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Via Email: jtrebbin@hoperanch.org

W.O. 18633.01

February 5, 2009

Mr. Jim Trebbin
Hope Ranch Park Homes
695 Via Tranquila
Santa Barbara, CA 93110

Subject: **Hope Ranch - Speed Survey and Traffic Engineering Support Services**

Dear Mr. Trebbin:

Penfield & Smith (P&S) is pleased to submit the following letter report summarizing the preliminary speed limit and signing recommendations for the following roadways within Hope Ranch:

- Via Presada
- Lago Drive
- Via Tranquila
- Estrella Drive

Our task was to collect and analyze pertinent speed and volume data, evaluate the visibility of existing stop signs and confirm the appropriateness of all way stops pursuant to current warrants, and recommend radar enforceable speed limits and sign and/or striping changes. Based on our discussions with you, this information will be used to enforce speed limits and stop sign violations on these streets.

ALL-WAY STOP WARRANT ANALYSIS

All-Way stop controls can be useful as a safety measure at intersections if certain traffic conditions exist, such as, an equal volume of traffic on each approach, a high collision rate, poor visibility, etc. Penfield & Smith reviewed the Manual of Uniform Traffic Control Devices (MUTCD) California Supplement¹ to determine whether the existing All-Way stop controls in the study area meet the current engineering warrants contained in the MUTCD. The six intersections listed in Table 1 were evaluated based on Guidance C: Minimum Volumes and Options A, C and D contained in Section 2B.07 of the MUTCD.

1. California Manual of Uniform Traffic Control Devices (MUTCD), Chapter 2B- Regulatory Signs, Part 2- Signs, Section 2B.07

Table 1
All-Way Stop Controlled Study Intersections

No.	Study Intersection	
	Major Approach	Minor Approach
1.	Via Tranquila	Via Presada
2.	Via Alegre/Via Esperanza	Via Vistosa
3.	Via Tranquila	Via Esperanza
4.	Via Bendita	Via Roblada
5.	Estrella Dr.	Cresta Ave./Cuervo Ave.
6.	Estrella Dr.	Llano Ave/Cantera Ave.

Guidance C: Minimum Volumes

P&S collected peak hour turning movement counts from 7AM to 9AM at the intersection of Via Tranquila and Via Presada on July 31, 2008. The turning movement counts are provided as an attachment to this letter. Based on our field observations, this intersection is one of the busier intersections in the area. Therefore, counts were collected at this intersection as a worst-case analysis. During the morning peak hour, 138 vehicles traveled through the intersection, including 108 vehicles on the major approach (Via Tranquila) and 30 vehicles on the minor approach (Via Presada).

Based on the counts collected, the existing traffic volumes do not meet the volume warrant thresholds for the required eight hours and it is assumed would not be met at the remaining five locations which are estimated to have lower traffic volumes. The Minimum Volume Warrant is described in Table 2 below.

Table 2
All-Way Stop Warrant Analysis
Guidance C: Minimum Vehicular Volume

Criteria	Guidance C: Minimum Vehicular Volume
1.	The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day, and
2.	The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to the minor street vehicular volume of at least 30 seconds per vehicle during the highest hour, but
3.	If the 85 th percentile approach speed of the major street traffic exceeds 65 KM/H or exceeds 40 MPH, the minimum vehicular volume warrants are 70 percent of the above values.



Option A, C, D

The MUTCD provides the following “other criteria” that may be considered in an engineering study for a All-Way stop sign installation.

Table 3
All-Way Stop Warrant Analysis
Option A, C, D

Criteria	Option
A.	The need to control left turn conflicts;
C.	Locations where a road user, after stopping, cannot see conflicting traffic and is not able to reasonably safely negotiate the intersection unless conflicting cross traffic is also required to stop; and
D.	An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multiway stop control would improve traffic operations characteristics of the intersection.

Based on the criteria listed above, P&S evaluated the visibility of the stop signs and sight distance at the six study intersections. Photographs of the intersections are provided as an attachment to this letter. The stopping sight distance for 35 mph, which was generally the observed travel speed on these roads, is 250 feet.

Due to vertical and/or horizontal curves and dense vegetation, the stopping sight distance is not met at five of the six locations. Downhill and uphill slopes, sharp curves, and the presence of mature trees and shrubs limit the visibility of oncoming traffic from the minor approach at intersections #1-2 and #4-6. Option C is particularly applicable to these locations, where a road user, after stopping, cannot see conflicting traffic and is not able to reasonably negotiate the intersection unless the major street cross traffic is also required to stop. A significant number of mature trees would need to be removed in order to improve the sight distance at these locations. Based on our engineering judgment, the existing stop signs meet the criteria contained in Option A, C and D.

The stopping sight distance at the intersection of Via Tranquila and Via Esperanza (Intersection #3) is met for all of the minor street approaches and therefore does not meet the criteria contained in Option A, C, and D. Via Tranquila (major approach) is relatively straight and flat and provides adequate sight distance in either direction. Therefore, an All-Way stop control may not be needed at this location.

Summary

None of the study intersections meet the Minimum Volume condition for an All-Way stop control warrant. However, based on our engineering judgment, five of the six intersections meet the criteria contained in Option A, C, and D. Due to the poor sight distance at the intersections, the road user, after stopping on the minor approach, cannot see conflicting traffic unless the major street cross traffic is also required to stop.



The intersection of Via Tranquila and Via Esperanza does not meet the criteria contained in Option A, C, and D. Since Via Tranquila provides good sight distance in either direction, the oncoming traffic could be seen from the minor street approach even if the oncoming traffic were not required to stop. Therefore, an All-Way stop control may not be needed at this location.

It is also suggested that "Stop Ahead" signs be placed in advance of these intersections (unless already present) to warn drivers to be prepared to stop. Per the MUTCD, an Advance Traffic Control sign may be used for additional emphasis of the primary traffic control device, even when the visibility distance to the device is satisfactory. It is recommended that the "Stop Ahead" signs be placed a minimum of 100 feet from the intersection.

Table 4 summarizes the All-Way Stop Control Warrant Analysis and recommendations for the six locations evaluated.

Table 4
All-Way Stop Control Analysis Summary

No.	Intersection	Minimum Volume Condition Met?	Option A, C, D Met?	Recommendation
1.	Via Tranquila/Via Presada	No	Yes	Maintain All-Way Stop
2.	Via Alegre/Via Esperanza/ Via Vistosa	No	Yes	Maintain All-Way Stop
3.	Via Tranquila/ Via Esperanza	No	No	Remove All-Way Stop
4.	Via Bendita/Via Roblada	No	Yes	Maintain All-Way Stop
5.	Estrella Dr./ Cresta Ave./ Cuervo Ave.	No	Yes	Maintain All-Way Stop
6.	Estrella Dr./ Llano Ave/ Cantera Ave.	No	Yes	Maintain All-Way Stop

RADAR SPEED DATA

Radar speed data was collected on July 21, 2008 and July 22, 2008 for the six road segments listed in Table 5. Speed limits for the six road segments were recommended based on current procedures outlined in the California Manual of Uniform Traffic Control Devices (CA MUTCD) per Section 627 of the California Vehicle Code and include the following criteria:

- Nearest 5 mph increment to the 85th percentile speed;
- A reduction of an additional 5 mph or more for conditions "not readily apparent to the driver", as applicable; and
- 100 existing speed samples, 50 minimum.



The CVC and MUTCD identify several items to be taken into consideration prior to recommending an additional 5 mph reduction in speed limit. These include:

- Collision History
- 10 mph Pace
- Inadequate sight distance
- Pedestrian/Bike Safety
- Residential Density

All of the roadways studied currently have a posted speed limit of 25 mph. Based on the information collected, P&S calculated the 50th percentile speed, the 85th percentile speed, and 10 mph pace speed for each segment. The speed data is summarized in Table 5.

As shown in the following table, the 50th percentile speed ranged from 27 to 30 mph and the 85th percentile speed ranged from 32 to 37 mph. The speed survey worksheets are provided as an attachment to this letter.

The adjacent land uses for all of the street segments are predominantly residential, although the street segments would not qualify as residential districts under CVC sections 240 and 515. All of the street segments are narrow with intermittent shoulders and/or informal paths on one or both sides of the street. Cyclists and pedestrians are present throughout this neighborhood and are frequently required to share the roadway with vehicles (see photos attached). The MUTCD cites this condition as a justification for a 5 mph reduction in speed limit. In finalizing this recommendation, P&S verified that the reduced speed limit was near the middle of the 10 mph pace speed range, confirming that the recommended speed limit is still representative of predominant operating speeds.

Table 5
Summary of Radar Speed Data

Street	From	To	Length (Miles)	50th Percentile Speed (mph)	85th Percentile Speed (mph)	10 MPH Pace Speed	Recommended Posted Speed (mph)
Lago Dr.	Las Palmas Dr.	Laguna Blanca Dr.	0.38	26	32	20-29 mph	25^a
Estrella Dr.	Lago Dr.	Cresta Ave./ Cuervo Ave.	1.0	30	35	26-35 mph	30^a
Estrella Dr.	Cresta Ave./ Cuervo Ave.	Marina Drive	<0.5	28	32	25-34 mph	30^b
Via Presada	Las Palmas Dr.	Via Tranquila	0.4	31	36	25-34 mph	30^a
Via Tranquila	Via Presada	Via Esperanza	0.4	32	36-37	27-36 mph	30^a
Via Tranquila	Via Esperanza	Las Palmas Dr.	0.5	30	35	27-36 mph	30^a

- Speed limit reduced additional 5 mph from speed nearest the 85th percentile due to regular presence of cyclists and pedestrian without continuous shoulders/pathways. Recommended speed limit also is near the middle of the 10 mph pace range.
- Cyclists and pedestrians are regularly present without continuous shoulders/pathways. However, reduced speed limit would be at the lower limit of the 10 mph pace range and therefore not recommended.



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This concludes our preliminary analysis of the existing speeds and sight distance issues in Hope Ranch. Should you require additional information or wish to discuss this analysis further, please give me a call. My direct line is (805) 963-9538, extension 157. Thank you again for considering Penfield & Smith for this project.

Very truly yours,

PENFIELD & SMITH



Derek Rapp, T.E.
Principal Traffic Engineer

Attachments:

1. Turning Movement Counts
2. Speed Data
3. Intersection Photographs



Hope Ranch Speed Study

Location: #1
Street: Lago Drive
From: Las Palmas Drive
To: Laguna Blanca Drive

Speed (MPH)	Frequency of Vehicles	Cumulative Frequency	Cumulative Percent	10 MPH Pace Speed
45	0	51	100%	
44	0	51	100%	
43	0	51	100%	
42	0	51	100%	
41	0	51	100%	
40	0	51	100%	
39	0	51	100%	
38	0	51	100%	
37	1	51	100%	
36	0	50	98%	1
35	3	50	98%	4
34	1	47	92%	5
33	2	46	90%	7
32	2	44	86%	9
31	2	42	82%	11
30	2	40	78%	13
29	7	38	75%	20
28	2	31	61%	22
27	4	29	57%	25
26	5	25	49%	30
25	6	20	39%	33
24	3	14	27%	35
23	3	11	22%	36
22	3	8	16%	37
21	3	0	0%	38
20	2	2	4%	38
Total	51	-		

Posted Speed Limit: 25 MPH
50th Percentile Speed: 30
85th Percentile Speed: 36 MPH
10 MPH Pace Speed: 20-29 MPH

Hope Ranch Speed Study

Location: #2
Street: Estrella Drive
From: Lago Drive
To: Paloma Drive

Speed (MPH)	Frequency of Vehicles	Cumulative Frequency	Cumulative Percent	10 MPH Pace Speed
45	0	52	100%	
44	0	52	100%	
43	0	52	100%	
42	0	52	100%	
41	0	52	100%	
40	3	52	100%	
39	3	49	94%	
38	2	46	88%	
37	2	44	85%	
36	4	42	81%	14
35	5	38	73%	19
34	3	33	63%	22
33	4	30	58%	26
32	6	26	50%	32
31	8	20	38%	40
30	1	12	23%	38
29	3	11	21%	38
28	2	8	15%	38
27	5	6	12%	41
26	1	1	2%	38
25	0	0	0%	33
24	0	0	0%	30
23	0	0	0%	26
22	0	0	0%	20
21	0	0	0%	12
20	0	0	0%	11
Total	52	-		

Posted Speed Limit: 25 MPH
50th Percentile Speed: 30
85th Percentile Speed: 36 MPH
10 MPH Pace Speed: 27-36 MPH

Hope Ranch Speed Study

Location: #3
Street: Estrella Drive
From: Paloma Drive
To: Cantera Avenue/Llamo Avenue

Speed (MPH)	Frequency of Vehicles	Cumulative Frequency	Cumulative Percent	10 MPH Pace Speed
45	0	52	100%	
44	0	52	100%	
43	0	52	100%	
42	0	52	100%	
41	1	52	100%	
40	0	51	98%	
39	0	51	98%	
38	0	51	98%	
37	0	51	98%	
36	0	51	98%	1
35	2	51	98%	3
34	2	49	94%	5
33	0	47	90%	5
32	4	47	90%	9
31	4	43	83%	12
30	5	39	75%	17
29	5	34	65%	22
28	11	29	56%	33
27	2	18	35%	35
26	4	16	31%	39
25	4	12	23%	41
24	0	8	15%	39
23	1	8	15%	40
22	2	7	13%	38
21	2	0	0%	36
20	3	3	6%	34
Total	52	-		

Posted Speed Limit: 25 MPH
50th Percentile Speed: 30
85th Percentile Speed: 36 MPH
10 MPH Pace Speed: 25-34 MPH

Hope Ranch Speed Study

Location: #4
Street: Via Presada
From: Las Palmas Drive
To: Via Tranquila

Speed (MPH)	Frequency of Vehicles	Cumulative Frequency	Cumulative Percent	10 MPH Pace Speed
45	0	54	100%	
44	0	54	100%	
43	0	54	100%	
42	0	54	100%	
41	0	54	100%	
40	2	54	100%	
39	2	52	96%	
38	1	50	93%	
37	2	49	91%	
36	2	47	87%	9
35	3	45	83%	12
34	3	42	78%	15
33	0	39	72%	15
32	7	39	72%	22
31	6	32	59%	28
30	7	26	48%	33
29	2	19	35%	33
28	6	17	31%	38
27	1	11	20%	37
26	2	10	19%	37
25	8	8	15%	42
24	0	0	0%	39
23	0	0	0%	39
22	0	0	0%	32
21	0	0	0%	26
20	0	0	0%	19
Total	54	-		

Posted Speed Limit: 25 MPH
50th Percentile Speed: 30
85th Percentile Speed: 36 MPH
10 MPH Pace Speed: 25-34 MPH

Hope Ranch Speed Study

Location: #5
Street: Via Tranquila
From: Via Presada
To: Via Esperanza

Speed (MPH)	Frequency of Vehicles	Cumulative Frequency	Cumulative Percent	10 MPH Pace Speed
45	0	52	100%	
44	0	52	100%	
43	0	52	100%	
42	0	52	100%	
41	0	52	100%	
40	0	52	100%	
39	1	52	100%	
38	5	51	98%	
37	0	46	88%	
36	8	46	88%	14
35	3	38	73%	17
34	2	35	67%	19
33	6	33	63%	25
32	5	27	52%	30
31	2	22	42%	32
30	9	20	38%	41
29	0	11	21%	40
28	4	11	21%	39
27	2	7	13%	41
26	2	5	10%	35
25	3	3	6%	35
24	0	0	0%	33
23	0	0	0%	27
22	0	0	0%	22
21	0	0	0%	20
20	0	0	0%	11
Total	52	-		

Posted Speed Limit: 25 MPH
50th Percentile Speed: 30
85th Percentile Speed: 36 MPH
10 MPH Pace Speed: 27-36 MPH

Hope Ranch Speed Study

Location: #6
Street: Via Tranquila
From: Via Esperanza
To: Las Palmas Drive

Speed (MPH)	Frequency of Vehicles	Cumulative Frequency	Cumulative Percent	10 MPH Pace Speed
45	0	53	100%	
44	0	53	100%	
43	0	53	100%	
42	0	53	100%	
41	0	53	100%	
40	0	53	100%	
39	0	53	100%	
38	0	53	100%	
37	2	53	100%	
36	4	51	96%	6
35	7	47	89%	13
34	0	40	75%	13
33	4	40	75%	17
32	4	36	68%	21
31	5	32	60%	26
30	11	27	51%	37
29	0	16	30%	37
28	6	16	30%	43
27	3	10	19%	44
26	3	7	13%	43
25	3	4	8%	39
24	1	1	2%	40
23	0	0	0%	36
22	0	0	0%	32
21	0	0	0%	27
20	0	0	0%	16
Total	53	-		

Posted Speed Limit: 25 MPH
50th Percentile Speed: 30
85th Percentile Speed: 36 MPH
10 MPH Pace Speed: 27-36 MPH