflict paint along the Harder Road bike lanes crossing Westview Way and along the Carlos Bee Boulevard bike lanes crossing Bunker Hill Boulevard, and bikeway signage and caution signage at and approaching these intersections for all intersection legs.

PUBLIC TRANSIT ASSESSMENT

The Project is not expected to increase traffic levels at intersections serving local AC Transit buses to levels that would require improvements under the Existing Plus Project scenario. In addition, pedestrian access to local bus stops can be addressed by implementing the pedestrian-oriented improvements detailed earlier in this section.

Section 7 — Parking Analysis

PARKING ANALYSIS

Given the potential for spillover parking onto adjacent residential streets, this chapter compares the proposed project's parking supply (including on-street parking) to the expected demand, including demand generated by the project's ADUs.

The project's supply is shown in Figure 14 and Table 19. As shown in the table, a total of 406 spaces will be provided, of which 100 are on-street spaces, 148 are driveway spaces, and 158 are garage spaces.

Table 19: Project Parking Supply

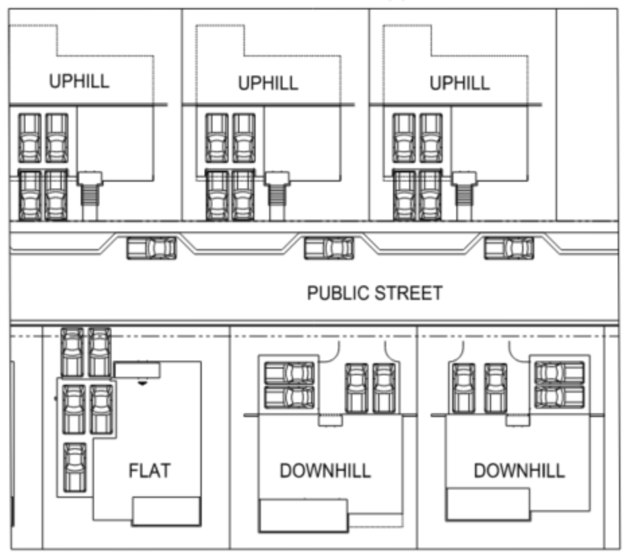
Type of Space	Number of Spaces
On-Street	100
Driveway	148
Garage	158
Total	***406***

The Urban Land Institute (ULI) publishes typical parking demand rates for various land uses based on data collected in the field. The ULI observed weekend peak parking demand rates for residential projects are listed below:

- Studio – 1.00 spaces per unit
- 1 bedroom – 1.05 per unit
- 2 bedroom – 1.80 per unit
- 3 or more bedrooms– 2.65 per unit

Given that each single-family home in the project will have four bedrooms and conservatively assuming that each ADU will have one bedroom, the weekend peak parking demand for the project is estimated to be 205 spaces. Therefore, the projects supply of 406 parking spaces will adequately accommodate peak demand. Should garage spaces not be included in the calculation (e.g., used by residents for storage) the supply of on-street and driveway spaces (248) should still be sufficient to meet the peak demand of 205.

Figure 14: Parking Plan

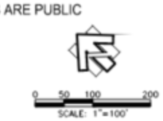


TYPICAL PARKING DETAIL

PARKING SUMMARY	
NUMBER OF UNITS	74
ON-STREET	
ALWAYS AVAILABLE	100
OBSTRUCTED ON GARBAGE DAY	N/A
TOTAL ON STREET PARKING	100
OFF-STREET	
DRIVEWAY (2/LOT @ 20' DEEP)	148
GARAGE (2/LOT)	128
GARAGE (3/LOT)	30
TOTAL OFF STREET PARKING	306
TOTAL PARKING PROVIDED	406

LEGEND
ON-STREET PARKING

NOTES:
ALL STREETS ARE PUBLIC



Source: MacKay & Somps
Dated May 14, 2021; Received May 19, 2021

Section 8 — Circulation and Access

CIRCULATION AND ACCESS

This section provides an overview of site access and on-site and local circulation.

SIGHT DISTANCE

Sight distance was assessed at the proposed access point at the new Bunker Hill Boulevard/Carlos Bee Boulevard intersection.

The line of sight for the exiting stop-controlled movements at this location was analyzed to ensure that adequate sight distances are provided for vehicles to see pedestrians, bicycles, and vehicles approaching the driveway. Line of sight was analyzed using standards and methodologies described in the American Association of State Highway and Transportation Officials (AASHTO) Geometric Design of Highways and Streets. AASHTO standards were used to develop departure sight triangles at the intersection that should be unobstructed for vehicles to provide sufficient view of approaching vehicles, bicycles, and pedestrians.

AASHTO recommends that the driver decision point of the sight triangle (the short side) should be 14.5 feet from the major road traveled way. However, where practical, AASHTO recommends increasing the distance to 18 feet. Given that protected bike lanes are planned along Carlos Bee Boulevard, a decision point of 18 feet was assumed for the intersection.

The following formula was used to calculate the necessary intersection sight distance:

$$ISD = 1.47 * V_{major} * t_g$$

where:

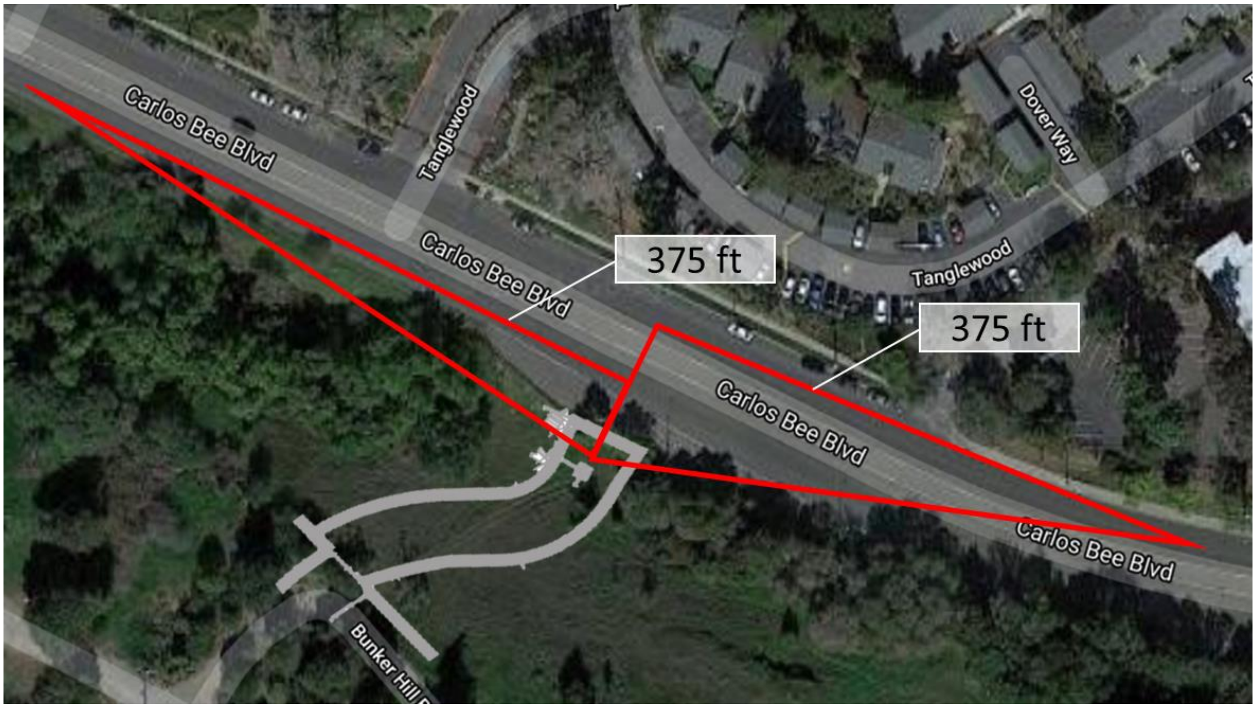
ISD = intersection sight distance (length of the leg of sight distance triangle along major road) (ft)

V_{major} = design speed of major road (mph)

t_g = time gap for minor road vehicle to enter the major road (s)

Assuming a passenger car time gap of 8.5 seconds (based on AASHTO) and a speed limit of 30 mph along Carlos Bee Boulevard, the intersection sight distances were calculated and recommended departure sight triangles are shown in Figure 15. As shown in the figure, 375 feet of sight distance is needed to the left (for exiting right-turning vehicles) and to the right (for exiting left-turning vehicles). Obstructions consist of trees. Therefore, it is recommended that when the Bunker Hill Boulevard intersection is being constructed, visual obstructions such as brush and landscaping should be cleared from the sight triangle area as shown in Figure 15.

Figure 15: Bunker Hill Blvd./Carlos Bee Blvd. Departure Sight Triangles



TRAFFIC CONTROLS

Intersection traffic controls in and around the project site were reviewed to determine if changes would be needed (e.g., due to limited visibility).

Residential street intersections in and around the project site consist of two-way stop controls (in other words only the minor approach must stop). This type of intersection control is present at intersections such as:

- Bunker Hill Court/Bunker Hill Boulevard
- Central Court/Central Boulevard
- Central Boulevard/Maitland Drive (north)
- Central Boulevard/Maitland Drive (south)
- Westview Way/Harder Road
- Del Mar Avenue/Central Boulevard
- Belmont Avenue/Central Boulevard
- Mission Boulevard/Central Boulevard
- Bunker Hill Boulevard/Carlos Bee Boulevard (proposed project access point)

The T-intersection of Westview Way and Central Boulevard has a unique intersection control configuration in that northbound and westbound traffic must stop, but southbound vehicles are not controlled.

Generally, this type of intersection control is appropriate for residential street intersections in and around the project site due to the relatively low traffic volumes and vehicle speeds as well as good visibility. However, the following intersections should be improved:

- **Westview Way/Central Boulevard**: This T-intersection has a unique configuration where southbound vehicles do not stop. In addition, the westbound stop sign and stop bar are set back from the intersection, potentially limiting visibility; westbound vehicles also have a very wide right turn, which can result in drivers missing the stop sign and driving at high speeds. To improve visibility and safety for all approaches, as well as address vehicle speeds and multimodal safety, improvements should be implemented at this intersection. A stop sign should be added at the southbound approach, and the westbound stop sign and stop bar should be moved approximately 35 feet closer to the intersection and the right turn tightened. This configuration is illustrated as part of the traffic calming concept plans in Section 9 of this report.

- **Westview Way/Harder Road**: The Westview Way approach is stop-controlled, while vehicles approaching along Harder Road are not; this includes vehicles traveling downhill towards Mission Boulevard. Vehicles exiting from Westview Way onto Harder Road may have difficulty seeing downhill vehicles due to the grade crest; in addition, exiting left-turning vehicles may have difficulty seeing approaching uphill vehicles due to median trees. These left-turning vehicles would need to be mindful of both of these approaches since the intersection is not fully controlled. In addition, the wide northeast curb at this intersection could result in downhill vehicles making a right turn from Harder Road onto Westview Way traveling at unsafe speeds. This intersection approach could be improved by adding a dedicated right turn lane (to allow deceleration) and tightening the curb. This configuration is illustrated as part of the traffic calming concept plans in Section 9 of this report.

TRUCK ACCESS

Given the narrow roads and presence of on-street parking, the project access points and roadway network was assessed to see if there would be sufficient curb-to-curb space for fire trucks and garbage trucks. The analysis was conducted using AutoCAD AutoTurn templates. The fire truck templates are shown in Figure 16 and Figure 17; the garbage truck templates are shown in Figure 18 and Figure 19. As shown in the figures, standard fire trucks and garbage trucks can navigate the project site to and from Carlos Bee Boulevard and Harder Road, including roadway segments with on-street parking.

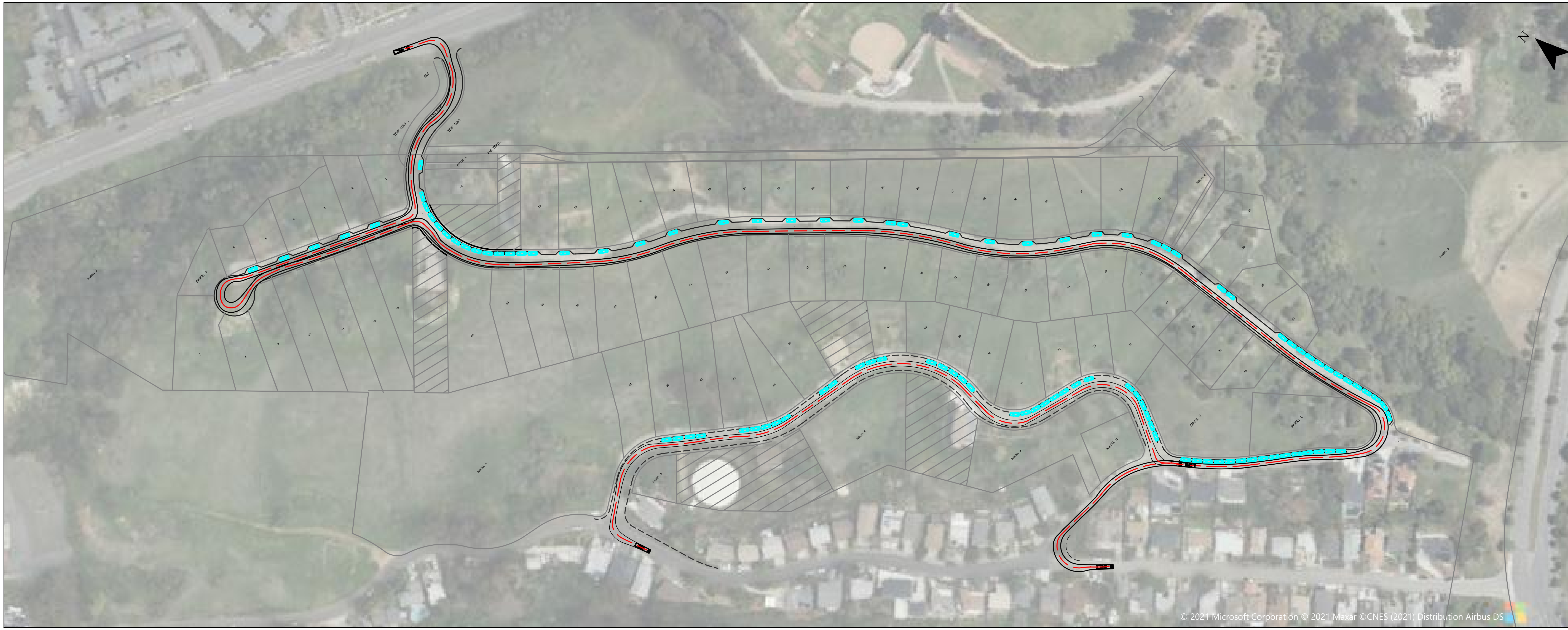
PASSENGER VEHICLE ACCESS

AutoTurn templates were not prepared for passenger vehicles, since the fire truck and garbage truck templates represent the largest vehicles expected to enter and exit the site. Given the results of the truck turning templates, it is expected that the access points and roadway network are sufficient to accommodate passenger vehicles. In addition, the exiting vehicle queues at the Bunker Hill Boulevard/Carlos Bee Boulevard and Westview Way/Harder Road intersections are not expected to exceed 25 feet. In addition, a single outbound lane at the planned Bunker Hill Boulevard/Carlos Bee Boulevard intersection is sufficient, especially since exiting vehicles are expected to primarily turn left to exit.

PEDESTRIANS AND BICYCLISTS

As detailed in Section 6, the project will include access to the Hayward Foothill Trail as well as facilities such as sidewalks, curb ramps, and on-street parking bulbouts. However, connectivity to the project is limited due to factors such as limited sidewalk coverage on local residential roads and adjacent arterial roads. Recommended pedestrian-oriented improvements are detailed in Section 6; in addition, traffic calming measures to reduce vehicles streets on local residential roads are detailed in Section 9.

Similar to pedestrians, bicyclists face a lack of suitable facilities to access the project site, since existing bike lanes are limited. However, protected bike lanes are planned along Carlos Bee Boulevard and along Harder Road. Recommended bicycle-oriented improvements are detailed in Section 6; in addition, traffic calming measures to reduce vehicles streets on local residential roads are detailed in Section 9.

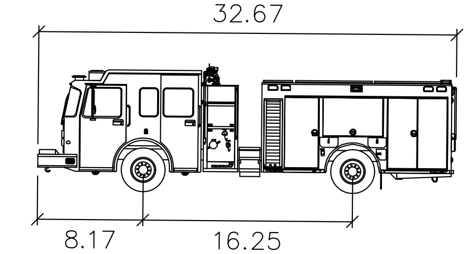


Legend:
- Parked Car
- Existing Top of Curb
- Proposed Top of Curb
- Truck Centerline

Turning Movements Analysed at 5 MPH.

Scale: 1" = 200'

200 100 0 200



Toyne Pumper

	feet
Width	: 8.35
Track	: 7.93
Lock to Lock Time	: 6.0
Steering Angle	: 50.0

Fire Truck Turning (Southbound)
Hayward, CA

Figure 16

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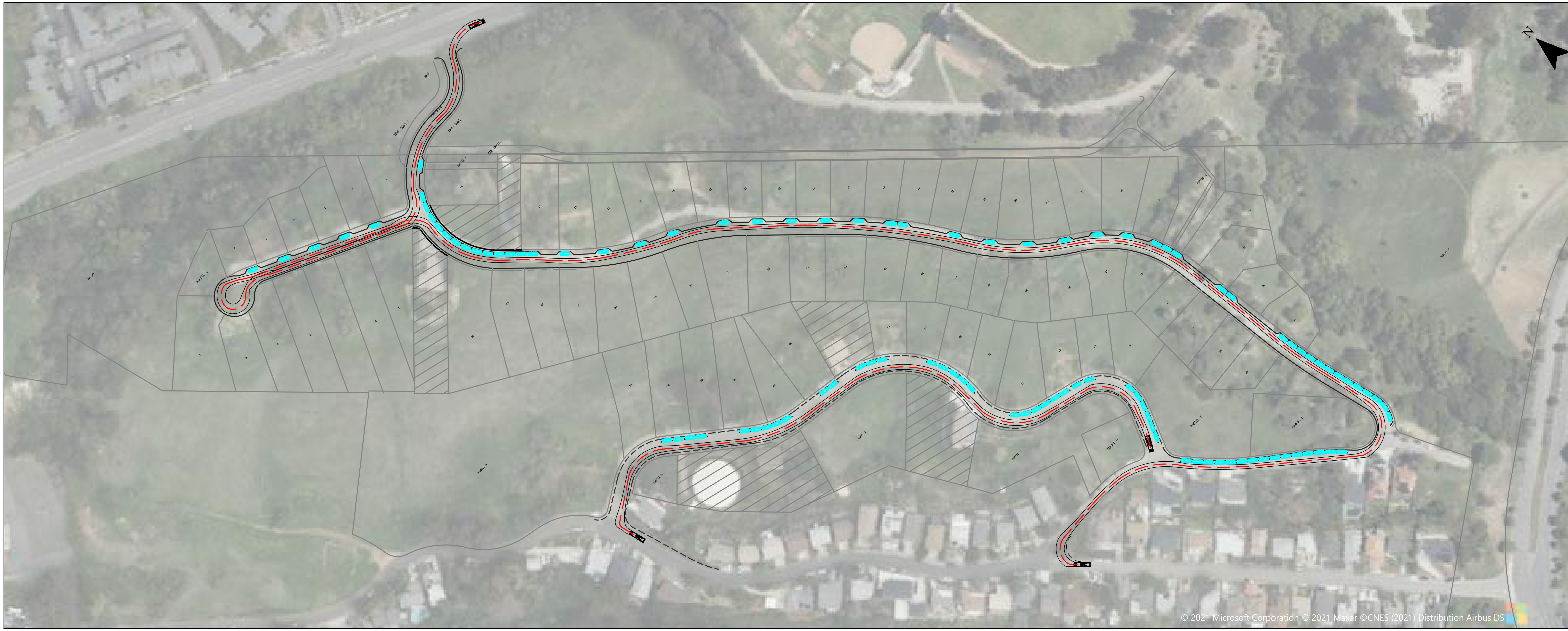
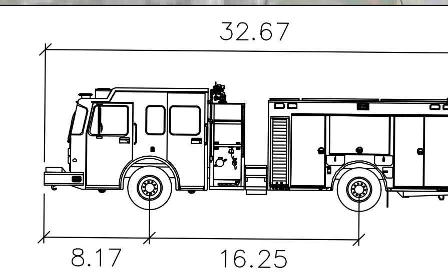
KITTELSON & ASSOCIATES



Legend:
- Parked Car
- Existing Top of Curb
- Proposed Top of Curb
- Truck Centerline



Toyne Pumper

	feet
Width	: 8.35
Track	: 7.93
Lock to Lock Time	: 6.0
Steering Angle	: 50.0

Scale: 1" = 200'

200 100 0 200

Turning Movements Analysed at 5 MPH.

Fire Truck Turning (Northbound)
Hayward, CA

Figure
17

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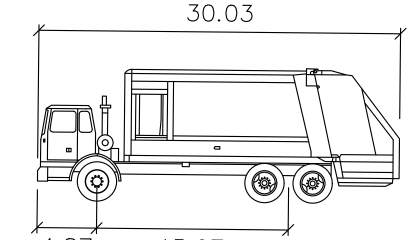
KITTELSON & ASSOCIATES

Legend:
- Parked Car
- Existing Top of Curb
- Proposed Top of Curb
- Truck Centerline



Heil DuraPack 5000

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 45.0

Scale: 1" = 200'

200 100 0 200

Turning Movements Analysed at 5 MPH.

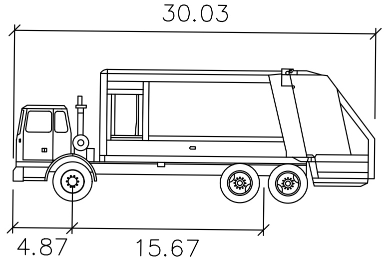
Garbage Truck Turning (Southbound)
Hayward, CA

Figure 18

H:\26\26151 - Parcel 5 Local Transportation Analysis\Analysis\AutoTurn\26151-Hayward Parcel 5 Auto Turn.dwg Jun 15, 2021 - 3:44pm - bhelm Layout Tab: 3

KITTELSON & ASSOCIATES

Legend:
- Parked Car
- Existing Top of Curb
- Proposed Top of Curb
- Truck Centerline



Heil DuraPack 5000

	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 45.0

Scale: 1" = 200'

200 100 0 200

Turning Movements Analysed at 5 MPH.

Garbage Truck Turning (Northbound)
Hayward, CA

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Section 9 — Traffic Calming

TRAFFIC CALMING

Given the potential for project trips to cut through adjacent residential areas via Central Boulevard and Westview Way, the City has requested examining opportunities to implement traffic calming measures to reduce effects on adjacent residences. These measures can also manage vehicle speeds to address pedestrian and bicyclist safety concerns.

Generally, pass-through vehicle concerns can be addressed with traffic calming measures to slow vehicles down to safer speeds.

Examples of traffic calming measures included in the City's Neighborhood Traffic Calming Program (NTCP) are as follows:

- Edgeline/Centerline Striping
- Target Speed Enforcement
- Speed Legends
- Signage
- Botts Dots/Raised Reflectors
- High Visibility Crosswalks
- Increased Patrol and Warning/Citations
- Speed Feedback Signs
- Flashing Beacons
- Road Diet
- Angled Parking
- Bulbouts
- Two Lane Chokers
- Center Island Narrowing/Pedestrian Refuge
- Traffic Circles
- Roundabouts (Single lane)
- Lateral Shifts
- Chicanes
- Speed Lumps
- Raised Crosswalks
- Raised Intersections
- Diagonal Diverters
- Partial Closures
- Full Closures
- Forced Turn Islands

Three locations along Westview Way and Central Boulevard were examined for traffic calming opportunities. Existing traffic volumes and the estimated project contributions are provided in Table 20. Note, daily vehicle volumes were estimated by multiplying existing PM peak hour volumes along the segments by 10.

Table 20: Anticipated Project Trip Contribution (Westview Way and Central Avenue)

Street	Existing Daily Volume	Project Contribution	Total Daily Volume
Central Boulevard	590	273	863
Westview Way	490	234	724

Given the constrained right-of-way and the presence of on-street parking, the number of applicable traffic calming techniques for the study area is limited. Most measures included in the NTCP are not applicable due to this area's land use and transportation context as well as the severe physical constraints; therefore, applicable measures are generally limited to striping, marked pedestrian crossings, and signage. Traffic calming concept plans were developed for two locations and potential traffic calming improvements developed for one location listed below. As part of the measures to reduce vehicle speeds, the concept plans also include improvements recommended earlier in this report to address bike access, pedestrian access, and intersection controls.

- **Westview Way at Harder Road**: Figure 20 presents the recommendations for Westview Way at Harder Road. As shown in the figure, a centerline is recommended for the entire length of Westview Way, to delineate the path of travel and reduce the perceived width. Signage is recommended to increase driver awareness of upcoming stop signs and the roadway's speed limit. Sharrows are also recommended, both to provide a marked facility for bicyclists and to also increase driver awareness of bicyclists along that segment. At the Westview Way/Harder Road intersection, the concept plan includes tightening both curbs. This can help reduce inbound and outbound vehicle speeds, especially for incoming southbound vehicles. In addition, a dedicated right turn lane is recommended to allow deceleration. Once the planned protected bike lanes along Harder Road are built, a green conflict zone should be included at the intersection.

- **Central Boulevard at Westview Way**: Figure 21 presents the recommendations for Central Boulevard at Westview Way. Similar to the Westview Way recommendations, a centerline and sharrows are recommended along Central Boulevard. To reduce westbound vehicle speeds and improve visibility, the westbound stop sign and stop bar should be moved approximately 35 feet closer to the intersection, paired with tightening the curb radius to reduce westbound right-turn speeds. Warning signage should also be added ahead of the westbound stop sign. In addition, a stop sign and stop bar should be added to the southbound approach (currently uncontrolled) to reduce confusion, reduce speeds, and improve safety and visibility at the intersection.

- **Central Boulevard at Belmont Avenue and Del Mar Avenue**: Figure 22 presents the recommendations for Central Boulevard at Belmont Avenue and Del Mar Avenue.
  - A centerline and sharrows are recommended along Central Boulevard until Mission Boulevard. Traffic circles at both intersections, paired with striping to reduce the approach lane width and laterally shift the approach, can help reduce vehicle speeds. In addition, traffic circles provide the opportunity to add high-visibility continental crosswalks on all four intersection legs to accommodate pedestrian crossings and increase driver awareness.

    Other traffic calming measures could be considered at this location either in combination with those recommended in Figure 22, or as alternate measures. However, the selected traffic calming measures should provide the same benefit as the measures recommended in Figure 22 (centerline, sharrows, traffic circles). Other traffic calming measures could include:
    - Speed legends
    - Signage
    - High visibility continental crosswalks
    - Speed lumps

While not shown in the three concept plans, centerline striping and sharrows should be provided along the entirety of Westview Way as well as Central Boulevard from Westview Way to Mission Boulevard. In addition, signage should be added along Central Boulevard near its intersection with Maitland Drive (north) warning drivers of the speed limit and upcoming stop signs; speed cushions should also be considered given the long distance between stop signs along this segment.

Note, traffic calming measures and designs are subject to further Engineering review.

Scale: 1" = 50'

50 25 0 50

Westview Way at Harder Road
Traffic Calming Concept Plan

Figure
20

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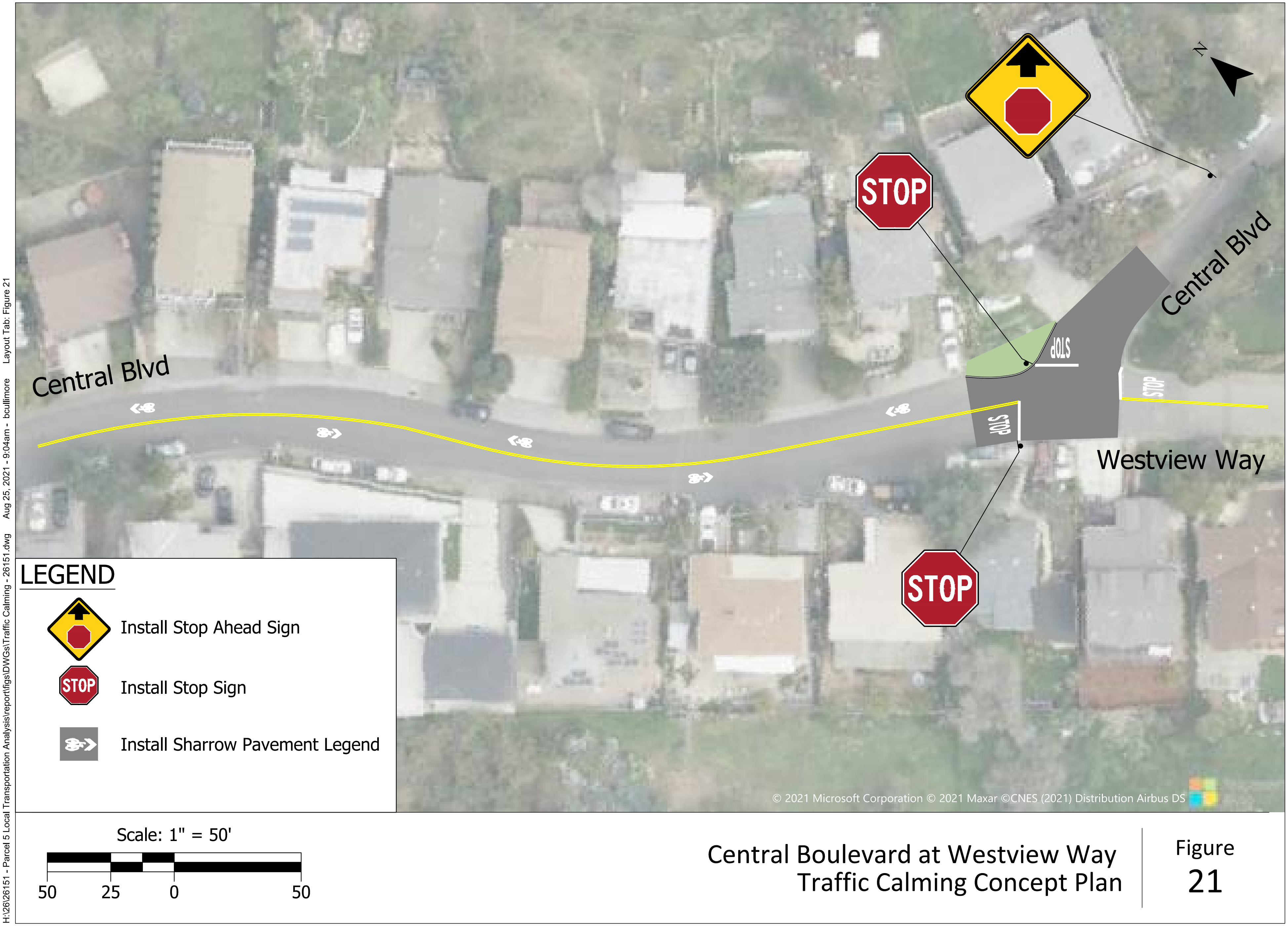

Central Boulevard at Westview Way
Traffic Calming Concept Plan

Figure 21

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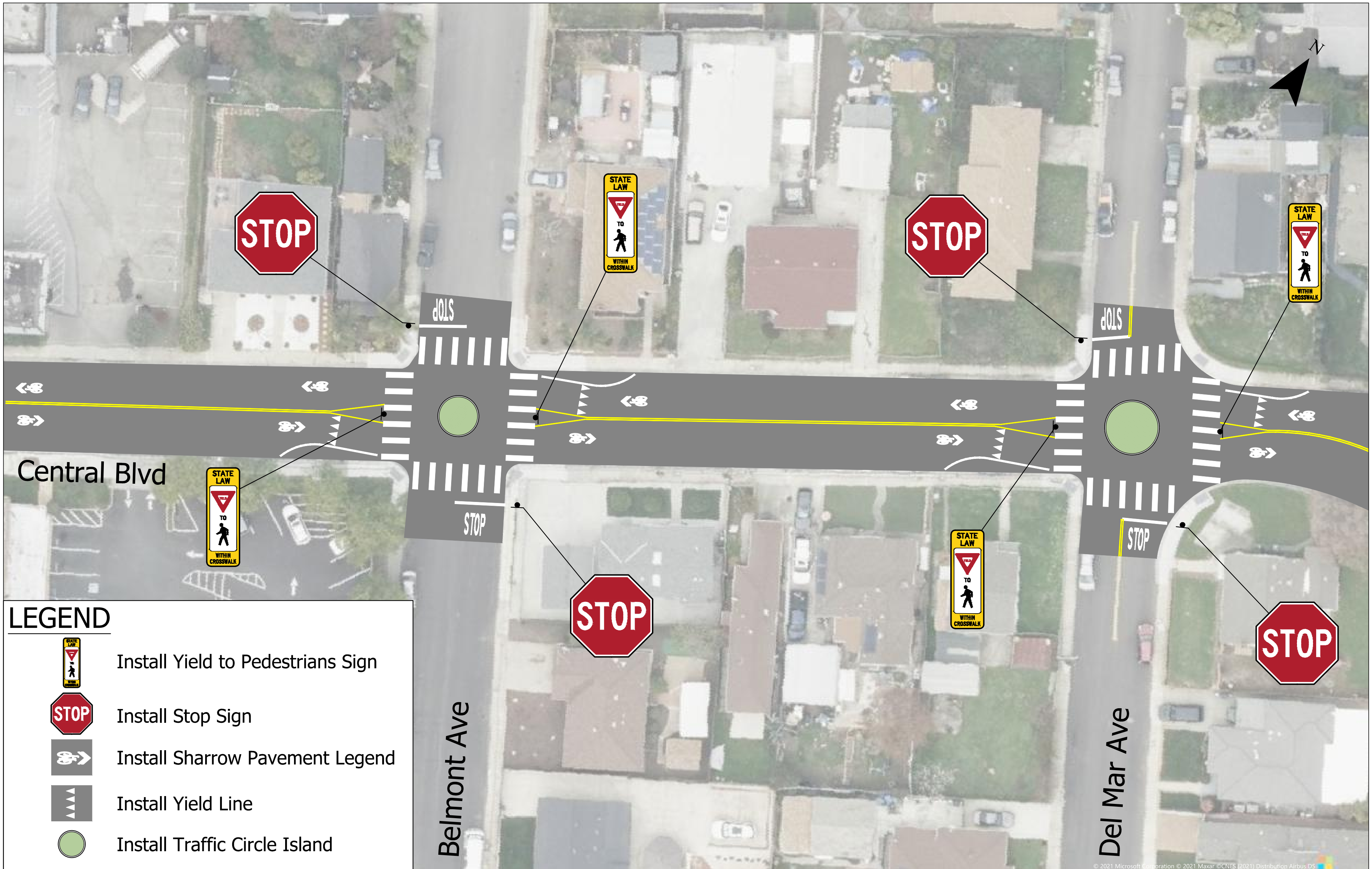

Scale: 1" = 50'

50 25 0 50

Central Boulevard at Belmont Avenue and Del Mar Avenue
Potential Traffic Calming Improvements

Figure 22

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Section 10 — VMT Reduction Measures

VMT REDUCTION MEASURES

The City has asked that this project's LTA include recommended measures and improvements to potentially reduce vehicle trips generated by the project. These recommendations are primarily associated with City requirements for the project applicant and could potentially be included as part of any conditions of approval requested by the City. Therefore, this analysis will be qualitative and quantified trip reductions will not be included.

The City's Transportation Impact Guidelines include relevant VMT reduction measures from the California Air Pollution Control Officers Association (CAPCOA), San Diego Association of Governments (SANDAG), Alameda CTC, and the City of San Jose; the City's VMT mitigation matrix is included as Appendix 6 to this LTA.

Given that this project consists entirely of single-family residential uses, the recommendations in this chapter will primarily focus on strategies for trip reductions from multimodal improvements to the community. On-site reduction strategies that are generally used for multifamily or office projects would not be applicable. In addition, it is assumed that this project's placement and density/land use mix would not be modified; measures to reduce VMT through land use mix or location are therefore not included.

Potential VMT reduction measures for the project include:

- Parking Management
  - Parking Pricing (e.g., residential permit programs)
  - Parking Supply Reduction
- Neighborhood Enhancements
  - Street Connectivity Improvement
  - Pedestrian Facility Improvement
  - Bikeway Network Expansion
  - Bike Facility Improvement
  - Bikeshare
  - Carshare
  - Community-Based Travel Planning
- Transit Strategies
  - Transit Service Expansion
  - Transit Frequency Improvements
  - Transit-Supportive Treatments
  - Transit Fare Reduction
  - Microtransit NEV Shuttle
- Residential Transportation Demand Management (TDM) Measures
  - Transit Pass for Residents
  - School Pool
  - Voluntary TDM Marketing

PROJECT FEATURES

The proposed project includes features that can help reduce project-generated VMT:

- **Street Connectivity Improvement**: The project includes replacing the existing Bunker Hill Boulevard cul-de-sac with a full-access unsignalized intersection at Carlos Bee Boulevard, improving accessibility.
- **Pedestrian Facility Improvement**: The project includes pedestrian-oriented improvements along Bunker Hill Boulevard and Maitland Drive such as sidewalks and on-street parking bulbouts (which can help increase the sidewalk buffer).

RECOMMENDED OFF-SITE IMPROVEMENTS

Other measures can also be applied to reduce project-generated VMT. However, the majority of the measures included in the City's guidelines would not be applicable or feasible for this project, as noted below:

- Parking pricing or supply reductions are likely not feasible as a standalone measure due to the potential parking demand spillover into adjacent residential streets.
- Transit strategies are either outside of the City's control or beyond the scope and area of this project.
- Bikeshare station implementation is not feasible since it would not be in proximity of a bikeshare network.
- Carshare would not be feasible since the project is generally isolated and low-density.

However, pedestrian and bicycle improvements in the project's vicinity can help reduce the project's vehicle trip generation and VMT. Several opportunities exist, as detailed below. Approximate costs are included (sourced from Appendix F of the City's BPMP) as well as the proposed project's fair share percentages.

- **Pedestrian Facility Improvement**: Currently, the sidewalk on the north side of Harder Road runs from Mission Boulevard to Bryn Mawr Avenue; there are no sidewalks between Bryn Mawr Avenue and Westview Way. Filling in this key sidewalk gap would improve pedestrian accessibility between Westview Way and Mission Boulevard, with its numerous destinations. This improvement could be used by both the proposed project as well as existing residents in the area.
  - The approximate cost for this improvement would be $152,000, based on unit costs from Appendix F of the City's BPMP. This assumes 428 cubic yards of excavation at a unit cost of $15, 3,850 square feet of concrete sidewalk at a unit cost of $17, and one ADA curb ramp at a unit cost of $4,700. This cost also includes soft costs such as traffic control, construction management, mobilization, and design/inspection (65% of material costs) and contingency (20% of the subtotal).
  - The existing daily vehicular volume along this segment of Harder Road is approximately 10,130 cars (assuming PM peak hour volumes represent 10% of daily volumes). The project is expected to increase daily volumes on this segment by 217, resulting in an existing plus project volume of 10,347. The project share of daily volumes (and its percent contribution to this improvement's cost) is therefore approximately 2.1%. The project's fair share contribution to this improvement (including soft costs and contingency) would be approximately $3,200.
- **Bike Facility Improvement**: The City's BPMP includes planned Class IV protected bike lanes along Harder Road. This project should contribute its fair share to building the portion of the protected bike lanes between Mission Boulevard and Westview Way. This way, project users and local residents have a way to get to and from Mission Boulevard on bike, and can connect to planned protected bike lanes along Mission Boulevard.
  - The BPMP includes a low-cost assumption for protected bike lanes ($336,000 per mile) and a high-cost assumption ($1,219,000 per mile). Given present constraints such as a steep incline and curve, it is assumed that the higher-end cost is more applicable. Assuming a length of 0.24 miles, the cost would be approximately $293,000.
  - The existing daily vehicular volume along this segment of Harder Road is approximately 10,130 cars (assuming PM peak hour volumes represent 10% of daily volumes). The project is expected to increase daily volumes on this segment by 217, resulting in an existing plus project volume of 10,347. The project share of daily volumes (and its percent contribution to this improvement's cost) is therefore approximately 2.1%. The project's fair share contribution to this improvement (including soft costs and contingency) would be approximately $6,100.

- **Bike Facility Improvement**: The City's BPMP also includes planned Class IV protected bike lanes along Carlos Bee Boulevard. The project should contribute its fair share to building the portion of the protected bike lanes between Mission Boulevard and Bunker Hill Boulevard, to improve local bicycling connectivity to Mission Boulevard.
  - The BPMP's high-cost assumption ($1,219,000 per mile) would be applicable, given the steep incline and curve. Assuming a length of 0.46 miles, the cost would be approximately $561,000.
  - The existing daily vehicular volume along this segment of Harder Road is approximately 16,507 cars (assuming PM peak hour volumes represent 10% of daily volumes). The project is expected to increase daily volumes on this segment by 273, resulting in an existing plus project volume of 16,779. The project share of daily volumes (and its percent contribution to this improvement's cost) is therefore approximately 1.6%. The project's fair share contribution to this improvement (including soft costs and contingency) would be approximately $9,000.

In total, the project's fair share contribution for these pedestrian and bicycle projects is approximately $18,300.

Section 11 — Summary of Findings and Recommendations

SUMMARY OF FINDINGS AND RECOMMENDATIONS

The *Route 238 Property Development Project (Parcel Group 5 and Parcel Group 6) Transportation Impact Analysis Report* previously did not determine any Existing Plus Project traffic impacts resulting from PG 5 vehicle trips under Existing Plus Project conditions.

Additionally, this LTA report did not find any additional deficiencies in study area traffic operations and queuing, project access and circulation for trucks and passenger vehicles, and parking supply.

RECOMMENDED MULTIMODAL IMPROVEMENTS

To address pedestrian, bicyclist, and transit user accessibility and conditions, the project applicant should work with the City to implement the following multimodal improvements:

- Install crossing facilities such as a rectangular rapid flashing beacon (RRFB) or a pedestrian hybrid beacon (PHB) at the planned unsignalized Bunker Hill Boulevard/Carlos Bee Boulevard intersection to give pedestrians access to the sidewalk on the north side of Carlos Bee Boulevard. Should the City install sidewalks on the south side of Carlos Bee Boulevard at a later time, then a high visibility crosswalk should be installed across Bunker Hill Boulevard at Carlos Bee Boulevard.
- Implement Class III bike routes with sharrows along Westview Way and Central Boulevard.
- Given that Class IV separated bike lanes are planned along Carlos Bee Boulevard and Harder Road and the project is expected to increase vehicle volumes at these locations, improvements should be installed at the Bunker Hill Boulevard/Carlos Bee Boulevard and Westview Way/Harder Road intersections. Recommended improvements include green conflict paint along the Harder Road bike lanes crossing Westview Way and along the Carlos Bee Boulevard bike lanes crossing Bunker Hill Boulevard, and bikeway signage and caution signage at and approaching these intersections for all intersection legs.
- To improve sight distance for exiting vehicles at the planned Bunker Hill Boulevard/Carlos Bee Boulevard intersection, it is recommended that when the intersection is being constructed, visual obstructions such as brush and landscaping should be cleared from the sight triangle area as shown in Figure 15.
- Improve the Westview Way/Central Boulevard T-intersection by adding a stop sign at the southbound approach. At the westbound approach, the westbound stop sign and stop bar should be moved approximately 35 feet closer to the intersection and the right turn tightened.
- Improve the Westview Way/Harder Road intersection by adding a dedicated right turn lane (to allow deceleration) and tightening the curb.

RECOMMENDED TRAFFIC CALMING TREATMENTS

To manage vehicle speeds and volumes along residential roads, the project applicant should work with the City to implement traffic calming strategies along local residential streets, which can also improve multimodal conditions. Concept design plans are provided for two locations with potential traffic calming improvements also developed for a third location: Westview Way at Harder Road, Central Boulevard at Westview Way, and Central Boulevard at Belmont Avenue and Del Mar Avenue. Note, traffic calming measures and designs are subject to further Engineering review.

- **Westview Way at Harder Road**: Install a centerline, stop sign and speed limit warning signage, and sharrows. At the Westview Way/Harder Road intersection, tighten curbs, install a dedicated westbound right turn lane, and add a green bike conflict zone.
- **Central Boulevard at Westview Way**: Install a centerline and sharrows. Move the westbound stop sign and stop bar approximately 35 feet closer to the intersection and tighten the curb radius. Install warning signage. Install a stop sign and stop bar to the southbound approach.
- **Central Boulevard at Belmont Avenue and Del Mar Avenue:** Install a centerline and sharrows along Central Boulevard until Mission Boulevard along with traffic circles at both intersections, paired with striping and high-visibility continental crosswalks. Other potential traffic calming improvements that could be applied at this location include speed legends, signage, high visibility continental crosswalks, and speed lumps.
- Centerline striping and sharrows should be provided along the entirety of Westview Way as well as Central Boulevard from Westview Way to Mission Boulevard. Signage should be added along Central Boulevard near its intersection with Maitland Drive (north) warning drivers of the speed limit and upcoming stop signs; speed cushions should also be considered given the long distance between stop signs along this segment.

RECOMMENDED VMT REDUCTION MEASURES

To reduce project-generated vehicle trips and VMT, the project applicant should contribute fair share costs to the following off-site improvements:

- Fill in the sidewalk gap on the north side of Harder Road between Bryn Mawr Avenue and Westview Way.
- Construct planned protected bike lanes along Harder Road between Mission Boulevard and Westview Way.
- Construct planned protected bike lanes along Carlos Bee Boulevard between Mission Boulevard and Bunker Hill Boulevard.

Cost estimates and fair share contributions for these improvements are shown in the table below.

Table 21: Recommended VMT Reduction Measures Fair Share Contributions

Improvement	Total Cost	Project Contribution (%)	Project Fair Share Contribution ($)
Harder Road Sidewalk	$152,000	2.1%	$3,200
Harder Road Bike Lanes	$293,000	2.1%	$6,100.
Carlos Bee Boulevard Bike Lanes	$561,000	1.6%	$9,000

Appendix 1 — Traffic Counts

Appendix 2 — Existing Level of Service, Queuing, and Peak Hour Traffic Signal Warrants Worksheets

Appendix 3 — Intersection Queuing Analysis Spreadsheets (June 2019 and Updated)

Appendix 4 — Existing Plus Project Level of Service, Queuing, and Peak Hour Traffic Signal Warrants Worksheets (June 2019 Report)

Appendix 5 — Existing Plus Project Level of Service and Queuing Worksheets (Updated)

Appendix 6 — VMT Reduction Strategies