

EXHIBIT "B"

ENGINEERING AND TRAFFIC SURVEY FOR SPEED LIMITS

Final Report

August 26, 2016

Prepared for:

CITY OF EMERYVILLE

Prepared by: **Kimley»»Horn**

CERTIFICATION

I, Robert V. Paderna, do hereby certify that this Engineering and Traffic Survey for the City of Emeryville was performed under my supervision. I certify that I am experienced in performing surveys of this type and duly registered in the State of California as a professional Civil Engineer.

Robert V. Paderna, PE
RCE# 73262
Exp. 12/31/2016

Approved by:

Maurice Kaufman
Public Works Director/City Engineer

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1.0 INTRODUCTION

This Engineering and Traffic Survey is intended to serve as the basis for the establishment and enforcement of speed limits for selected streets within the City of Emeryville. This survey was authorized by the City and independently conducted by the private consulting firm Kimley-Horn and Associates, Inc (Kimley-Horn).

Engineering and traffic surveys for speed limits are regularly conducted once every five (5) years by governing municipalities for the purpose of complying with Section 40802(a) of the *California Vehicle Code (CVC)* and the national *Uniform Vehicle Code*. Engineering and traffic surveys may be extended to every seven (7) years if criteria is met, or every ten (10) years if a registered engineer evaluates the section of the highway and determines that no significant changes in roadway or traffic conditions have occurred as specified in Section 40802(c) of the *California Vehicle Code (CVC)*. In addition, an engineering and traffic survey should be conducted on newly constructed roadways or roadways where the roadway conditions have significantly changed.

1.1 Regulations and Guidelines

Division 11, Chapter 7, of the 2015 California Vehicle Code defines the California Speed Laws. Section 22352 of the CVC indicates that prima facie speed limits are 15 miles per hour (mph) at unprotected railroad grade crossings, highway intersections with site restrictions, and on any alley. In addition, the prima facie speed limit is 25 mph in residential and business districts, when approaching or passing a school building or grounds thereof or when passing a senior center or other facility primarily used by senior citizens. Division 1 of the CVC defines a business district and residence district in Section 235 and 515, respectively.

"A "business district" is that portion of a highway and the property contiguous thereto (a) upon one side of which highway, for a distance of 600 feet, 50 percent or more of the contiguous property fronting thereon is occupied by buildings in use for business, or (b) upon both sides of which highway, collectively, for a distance of 300 feet, 50 percent or more of the contiguous property fronting thereon is so occupied. A business district may be longer than the distances specified in this section if the above ratio of buildings in use for business to the length of the highway exists."¹

"A "residence district" is that portion of a highway and the property contiguous thereto, other than a business district, (a) upon one side of which highway, within

¹ California Department of Motor Vehicles, California Vehicle Code, Division 1, Section 235, 2015.

a distance of a quarter of a mile, the contiguous property fronting thereon is occupied by 13 or more separate dwelling houses or business structures, or (b) upon both sides of which highway, collectively, within a distance of a quarter of a mile, the contiguous property fronting thereon is occupied by 16 or more separate dwelling houses or business structures. A residence district may be longer than one-quarter of a mile if the above ratio of separate dwelling houses or business structures to the length of the highway exists.”²

Section 22357(a) permits the establishment of speed limits greater than 25 mph based on the following text:

“Whenever a local authority determines upon the basis of an engineering and traffic survey that a speed greater than 25 miles per hour would facilitate the orderly movement of vehicular traffic and would be reasonable and safe upon any street other than a state highway otherwise subject to a prima facie limit of 25 miles per hour, the local authority may by ordinance determine and declare a prima facie speed limit of 30, 35, 40, 45, 50, 55, or 60 miles per hour or a maximum speed limit of 65 miles per hour, whichever is found most appropriate to facilitate the orderly movement of traffic and is reasonable and safe.”³

Therefore, the CVC allows local authorities to increase or decrease the prima facie limits by ordinance or resolution to appropriate limits as determined by an engineering and traffic survey. Posted speed limits not defined in the CVC or established by ordinance are not valid. The CVC requires that speed surveys must be performed with the use of radar or other electronic devices at locations where speed limits are to be enforced with the use of radar. The current survey must be completed within five years as specified in Section 40802(a); seven years as specified in Section 40802(c), or ten years as specified in Section 40802(c), of the date of the preceding survey. A survey allowed to expire passed the valid duration of the previous survey would constitute a speed trap as defined in Sections 40802(a) and 40802(b) of the CVC:

“(1) A particular section of a highway measured as to distance and with boundaries marked, designated, or otherwise determined in order that the speed of a vehicle may be calculated by securing the time it takes the vehicle to travel the known distance.

² California Department of Motor Vehicles, California Vehicle Code, Division 1, Section 515, 2015.

³ California Department of Motor Vehicles, California Vehicle Code, Division 11, Chapter 7, Section 22357(a), 2015.

(2) A particular section of a highway with a prima facie speed limit that is provided by this code or by local ordinance under subparagraph (A) of paragraph (2) of subdivision (a) of Section 22352, or established under Section 22354, 22357, 22358, or 22358.3, if that prima facie speed limit is not justified by an engineering and traffic survey conducted within five years prior to the date of the alleged violation, and enforcement of the speed limit involves the use of radar or any other electronic device that measures the speed of moving objects. This paragraph does not apply to a local street, road, or school zone.

(b) (1) For purposes of this section, a local street or road is one that is functionally classified as "local" on the "California Road System Maps," that are approved by the Federal Highway Administration and maintained by the Department of Transportation. When a street or road does not appear on the "California Road System Maps," it may be defined as a "local street or road" if it primarily provides access to abutting residential property and meets the following three conditions:

(A) Roadway width of not more than 40 feet.

(B) Not more than one-half of a mile of uninterrupted length. Interruptions shall include official traffic control signals as defined in Section 445.

(C) Not more than one traffic lane in each direction.

(2) For purposes of this section "school zone" means that area approaching or passing a school building or the grounds thereof that is contiguous to a highway and on which is posted a standard "SCHOOL" warning sign, while children are going to or leaving the school either during school hours or during the noon recess period. "School zone" also includes the area approaching or passing any school grounds that are not separated from the highway by a fence, gate, or other physical barrier while the grounds are in use by children if that highway is posted with a standard "SCHOOL" warning sign."⁴

⁴ California Department of Motor Vehicles, California Vehicle Code, Division 17. Chapter 2, Section 40802, 2015.

1.2 Requirements and Methodology of an Engineering and Traffic Study

Speed zones are primarily established to protect the public from the unreasonable behavior of reckless, unreliable, or otherwise dangerous drivers. Speed limits are generally established at or near the 85th percentile speed, which is defined as the speed at or below which 85 percent of traffic is moving. Speed limits established on this basis conform to the consensus of those who drive on the roadways as to what speed is reasonable and safe, and are not dependent on the judgment of one or a few individuals.

The Engineering and Traffic Survey, as defined in Section 627 of the CVC, must consider the prevailing speeds, collision records, pedestrian and bicycle activity, and roadway traffic and roadside conditions not readily apparent to the driver. Speed zones are also established to advise motorists of road conditions or hazards, which may not be readily apparent to a reasonable driver. For this reason, a field review of related road/traffic variables is conducted which is considered in combination with the statistical data and collision history of a particular roadway segment to determine a safe and reasonable speed limit. The specific procedures used in the performance of an Engineering and Traffic Study are outlined in the *2014 California MUTCD*. The statistical factors used to analyze the collected speed survey data and additional factors as noted in the *2014 California MUTCD* to consider are defined in the following section.

2.0 SPEED SURVEY EVALUATION

Nine (9) locations were evaluated by Kimley-Horn and included in this report. These roadway sections and limits of the sections are listed in Table 1.

Table 1: Survey Locations and Limits Evaluated by Kimley-Horn

NO	STREET	LIMIT 1	LIMIT 2
1	Hollis St	67th St	Powell St
2	Hollis St	Powell St	Yerba Buena Ave
3	Powell St	Exit Driveway of 3306 Powell St	Frontage Road
4	Horton St	62nd St	40th St
5	40th St	East abutment of 40 th St Bridge	San Pablo Ave
6	Shellmound St	67th St	Christie Ave
7	Shellmound St	Christie Ave	East abutment of 40 th St Bridge
8	Christie Ave	65th St	Powell St
9	Christie Ave	Powell St	Shellmound St

2.1 Field Review

Speed data was collected using manual radar surveys performed by a sub-consultant to Kimley-Horn, All Traffic Data, Inc. (ATD). Speed measuring devices used for the speed data collection have been tested and calibrated (refer to Appendix B for Certificates of Calibration). Each of the radar speed checks were made from an inconspicuously parked, unmarked vehicle. An effort was made to ensure that the presence of the vehicle in no way affected the speed of the traffic being surveyed. Field information from these speed surveys and other roadway characteristics were recorded on field data forms and later coded into engineering software for analysis purposes. Chapter 2B of the *2014 California MUTCD* indicates that it is desirable to have a minimum sample of 100 vehicles for a speed zone survey for an arterial street. This may result in excessive survey periods for low volume roadways, but a survey should not contain less than 50 vehicles. In addition, average daily traffic volumes (ADT) were collected at all the locations.

Examples of the field data collected for the purposes of analyzing related roadway characteristics as they pertain to the determination of appropriate speed limits are listed below. The results of the field review for related roadway and traffic variables are summarized in the Engineering and Traffic Survey forms included in Appendix A.

1. Segment length, width and alignment;
2. Level of pedestrian, bicycle, and truck activity

3. Traffic flow characteristics;
4. Number of lanes and other channelization/stripping factors;
5. Frequency of intersections, driveways, on-street parking, bike lanes;
6. Locations of stop signs, traffic signals, and other regulatory traffic control devices;
7. Pavement condition;
8. Obstructions to driver/pedestrian visibility;
9. Land use and proximity of schools, parks/recreation areas and senior centers;
10. Uniformity with existing speed zones in adjacent jurisdictions; and,
11. Any other unusual conditions or hazards not readily apparent to the driver.

2.2 Statistical Analysis Factors

Significant factors used to analyze the collected survey data are summarized below:

1. **85th Percentile Speed.** The Critical Speed, or the 85th percentile speed, is defined as that speed at or below which 85 percent of the traffic is moving. This factor is the primary guide in determining what speeds the majority of safe and reasonable drivers are traveling. Therefore, the practice is to set the speed limit to the nearest 5 mph increment from the critical speed unless based on engineering judgment, there is justification for lower speed limit based on factors listed in Section 2.1 above. Speed limits set on this basis provide law enforcement officials with a means of controlling reckless or unreliable drivers who will not conform to what the majority finds reasonable.
2. **The 10-mph Pace.** The 10-mph Pace is the 10-mph increment range, which contains the largest number of recorded vehicles. The pace is a measure of the dispersion of speeds within the sample surveyed. Speed limits should normally be set to fall within the 10-mph pace. However, conditions not readily apparent to the driver or adhering to State mandated limits such as in Residence Districts may require setting speed limits below the 10-mph pace.
3. **50th Percentile Speed.** The Median Speed, or 50th Percentile Speed, represents the mid-point value within the range of recorded speeds for a particular roadway location. In other words, 50 percent of the vehicles travel faster than and 50 percent travel slower than, the median speed. This value is another measure of the central tendency of the vehicle speed distribution. Typically speed limits should not be set below the 50th Percentile Speed, since it would result in greater than 50-percent of the drivers exceeding the speed limit.

4. 15th Percentile Speed. The 15th Percentile Speed is that speed at or below which 15 percent of the vehicles are traveling. This value is important in determining the minimum allowable speed limit, given that the vehicles traveling below this speed tend to obstruct the flow of traffic, thereby increasing the collision potential.
5. Percent of Vehicles in Pace Speed. The percent of vehicles in the 10-mph pace speed is an indication of the grouping of vehicular speeds. Ideally, if all vehicles were traveling at or about the same speed, there would be a reduced likelihood of vehicular collisions. In speed limit analysis, the higher the percent of vehicles within the pace speed, the more favorable the speed distribution. The percent of the 10-mph pace is often between 60 and 90 percent.

2.3 2014 California MUTCD and CVC Guidance

Based on the *2014 California MUTCD*, speed limits "shall be established at the nearest 5 mph increment of the 85th-percentile speed of free-flowing traffic."⁵ In matching existing conditions with the traffic safety needs of the community, engineering judgment may indicate the need for a reduction of the posted speed limit by 5 mph due to specific factors such as road characteristics, the pace speed, roadside development and environment, pedestrian activity, and collision history. Alternatively, the *2014 California MUTCD* states that "for cases in which the nearest 5 mph increment of the 85th-percentile speed would require a rounding up, then the speed limit may be rounded down to the nearest 5 mph increment below the 85th-percentile speed, if no further reduction is used."⁵ The following are some other factors to consider when establishing speed limits between adjacent street segments:

1. Avoid Short Segments. Short speed zones of less than ½ mile should be avoided, except in transition areas.
2. Change in Roadway Conditions or Roadside Development. Speed zone changes should be coordinated with changes in roadway conditions or roadside development.
3. Minimize Change in Speed between Adjacent Segments. Speed zoning should be in 10 mph increments except in urban areas where 5 mph increments are preferable.
4. Coordinate Speed Zoning with Adjacent Jurisdictions.

⁵ California Department of Transportation, 2014 California MUTCD, Chapter 2B, page 134, 7 November 2014.

2.4 Collision History

The Engineering and Traffic Survey forms summarize the available collision information for each of the street segments. The collision information was obtained from the City of Emeryville Police Department for a 3-year period from March 1, 2013 to March 31, 2016. The collisions were reviewed and corridor related collisions, those not related to signalized intersections, were summarized for each segment. Based on the number of total collisions studied over the 3-year period and ADT counts, a collision rate per million vehicle miles was calculated for each segment. To provide a general comparison of the collision rates on the segments to expected collisions rates for similar types of local roadways, the collision rates for each segment were compared to the statewide average rate listed in the 2012 Collision Data on California State Highways (road miles, travel, collisions, collision rates) as listed in Table 2.

Table 2: 2012 California State Highways Collision Rates

Lane Type	Total Collision Rate Per Million Vehicle Miles (3-year rates for 2010, 2011, and 2012)
2&3 Lanes	1.37
4 lanes (undivided highway)	1.85
4 lanes (divided highway)	1.45

3.0 RESULTS AND RECOMMENDATIONS

The recommendations contained in this report are intended to establish prima facie speed limits. Prima facie limits attempt to advise the motorist and enforcement of the reasonable speed for a particular section of roadway for the prevailing conditions. In many cases, the recommendations made produce a uniform speed limit along the road. As a result, the speed limits in adjacent jurisdictions were considered as well as along the various street segments surveyed within the City of Emeryville.

The Engineering and Traffic Survey forms, presented in Appendix A, illustrate the results of a thorough evaluation of the available data and indicate a recommended speed limit for each of the street segments surveyed. A summary of the data analysis, along with recommended speed limits can be found in Table 3. Recommended speed limits are also presented in Figure 1.

Table 3: Speed Survey Recommendations

No.	Street Segment	Existing Speed Limit (mph)	Recom Speed Limit (mph) ¹	85% Speed (mph)	Median Speed (mph)	10 mph Pace Range (mph)	% of Veh. In Pace	Collision Rate	Justification
1	Hollis Street between 67 th Street and Powell St	30	25	27.0	24.2	21-30	92.4	1.79	85th-percentile speed, High collision rate, Uncontrolled crosswalks
2	Hollis Street between Powell Street and Yerba Buena Avenue	30	30	29.9	27.2	23-32	98.5	0.76	85th-percentile speed
3	Powell Street between Exit Driveway of 3306 Powell Street building and I-80 Frontage Road	30	30	32.8	30.2	25-34	96	0.59	85th-percentile speed rounded down per CVC Section 21400(b), 10 mph pace range, Uncontrolled crosswalks
4	Horton Street between 62 nd Street and 40 th Street	25	25	27.8	24.5	19-28	90	0.00	85th-percentile speed rounded down per CVC Section 21400(b), High bicycle activity (bike boulevard), 10 mph pace range Uncontrolled crosswalks
5	40 th Street between east abutment of 40 th Street Bridge and San Pablo Ave	30	30	35.5	32.3	29-38	92	1.22	85th-percentile speed downgraded 5 mph due to high pedestrian activity and uncontrolled crosswalk
6	Shellmound Street 67 th Street and Christie Avenue	25	25	27.9	25.0	22-31	94.2	1.48	85th-percentile speed rounded down per CVC Section 21400(b), High pedestrian activity, Uncontrolled crosswalks, High collision rate

Table 3, continued: Speed Survey Recommendations

No.	Street Segment	Existing Speed Limit (mph)	Recom Speed Limit (mph) ¹	85% Speed (mph)	Median Speed (mph)	10 mph Pace Range (mph)	% of Veh. In Pace	Collision Rate	Justification
7	Shellmound Street between Christie Avenue and east abutment of 40 th Street bridge	30	30	31.3	28.2	24-33	92	1.92	85th-percentile speed
8	Christie Avenue between 65 th Street and Powell Street	25	25	28.1	25.2	22-31	91	0.78	85th-percentile speed rounded down per CVC Section 21400(b), High pedestrian activity, Proximity to park, Uncontrolled Crosswalks
9	Christie Avenue between Powell St and Shellmound Street	25	25	25.4	23	19-28	97	2.88	85th-percentile speed

Note:

¹ Bold reflects recommended speed limit change.

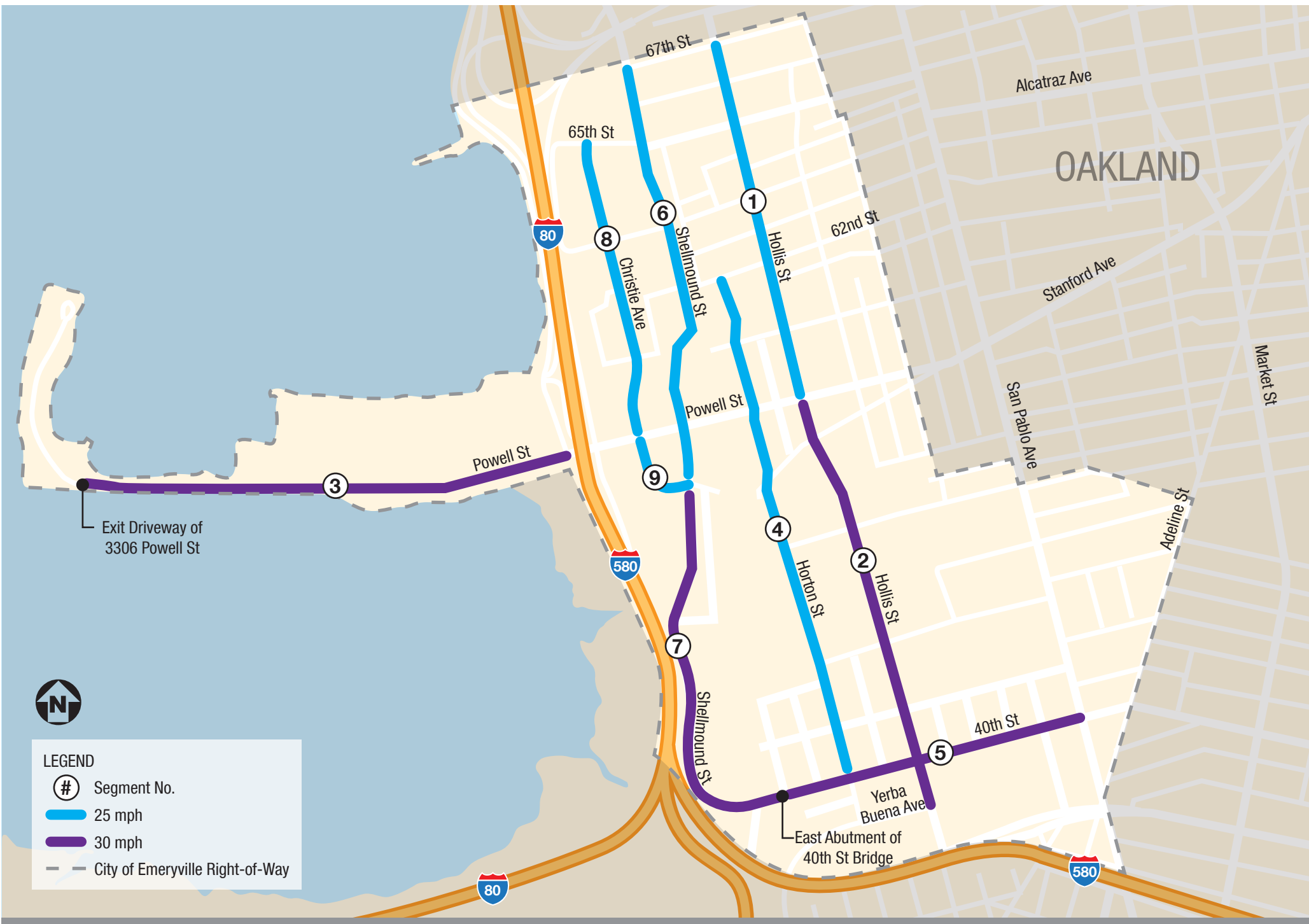


Figure 1: Recommended Posted Speed Limits
City of Emeryville

Appendix A

Engineering and Traffic Survey Forms

CITY OF EMERYVILLE

ENGINEERING AND TRAFFIC SURVEY

1

STREET: Hollis
FROM: Powell Street

SURVEY DATE: 5/17/2016
TO: 67th Avenue

SPEED DATA

Location of Speed Survey	Between 66th and 65th	Posted Speed Limit	30 mph
Time of Speed Survey	9:30 AM - 10:30 AM	Recommended Speed Limit	25 mph
50th Percentile Speed (Mean Speed)	24.2 mph	Speed Limit Change	Yes
85th Percentile Speed	27.0 mph	Speed Justification	85th %ile speed, high collision rate
10 mph Pace Speed	21-30 mph		
Percentage of Vehicles in Pace	92.4%		
Number of Survey Samples	197		

COLLISION HISTORY

Number of Years Studied	3
Total Collisions	13
Collision Rate (ACC/MVM)	1.79
Expected Collisions (ACC/MVM)	1.37

TRAFFIC FACTORS

Average Daily Traffic	
Type of Traffic Control	Traffic signals at 59th, 64th, 65th
Pedestrian Traffic	High
Truck Traffic	Low

ROADWAY CHARACTERISTICS

Length of Segment	3500 ft.
Width	30 ft.
Number of Lanes	1 - NB, 1 - SB
Street Classification	Collector
Divided Median?	No
Designated Bike Route?	No
Bike Lanes?	No
Uncontrolled Crosswalks?	Yes-61st, 62nd, 63rd, 66th
On-Street Parking?	Yes
Sidewalks?	Yes
Driveways?	Yes
Vertical Curve	No
Horizontal Curve	No
Visibility	Good
Pavement Condition	Good
Adjacent Land Use	Commercial / Residential

COMMENTS

The 85th-percentile speed of 27.0 mph indicates a 25 mph speed limit. The 10 mph pace ranges from 21 mph to 30 mph and the suggested speed limit falls within this range. The collision rate is above the expected rate. Based on the 85th-percentile speed, it is recommended that the posted speed limit be decreased to 25 mph.

**City of Emeryville
Public Works Department**

Street Name: Hollis Street
Limits: 67th and Powell

Radar Survey Sheet

X = North / = South

	5	10	15	20	25	30	#	%ea	cum.%
70+							0		
							0		
							0		
							0		
							0		
65							0		
							0		
							0		
							0		
							0		
60							0		
							0		
							0		
							0		
							0		
55							0		
							0		
							0		
							0		
							0		
50							0		
							0		
							0		
							0		
							0		
45							0		
							0		
							0		
							0		
							0		
40							0		
							0		
							0		
							0		
							0		
35	/						1	0.5%	100.0%
	/						1	0.5%	99.5%
	X	X	/				3	1.5%	99.0%
	/	/	/				3	1.5%	97.5%
	X	/	/				3	1.5%	95.9%
30	X	/	/	/	/		5	2.5%	94.4%
	X	X	X	X	/	/	9	4.6%	91.9%
	X	X	/	/	/	/	4	2.0%	87.3%
	X	X	X	X	X	X	23	11.7%	85.3%
	X	X	X	X	X	X	24	12.2%	73.6%
25	X	X	X	X	X	X	29	14.7%	61.4%
	X	X	X	X	X	X	25	12.7%	46.7%
	X	X	X	X	X	X	29	14.7%	34.0%
	X	X	X	X	X	/	16	8.1%	19.3%
	X	X	X	X	X	/	18	9.1%	11.2%
20	X	X	X	/			4	2.0%	2.0%
							0		
							0		
							0		
							0		
15							0		
							0		
							0		
							0		
10							0		

Total Samples = 197

85th Percentile Speed: 27.0 mph
 50th Percentile Speed: 24.2 mph
 15th Percentile Speed: 21.5 mph
 10 MPH Pace: 21 - 30
 Number in Pace: 182
 Percent in Pace: 92.4%

Date of Survey: 5/17/16
 Weather: Clear
 Road Condition: _____
 Street Class.: _____
 Conditions not _____
 Apparent: _____

Start Time: 9:30
 End Time: 10:30
 Posted
 Speed: 30 MPH

CITY OF EMERYVILLE

ENGINEERING AND TRAFFIC SURVEY

2

STREET: Hollis Street
FROM: Yerba Buena Avenue

SURVEY DATE: 5/17/2016
TO: Powell Street

SPEED DATA

Location of Speed Survey	Between 45th and 53rd	Posted Speed Limit	30 mph
Time of Speed Survey	10:45 AM - 11:35 AM	Recommended Speed Limit	30 mph
50th Percentile Speed (Mean Speed)	27.2 mph	Speed Limit Change	No
85th Percentile Speed	29.9 mph	Speed Justification	85th %ile Speed
10 mph Pace Speed	23-32 mph		
Percentage of Vehicles in Pace	98.5%		
Number of Survey Samples	203		

COLLISION HISTORY

Number of Years Studied	3
Total Collisions	6
Collision Rate (ACC/MVM)	0.76
Expected Collisions (ACC/MVM)	1.37

TRAFFIC FACTORS

Average Daily Traffic	
Type of Traffic Control	Traffic signals at 40th, Park, 53rd, Stanford, Powell--Stop control at Yerba Buena Avenue, 45th
Pedestrian Traffic	High
Truck Traffic	Low

ROADWAY CHARACTERISTICS

Length of Segment	4100 ft.
Width	40 ft.
Number of Lanes	1-2 - NB, 1 - SB
Street Classification	Collector
Divided Median?	No
Designated Bike Route?	Yes
Bike Lanes?	Yerba Buena Avenue to 40th
Uncontrolled Crosswalks?	No
On-Street Parking?	Yes
Sidewalks?	Yes
Driveways?	Yes
Vertical Curve	No
Horizontal Curve	Yes
Visibility	Good
Pavement Condition	Good
Adjacent Land Use	Commercial / Residential

COMMENTS

The 85th-percentile speed of 29.9 mph indicates a 30 mph speed limit. The 10 mph pace ranges from 23 mph to 32 mph and the suggested speed limit falls within this range. The collision rate is below the expected rate. Based on the 85th-oercentile speed, it is recommended that the posted speed limit remains at 30 mph.

**City of Emeryville
Public Works Department**

Street Name: Hollis Street

Limits: Yerba Buena Avenue and Powell Street

Radar Survey Sheet

X = North / = South

	5	10	15	20	25	30	#	%ea	cum.%
70+							0		
							0		
							0		
							0		
							0		
65							0		
							0		
							0		
							0		
							0		
60							0		
							0		
							0		
							0		
							0		
55							0		
							0		
							0		
							0		
							0		
50							0		
							0		
							0		
							0		
							0		
45							0		
							0		
							0		
							0		
							0		
40							0		
							0		
							0		
							0		
							0		
35	/						1	0.5%	100.0%
							0		99.5%
	X /						2	1.0%	99.5%
	X X X X / / / / /						9	4.4%	98.5%
	X X X X X X X / / / / / / / /						15	7.4%	94.1%
30	X X X X X X X X X X X X / / / / / / / / / / / / / /						25	12.3%	86.7%
	X X X X X X X X X X X X / / / / / / / / / / / / / /						26	12.8%	74.4%
	X X X X X X X X X X X X X X X / / / / / / / / / / / / / /						29	14.3%	61.6%
	X X X X X X X X X X X X X X X / / / / / / / / / / / / / /						33	16.3%	47.3%
	X X X X X X X X X X X X / / / / / / / / / / / / / /						25	12.3%	31.0%
25	X X X X X X X X X X / / / / / / / / / / / / / /						22	10.8%	18.7%
	X X X X X X X / / / / /						12	5.9%	7.9%
	X X / /						4	2.0%	2.0%
							0		
							0		
20							0		
							0		
							0		
							0		
							0		
15							0		
							0		
							0		
							0		
10							0		
							0		

Total Samples = 203

85th Percentile Speed: 29.9 mph
 50th Percentile Speed: 27.2 mph
 15th Percentile Speed: 24.7 mph
 10 MPH Pace: 23 - 32
 Number in Pace: 200
 Percent in Pace: 98.5%

Date of Survey: 5/17/16
 Weather: Clear
 Road Condition: _____
 Street Class.: _____
 Conditions not Apparent: _____

Start Time: 10:45
 End Time: 11:35
 Posted Speed: 30 MPH

CITY OF EMERYVILLE

ENGINEERING AND TRAFFIC SURVEY

3

STREET: Powell Street
FROM: Exit Driveway for 3306 Buidling

SURVEY DATE: 5/17/2016
TO: I-80 Frontage Road

SPEED DATA

Location of Speed Survey	100' east of Admiral Drive	Posted Speed Limit	30 mph
Time of Speed Survey	11:50 AM - 12:50 PM	Recommended Speed Limit	30 mph
50th Percentile Speed (Mean Speed)	30.2 mph	Speed Limit Change	No
85th Percentile Speed	32.8 mph	Speed Justification	85th percentile speed rounded down per CVC Section 21400(b)
10 mph Pace Speed	25-34 mph		
Percentage of Vehicles in Pace	96.0%		
Number of Survey Samples	163		

COLLISION HISTORY

Number of Years Studied	3
Total Collisions	4
Collision Rate (ACC/MVM)	0.59
Expected Collisions (ACC/MVM)	1.37

TRAFFIC FACTORS

Average Daily Traffic	
Type of Traffic Control	Traffic signals Access Road and Frontage Road
Pedestrian Traffic	Low
Truck Traffic	Low

ROADWAY CHARACTERISTICS

Length of Segment	6650 ft.
Width	26 ft.
Number of Lanes	1 - NB, 1 - SB
Street Classification	Collector
Divided Median?	Yes - Emery Cove Yacht Harbor to Frontage Road
Designated Bike Route?	Yes
Bike Lanes?	Emery Cove Yacht Harbor to Frontage Road
Uncontrolled Crosswalks?	Cul-de-sac, Anchor Dr, Admiral Dr, Commodor Dr, Captain Dr,
On-Street Parking?	No
Sidewalks?	Yes
Driveways?	Yes
Vertical Curve	No
Horizontal Curve	Yes - 1
Visibility	Good
Pavement Condition	Good
Adjacent Land Use	Commercial

COMMENTS

The 85th-percentile speed of 32.8 mph indicates a 35 mph speed limit. The 10 mph pace ranges from 25 mph to 34 mph and the suggested speed limit is above this range. The collision rate is below the expected rate. Based on CVC Section 21400(b), the 85th-percentile speed was rounded down to the nearest 5 mph increment. Therefore, it is recommended that the posted speed limit remains at 30 mph.

CITY OF EMERYVILLE

ENGINEERING AND TRAFFIC SURVEY

4

STREET: Horton Street
FROM: 40th Street

SURVEY DATE: 5/17/2016
TO: 62nd Street

SPEED DATA

Location of Speed Survey	Between 53rd and 45th	Posted Speed Limit	25 mph
Time of Speed Survey	1:15 PM - 2:35 PM	Recommended Speed Limit	25 mph
50th Percentile Speed (Mean Speed)	24.5 mph	Speed Limit Change	No
85th Percentile Speed	27.8 mph	Speed Justification	85th %ile speed recorded down per CVC Section 21400(b), high bicycle activity.
10 mph Pace Speed	19-28 mph		
Percentage of Vehicles in Pace	90.0%		
Number of Survey Samples	111		

COLLISION HISTORY

Number of Years Studied	3
Total Collisions	0
Collision Rate (ACC/MVM)	0.00
Expected Collisions (ACC/MVM)	1.37

TRAFFIC FACTORS

Average Daily Traffic	
Type of Traffic Control	Traffic signals at 40th, Stop control at Park Av, 45th Street, 53rd, Stanford, 59th, 62nd
Pedestrian Traffic	Low
Truck Traffic	Low

ROADWAY CHARACTERISTICS

Length of Segment	4950 ft.
Width	32 ft.
Number of Lanes	1 - NB, 1 - SB
Street Classification	Residential
Divided Median?	No
Designated Bike Route?	Yes
Bike Lanes?	Entire Limits
Uncontrolled Crosswalks?	Sherwin Ave, Midblock (45th/53rd), Midblock (53rd/Stanford), Powell
On-Street Parking?	Yes
Sidewalks?	Yes
Driveways?	Yes
Vertical Curve	No
Horizontal Curve	Yes, 59th-62nd
Visibility	Good
Pavement Condition	Good
Adjacent Land Use	Commercial / Residential

COMMENTS

The 85th-percentile speed of 27.8 mph indicates a 30 mph speed limit. The 10 mph pace ranges from 19 mph to 28 mph and the suggested speed limit is above this range. The collision rate is below the expected rate. Based on CVC Section 21400(b), the 85th-percentile speed was rounded down to the nearest 5 mph increment. Therefore, it is recommended that the posted speed limit remains at 25 mph.

**City of Emeryville
Public Works Department**

Street Name: Horton Street

Limits: Between 53rd and 45th

Radar Survey Sheet

X = North / = South

	5	10	15	20	25	30	#	%ea	cum.%
70+							0		
							0		
							0		
							0		
							0		
65							0		
							0		
							0		
							0		
							0		
60							0		
							0		
							0		
							0		
							0		
55							0		
							0		
							0		
							0		
							0		
50							0		
							0		
							0		
							0		
							0		
45							0		
							0		
							0		
							0		
							0		
40							0		
							0		
							0		
							0		
							0		
35							0		
							0		
							0		
							0		
							0		
	X / /						3	2.7%	100.0%
	/						1	0.9%	97.3%
30	X / /						3	2.7%	96.4%
	/						1	0.9%	93.7%
	X X X X X / /						7	6.3%	92.8%
	X X X / / / / /						7	6.3%	86.5%
	X X X X X X X / / / / / / / /						15	13.5%	80.2%
25	X X X X X X / / / / / /						12	10.8%	66.7%
	X X X X X X X X / / / / /						12	10.8%	55.9%
	X X X X X X / / / / / /						12	10.8%	45.0%
	X X X X X X / / / / / / / / /						15	13.5%	34.2%
	X X X X X / / / /						9	8.1%	20.7%
20	X X X X X / /						7	6.3%	12.6%
	X X / /						4	3.6%	6.3%
	X / /						3	2.7%	2.7%
							0		
							0		
15							0		
							0		
							0		
							0		
							0		
10							0		
							0		
Total Samples =							111		

85th Percentile Speed: 27.8 mph
 50th Percentile Speed: 24.5 mph
 15th Percentile Speed: 21.3 mph
 10 MPH Pace: 19 - 28
 Number in Pace: 100
 Percent in Pace: 90.0%

Date of Survey: 5/17/16
 Weather: Clear
 Road Condition: _____
 Street Class.: _____
 Conditions not _____
 Apparent: _____

Start Time: 13:15
 End Time: 14:35
 Posted
 Speed: 25 MPH

CITY OF EMERYVILLE

ENGINEERING AND TRAFFIC SURVEY

5

STREET: 40th Street
FROM: East Abutment of 40th Street Bridge and San Pablo Avenue

SURVEY DATE: 5/18/2016
TO: San Pablo Avenue

SPEED DATA

Location of Speed Survey	150 feet east of Harlan Street	Posted Speed Limit	30 mph
Time of Speed Survey	9:30 AM to 10:00 AM	Recommended Speed Limit	30 mph
50th Percentile Speed (Mean Speed)	32.3 mph	Speed Limit Change	No
85th Percentile Speed	35.5 mph	Speed Justification	85th %ile speed
10 mph Pace Speed	29-38		downgraded 5 mph
Percentage of Vehicles in Pace	92.0%		due to high pedestrian
Number of Survey Samples	209		activity and
			uncontrolled
			crosswalk

COLLISION HISTORY

Number of Years Studied	3
Total Collisions	10
Collision Rate (ACC/MVM)	1.22
Expected Collisions (ACC/MVM)	1.45

TRAFFIC FACTORS

Average Daily Traffic	
Type of Traffic Control	Traffic signals at Horton, Hollis, Emery St, San Pablo
Pedestrian Traffic	High
Truck Traffic	Low

ROADWAY CHARACTERISTICS

Length of Segment	2300 ft.
Width	74 ft.
Number of Lanes	2 - NB, 2 - SB
Street Classification	Arterial
Divided Median?	Yes
Designated Bike Route?	Yes
Bike Lanes?	Entire Limits
Uncontrolled Crosswalks?	Harlan St
On-Street Parking?	No
Sidewalks?	Yes
Driveways?	No
Vertical Curve	No
Horizontal Curve	No
Visibility	Good
Pavement Condition	Good
Adjacent Land Use	Commercial

COMMENTS

The 85th-percentile speed of 35.5 mph indicates a 35 mph speed limit. The 10 mph pace ranges from 29 mph to 38 mph and the suggested speed limit falls within this range. The collision rate is below the expected rate. Due to the high pedestrian activity and uncontrolled crosswalk, a downgrading of the speed limit by 5 mph is justified. Therefore, it is recommended that the posted speed limit remains at 30 mph.

Speed: 30 MPH

CITY OF EMERYVILLE
ENGINEERING AND TRAFFIC SURVEY

6

STREET: Shellmound Street
FROM: 67th Street

SURVEY DATE: 5/18/2016
TO: Christie Avenue

SPEED DATA

Location of Speed Survey	Emeryville Marketplace	Posted Speed Limit	25 mph
Time of Speed Survey	10:20 AM - 11:00 AM	Recommended Speed Limit	25 mph
50th Percentile Speed (Mean Speed)	25.0 mph	Speed Limit Change	No
85th Percentile Speed	27.9 mph	Speed Justification	85th %ile speed rounded down per CVC Section 21400(b), high pedestrian activity, high collision rate
10 mph Pace Speed	22 - 31 mph		
Percentage of Vehicles in Pace	94.2%		
Number of Survey Samples	206		

COLLISION HISTORY

Number of Years Studied	3
Total Collisions	8
Collision Rate (ACC/MVM)	1.48
Expected Collisions (ACC/MVM)	1.37

TRAFFIC FACTORS

Average Daily Traffic	
Type of Traffic Control	Traffic signals at Shellmound Way & 65th, Stop control at Public Market.
Pedestrian Traffic	High
Truck Traffic	High

ROADWAY CHARACTERISTICS

Length of Segment	4150 ft.
Width	45 ft.
Number of Lanes	1 - NB, 1 - SB
Street Classification	Arterial
Divided Median?	No
Designated Bike Route?	Yes
Bike Lanes?	Yes
Uncontrolled Crosswalks?	Yes: Midblock (Shellmound Way & Public Market), 64th
On-Street Parking?	Yes
Sidewalks?	Yes
Driveways?	Yes
Vertical Curve	No
Horizontal Curve	Yes: Public Market Area
Visibility	Good
Pavement Condition	Good
Adjacent Land Use	Commercial / Residential

COMMENTS

The 85th-percentile speed of 27.9 mph indicates a 30 mph speed limit. The 10 mph pace ranges from 22 mph to 31 mph and the suggested speed limit falls within this range. The collision rate is above the expected rate. Based on CVC Section 21400(b), the 85th-percentile speed was rounded down to the nearest 5 mph increment. Therefore, it is recommended that the posted speed limit remains at 25 mph.

**City of Emeryville
Public Works Department**

Street Name: Shellmound Street

Limits: Christie Avenue to 67th Street

Radar Survey Sheet

X = North / = South

	5	10	15	20	25	30	#	%ea	cum.%
70+							0		
							0		
							0		
							0		
							0		
65							0		
							0		
							0		
							0		
							0		
60							0		
							0		
							0		
							0		
							0		
55							0		
							0		
							0		
							0		
							0		
50							0		
							0		
							0		
	Yes						0		
							0		
							0		
45							0		
							0		
							0		
							0		
							0		
40							0		
	X						1	0.5%	100.0%
							0		99.5%
							0		99.5%
							0		99.5%
35							0		99.5%
	X						1	0.5%	99.5%
	X	X	X	X	/	/	6	2.9%	99.0%
	X	/					2	1.0%	96.1%
	X	X	X	/			4	1.9%	95.1%
30	X	X	/	/	/	/	6	2.9%	93.2%
	X	X	X	X	X	/	9	4.4%	90.3%
	X	X	X	X	X	X	13	6.3%	85.9%
	X	X	X	X	X	X	32	15.5%	79.6%
	X	X	X	X	X	X	28	13.6%	64.1%
25	X	X	X	X	X	X	34	16.5%	50.5%
	X	X	X	X	X	X	34	16.5%	34.0%
	X	X	X	X	X	X	21	10.2%	17.5%
	X	X	X	X	/	/	13	6.3%	7.3%
20	X	/					2	1.0%	1.0%
							0		
							0		
							0		
							0		
							0		
15							0		
							0		
							0		
							0		
10							0		
							0		
Total Samples =							206		

85th Percentile Speed: 27.9 mph
 50th Percentile Speed: 25.0 mph
 15th Percentile Speed: 22.8 mph
 10 MPH Pace: 22-31
 Number in Pace: 194
 Percent in Pace: 94.2%

Date of Survey: 5/18/16
 Weather: Clear
 Road Condition: _____
 Street Class.: _____
 Conditions not _____
 Apparent: _____

Start Time: 10:20
 End Time: 11:00
 Posted
 Speed: 25 MPH

CITY OF EMERYVILLE

ENGINEERING AND TRAFFIC SURVEY

7

STREET: Shellmound Street
FROM: Christie Ave

SURVEY DATE: 5/17/2016
TO: East abutment of 40th Street Bridge

SPEED DATA

Location of Speed Survey	Between Bay Street and IKEA	Posted Speed Limit	30 mph
Time of Speed Survey	11:15 AM - 12:00 PM	Recommended Speed Limit	30 mph
50th Percentile Speed (Mean Speed)	28.2	Speed Limit Change	No
85th Percentile Speed	31.3	Speed Justification	85 %ile speed
10 mph Pace Speed	24 - 33 mph		
Percentage of Vehicles in Pace	92.0%		
Number of Survey Samples	221		

COLLISION HISTORY

Number of Years Studied	3
Total Collisions	23
Collision Rate (ACC/MVM)	1.92
Expected Collisions (ACC/MVM)	1.85

TRAFFIC FACTORS

Average Daily Traffic	
Type of Traffic Control	Traffic signals at Chrisite, Ohlone, Bay Street Garage, Ikea Exit, Ikea Entrance
Pedestrian Traffic	High
Truck Traffic	Low

ROADWAY CHARACTERISTICS

Length of Segment	3500 ft.
Width	60 ft.
Number of Lanes	2 - NB, 2 - SB
Street Classification	Arterial
Divided Median?	No
Designated Bike Route?	Yes
Bike Lanes?	Yes
Uncontrolled Crosswalks?	None
On-Street Parking?	No
Sidewalks?	Yes
Driveways?	Yes
Vertical Curve	Yes- At 40th street bridge approach
Horizontal Curve	Yes- At 40th street bridge approach
Visibility	Good
Pavement Condition	Good
Adjacent Land Use	Commercial

COMMENTS

The 85th-percentile speed of 31.3 mph indicates a 30 mph speed limit. The 10 mph pace ranges from 24 mph to 33 mph and the suggested speed limit falls within this range. The collision rate is above the expected rate. Based on the 85th-percentile speed, it is recommended that the posted speed limit remains at 30 mph.

**City of Emeryville
Public Works Department**

Street Name: Shellmound Street

Limits: Christie Avenue to East Abutment of 40th Street Bridge

Radar Survey Sheet

X = North / = South

	5	10	15	20	25	30	#	%ea	cum.%
70+							0		
							0		
							0		
							0		
							0		
65							0		
							0		
							0		
							0		
							0		
60							0		
							0		
							0		
							0		
							0		
55							0		
							0		
							0		
							0		
							0		
50							0		
							0		
							0		
							0		
							0		
45							0		
							0		
							0		
							0		
							0		
40	/						1	0.5%	100.0%
	X						1	0.5%	99.5%
	X						1	0.5%	99.1%
	/						1	0.5%	98.6%
35 mph.	X	X	/	/			4	1.8%	98.2%
	X	X	X	/			4	1.8%	96.4%
	X	X	/				3	1.4%	94.6%
	X	/	/	/			4	1.8%	93.2%
	X	X	X	X	X	X	19	8.6%	91.4%
	X	X	X	X	X	X	18	8.1%	82.8%
30	X	X	X	X	X	X	32	14.5%	74.7%
	X	X	X	X	X	X	29	13.1%	60.2%
	X	X	X	X	X	X	27	12.2%	47.1%
	X	X	X	X	X	X	27	12.2%	34.8%
	X	X	X	X	X	X	26	11.8%	22.6%
25	X	X	X	X	X	X	15	6.8%	10.9%
	X	X	X	/	/	/	6	2.7%	4.1%
	X	X	/				3	1.4%	1.4%
							0		
							0		
20							0		
							0		
							0		
							0		
							0		
15							0		
							0		
							0		
							0		
10							0		
							0		
Total Samples =							221		

85th Percentile Speed: 31.3 mph
 50th Percentile Speed: 28.2 mph
 15th Percentile Speed: 25.4 mph
 10 MPH Pace: 24 - 33
 Number in Pace: 203
 Percent in Pace: 92.0%

Date of Survey: 5/17/16
 Weather: _____
 Road Condition: _____
 Street Class.: _____
 Conditions not _____
 Apparent: _____

Start Time: 11:15
 End Time: 12:00
 Posted Speed: 30

CITY OF EMERYVILLE

ENGINEERING AND TRAFFIC SURVEY

8

STREET: Christie Avenue
FROM: Powell Street

SURVEY DATE: 5/18/2016
TO: 65th Avenue

SPEED DATA

Location of Speed Survey	Between 65th and 59rd	Posted Speed Limit	25 mph
Time of Speed Survey	12:15 PM - 1:05 PM	Recommended Speed Limit	25 mph
50th Percentile Speed (Mean Speed)	25.2 mph	Speed Limit Change	No
85th Percentile Speed	28.1 mph	Speed Justification	85th %ile speed rounded down per CVC section 21400(b), high pedestrian activity
10 mph Pace Speed	22 - 31 mph		
Percentage of Vehicles in Pace	91.0%		
Number of Survey Samples	203		

COLLISION HISTORY

Number of Years Studied	3
Total Collisions	3
Collision Rate (ACC/MVM)	0.78
Expected Collisions (ACC/MVM)	1.37

TRAFFIC FACTORS

Average Daily Traffic	
Type of Traffic Control	Traffic signals at Powell, Shellmound Way, Midblock (59th and 64th), Stop control at 64th, 65th.
Pedestrian Traffic	Low
Truck Traffic	Low

ROADWAY CHARACTERISTICS

Length of Segment	2880 ft.
Width	35 ft.
Number of Lanes	1 - NB, 1 - SB
Street Classification	Residential
Divided Median?	No
Designated Bike Route?	No
Bike Lanes?	None
Uncontrolled Crosswalks?	59th, Public Market Entrance
On-Street Parking?	Yes
Sidewalks?	Yes
Driveways?	Yes
Vertical Curve	No
Horizontal Curve	Yes
Visibility	Good
Pavement Condition	Good
Adjacent Land Use	Residential, Commercial

COMMENTS

The 85th-percentile speed of 28.1 mph indicates a 30 mph speed limit. The 10 mph pace ranges from 22 mph to 31 mph and the suggested speed limit falls within this range. The collision rate is below the expected rate. Based on CVC Section 21400(b), the 85th-percentile speed was rounded down to the nearest 5 mph increment. Therefore, it is recommended that the posted speed limit remains at 25 mph.

Street Name: Christie Avenue
Limits: Powell Street to 65th Street

X = North / = South

85th Percentile Speed:	28.1 mph
50th Percentile Speed:	25.2 mph
15th Percentile Speed:	22.6 mph
10 MPH Pace:	22 - 31
Number in Pace:	186
Percent in Pace:	91.0%

Start Time: 12:15
End Time: 13:05
Posted
Speed: 25 MPH

CITY OF EMERYVILLE

ENGINEERING AND TRAFFIC SURVEY

9

STREET: Christie Avenue
FROM: Shellmound Street

SURVEY DATE: 5/18/2016
TO: Powell Street

SPEED DATA

Location of Speed Survey	South of Powell St	Posted Speed Limit	25 mph
Time of Speed Survey	1:20 PM - 2:20 PM	Recommended Speed Limit	25 mph
50th Percentile Speed (Mean Speed)	23.0 mph	Speed Limit Change	No
85th Percentile Speed	25.4 mph	Speed Justification	85 %ile speed
10 mph Pace Speed	19 - 28 mph		
Percentage of Vehicles in Pace	97.0%		
Number of Survey Samples	168		

COLLISION HISTORY

Number of Years Studied	3
Total Collisions	6
Collision Rate (ACC/MVM)	2.88
Expected Collisions (ACC/MVM)	1.85

TRAFFIC FACTORS

Average Daily Traffic	
Type of Traffic Control	Traffic signals at Powell, Powell Street Plaza, Shellmound
Pedestrian Traffic	High
Truck Traffic	High

ROADWAY CHARACTERISTICS

Length of Segment	800 ft.
Width	50 ft.
Number of Lanes	1 - NB, 3 - SB
Street Classification	Collector
Divided Median?	No
Designated Bike Route?	No
Bike Lanes?	None
Uncontrolled Crosswalks?	None
On-Street Parking?	No
Sidewalks?	Yes
Driveways?	Yes
Vertical Curve	No
Horizontal Curve	Yes
Visibility	Good
Pavement Condition	Good
Adjacent Land Use	Commercial

COMMENTS

The 85th-percentile speed of 25.4 mph indicates a 25 mph speed limit. The 10 mph pace ranges from 19 mph to 28 mph and the suggested speed limit falls within this range. The collision rate is above the expected rate. Based on the 85th-percentile speed, it is recommended that the posted speed limit remains at 25 mph.

Appendix B

Speed Measuring Device Certificates of Calibration

PB Electronics Inc.
248 W Peaceful Ct., Shepherdsville, KY 40165
502 543-7032 www.pbelectronics.com
Factory Authorized Calibration Center for Stalker, MPH, Kustom, and LTI

Certificate of Calibration

Manufacturer: MPH

Model: K-55

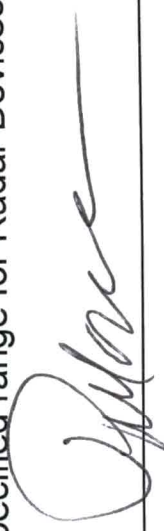
Serial Number: 45821

I hereby certify that this Speed Measuring Device has been checked for accuracy and correctness of operation under my supervision. This Speed Measuring Device is certified accurately within ± 0.5 mph in stationary mode and ± 1 mph in moving mode using equipment traceable to National Institute of Standards and technology.

The transmitter of this device has been tested and found to be within specified range for Radar Devices as established by the Federal Communications Commission and IACP.

FCC License number PG-18-12552

Technician Signature



Certified Tuning Fork Serial Number: n/a

Date: March 14, 2016



PB Electronics Inc.
248 W Peaceful Ct., Shepherdsville, KY 40165
502 543-7032 www.pbelectronics.com
Factory Authorized Calibration Center for Stalker, MPH, Kustom, and LTI

Certificate of Calibration

Manufacturer: MPH

Model: K-55

Serial Number: 17488

I hereby certify that this Speed Measuring Device has been checked for accuracy and correctness of operation under my supervision. This Speed Measuring Device is certified accurately within ± 0.5 mph in stationary mode and ± 1 mph in moving mode using equipment traceable to National Institute of Standards and technology.

The transmitter of this device has been tested and found to be within specified range for Radar Devices as established by the Federal Communications Commission and IACP.

FCC License number PG-18-12552

Technician Signature



Certified Tuning Fork Serial Number: n/a

Date: March 14, 2016



PB Electronics Inc.

248 W Peaceful Ct., Shepherdsville, KY 40165

502 543-7032 www.pbelectronics.com

Factory Authorized Calibration Center for Stalker, MPH, Kustom, and LTI

Certificate of Calibration

Manufacturer: MPH

Model: K-55

Serial Number: 17806

I hereby certify that this Speed Measuring Device has been checked for accuracy and correctness of operation under my supervision. This Speed Measuring Device is certified accurately within ± 0.5 mph in stationary mode and ± 1 mph in moving mode using equipment traceable to National Institute of Standards and technology.

The transmitter of this device has been tested and found to be within specified range for Radar Devices as established by the Federal Communications Commission and IACP.

FCC License number PG-18-12552

Technician Signature

Certified Tuning Fork Serial Number: n/a

Date: March 14, 2016

