City of Laguna Hills
Traffic Commission

Regular Meeting Agenda
Wednesday, March 19, 2025 - 6:00 PM

Michael Caputo
Chair

Neel Patel
Vice Chair

Manuel Hernandez
Commissioner

Scott Miller
Commissioner

Mark Schaff
Commissioner

City Council Chamber
24035 El Toro Road
Laguna Hills, CA 92653

Teleconference Location:
*pursuant to Government Code Section 54953(b) members of the body may remotely participate at the location(s) listed below

Scott Miller
The Carleton Business Center
122 Ferdinand Drive
Gallatin, TN 37066

Any person wishing to address the Traffic Commission on any matter, whether or not it appears on this Agenda, is asked to complete a "Request to Speak" form available on the table at the back of the Chamber. The completed form is to be submitted to the Recording Secretary prior to an individual being heard by the Traffic Commission. Completion of the form is voluntary. All persons may attend the meeting regardless of whether this form is completed.

Members of the public wishing to address the Traffic Commission can do so during the Public Comments portion of the Agenda with a time limitation of three minutes per person, as determined by the Chair, and a total time limit of thirty minutes for Public Comments. If you are commenting on an Agenda item, your comments will be heard at the time that item is scheduled on the Agenda. If you are addressing the Commission on an item not listed on the Agenda, the Traffic Commission is prohibited by law from discussing or taking any action on that item.

Call to Order

Resolution No. 96-04-09-1 established rules of decorum for public meetings held by the City of Laguna Hills. Resolution No. 96-04-09-1 is available on the table at the back of the City Council Chamber.

Pledge of Allegiance

Roll Call of Commissioner Members

1. Public Comment

This is the time to address the Traffic Commission on any matter not listed on this Agenda that is within the subject matter jurisdiction of the Commission. Public Comments are limited to three minutes per person as determined by the Chair and a total time limit of thirty minutes.

2. Minutes Approval

2.1 Approval of Minutes for January 15, 2025, Traffic Commission Meeting

Recommendation: That the Traffic Commission approve the minutes of the January 15, 2025.

3. Presentations

4. Administrative Reports

4.1 Sight Distance and Stop Sign Evaluation for the Intersection of Sunburst Avenue and Largo Drive

Recommendation: That the Traffic Commission recommend to the City Council the installation of a One-Way Stop Sign on Sunburst Avenue at Largo Drive.

4.2 Review of Traffic Conditions on Bridlewood Drive and Vista Viejo

Recommendation: That the Traffic Commission recommend that the City Engineer add Bridlewood Drive and Vista Viejo to the portable radar speed-feedback trailer rotational deployment list and conduct another speed survey in 90 days, and that Police Services conduct increased law (speed) enforcement on Bridlewood Drive and Vista Viejo.

4.3 Establishment of Speed Limit for Del Lago Drive between Lake Forest Drive and La Cadena Drive

Recommendation: That the Traffic Commission recommends the City Council adopt an ordinance establishing a speed limit of 30 MPH for Del Lago Drive between Lake Forest Drive and La Cadena Drive, and the posting of 25 MPH speed limit signs on El Pacifico Drive, Peralta Drive, and Plaza Pointe Drive at the entry points to the North Laguna Hills commercial/industrial area.

4.4 La Paz Road & Appaloosa Place - Installation of Acceleration Lane

Recommendation: That the Traffic Commission receive and file the report.

4.5 Bicycle Mater Plan Update

Recommendation: That the Traffic Commission recommend that the City Council direct City staff to update the bikeways portion of the Bikeways, Trails & Open Space Master Plan ("Bicycle Master Plan") and appropriate funding for this work.

5. Informational Items

5.1 Sheriff's Department Verbal Report

6. Commissioner Comments

Adjournment

The next Regular Meeting of the Parks & Recreation Commission will be May 21, 2025, at 6:00 p.m. in the City Council Chamber, located at 24035 El Toro Road, Laguna Hills, California.

CERTIFICATION

I, JOE AMES, P.E., T.E., Public Works Director/City Engineer of the City of Laguna Hills, do hereby certify that a copy of the foregoing Agenda was posted at Laguna Hills City Hall, Laguna Hills Community Center, and the Courtyard at La Paz Center by (Date), 2024, at 5:00p.m.,

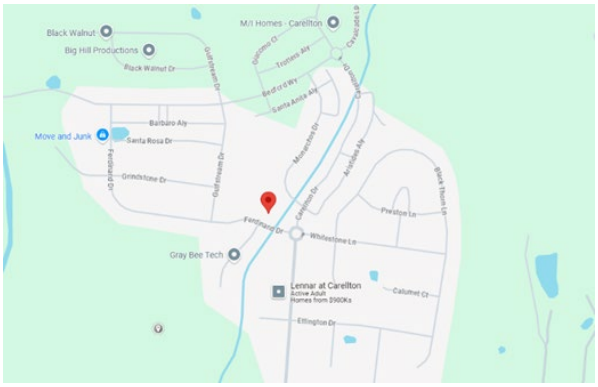
Joe Ames, P.E., T.E, Public Works Director/City Engineer

I, Scott Miller, Traffic Commissioner of the City of Laguna Hills, do hereby certify that a copy of the foregoing Agenda was posted at The Carleton Business Center, 122 Ferdinand Drive, Gallatin, TN 37066 (map below), by March 14, 2025, at 3:00 p.m. Central Standard Time.

Scott Miller, Traffic Commissioner

Teleconference Location Map
Pursuant to Government Code Section 54953(b):

Scott Miller
The Carleton Business Center
122 Ferdinand Drive
Gallatin, TN 37066



In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, you should contact the office of the Public Works Director/City Engineer at (949) 707-2651. Notification 48 hours prior to the meeting will enable the City to make reasonable arrangements to assure access.

Materials related to an item on this Agenda submitted to the Commission after distribution of the Agenda packet are available for public inspection in the Public Services Department at 24035 El Toro Road, Laguna Hills, California, during normal business hours.

CITY OF LAGUNA HILLS
TRAFFIC COMMISSION

REGULAR MEETING
MINUTES
Wednesday, January 15, 2025

CALL TO ORDER

Resolution No. 96-04-09-1 established rules of decorum for public meetings held by the City of Laguna Hills. Resolution No. 96-04-09-1 is available on the table at the back of the City Council Chamber.

The meeting was called to order at 6:03 p.m. by Vice Chair Patel.

PLEDGE OF ALLEGIANCE

Vice Chair Patel led the pledge of Allegiance.

ROLL CALL OF COMMISSION MEMBERS

Attendee Name	Title	Status	Arrived
Michael Caputo	Chair	Absent	
Scott Miller	Commissioner	Present	
Neel Patel	Vice Chair	Present	
Mark Schaff	Commissioner	Present	
Manuel Hernandez	Commissioner	Present	6:06 PM

1. PUBLIC COMMENTS

There were no Public Comments.

2. MINUTES

2.1 Minutes

Recommendation: That the Traffic Commission approve the minutes of November 20, 2024.

RESULT:	**APPROVED [4-0]**
MOVER:	Scott Miller, Commissioner
SECONDER:	Mark Schaff, Commissioner
AYES:	Manuel Hernandez, Commissioner, Scott Miller, Commissioner, Neel Patel, Vice Chair, Mark Schaff, Commissioner
NOES:	None
ABSENT:	Mike Caputo, Chair

3. PRESENTATIONS

There were no Presentations.

4. ADMINISTRATIVE REPORTS

4.1 Exploring the Adoption of E-Bike Regulations

Director of Public Works/City Engineer Ames reviewed the information provided in the staff report.

Recommendation: That the Traffic Commission recommend the City Council adopt a "Regulated Mobility Device Ordinance" that addresses specific issues recommended by the Traffic Commission and recommend the City Council adopt an education and enforcement plan.

RESULT:	**APPROVED [4-0]**
MOVER:	Mark Schaff, Commissioner
SECONDER:	Scott Miller, Commissioner
AYES:	Manuel Hernandez, Commissioner, Scott Miller, Commissioner, Neel Patel, Vice Chair, Mark Schaff, Commissioner
NOES:	None
ABSENT:	Mike Caputo, Chair

5. INFORMATIONAL ITEMS

5.1. Sheriff's Department Verbal Report

Sergeant Avalos indicated he did not have anything to report.

6. COMMISSIONER COMMENTS

- Commissioner Miller said it had been an honor to serve with Commissioner Hernandez, he learned so much from Commissioner Hernandez and he appreciated his knowledge, work and service to the Laguna Hills community.

- Commissioner Schaff seconded Commissioner Miller's praise of Commissioner Hernandez.

- Vice Chair Patel said he appreciated Commissioner Hernandez and his responsiveness to the community. Vice Chair Patel thanked Commissioner Hernandez for his support in establishing a permit parking program in the Lomas Laguna neighborhood and that they had become family friends.

7. ADJOURNMENT

There being no further business before the Traffic Commission at this session, Vice Chair Patel declared the meeting adjourned at 8:05 p.m.

Joe Ames, P.E., T.E. Director of Public Works/City Engineer

ATTEST:

Neel Patel, Vice Chair

Approved at meeting of March 19, 2025

City of Laguna Hills
Traffic Commission
Staff Report

Date: March 19, 2025
To: Chair and Commission Members
From: Samantha Vu, Assistant Engineer
Issue: Sight Distance and Stop Sign Evaluation for the Intersection of Sunburst Avenue at Largo Drive

Recommendation: That the Traffic Commission recommend to the City Council the installation of a One-Way Stop Sign on Sunburst Avenue at Largo Drive.

Background:

Staff received a request from a resident of the community to evaluate the need for stop sign control facing Sunburst Avenue traffic at the intersection of Sunburst Avenue and Largo Drive to enhance safety. The resident was concerned about oncoming vehicles from Sunburst Avenue potentially colliding with vehicles on Largo Drive.

Sunburst Avenue and Largo Drive are both local residential streets and do not have a posted speed limit. Both streets are two-lane residential roadways with an applicable prima facie local speed limit of 25 MPH. The intersection is currently uncontrolled, has no marked crosswalks on any leg, and meets in a T-intersection. Please see the attached Vicinity Map.

Upon receiving the request, City staff contacted Hartzog and Crabill, Inc. (HCI), the City's traffic engineering consultant, to perform a sight distance evaluation and five (5) year accident history review. Based on the guidelines of the California Manual on Uniform Traffic Control Devices (MUTCD), HCI reviewed the accident history and visibility at the intersection. In summary, an accident history review from the California Highway Patrol (CHP) Statewide Integrated Traffic Records System (SWITRS) from January 2020 through December 2025 revealed one (1) reported collision which occurred away from the intersection. The collision warrant requires a minimum of five (5) reported, correctible

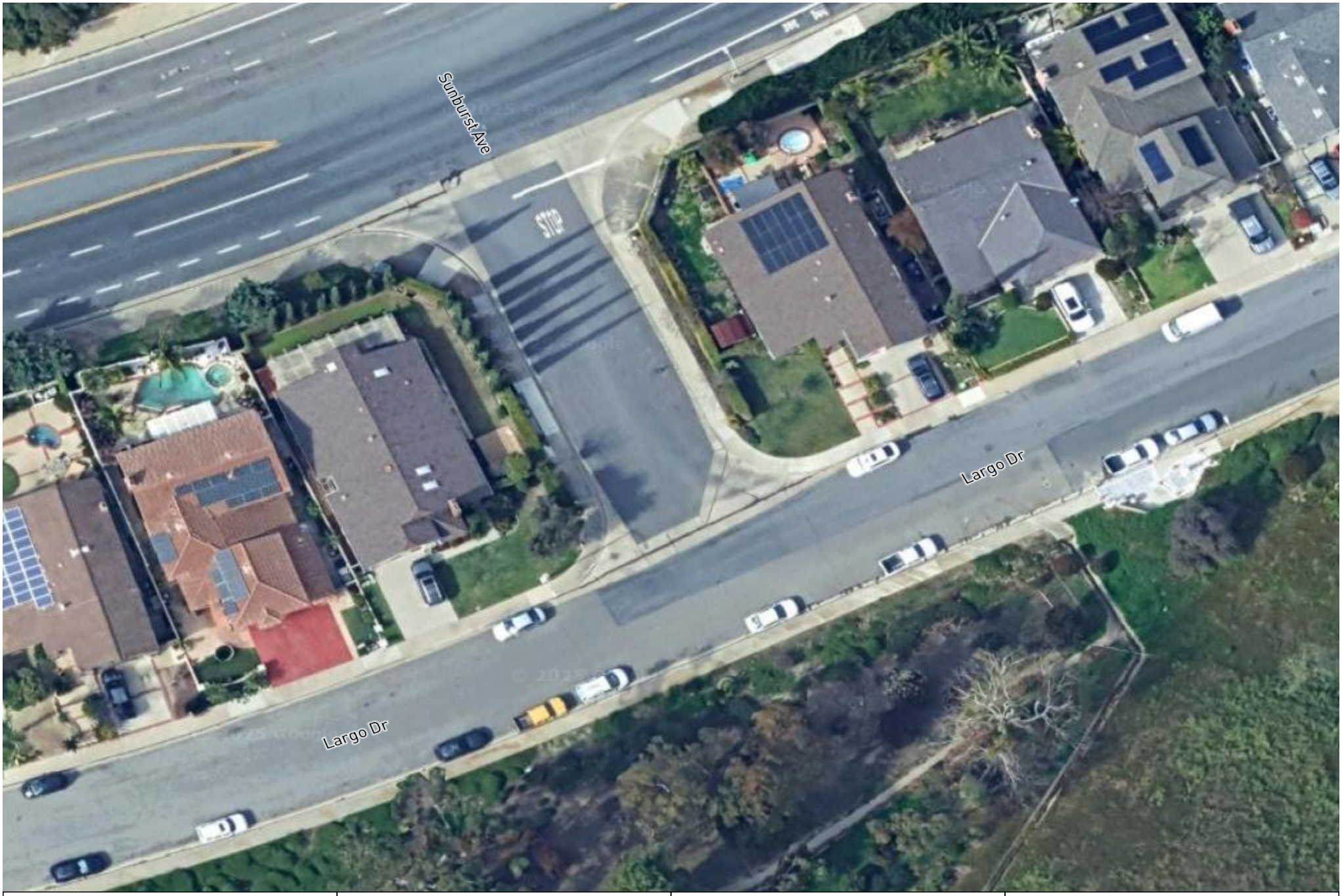
accidents within a 12-month period, and therefore does not trigger the requirement of a stop sign. The applicable sight distance was derived from the stopping sight distance guidelines found in the California MUTCD. In this reference, a 25 MPH roadway speed recommends a minimum Stopping Sight Distance of 155 feet. For a more conservative approach, a 30 MPH speed limit was utilized for analysis which has a minimum sight distance of 200 feet. The sight distance analysis found that a stopped driver's perspective from the minor street of Sunburst Avenue was sufficient in both directions. Please see the attached report for details.

The collision history alone does not indicate the need for installation of a stop sign at the intersection of Sunburst Avenue and Largo Drive. However, in conformance with other similar recent recommendations and to better assign right-of-way, City staff recommends the installation of a one-way stop sign on Sunburst Avenue at Largo Drive. This would include the installation of applicable STOP pavement markings and a limit line.

Fiscal Impact:
The anticipated installation cost of the required signing and striping is $1,000.00. Funds are available for this work in the 2024-25 Fiscal Year Public Works Maintenance Budget.

Attachments:
1. Vicinity Map
2. Hartzog & Crabill, Inc. Recommendation Letter – Sight Distance Evaluation for the Intersection of Sunburst Avenue and Largo Drive, dated March 3, 2025

Sunburst Avenue and Largo Drive



1" = 40 ft	**Vicinity Map**	**03/10/2025**	

This map may represent a visual display of related geographic information. Data provided here is not a guarantee of actual field conditions. To ensure complete accuracy, please contact the responsible staff for the most up-to-date information.

HARTZOG & CRABILL, Inc.

Gerald J. Stock, PE, TE,
Executive Vice President

17821 E. 17th Street
Suite 245
Tustin, CA 92780

Phone: (714) 731-9455
FAX: (714) 731-9498

www.hartzog-crabill.com

March 3, 2025

Mr. Joe Ames, P.E., T.E.
Public Works Director/City Engineer
City of Laguna Hills
24035 El Toro Road
Laguna Hills, CA 92653

Subject: Recommendation Letter - Sight Distance Evaluation for the Intersection of Sunburst Avenue and Largo Drive

Dear Mr. Ames:

Hartzog & Crabill, Inc. (HCI) has completed the preparation of a 5-year SWITRS collision report for the residential T-intersection of Sunburst Avenue and Largo Drive. As you will see in the attached report (***see Appendix A***), there was one (1) collision reported during the past five (5) years, which occurred away from the intersection. Based on the intersection collision history alone, there is no indication to support the need for installation of multi-way STOP signs at this intersection. However, in regards to driver visibility, HCI performed the following sight distance evaluation for this intersection in the field.

SIGHT DISTANCE EVALUATION:

In brief summary, Sunburst Avenue and Largo Drive do not have a posted speed limit. Both streets are two-lane residential roadways with an applicable *prima facie* local speed limit of 25 MPH (and do not require posting). The applicable sight distance was derived from the stopping sight distance guidelines found in the California MUTCD ***(see Appendix B)***. In this reference, a 25 MPH roadway speed recommends a minimum Stopping Sight Distance of 155 feet. However, it is likely that the overall speeds on these roads typically exceed the local 25 MPH speed limit. Therefore, a 30 MPH speed limit was used as a more conservative measure, which has a minimum sight distance of 200 feet.

HCI prepared the attached Sight Distance exhibit (***see Appendix C***), which shows a stopped driver's perspective from the side-street of Sunburst Avenue looking for oncoming traffic on Largo Drive. As shown, when looking in both directions there is sufficient sight distance to the orange cone 200 feet away.

SIGHT DISTANCE EVALUATION: (*continued*)

Table 1 below summarizes our findings based on the sight distance (visibility) of the orange cone at the applicable stopping sight distance.

TABLE 1

Intersection	*Prima Facie* Speed Limit (MPH)	'Design' Speed = Speed Limit + 5 MPH (MPH)	California Stopping Sight Distance for Design Speed (feet)	Stopping Sight Distance Satisfied? (Yes or No)	Comments
Sunburst Avenue and Largo Drive	25	30	200	Yes	There is a sight distance 'window' when looking in both directions along Largo Drive via driveways & a fire hydrant.

CONCLUSION / RECOMMENDATIONS:

Based on review of the 5-year intersection collision history alone, it does not indicate the need for installation of multi-way Stop sign(s) at the intersection of Sunburst Avenue and Largo Drive.

However, in order to better assign right-of-way at this intersection, the installation of a STOP sign, STOP pavement marking, and limit line is recommended for the side-street approach of Sunburst Avenue.

We look forward to your review and acceptance of our recommendations, and to any additional services the City of Laguna Hills may request. If you may have any questions or need further information, please feel free to call our office at (714) 731-9455. Thank you again for the opportunity to serve your community.

Sincerely,
Hartzog & Crabill, Inc.

Scott Ma

Scott Ma, P.E., T.E.
Senior Engineer

Attachments: 5-Year SWITRS Intersection Collision History Report
Stopping Sight Distance as a Function of Speed Table (*California MUTCD*)
Sight Distance Photo Exhibit

APPENDIX A

5-YEAR SWITRS
INTERSECTION COLLISION HISTORY

CITY OF LAGUNA HILLS
INTERSECTION OF SUNBURST AVENUE AND LARGO DRIVE
5-YEAR SWITRS COLLISION DATABASE
JAN. 1, 2020 THROUGH DEC. 31, 2024

CASE ID	COLL. DATE	COLL. TIME	PRIMARY ROAD	SECONDARY ROAD	DIST.	DIR.	INTERS.	WEATH. 1	COLL. SEVERITY	PRIM. COLL. FACT.	PCF VIOL CAT.	PCF VIOL.	HIT AND RUN	TYPE OF COLL.	MOTOR VEHICLE INVOLVED WITH	ROAD SURF.
9559225	20230118	24	LARGO	SUNBURST	84	W	N	A	4	A	1	23152	N	D	C	A

NOTES:

Weather 1
A - Clear
B - Cloudy
C - Raining
D - Snowing
E - Fog
F - Other
G - Wind
- - Not Stated

Collision Severity
1 - Fatal
2 - Injury (Severe)
3 - Injury (Other Visible)
4 - Injury (Complaint of Pain)
0 - PDO (Property Damage Only)

Primary Collision Factor
A - (Vehicle) Code Violation
B - Other Improper Driving
C - Other Than Driver
D - Unknown
E - Fell Asleep
- - Not Stated

Motor Vehicle Involved With:
A - Non-Collision
B - Pedestrian
C - Other Motor Vehicle
D - Motor Vehicle on Other Roadway
E - Parked Motor Vehicle
F - Train
G - Bicycle
H - Animal
I - Fixed Object
J - Other Object
- - Not Stated

PCF Violation Category
01 - Driving or Bicycling Under Influence
02 - Impeding Traffic
03 - Unsafe Speed
04 - Following Too Closely
05 - Wrong Side of Road
06 - Improper Passing
07 - Unsafe Lane Change
08 - Improper Turning
09 - Automobile ROW
10 - Pedestrian ROW
11 - Pedestrian Violation
12 - Traffic Signals and Signs
13 - Hazardous Parking
14 - Lights
15 - Brakes
16 - Other Equipment
17 - Other Hazardous Violation
18 - Other Than Driver (or Ped)
19 -
20 -
21 - Unsafe Starting or Backing
22 - Other Improper Driving
23 - Pedestrian or "Other" Under the Influence
24 - Fell Asleep
00 - Unknown
- - Not Stated

Hit and Run
F - Felony
M - Misdemeanor
N - Not Hit & Run

Road Surface
A - Dry
B - Wet
C - Snowy or Icy
D - Slippery
- - Not Stated

Type of Collision
A - Head-On
B - Sideswipe
C - Rear-End
D - Broadside
E - Hit Object
F - Overturned
G - Vehicle/Pedestrian
H - Other
- - Not Stated

APPENDIX B

CA MUTCD
STOPPING SIGHT DISTANCE
AS A FUNCTION OF SPEED

Table 6C-1. Recommended Advance Warning Sign ~~Minimum~~ Spacing

Road Type	Distance Between Signs*		
	A	B	C
Urban (low speed) - 25 mph or less	100 feet	100 feet	100 feet
Urban (high speed) - more than 25 mph to 40 mph	250 feet	250 feet	250 feet
Urban (high speed) - more than 40 mph	350 feet	350 feet	350 feet
Rural	500 feet	500 feet	500 feet
Expressway / Freeway	1,000 feet	1,500 feet	2,640 feet

* ~~Speed category to be determined by the highway agency.~~
** The column headings A, B, and C are the dimensions shown in Figures 6H-1 through 6H-46. The A dimension is the distance from the transition or point of restriction to the first sign. The B dimension is the distance between the first and second signs. The C dimension is the distance between the second and third signs. (The "first sign" is the sign in a three-sign series that is closest to the TTC zone. The "third sign" is the sign that is furthest upstream from the TTC zone.)

Table 6C-2. Stopping Sight Distance as a Function of Speed

Speed*	Distance
20 mph	115 feet
25 mph	155 feet
30 mph	200 feet
35 mph	250 feet
40 mph	305 feet
45 mph	360 feet
50 mph	425 feet
55 mph	495 feet
60 mph	570 feet
65 mph	645 feet
70 mph	730 feet
75 mph	820 feet

* Posted speed, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed.
Can also be used as Stopping Sight Distance as suggested buffer space length or location for flagger station.

Table 6C-3. Taper Length Criteria for Temporary Traffic Control Zones

Type of Taper	Taper Length
Merging Taper	at least L
Shifting Taper	at least 0.5 L
Shoulder Taper	at least 0.33 L
One-Lane, Two-Way Traffic Taper	50 feet minimum, 100 feet maximum
Downstream Taper	50 feet minimum, 100 feet maximum

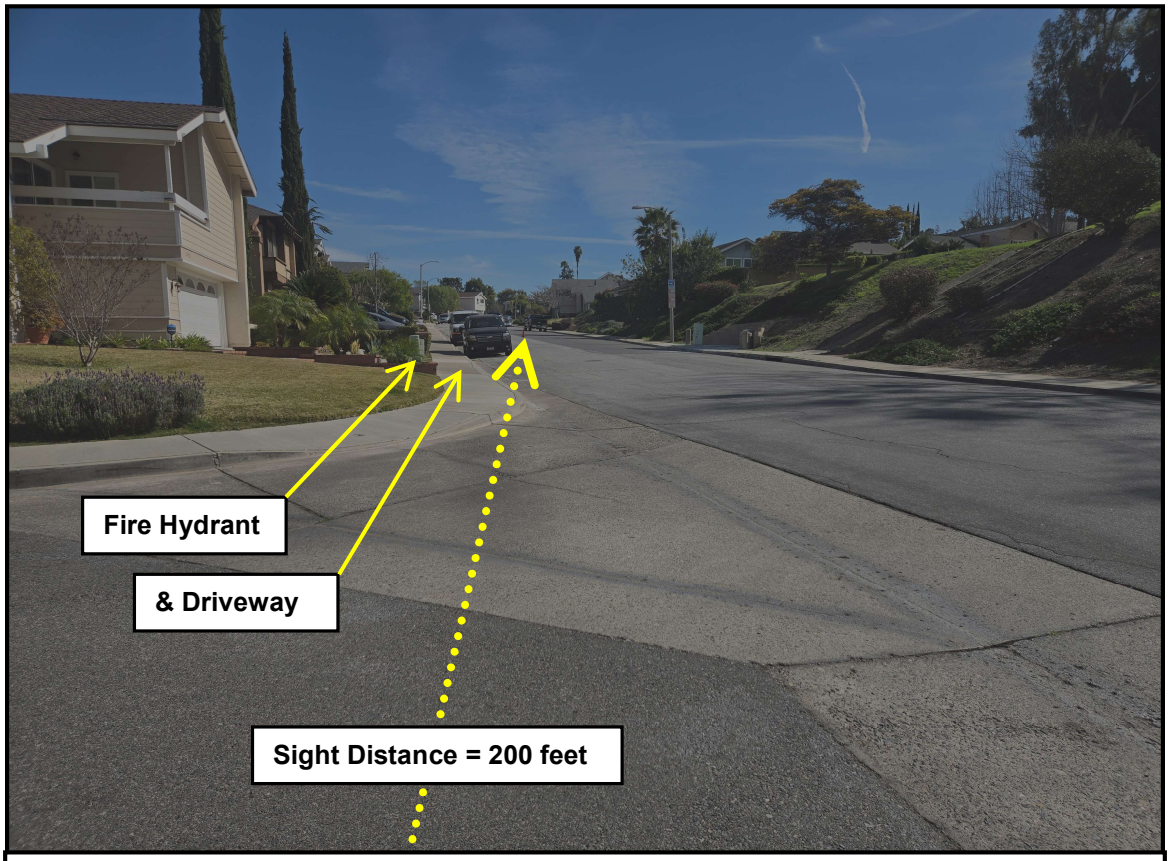
Note: Use Table 6C-4 to calculate L

APPENDIX C

SIGHT DISTANCE EXHIBIT

SIGHT DISTANCE EXHIBIT

SB SUNBURST AVENUE (*LOOKING WESTERLY*) AT ONCOMING EB TRAFFIC ALONG LARGO DRIVE



SB SUNBURST AVENUE (*LOOKING EASTERLY*) AT ONCOMING WB TRAFFIC ALONG LARGO DRIVE

City of Laguna Hills
Traffic Commission
Staff Report

Date: March 19, 2025
To: Chair and Commission Members
From: Samantha Vu, Assistant Engineer
Issue: Review of Traffic Conditions on Bridlewood Drive and Vista Viejo

Recommendation: That the Traffic Commission recommend that the City Engineer add Bridlewood Drive and Vista Viejo to the portable radar speed-feedback trailer rotational deployment list and conduct another speed survey in 90 days, and that Police Services conduct increased law (speed) enforcement on Bridlewood Drive and Vista Viejo.

Background:

City staff was recently contacted by a resident of the community regarding concerns of vehicular speeding on Bridlewood Drive and Vista Viejo. Please see the attached Vicinity Map. Based upon the resident's concern and in accordance with the Residential Streets Management Policy, City staff initiated a review of the requested area.

City staff was previously contacted by a resident of Moulton Ranch in April 2018 regarding concerns of vehicular speeding and collisions on Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive. City staff subsequently initiated a traffic engineering evaluation of Bridlewood Drive between Vista Viejo Road and Laurel Crest Drive. The report presented at the July 18, 2018 meeting of the Traffic Commission concluded the 85th percentile speed measurement of Bridlewood Drive was higher than expected and considered to be unacceptable. Additional traffic speed enforcement and use of the radar trailer were utilized to address this issue. The Traffic Commission requested City staff repeat the speed survey of Bridlewood Drive in six months' time.

In accordance with the Traffic Commission's request, a follow-up speed survey was performed in December 2018. Although the prevailing speed of traffic was lower than previous measurements, it was still higher than expected for a residential street.

Therefore, City staff recommended and subsequently installed additional signs and pavement legends on Bridlewood Drive. Continued concentrated police enforcement was also recommended in addition to a follow-up speed survey in six months' time.

In accordance with the recommendation at the January 16, 2019, meeting of the Traffic Commission, a new speed survey was performed in October 2019. This speed survey determined the prevailing speed of traffic was in the acceptable range in the morning but remained higher than expected in the afternoon time period. At the time, it was determined that the appropriate steps were to continue concentrated police enforcement. Previous Traffic Commission reports are attached.

Due to the previous studies being more than two (2) years old, City staff contacted Counts Unlimited, Inc. to conduct a four (4) day speed survey in two locations. Please see the attached Speed Survey Location Map. Counts Unlimited, Inc. collected and reported the attached 96-hour speed survey on Bridlewood Drive and Vista Viejo, between January 3 and January 6, 2025. Table 1 below contains a summary of the results. It should be noted that Bridlewood Drive has a posted speed limit of 25 MPH. Vista Viejo has a posted speed limit of 35 MPH in the City of Mission Viejo which decreases to 30 MPH for the portion of the roadway that is in within the City of Laguna Hills.

Table 1: Speed Survey Summary

Speed Summary	Bridlewood Drive			Vista Viejo		
	NB	SB	Both	EB	WB	Both
85th Percentile Speed (MPH)	35.5	34.25	35	36.75	33.75	35.5
Average Speed (MPH)	30.5	28.75	29.75	31.5	29	30.25
Percent of Vehicles in Pace (Within 26-35 MPH)	65.03%	57.75%	62.5%	56.55%	67.15%	61.38%

Staff's experience has found the typical prevailing speed range for such streets to be between 32 and 34 MPH, without traffic safety concerns. This is approximately 7-8 MPH above the posted speed limit. The speed survey counts determined the 85th percentile speeds on Bridlewood Drive as 35 MPH and 35.5 MPH on Vista Viejo. Based on the data in Table 1, the 85th percentile speeds were found to be high for Bridlewood Drive. Both streets experienced low vehicle volumes for a typical, residential streets; however, Bridlewood Drive and Vista Viejo had unusual spotty speeding which lead to a low percent of vehicles in pace for both streets.

To address traffic safety concerns, the Residential Streets Traffic Management Policy outlines procedures and incremental solutions. Generally, actions to address speeding issues on residential streets will only be recommended if the prevailing speed is above 32 to 34 MPH, if unusual conditions exist on the roadway, or if there are documented speed-related traffic collisions. Although Vista Viejo does not pose a traffic safety concern on average, the unusual spotty speeding poses a safety issue for residents. In this case, the policy recommends an incremental approach, which includes:

- Increased law enforcement
- Frequent deployment of portable radar speed-feedback trailers
- The use of traffic control devices, regulatory signs and markings, warning signs, and striping
- Physical devices like bolt-down speed cushions

It should be noted that the implementation of physical devices has additional criteria to be considered during assessment. According to the Residential Streets traffic management Policy, the following minimum criteria must be met to consider the implementation of physical devices:

a. At least 67% of the affected residents of the street and adjacent area streets support the implementation of the physical device. The streets to be used to evaluate the support for the physical device will be those that reasonably can be inferred to draw traffic to the street of concern.

b. The prevailing speed of traffic has been documented to be greater than 34 mph for at least two radar speed surveys taken 90 days apart as part of the follow-up evaluation of all other traffic controls used to address the issue.

c. At least 1,500 vehicles traverse the street in a 24-hour period.

d. The location meets the approval of the Police and Fire Department related to adequate response time of safety vehicles.

e. The grade of the street shall not exceed 6%.

f. The street must have a length of at least 1,300 feet and be able to accommodate a minimum of three speed humps unless otherwise directed by the City Council.

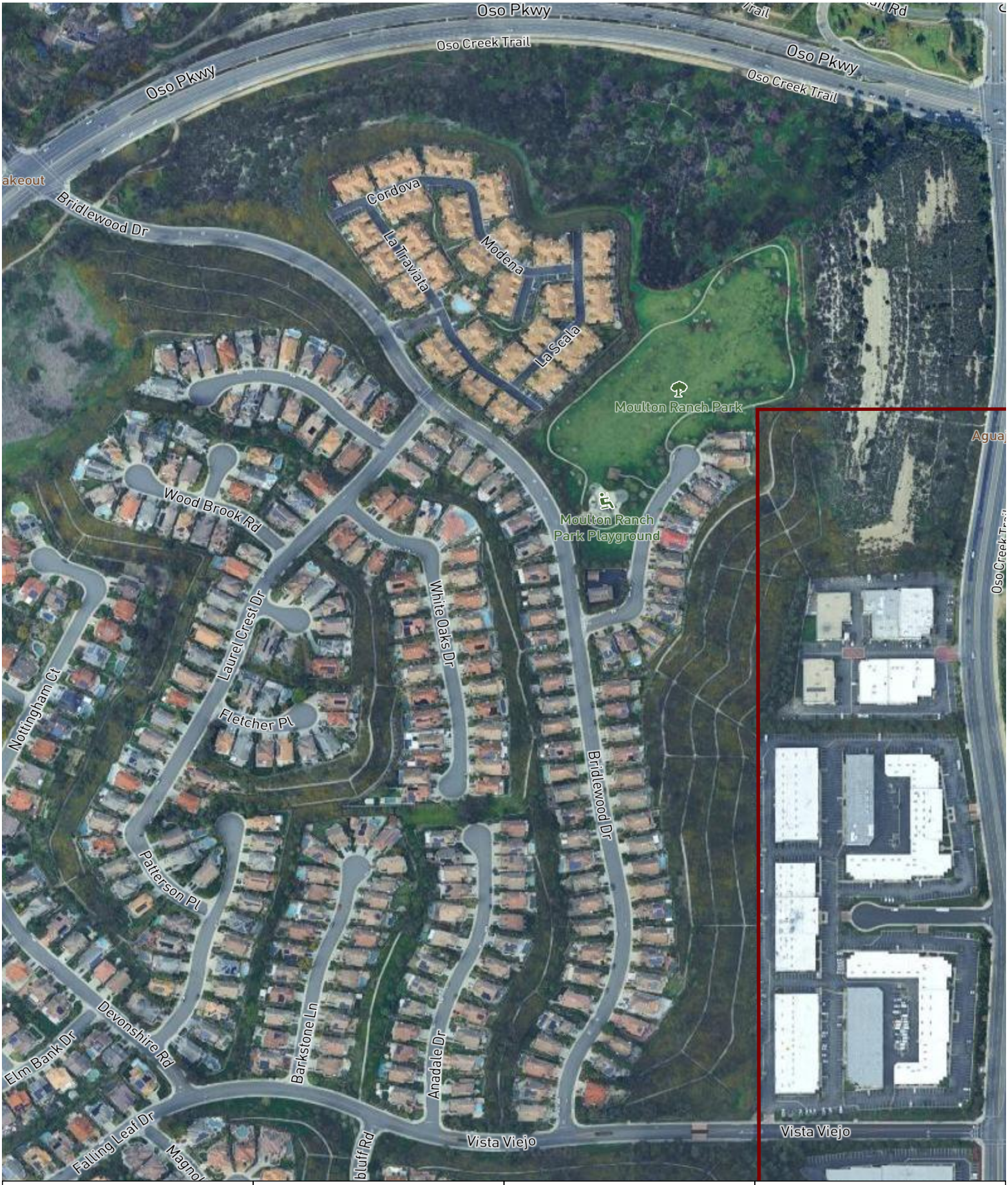
g. Other issues related to traffic engineering will be considered as deemed appropriate by the City Traffic Engineer.

City staff recommends an incremental approach to be followed by adding both Bridlewood Drive and Vista Viejo to the portable radar speed-feedback trailer rotational deployment list, conducting another speed survey in 90 days, and requesting that Police Services conduct increased law (speed) enforcement on Bridlewood Drive and Vista Viejo. If no change is observed using the incremental approach and the minimum criteria in the Residential Streets Traffic Management Policy are met, City staff will research the implementation of physical devices including cost and present it to the Traffic Commission at a future meeting.

Fiscal Impact:
City staff's recommendation will result in no new fiscal impact.

Attachments:
1. Vicinity Map
2. Traffic Commission Item 4.2, dated July 18, 2018
3. Traffic Commission Item 4.2, dated January 16, 2019
4. Traffic Commission Item 4.5, dated November 20, 2019
5. Speed Survey Location Map
6. Counts Unlimited, Inc. Speed Survey, January 3, 2025 through January 6, 2025

Bridlewood Drive and Vista Viejo



1" = 350 ft	Vicinity Map	03/10/2025	

This map may represent a visual display of related geographic information. Data provided here is not a guarantee of actual field conditions. To ensure complete accuracy, please contact the responsible staff for the most up-to-date information.

City of Laguna Hills

Traffic Commission

Staff Report

DATE: July 18, 2018

TO: Traffic Commissioners

FROM: Kenneth H. Rosenfield P.E.
Assistant City Manager/Director of Public Services

ISSUE: Review of Traffic Conditions on Bridlewood Drive and Devonshire Road

RECOMMENDATION: That the Traffic Commission Request Staff Monitor the Speed of Vehicles and Repeat the Speed Survey of Bridlewood Drive Between Vista Viejo Road and Laurel Crest Drive in Six Months Time.

SUMMARY:

Staff was recently contacted by a resident of Moulton Ranch regarding concerns of vehicular speeding and traffic collisions on Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive, and on Devonshire Road, between Falling Leaf Drive and Nottingham Court. Please see the attached Vicinity Map. Based upon the resident's concern and in accordance with the Residential Streets Management Policy, staff initiated a review of the travel speeds, traffic volume and traffic collision history on Bridlewood Drive and on Devonshire Road.

The Traffic Engineers of Hartzog & Crabill, Inc., (HCI) completed the attached June 1, 2018, study of the traffic attributes of Bridlewood Drive from Vista Viejo Road to Laurel Crest Drive and Devonshire Road from Falling Leaf Drive to Nottingham Court. The speed surveys, performed by HCI, as shown in the study, determined the 85th percentile speeds on Bridlewood Drive and Devonshire Road as 37.1 mph and 32.9 mph, respectively.

0840-50 90002872

The 85th percentile speed measurement of Bridlewood Drive is higher than expected and considered to be unacceptable for a residential character street. The study also determined 24.6% of the vehicles on Bridlewood Drive were exceeding 34 mph, which is also a higher percentage than the expected percentage, typically at approximately 15%.

The 85th percentile speed measurement of Devonshire Road was fully within the expected range. Staff's long term experience has found the typical prevailing speed range for such streets to be between 32 and 34 mph, without adverse traffic collision history. Hence, the 85th percentile speed on Devonshire of 32 mph is not of concern for this residential character street.

The traffic count data, for both Bridlewood Drive and Devonshire Road, revealed the 24-hr volumes to be very low for a typical residential street that is a connecting, or through, street to other neighborhoods. The traffic volumes are not significant and no action is needed in response to this data.

A five-year traffic collision history review of Bridlewood Drive was also included in the study which determined three traffic collisions, including one not identified in the collision data from SWITRS but noted based on the attached photographic evidence provided by a resident, had occurred on Bridlewood Drive during this time. None of the traffic collisions were identified as speed-related.

The five-year traffic collision history review of Devonshire Road identified a single traffic collision which was not identified as speed-related and is not considered significant for the purposes of this report.

Concentrated police enforcement of driver behavior is the best and appropriate remedy for residential streets vehicular speeding and is recommended for Bridlewood Drive. Staff will work with the Orange County Sheriff's Department on enforcement activity in this area and will also post the radar trailer in this area to increase driver education as to the appropriate speed on Bridlewood Drive. Staff will also provide the Moulton Ranch Homeowners Association (HOA) with a traffic safety article to be included in their newsletter for the residents of their HOA. In addition, a follow-up speed survey is recommended to be performed in six months. Should the speeding issue remain, the next incremental action will be evaluated. Currently, there are 25 mph pavement

legends and 25 mph signs posted at multiple locations along Bridlewood Drive between Vista Viejo Road and Laurel Crest Drive. While no changes to existing traffic controls are currently proposed, the number and locations of speed limit signage and pavement markings will also be reviewed following the repeat speed survey.

ATTACHMENTS:

- Vicinity Map
- Photograph
- Traffic Evaluation

VICINITY MAP - BRIDLEWOOD DRIVE & DEVONSHIRE ROAD

NORTH

0 0.02750.055 0.11 mi

Attachment: Vicinity Map (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

HARTZOG & CRABILL, Inc.

Trammell Hartzog, President
Gerald J. Stock, PE, TE,
Executive Vice President

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Suite 101
Tustin, CA 92780

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FAX: (714) 731-9498

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June 1, 2018

Mr. Kenneth H. Rosenfield, PE
Assistant City Manager/Public Services Director
City of Laguna Hills
24035 El Toro Road
Laguna Hills, CA 92653

Subject: Traffic Data Evaluation - Letter of Opinion - Speeding and Collision Concerns along Bridlewood Drive and Also along Devonshire Road

Dear Mr. Rosenfield,

Pursuant to your request, Hartzog & Crabill, Inc. (HCI) has prepared this traffic engineering evaluation regarding residential concerns of speeding and collisions along the following two (2) street segments:

1) Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive
2) Devonshire Road, between Falling Leaf Drive and Nottingham Court

BACKGROUND

Bridlewood Drive

Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive, is a 40-foot wide, 2-lane, north-south residential collector roadway. At the project limits, there is a 1-way stop at Vista Viejo Road and a 3-way stop at Laurel Crest Drive. There is no centerline striping along the entire segment, with exception of a short length of double-yellow centerline at the project limits.

There are posted 25 MPH speed limit signs along Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive. There are also '25' pavement markings adjacent to the sign postings. On-street parking is allowed along both sides of Bridlewood Drive.

Devonshire Road

Devonshire Road, between Falling Leaf Drive and Nottingham Court, is a 40-foot wide, 2-lane, north-south residential collector roadway. At the project limits, both intersections have 1-way stop controls. There is no centerline striping along the entire segment, with exception of a short length of double-yellow centerline at the project limits.

There are posted 25 MPH speed limit signs along Devonshire Road between Falling Leaf Drive and Nottingham Court. There are also '25' pavement markings adjacent to the sign postings. On-street parking is allowed along both sides of Devonshire Road.

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

TRAVEL SPEED DATA

To determine travel speeds on Bridlewood Drive and on Devonshire Road, a spot speed radar survey was conducted along each of these residential collector roadways on Wednesday, May 16, 2018, and Thursday, May 17, 2018, respectively. Tables 1 & 2 below summarize the radar speed data.

TABLE 1
SPEED SURVEY SUMMARY
BRIDLEWOOD DRIVE, FROM VISTA VIEJO ROAD TO LAUREL CREST DRIVE

Speed-Count Summary	From Vista Viejo Road to Laurel Crest Drive
85th Percentile Speed	37.1 MPH
Median Speed	29.5 MPH
15th Percentile Speed	25.0 MPH
10 MPH Pace Speed	25-34 MPH
Average Daily Traffic (ADT)	722 vehicles

As shown above, the 85th percentile speed on Bridlewood Drive was recorded at 37.1 MPH. This data shows that higher than typical travel speeds are occurring above the posted 25 MPH speed limit.

TABLE 2
SPEED SURVEY SUMMARY
DEVONSHIRE ROAD, FROM FALLING LEAF DRIVE TO NOTTINGHAM COURT

Speed-Count Summary	From Falling Leaf Drive to Nottingham Court
85th Percentile Speed	32.9 MPH
Median Speed	27.9 MPH
15th Percentile Speed	25.0 MPH
10 MPH Pace Speed	25-34 MPH
Average Daily Traffic (ADT)	590 vehicles

As shown above, the 85th percentile speed on Devonshire Road was recorded at 32.9 MPH. This data shows that typical travel speeds are occurring for a posted 25 MPH speed limit street. All radar survey data is attached to this letter.

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

TRAFFIC VOLUME DATA

Bridlewood Drive

Average Daily Traffic (ADT) counts were collected for the segment of Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive, on Wednesday, May 2, 2018. The ADT, or 24-hour two-way traffic volume, along this segment resulted in 722 vehicles.

A two-lane collector street generally has a Level-of-Service (LOS) 'D' capacity of 11,300 vehicles per day. Consequently, the existing traffic volume is well under the roadway capacity.

Devonshire Road

Average Daily Traffic (ADT) counts were collected for the segment of Devonshire Road, between Falling Leaf Drive and Nottingham Court, on Wednesday, May 2, 2018. The ADT, or 24-hour two-way traffic volume, along this segment resulted in 590 vehicles.

As mentioned, a two-lane collector street generally has a Level-of-Service (LOS) 'D' capacity of 11,300 vehicles per day. Consequently, the existing traffic volume is well under the roadway capacity. All traffic volume data is included in the appendix.

COLLISION DATA

Bridlewood Drive

HCI obtained collision data for the past five (5) years, between January 1, 2013 – February 28, 2018, from the Statewide Integrated Traffic Records System website (*i*-SWITRS) database to determine the number of collisions occurring on this segment of Bridlewood Drive. Table 3 below presents the summary collision data.

TABLE 3
TRAFFIC COLLISION DATA SUMMARY
BRIDLEWOOD DRIVE, FROM VISTA VIEJO ROAD TO LAUREL CREST DRIVE

YEAR	NUMBER OF COLLISIONS	FATAL	INJURY	PROPERTY DAMAGE ONLY
2013	1	0	1	0
2014	0	0	0	0
2015	0	0	0	0
2016	0	0	0	0
2017	1	0	0	1
2018 *	1	0	0	1

* Available SWITRS data was only up to February 2018 at the time of report preparation.

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

COLLISION DATA (*continued*)

As shown above, there were a total of three (3) collisions reported along this segment within the last (5) years. The collisions were recorded as Rear End and Head-On types, and categorized as Driving or Bicycling Under Influence and Automobile ROW. As such, there were no collisions determined as 'speed-related'. Consequently, there are no other recommendations regarding collisions at this time.

It is noted, a resident provided the City with photographic evidence of a two vehicle traffic collision having occurred on Bridlewood Drive on April 5, 2018. The Sheriff's Department reported that no police report was written as the parties described no injuries and stated they would settle the matter on their own. Accordingly, we have no details on the cause of this traffic collision.

Devonshire Road

HCI also obtained collision data for the past five (5) years, between January 1, 2013 – February 28, 2018, from the Statewide Integrated Traffic Records System website (*i*-SWITRS) database to determine the number of collisions occurring on the subject segment of Devonshire Road. Table 4 below presents the summary collision data.

TABLE 4
TRAFFIC COLLISION DATA SUMMARY
DEVONSHIRE ROAD, FROM FALLING LEAF DRIVE TO NOTTINGHAM COURT

YEAR	NUMBER OF COLLISIONS	FATAL	INJURY	PROPERTY DAMAGE ONLY
2013	0	0	0	0
2014	0	0	0	0
2015	0	0	0	0
2016	0	0	0	0
2017	1	0	1	0
2018 *	0	0	0	0

* Available SWITRS data was only up to February 2018 at the time of report preparation.

As shown above, there was only one (1) collision reported along this segment within the last (5) years. This collision was recorded as a Rear End type, and categorized as Improper Turning. As such, there were no collisions determined as 'speed-related'. Consequently, there are no other recommendations regarding collisions at this time. The comprehensive 5-year segment collision history reports are attached to this letter.

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

RECOMMENDATIONS

As speeding was verified on Bridlewood Drive, it is recommended that an incremental approach be taken to address the higher travel speeds. Initial steps include:

- increased law enforcement.
- deployment of portable radar speed-feedback trailers.
- neighborhood watch committee meeting to help make all residents aware of speeding.

It has been our pleasure to prepare this letter of opinion regarding speeds, traffic volumes, and collisions on Bridlewood Drive, and also on Devonshire Road. If you may have any questions or need additional information, please feel free to call us anytime at (714) 731-9455.

Sincerely,
HARTZOG & CRABILL, INC.

Gerald J. Stock, PE, TE
Executive Vice President

Attachments: Radar Speed Data (Qty. 2)
ADT Volume Data (Qty. 2)
Collision History (Qty. 2)

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

Speed Data

RADAR SPEED DISTRIBUTION SHEET

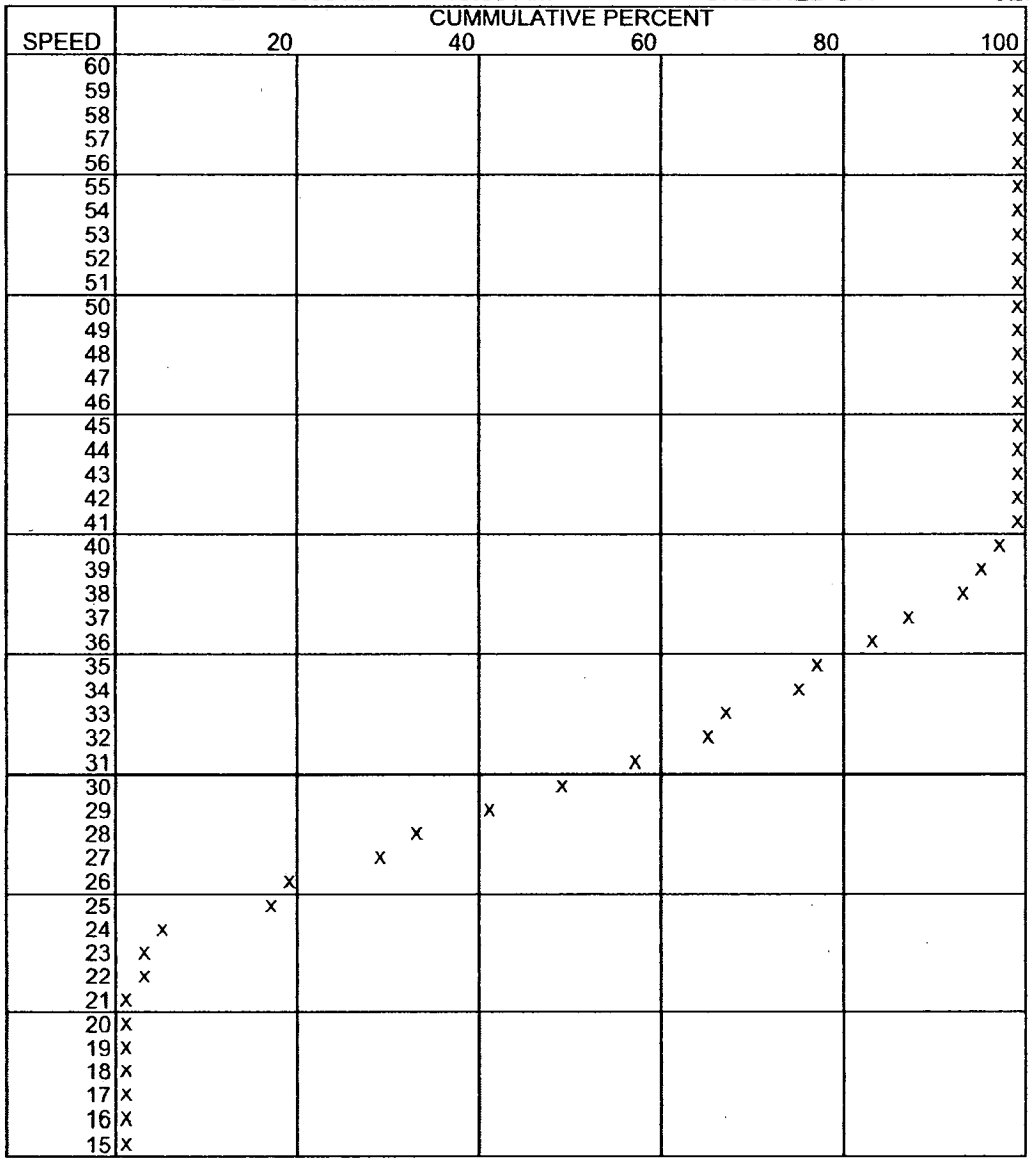
HCI

CITY OF LAGUNA HILLS

BRIDLEWOOD DRIVE — LAUREL CREST DR TO VISTA VIEJO

DATE: 5/16/2018 — SURVEY BY: C. BUENDIA

TIME: 9:00 AM - 10:00 AM — CHECKED BY: JERRY STOCK



UPPER LIMIT 10 MPH PACE:	34	MPH	
LOWER LIMIT 10 MPH PACE:	25	MPH	
PERCENT OVER PACE:	24.5	%	85th PERCENTILE SPEED: 36.5 MPH
PERCENT IN PACE:	69.8	%	MEDIAN SPEED: 30.1 MPH
PERCENT UNDER PACE:	5.7	%	15th PERCENTILE SPEED: 24.8 MPH

wood Spot Spd 2018-01

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL

AGENCY: CITY OF LAGUNA HILLS
STREET: BRIDLEWOOD
LOCATION: LAUREL CREST DR TO VISTA VIEJO

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 5-16-18
START TIME: 9:00 AM
END TIME: 10:00 AM VH

DIRECTION: SOUTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43		
42		
41		
40	/	1
39		0
38	/	1
37	/	1
36		0
35		0
34	/	1
33		0
32	/	1
31	///	3
30	///	3
29		2
28	///	3
27	//	2
26		0
25	///	3
24	/	1
23		
22		
21		
20		
19		
18		
17		
16		
15		

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

DIRECTION: NORTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL	CUMULATIVE TOTAL	MPH
60				60
59				59
58				58
57				57
56				56
55				55
54				54
53				53
52				52
51				51
50				50
49				49
48				48
47				47
46				46
45				45
44				44
43	/	1		43
42		0	0	42
41	/	1		41
40		0		40
39	/	1	1	39
38	//	2	3	38
37			3	37
36	///	3	3	36
35			1	35
34	///	3	4	34
33			2	33
32	///	3	4	32
31	/	1	4	31
30	//	2	4	30
29	///	3	4	29
28		0	3	28
27	///	3	5	27
26	/	1	1	26
25	///	3	4	25
24		0		24
23		0	0	23
22	/	1	1	22
21		0	0	21
20	/	1	1	20
19				19
18				18
17				17
16				16
15				15

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire

RADAR SPEED DISTRIBUTION SHEET

HCI

CITY OF LAGUNA HILLS

BRIDLEWOOD DRIVE — LAUREL CREST DR TO VISTA VIEJO

DATE: 5/16/2018 — SURVEY BY: C. BUENDIA

TIME: 10:00 AM - 11:00 AM — CHECKED BY: JERRY STOCK

SPEED	CUMMULATIVE PERCENT (20 / 40 / 60 / 80 / 100)						
60					x	100.0%	
59					x	100.0%	
58					x	100.0%	
57					x	100.0%	
56					x	100.0%	
55					x	100.0%	
54					x	100.0%	
53					x	100.0%	
52					x	100.0%	
51					x	100.0%	
50					x	98.4%	
49					x	98.4%	
48					x	98.4%	
47					x	98.4%	
46					x	98.4%	
45					x	98.4%	
44					x	98.4%	
43					x	98.4%	
42					x	98.4%	
41					x	96.7%	
40					x	95.1%	
39					x	93.4%	
38					x	91.8%	
37					x	82.0%	---85PCT
36				x		78.7%	
35				x		78.7%	
34				x		75.4%	}PACE
33				x		67.2%	}PACE
32				x		63.9%	}PACE
31				x		60.7%	}PACE
30			x			57.4%	}PACE
29			x			50.8%	}PACE
28			x			45.9%	}PACE ---MEAN
27		x				34.4%	}PACE
26	x					18.0%	}PACE
25	x					13.1%	}PACE ---15PCT
24	x					8.2%	
23	x					6.6%	
22	x					4.9%	
21	x					4.9%	
20	x					3.3%	
19	x					1.6%	
18	x					0.0%	
17	x					0.0%	
16	x					0.0%	
15	x					0.0%	

UPPER LIMIT 10 MPH PACE:	34	MPH			
LOWER LIMIT 10 MPH PACE:	25	MPH	85th PERCENTILE SPEED:	37.3	MPH
PERCENT OVER PACE:	24.6	%	MEDIAN SPEED:	28.8	MPH
PERCENT IN PACE:	67.2	%	15th PERCENTILE SPEED:	25.4	MPH
PERCENT UNDER PACE:	8.2	%			

wood Spot Spd 2018-02

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL

AGENCY: CITY OF LAGUNA HILLS
STREET: BRIDLEWOOD
LOCATION: LAUREL CREST DR TO VISTA VIEJO

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 5-16-18
START TIME: 10:00AM
END TIME: 11:00AM

DIRECTION: SOUTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43		
42		
41	/	1
40		0
39		0
38	/	1
37	/	1
36		0
35	/	1
34	//	2
33	//	2
32		0
31	/	1
30	//	2
29	//	2
28	//	2
27	/////	5
26		0
25	///	3
24	/	1
23		
22		
21		
20		
19		
18		
17		
16		
15		

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

DIRECTION: NORTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51	/	1
50		0
49		0
48		0
47		0
46		0
45		0
44		0
43		0
42	/	1
41		0
40	/	1
39	/	1
38	/////	5
37		0
36	//	2
35	///	3
34	//	2
33	//	2
32	//	2
31	//	2
30	////	4
29	/////	5
28	/////	5
27		0
26	//	2
25		0
24		0
23	/	1
22		0
21	/	1
20	/	1
19	/	1
18		
17		
16		
15		

CUMULATIVE TOTAL	MPH
	60
	59
	58
	57
	56
	55
	54
	53
	52
1	51
1	50
1	49
1	48
1	47
1	46
1	45
1	44
1	43
2	42
2	41
2	40
2	39
7	38
7	37
9	36
11	35
16	34
18	33
20	32
22	31
24	30
29	29
32	28
37	27
39	26
42	25
44	24
44	23
45	22
46	21
46	20
46	19
46	18
46	17
46	16
46	15

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

1000000011222294339466871059492111121

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire

RADAR SPEED DISTRIBUTION SHEET

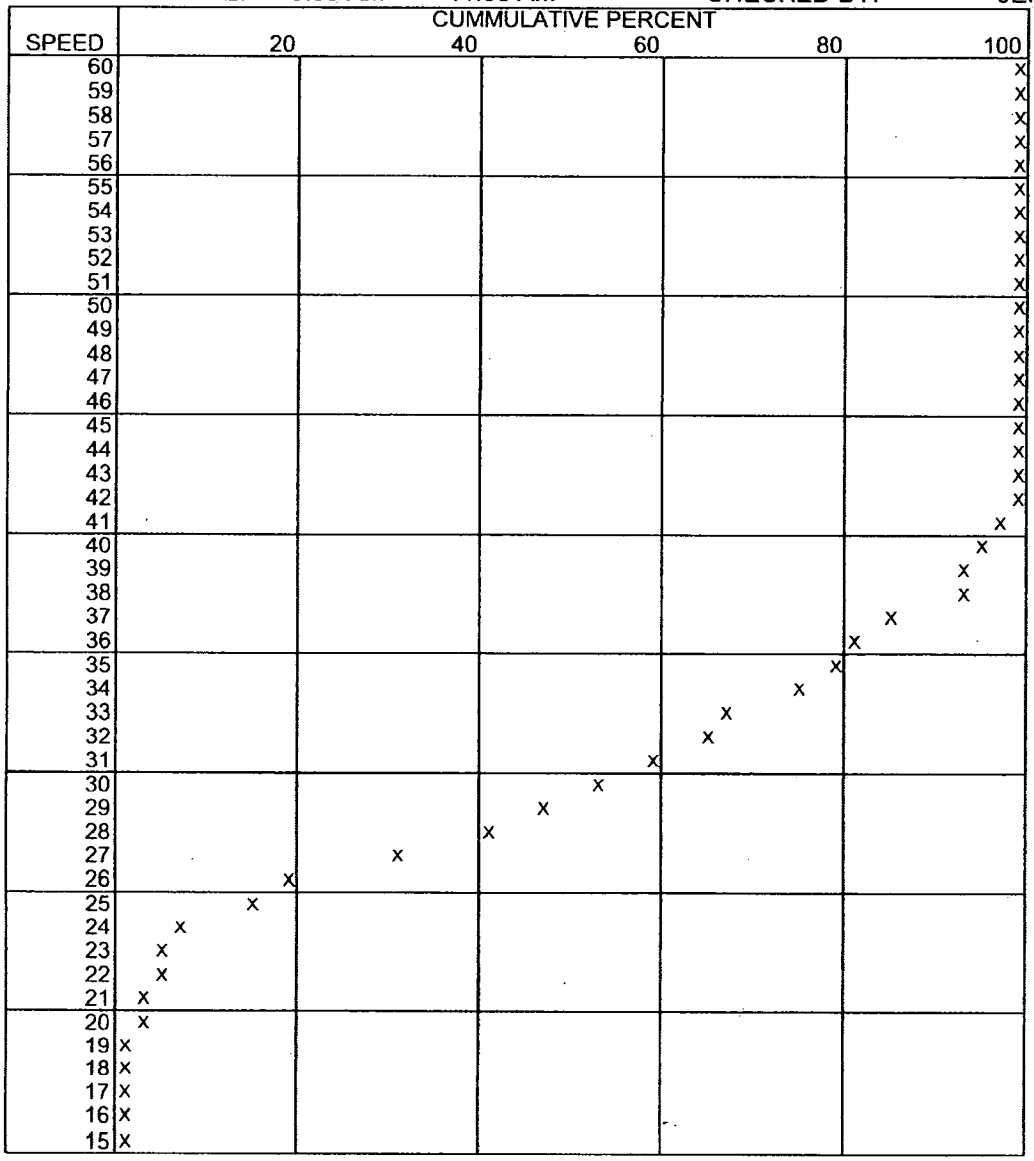
CITY OF LAGUNA HILLS

HCI

BRIDLEWOOD DRIVE — LAUREL CREST DR TO VISTA VIEJO

DATE: 5/16/2018 — SURVEY BY: C. BUENDIA

TIME: 9:00 AM - 11:00 AM — CHECKED BY: JERRY STOCK



UPPER LIMIT 10 MPH PACE:	34	MPH	
LOWER LIMIT 10 MPH PACE:	25	MPH	
PERCENT OVER PACE:	24.6	%	85th PERCENTILE SPEED: 37.1 MPH
PERCENT IN PACE:	68.4	%	MEDIAN SPEED: 29.5 MPH
PERCENT UNDER PACE:	7.0	%	15th PERCENTILE SPEED: 25.0 MPH

od Spot Spd 2018-CUM

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

RADAR SPEED DISTRIBUTION SHEET

HCI

CITY OF LAGUNA HILLS

DEVONSHIRE ROAD — FALLING LEAF DR TO NOTTINGHAM CT

DATE: 5/17/2018 — SURVEY BY: C. BUENDIA

TIME: 9:00 AM - 10:00 AM — CHECKED BY: JERRY STOCK

SPEED	CUMMULATIVE PERCENT 20	40	60	80	100		
60					x	100.0%	
59					x	100.0%	
58					x	100.0%	
57					x	100.0%	
56					x	100.0%	
55					x	100.0%	
54					x	100.0%	
53					x	100.0%	
52					x	100.0%	
51					x	100.0%	
50					x	100.0%	
49					x	100.0%	
48					x	100.0%	
47					x	100.0%	
46					x	100.0%	
45					x	100.0%	
44					x	100.0%	
43					x	100.0%	
42					x	100.0%	
41					x	100.0%	
40					x	100.0%	
39					x	100.0%	
38					x	100.0%	
37					x	96.9%	
36					x	96.9%	
35					x	96.9%	
34					x	93.8%	}PACE
33				x		78.1%	}PACE - - -85PCT
32				x		78.1%	}PACE
31				x		75.0%	}PACE
30				x		71.9%	}PACE
29			x			62.5%	}PACE
28			x			50.0%	}PACE - - - -MEAN
27			x			46.9%	}PACE
26		x				28.1%	}PACE
25		x				21.9%	}PACE
24	x					9.4%	- - -15PCT
23	x					9.4%	
22	x					3.1%	
21	x					3.1%	
20	x					0.0%	
19	x					0.0%	
18	x					0.0%	
17	x					0.0%	
16	x					0.0%	
15	x					0.0%	

UPPER LIMIT 10 MPH PACE:	34	MPH			
LOWER LIMIT 10 MPH PACE:	25	MPH	85th PERCENTILE SPEED:	33.4	MPH
PERCENT OVER PACE:	6.3	%	MEDIAN SPEED:	28.0	MPH
PERCENT IN PACE:	84.4	%	15th PERCENTILE SPEED:	24.5	MPH
PERCENT UNDER PACE:	9.4	%			

Devonshire 2018-01

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL II

AGENCY: CITY OF LAGUNA HILLS
STREET: DEVONSHIRE ROAD
LOCATION: FALLING LEAF DR. TO NOTTINGHAM CT

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 05-17-18
START TIME: 9:00 AM
END TIME: 10:00 AM

DIRECTION: SOUTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43		
42		
41		
40		
39		
38		
37		
36		
35	/	1
34	////	4
33		0
32	/	1
31	/	3
30	///	3
29	///	4
28	/	1
27	///	4
26		0
25	/	1
24		0
23	/	1
22		0
21	/	1
20		
19		
18		
17		
16		
15		

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

DIRECTION:

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL	CUMULATIVE TOTAL	MPH
60				60
59				59
58				58
57				57
56				56
55				55
54				54
53				53
52				52
51				51
50				50
49				49
48				48
47				47
46				46
45				45
44				44
43				43
42				42
41				41
40				40
39				39
38	/	1	1	38
37		0	1	37
36		0	1	36
35		0	1	35
34	/	1	2	34
33		0	2	33
32		0	2	32
31		0	2	31
30		0	2	30
29	/	1	3	29
28		0	3	28
27	//	2	5	27
26	//	2	7	26
25	///	3	10	25
24		0	10	24
23	/	1	11	23
22			11	22
21			11	21
20			11	20
19				19
18				18
17				17
16				16
15				15

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire

RADAR SPEED DISTRIBUTION SHEET

HCI

CITY OF LAGUNA HILLS

DEVONSHIRE ROAD — FALLING LEAF DR TO NOTTINGHAM CT

DATE: 5/17/2018 — SURVEY BY: C. BUENDIA

TIME: 10:00 AM - 11:00 AM — CHECKED BY: JERRY STOCK

SPEED	CUMMULATIVE PERCENT 20	40	60	80	100		
60					x	100.0%	
59					x	100.0%	
58					x	100.0%	
57					x	100.0%	
56					x	100.0%	
55					x	100.0%	
54					x	100.0%	
53					x	100.0%	
52					x	100.0%	
51					x	100.0%	
50					x	100.0%	
49					x	100.0%	
48					x	100.0%	
47					x	100.0%	
46					x	100.0%	
45					x	100.0%	
44					x	100.0%	
43					x	100.0%	
42					x	100.0%	
41					x	100.0%	
40					x	100.0%	
39					x	100.0%	
38					x	100.0%	
37					x	95.7%	
36					x	95.7%	
35					x	95.7%	
34					x	95.7%	}PACE
33					x	95.7%	}PACE
32				x		87.0%	}PACE
31				x		87.0%	}PACE
30				x		78.3%	}PACE - - 85PCT
29			x			60.9%	}PACE
28			x			52.2%	}PACE
27		x				39.1%	}PACE - - - -MEAN
26		x				21.7%	}PACE
25	x					4.3%	}PACE - - -15PCT
24	x					0.0%	
23	x					0.0%	
22	x					0.0%	
21	x					0.0%	
20	x					0.0%	
19	x					0.0%	
18	x					0.0%	
17	x					0.0%	
16	x					0.0%	
15	x					0.0%	

UPPER LIMIT 10 MPH PACE:	34	MPH			
LOWER LIMIT 10 MPH PACE:	25	MPH	85th PERCENTILE SPEED:	30.8	MPH
PERCENT OVER PACE:	4.3	%	MEDIAN SPEED:	27.8	MPH
PERCENT IN PACE:	95.7	%	15th PERCENTILE SPEED:	25.6	MPH
PERCENT UNDER PACE:	0.0	%			

Devonshire 2018-02

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL

AGENCY: CITY OF LAGUNA HILLS
STREET: DEVONSHIRE ROAD
LOCATION: FALLING LEAF DR TO NOTTINGHAM CT.

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 5-17-18
START TIME: 10:00 AM
END TIME: 11:00 AM VM

DIRECTION: SOUTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43		
42		
41		
40		
39		
38	/	1
37		0
36		0
35		0
34		0
33	/	1
32		0
31	/	1
30	///	3
29		0
28		0
27	///	3
26	//	2
25	/	1
24		
23		
22		
21		
20		
19		
18		
17		
16		
15		

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

DIRECTION: NORTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL	CUMULATIVE TOTAL	MPH
60				60
59				59
58				58
57				57
56				56
55				55
54				54
53				53
52				52
51				51
50				50
49				49
48				48
47				47
46				46
45				45
44				44
43				43
42				42
41				41
40				40
39				39
38			1	38
37			1	37
36			1	36
35			1	35
34			1	34
33	/	1	2	33
32		0	2	32
31	/	1	3	31
30	/	1	4	30
29		0	4	29
28	///	3	7	28
27		0	7	27
26	//	2	9	26
25			9	25
24				24
23				23
22				22
21				21
20				20
19				19
18				18
17				17
16				16
15				15

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire 20151237641085020 1)

RADAR SPEED DISTRIBUTION SHEET

HCI

CITY OF LAGUNA HILLS

DEVONSHIRE ROAD — FALLING LEAF DR TO NOTTINGHAM CT

DATE: 5/17/2018 — SURVEY BY: C. BUENDIA

TIME: 9:00 AM - 11:00 AM — CHECKED BY: JERRY STOCK

SPEED	CUMMULATIVE PERCENT 20	40	60	80	100		
60					x	100.0%	
59					x	100.0%	
58					x	100.0%	
57					x	100.0%	
56					x	100.0%	
55					x	100.0%	
54					x	100.0%	
53					x	100.0%	
52					x	100.0%	
51					x	100.0%	
50					x	100.0%	
49					x	100.0%	
48					x	100.0%	
47					x	100.0%	
46					x	100.0%	
45					x	100.0%	
44					x	100.0%	
43					x	100.0%	
42					x	100.0%	
41					x	100.0%	
40					x	100.0%	
39					x	100.0%	
38					x	100.0%	
37					x	96.4%	
36					x	96.4%	
35					x	96.4%	
34					x	94.5%	}PACE
33				x		85.5%	}PACE
32				x		81.8%	}PACE - - -85PCT
31				x		80.0%	}PACE
30				x		74.5%	}PACE
29			x			61.8%	}PACE
28			x			50.9%	}PACE
27		x				43.6%	}PACE - - -MEAN
26		x				25.5%	}PACE
25	x					14.5%	}PACE - - -15PCT
24	x					5.5%	
23	x					5.5%	
22	x					1.8%	
21	x					1.8%	
20	x					0.0%	
19	x					0.0%	
18	x					0.0%	
17	x					0.0%	
16	x					0.0%	
15	x					0.0%	

UPPER LIMIT 10 MPH PACE:	34	MPH			
LOWER LIMIT 10 MPH PACE:	25	MPH	85th PERCENTILE SPEED:	32.9	MPH
PERCENT OVER PACE:	5.5	%	MEDIAN SPEED:	27.9	MPH
PERCENT IN PACE:	89.1	%	15th PERCENTILE SPEED:	25.0	MPH
PERCENT UNDER PACE:	5.5	%			

Devonshire 2018 CUM

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

ADT Volume Data

Prepared by NDS/ATD

VOLUME

Bridlewood Dr Bet. Vista Viejo Rd & Laurel Crest Dr

Day: Wednesday
Date: 5/2/2018

City: Laguna Hills
Project #: CA18_1093_001

DAILY TOTALS	NB	SB	EB	WB	Total
	454	268	0	0	722

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00	0		0						0		12:00	5		10						15	
00:15	1		1						2		12:15	6		9						15	
00:30	0		0						0		12:30	7		3						10	
00:45	0	1	0	1					0	2	12:45	7	25	4	26					11	51
01:00	0		0						0		13:00	5		2						7	
01:15	0		0						0		13:15	6		4						10	
01:30	0		0						0		13:30	8		4						12	
01:45	0		0						0		13:45	2	21	9	19					11	40
02:00	0		0						0		14:00	8		7						15	
02:15	0		0						0		14:15	7		4						11	
02:30	0		0						0		14:30	7		5						12	
02:45	0		0						0		14:45	9	31	5	21					14	52
03:00	0		0						0		15:00	5		7						12	
03:15	0		0						0		15:15	9		5						14	
03:30	0		0						0		15:30	3		6						9	
03:45	0		0						0		15:45	8	25	4	22					12	47
04:00	1		1						2		16:00	12		5						17	
04:15	0		0						0		16:15	10		7						17	
04:30	1		0						1		16:30	6		3						9	
04:45	1	3	0	1					1	4	16:45	11	39	3	18					14	57
05:00	1		1						2		17:00	4		2						6	
05:15	0		0						0		17:15	4		3						7	
05:30	2		0						2		17:30	15		10						25	
05:45	1	4	0	1					1	5	17:45	9	32	5	20					14	52
06:00	2		1						3		18:00	4		2						6	
06:15	1		1						2		18:15	10		8						18	
06:30	5		0						5		18:30	10		4						14	
06:45	2	10	1	3					3	13	18:45	7	31	6	20					13	51
07:00	9		3						12		19:00	12		7						19	
07:15	8		5						13		19:15	3		1						4	
07:30	7		4						11		19:30	4		4						8	
07:45	15	39	4	16					19	55	19:45	4	23	3	15					7	38
08:00	11		7						18		20:00	4		1						5	
08:15	11		4						15		20:15	4		1						5	
08:30	16		5						21		20:30	4		3						7	
08:45	7	45	2	18					9	63	20:45	3	15	1	6					4	21
09:00	9		6						15		21:00	4		1						5	
09:15	11		1						12		21:15	3		2						5	
09:30	8		4						12		21:30	2		4						6	
09:45	4	32	4	15					8	47	21:45	1	10	0	7					1	17
10:00	4		2						6		22:00	0		4						4	
10:15	6		4						10		22:15	0		2						2	
10:30	11		4						15		22:30	2		0						2	
10:45	8	29	5	15					13	44	22:45	1	3	0	6					1	9
11:00	6		8						14		23:00	1		1						2	
11:15	7		4						11		23:15	0		0						0	
11:30	13		2						15		23:30	0		0						0	
11:45	8	34	3	17					11	51	23:45	1	2	0	1					1	3
TOTALS		197		87						284	TOTALS		257		181						438
SPLIT %		69.4%		30.6%						39.3%	SPLIT %		58.7%		41.3%						60.7

DAILY TOTALS	NB	SB	EB	WB	Total
	454	268	0	0	722

AM Peak Hour	07:45	11:45			07:45	PM Peak Hour	16:00	12:00			18:1
AM Pk Volume	53	25			73	PM Pk Volume	39	26			64
Pk Hr Factor	0.828	0.625			0.869	Pk Hr Factor	0.813	0.650			0.84
7 - 9 Volume	84	34	0	0	118	4 - 6 Volume	71	38	0	0	109
7 - 9 Peak Hour	07:45	07:15			07:45	4 - 6 Peak Hour	16:00	17:00			16:0
7 - 9 Pk Volume	53	20	0	0	73	4 - 6 Pk Volume	39	20	0	0	57
Pk Hr Factor	0.828	0.714	0.000	0.000	0.869	Pk Hr Factor	0.813	0.500	0.000	0.000	0.83

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

Prepared by NDS/ATD

VOLUME

Devonshire Rd Bet. Falling Leaf Dr & Nottingham Ct

Day: Wednesday
Date: 5/2/2018

City: Laguna Hills
Project #: CA18_1093_002

DAILY TOTALS	NB	SB	EB	WB	Total
	174	416	0	0	590

AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00	0	0			0	12:00	2	9			11
00:15	0	0			0	12:15	2	7			9
00:30	0	0			0	12:30	3	6			9
00:45	0	0			0	12:45	4	8			12
01:00	0	0			0	13:00	2	5			7
01:15	0	0			0	13:15	5	7			12
01:30	0	0			0	13:30	3	5			8
01:45	0	0			0	13:45	5	3			8
02:00	0	0			0	14:00	6	7			13
02:15	0	0			0	14:15	4	7			11
02:30	0	0			0	14:30	5	5			10
02:45	0	0			0	14:45	2	6			8
03:00	1	0			1	15:00	3	10			13
03:15	0	0			0	15:15	6	9			15
03:30	0	0			0	15:30	7	10			17
03:45	0	0			0	15:45	1	7			8
04:00	0	0			0	16:00	0	6			6
04:15	0	0			0	16:15	8	4			12
04:30	0	0			0	16:30	4	9			13
04:45	0	1			1	16:45	7	12			19
05:00	0	0			0	17:00	3	11			14
05:15	1	1			2	17:15	6	14			20
05:30	0	0			0	17:30	3	12			15
05:45	0	1			1	17:45	2	14			16
06:00	1	1			2	18:00	2	14			16
06:15	0	0			0	18:15	4	19			23
06:30	0	5			5	18:30	2	7			9
06:45	0	1			2	18:45	3	11			11
07:00	1	2			3	19:00	3	8			11
07:15	0	3			3	19:15	2	4			6
07:30	5	1			6	19:30	4	4			8
07:45	2	8			7	19:45	1	10			4
08:00	2	6			8	20:00	1	6			7
08:15	2	7			9	20:15	2	3			5
08:30	6	4			10	20:30	1	1			2
08:45	2	12			7	20:45	1	5			4
09:00	3	10			13	21:00	0	2			2
09:15	0	7			7	21:15	3	5			8
09:30	4	4			8	21:30	1	4			5
09:45	3	10			9	21:45	1	5			2
10:00	1	9			10	22:00	0	6			6
10:15	0	3			3	22:15	1	3			4
10:30	2	5			7	22:30	0	0			0
10:45	2	5			8	22:45	2	3			2
11:00	2	7			9	23:00	1	1			2
11:15	1	5			6	23:15	0	3			3
11:30	3	5			8	23:30	0	0			0
11:45	2	8			7	23:45	0	1			2
TOTALS	46	116			162	TOTALS	128	300			428
SPLIT %	28.4%	71.6%			27.5%	SPLIT %	29.9%	70.1%			72.5

DAILY TOTALS	NB	SB	EB	WB	Total
	174	416	0	0	590

AM Peak Hour	08:15	09:00			08:15	PM Peak Hour	16:15	17:30			17:3
AM Pk Volume	13	27			39	PM Pk Volume	22	59			70
Pk Hr Factor	0.542	0.675			0.750	Pk Hr Factor	0.688	0.776			0.76
7 - 9 Volume	20	33	0	0	53	4 - 6 Volume	33	82	0	0	115
7 - 9 Peak Hour	07:45	07:45			07:45	4 - 6 Peak Hour	16:15	17:00			16:4
7 - 9 Pk Volume	12	22	0	0	34	4 - 6 Pk Volume	22	51	0	0	68
Pk Hr Factor	0.500	0.786	0.000	0.000	0.850	Pk Hr Factor	0.688	0.911	0.000	0.000	0.85

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

Collision History

CITY OF LAGUNA HILLS
SWITRS COLLISION DATABASE
BRIDLEWOOD DRIVE, FROM VISTA VIEJO ROAD TO LAUREL CREST DRIVE
JAN. 1, 2013 - FEB. 28, 2018

CASE ID	COLL. DATE	COLL. TIME	PRIMARY ROAD	SECONDARY ROAD	DIST.	DIR.	INTERS.	WEATH. 1	COLL. SEVERITY	PRIM. COLL. FACT.	PCF VIOL CAT.	PCF VIOL.	HIT AND RUN	TYPE OF COLL.	MOTOR VEHICLE INVOLVED WITH	ROA SURI
8361526	20170326	10	BRIDLEWOOD DR	VISTA VIEJO RD	488	N	N	A	0	A	1	23152	N	C	E	A
6174038	20130806	1741	VISTA VIEJO	BRIDLEWOOD LN	0		Y	A	4	A	9	21801	N	A	C	A

NOTES:

Weather 1
- A - Clear
- B - Cloudy
- C - Raining
- D - Snowing
- E - Fog
- F - Other
- G - Wind
- - - Not Stated

Collision Severity
- 1 - Fatal
- 2 - Injury (Severe)
- 3 - Injury (Other Visible)
- 4 - Injury (Complaint of Pain)
- 0 - PDO (Property Damage Only)

Primary Collision Factor
- A - (Vehicle) Code Violation
- B - Other Improper Driving
- C - Other Than Driver
- D - Unknown
- E - Fell Asleep
- - - Not Stated

Motor Vehicle Involved With:
- A - Non-Collision
- B - Pedestrian
- C - Other Motor Vehicle
- D - Motor Vehicle on Other Roadway
- E - Parked Motor Vehicle
- F - Train
- G - Bicycle
- H - Animal
- I - Fixed Object
- J - Other Object
- - - Not Stated

PCF Violation Category
- 01 - Driving or Bicycling Under Influence
- 02 - Impeding Traffic
- 03 - Unsafe Speed
- 04 - Following Too Closely
- 05 - Wrong Side of Road
- 06 - Improper Passing
- 07 - Unsafe Lane Change
- 08 - Improper Turning
- 09 - Automobile ROW
- 10 - Pedestrian ROW
- 11 - Pedestrian Violation
- 12 - Traffic Signals and Signs
- 13 - Hazardous Parking
- 14 - Lights
- 15 - Brakes
- 16 - Other Equipment
- 17 - Other Hazardous Violation
- 18 - Other Than Driver (or Ped)
- 19 -
- 20 -
- 21 - Unsafe Starting or Backing
- 22 - Other Improper Driving
- 23 - Pedestrian or "Other" Under the Influence
- 24 - Fell Asleep
- 00 - Unknown
- - - Not Stated

Hit and Run
- F - Felony
- M - Misdemeanor
- N - Not Hit & Run

Road Surface
- A - Dry
- B - Wet
- C - Snowy or Icy
- D - Slippery
- - - Not Stated

Type of Collision
- A - Head-On
- B - Sideswipe
- C - Rear-End
- D - Broadside
- E - Hit Object
- F - Overturned
- G - Vehicle/Pedestrian
- H - Other
- - - Not Stated

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire

CITY OF LAGUNA HILLS
SWITRS COLLISION DATABASE
DEVONSHIRE ROAD, FROM FALLING LEAF DRIVE TO NOTTINGHAM COURT
JAN. 1, 2013 - FEB. 28, 2018

CASE ID	COLL. DATE	COLL. TIME	PRIMARY ROAD	SECONDARY ROAD	DIST.	DIR.	INTERS.	WEATH. 1	COLL. SEVERITY	PRIM. COLL. FACT.	PCF VIOL CAT.	PCF VIOL.	HIT AND RUN	TYPE OF COLL.	MOTOR VEHICLE INVOLVED WITH	ROA SURI
8326285	20170220	2256	DEVONSHIRE RD	NORTH ELM BANK DR	175		N	A	4	A	8	22107	N	C	E	A

NOTES:

Weather 1
- A - Clear
- B - Cloudy
- C - Raining
- D - Snowing
- E - Fog
- F - Other
- G - Wind
- - - Not Stated

Collision Severity
- 1 - Fatal
- 2 - Injury (Severe)
- 3 - Injury (Other Visible)
- 4 - Injury (Complaint of Pain)
- 0 - PDO (Property Damage Only)

Primary Collision Factor
- A - (Vehicle) Code Violation
- B - Other Improper Driving
- C - Other Than Driver
- D - Unknown
- E - Fell Asleep
- - - Not Stated

Motor Vehicle Involved With:
- A - Non-Collision
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- G - Bicycle
- H - Animal
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- J - Other Object
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- 11 - Pedestrian Violation
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- 13 - Hazardous Parking
- 14 - Lights
- 15 - Brakes
- 16 - Other Equipment
- 17 - Other Hazardous Violation
- 18 - Other Than Driver (or Ped)
- 19 -
- 20 -
- 21 - Unsafe Starting or Backing
- 22 - Other Improper Driving
- 23 - Pedestrian or "Other" Under the Influence
- 24 - Fell Asleep
- 00 - Unknown
- - - Not Stated

Hit and Run
- F - Felony
- M - Misdemeanor
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Road Surface
- A - Dry
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- D - Broadside
- E - Hit Object
- F - Overturned
- G - Vehicle/Pedestrian
- H - Other
- - - Not Stated

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire

City of Laguna Hills

Traffic Commission

Staff Report

DATE: January 16, 2019

TO: Traffic Commissioners

FROM: Amber Shah
Associate Engineer

ISSUE: Repeat Speed Survey on Bridlewood Drive

RECOMMENDATION: That the Traffic Commission Request Staff Implement Additional Pavement Legends and Markings on Southbound Bridlewood Drive Between Vista Viejo Road and Laurel Crest Drive and Repeat the Speed Survey of Bridlewood Drive in Six Months' Time.

SUMMARY:

Staff was contacted by a resident of Moulton Ranch in April 2018 regarding concerns of vehicular speeding and traffic collisions on Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive, and on Devonshire Road, between Falling Leaf Drive and Nottingham Court. Please see the attached Vicinity Map. Based upon the resident's concern and in accordance with the Residential Streets Management Policy, staff subsequently initiated a review of the vehicular speeds, traffic volume and traffic collision history on Bridlewood Drive and on Devonshire Road. The report presented at the July 18, 2018 meeting of the Traffic Commission concluded the 85th percentile speed measurement of Bridlewood Drive was higher than expected and considered to be unacceptable for a residential character street. Additional traffic speed enforcement and use of the radar trailer were utilized to address this issue. The Traffic Commission requested staff repeat the speed survey of Bridlewood Drive in six months' time.

In accordance with the Traffic Commission's request, the Traffic Engineers of Hartzog & Crabill, Inc., (HCI) completed the attached January 9, 2019, speed survey of Bridlewood Drive from Vista Viejo Road to Laurel Crest Drive. This speed survey determined the 85th percentile speed on Bridlewood Drive reduced from 37.1 mph, as recorded in the first

speed survey in May 2018, to 36.1 mph in December 2018. The 85th percentile speed measurement of Bridlewood Drive is still higher than expected and considered to be unacceptable for a residential character street. The study also determined the percent of vehicles on Nellie Gail Road exceeding 34 mph has only slightly declined from 24.6% to 24.2% which is also a higher percentage than the expected percentage, typically at approximately 15%.

Based upon the results of this speed survey indicating vehicular speed remains an issue on Bridlewood Drive, staff field reviewed the existing number and locations of speed limit signage and pavement markings. Currently, there are 25 mph pavement legends and 25 mph signs posted at multiple locations along northbound Bridlewood Drive between Vista Viejo Road and Laurel Crest Drive and 25 mph signage but no pavement legends along southbound Bridlewood Drive. Staff recommends painting two "25" mph pavement legends adjacent to the posted speed limits signs along southbound Bridlewood Drive and "Stop Ahead" pavement markings in advance of the stop sign at Vista Viejo Road. Continued concentrated police enforcement of driver behavior is the best and appropriate remedy for residential streets vehicular speeding and is recommended for Bridlewood Drive. Staff will continue to work with the Sheriff's Department on enforcement activity in this area and will also post the radar trailer in this area to increase driver education as to the appropriate speed on Bridlewood Drive. In addition, a follow-up speed survey is recommended to be performed in six months' time. Should the speeding issue remain, the next incremental action will be evaluated.

ATTACHMENTS:

- Vicinity Map - Bridlewood Drive
- Traffic Study
- Bridlewood Dr Traffic Commission Agenda Item 4.2 7-18-18

NORTH

0 0.02750.055 0.11 mi

VICINITY MAP - BRIDLEWOOD DRIVE

HARTZOG & CRABILL, Inc.

Trammell Hartzog, President
Gerald J. Stock, PE, TE,
Executive Vice President

17852 E. 17th Street
Suite 101
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FAX: (714) 731-9498

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January 9, 2019

Mr. Kenneth H. Rosenfield, PE
Assistant City Manager/Public Services Director
City of Laguna Hills
24035 El Toro Road
Laguna Hills, CA 92653

Subject: Letter of Opinion – Speeding, Cut-through Traffic, and Collision Concerns along Wilkes Place and Grissom Road, and Speeding Along Bridlewood Drive and Nellie Gail Road

Dear Mr. Rosenfield,

Pursuant to your request, Hartzog & Crabill, Inc. (HCI) has prepared this traffic engineering evaluation regarding resident concerns of speeding and cut-through traffic, along with review of collisions, on the following two street segments:

- Wilkes Place, south of Alicia Parkway, and
- Grissom Road, east of Wilkes Place.

This evaluation also includes follow-up spot speed radar surveys along the two following two segments:

- Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive,
- Nellie Gail Road, between Oso Parkway and Hidden Trail Road.

BACKGROUND

Wilkes Place

Wilkes Place, between Alicia Parkway and Grissom Road, is a 36-foot to 40-foot wide, 2-lane, diagonal north-south residential collector roadway. At the project limits, there is a traffic signal at Alicia Parkway and a 90 degree bend at Grissom Road. There is double-yellow and single-yellow skip centerline striping along the entire segment. There is also an uncontrolled, marked yellow crosswalk across Wilkes Place at Barents Street, along with SCHOOL XING warning signs and advance SLOW SCHOOL XING pavement markings. There is a posted 25 MPH speed limit sign just south of Alicia Parkway. On-street parking is allowed along both sides of Wilkes Place.

BACKGROUND (*continued*)

Grissom Road

Grissom Road, between Wilkes Place and Las Bolsas Street, is a 36-foot wide, 2-lane, east-west residential collector roadway. At the project limits, there are 90-degree bends with double-yellow centerlines delineating the curves only. There is no centerline striping along the entire segment, and no posted speed limit signs. On-street parking is allowed along both sides of Grissom Road. An intersecting T-intersection with Velasquez Road connects to Paseo de Valencia.

Bridlewood Drive

Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive, is a 40-foot wide, 2-lane, north-south residential collector roadway. At the project limits, there is a 1-way stop at Vista Viejo Road and a 3-way stop at Laurel Crest Drive. There is no centerline striping along the entire segment, with exception of a short length of double-yellow centerline at the project limits. There are posted 25 MPH speed limit signs along Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive. There are also '25' pavement markings adjacent to the sign postings. On-street parking is allowed along both sides of Bridlewood Drive.

Nellie Gail Road

Nellie Gail Road, between Oso Parkway and Hidden Trail Road, is a 40-foot wide, curvy 2-lane, residential collector roadway. There is a traffic signal control at Oso Parkway and a one-way Stop control at Hidden Trail Road. There is a double-yellow centerline stripe along the entire segment, and a raised landscaped center median at Oso Parkway. There are Equestrian Xings with posted warning signs within this segment, along with other advance Side Street warning signs. There are posted 25 MPH speed limit signs along Nellie Gail Road between Oso Parkway and Hidden Trail Road. There is also a '25' pavement marking adjacent to the sign posting just south of Oso Parkway. On-street parking is allowed along both sides of Nellie Gail Road.

TRAVEL SPEED DATA

To determine travel speeds on the four (4) segments of:

1) Wilkes Place, between Alicia Parkway and Grissom Road;
2) Grissom Road, between Wilkes Place and Las Bolsas Street;

3) Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive;
4) Nellie Gail Road, between Oso Parkway and Hidden Trail Road;

a spot speed radar survey was conducted on each of the locations on Tuesday, December 11, and on Wednesday, December 12, 2018. Tables 1 and 2 (next page) summarize the spot speed radar survey data.

TRAVEL SPEED DATA (*continued*)

TABLE 1
SPEED SURVEY SUMMARY
WILKES PLACE, FROM ALICIA PARKWAY TO GRISSOM ROAD
GRISSOM ROAD, FROM WILKES PLACE TO LAS BOLSAS STREET

Speed Summary	Along Wilkes Place Segment	Along Grissom Road Segment
Posted Speed Limit	25 MPH	25 MPH
85th Percentile Speed	30 MPH	28.4 MPH
Average Speed	25 MPH	25.2 MPH
10 MPH Pace Range	21 - 30 MPH	20 - 29 MPH
Percent of Vehicles in Pace	74.1%	87.3%

Source: Hartzog & Crabill, Inc., 2018.

TABLE 2
SPEED SURVEY SUMMARY
BRIDLEWOOD DRIVE, FROM VISTA VIEJO ROAD TO LAUREL CREST DRIVE
NELLIE GAIL ROAD, FROM OSO PARKWAY TO HIDDEN TRAIL ROAD

Speed Summary	Along Bridlewood Drive Segment	Along Nellie Gail Road Segment
Posted Speed Limit	25 MPH	25 MPH
85th Percentile Speed	36.1 MPH	34.8 MPH
Average Speed	29.3 MPH	30.9 MPH
10 MPH Pace Range	25 - 34 MPH	26 - 35 MPH
Percent of Vehicles in Pace	70.7%	77.0%

Source: Hartzog & Crabill, Inc., 2018.

As shown above, the 85th percentile speeds on Wilkes Place and Grissom Road were recorded at 30 MPH and 28.4 MPH, respectively. This data shows that typical travel speeds are occurring for a posted 25 MPH speed limit street. The 85th percentile speeds on Bridlewood Drive and Nellie Gail Road were recorded at 36.1 MPH and 34.8 MPH, respectively. This data shows that higher travel speeds are occurring along Bridlewood Drive. It is noted, back in March 2018, the 85th percentile speed on Bridlewood Drive was recorded at 37.1 MPH. In May 2018, the 85th percentile speed on Nellie Gail Road was recorded at 39 MPH, which has reduced to a typical speed for this type of roadway.

The overall speed radar survey data is attached to this letter.

TRAVEL SPEED DATA (*continued*)

In an effort to lower overall speeds on Bridlewood Drive, the City may want to consider taking an incremental approach that may include the following:

- increased law enforcement
- frequent deployment of portable radar speed-feedback trailers
- neighborhood watch committee meeting to help make all residents aware of speeding

TRAFFIC VOLUME DATA

Average Daily Traffic (ADT) counts were collected for the two (2) segments of Wilkes Place and Grissom Road on Wednesday, December 12, 2018. The ADT, or 24-hour two-way traffic volume, along these segments resulted in 838 and 494 vehicles, respectively.

A two-lane collector street generally has a Level-of-Service (LOS) 'D' capacity of 11,300 vehicles per day. Consequently, the current traffic volumes are well under the roadway capacity, and there are no other recommendations regarding traffic volume data to provide at this time.

The ADT count data collected as part of this evaluation is attached to this letter.

COLLISION DATA

HCI obtained collision data for the past six (6) years, between January 1, 2013 – November 30, 2018, from the Statewide Integrated Traffic Records System website (*i*-SWITRS) database to determine the number of collisions occurring on the two (2) segments of Wilkes Place and Grissom Road.

Tables 3 and 4 (next page) presents the summary collision data.

COLLISION DATA (*continued*)

TABLE 3
TRAFFIC COLLISION DATA SUMMARY
WILKES PLACE, FROM ALICIA PARKWAY TO GRISSOM ROAD

YEAR	NUMBER OF COLLISIONS	FATAL	INJURY	PROPERTY DAMAGE ONLY
2013	0	0	0	0
2014	0	0	0	0
2015	0	0	0	0
2016	**3**	0	**3**	0
2017	0	0	0	0
2018 *	0	0	0	0

∗ Available SWITRS data up to November 2018 at the time of report preparation.

As shown above, there have been a total of three (3) collisions reported within the last six (6) years on Wilkes Place. It is noted, all three collisions occurred at the intersection of Wilkes Place and Alicia Parkway. There were no collisions determined as 'speed-related'.

TABLE 4
TRAFFIC COLLISION DATA SUMMARY
GRISSOM ROAD, FROM WILKES PLACE TO LAS BOLSAS STREET

YEAR	NUMBER OF COLLISIONS	FATAL	INJURY	PROPERTY DAMAGE ONLY
2013	0	0	0	0
2014	0	0	0	0
2015	0	0	0	0
2016	0	0	0	0
2017	0	0	0	0
2018 *	**1**	0	0	**1**

∗ Available SWITRS data up November 2018 at the time of report preparation.

As shown above, there has been a total of one (1) collision reported within the last six (6) years on Grissom Road. This collision occurred at the intersection of Grissom Road and Las Bolsas Street, and was not determined as 'speed-related'.

Consequently, there are no other recommendations regarding collision data on these two segments at this time.

The comprehensive 6-year segment collision history reports are attached to this letter.

CUT-THROUGH TRAFFIC

An Origin and Destination (O&D) study (i.e., license plate survey) was conducted on Wednesday, December 12, 2018 during the AM peak period (7 - 9am) to quantify the amount of traffic that are likely using Wilkes Place and Grissom Road as a short-cut.

The study collected license plate numbers in a 5-minute interval basis for all vehicles entering and exiting Wilkes Place at the project limit of Alicia Parkway, and also entering and exiting Velasquez Road at Paseo de Valencia (via Grissom Road).

Table 5 below shows a summary of the license plate matches recorded per each hour.

TABLE 5
ORIGIN-DESTINATION LICENSE PLATE MATCHES
USING WILKES PLACE AND GRISSOM ROAD

Path	7:00:00 AM	7:05:00 AM	7:45:00 AM	7:50:00 AM	8:05:00 AM	8:10:00 AM	8:15:00 AM	8:50:00 AM	8:55:00 AM	Total
2 to 1	1	1	1		3		1			**7**
1 to 2				2	1	2	1	1	1	**8**
Grand Total	**1**	**1**	**1**	**2**	**4**	**2**	**2**	**1**	**1**	**15**

The numbers (1 to 2 & 2 to 1) in Table 5 above refer to vehicles entering from and exiting to as follows:

Location 1 - Wilkes Place, just south of Alicia Parkway.

Location 2 - Velasquez Road, just north of Paseo de Valencia (short leg leading to Grissom Road).

The overall Origin-Destination Study spreadsheet is attached to this letter.

Per the ADT count data collected, the hourly traffic volumes for these same peak hours are compared as follows:

Hour	ADT Traffic Volume	Cut-Thru	Cut-Thru/Volume
7-8 AM	48	5	10%
8-9 AM	170	10	6%

As shown above, the actual hourly percentages are very low for what may be considered ‘cut-through’ traffic. Consequently, there are no recommendations regarding ‘cut-through’ traffic at this time.

SUMMARY

Wilkes Place and Grissom Road

In summary, the traffic data on Wilkes Place and Grissom Road resulted in the following:

- ✓ typical travel speeds are occurring for these 25 MPH speed limit streets;
- ✓ traffic volumes are well-below the traffic carrying capacity of the two roadways;
- ✓ there is no traffic collision history related to traffic speeds along these segments; and,
- ✓ 'cut-through' traffic is determined as very low.

Bridlewood Drive and Nellie Gail Road

In summary, the recent speed data on Bridlewood Drive and Nellie Gail Road resulted in the following:

- ✓ higher than typical travel speeds are occurring along Bridlewood Drive.
- ✓ the Nellie Gail Road speed results are typical and do not result in recommended actions.

RECOMMENDATIONS

Wilkes Place and Grissom Road

In review of the existing School Xing signage on Wilkes Place, it is recommended to update the signage to the newer standard signs with fluorescent yellow-green background.

Bridlewood Drive

In order to address the higher travel speeds along Bridlewood Drive, it is recommended that an incremental approach continue to be followed, which includes:

- increased law enforcement.
- frequent deployment of portable radar speed-feedback trailers.
- neighborhood watch committee meeting to help make all residents aware of speeding.

It has been our pleasure to prepare this letter of opinion regarding speeds, traffic volumes, collisions, and cut-through traffic on these project segments. If you have any questions or need additional information, please feel free to call us anytime at (714) 731-9455.

Sincerely,
HARTZOG & CRABILL, INC.

Gerald J. Stock, PE, TE
Executive Vice President

Attachments: Spot Speed Radar Data
ADT Traffic Volume Data
Collision History Data
Origin-Destination Study

Spot Speed Radar Data

SUMMARY OF SPOT SPEED SURVEYS
DECEMBER 2018

STREET LOCATION	EXISTING SPEED LIMIT	RECOMMENDED SPEED LIMIT	85TH PERCENTILE SPEED	AVERAGE SPEED	10 MPH PACE RANGE	PERCENT OF VEHICLES IN PACE	DAY / DATE / TIME
BRIDLEWOOD DRIVE							
LAUREL CREST TO VISTA VIEJO	25	-	36.1	29.3	25-34	70.7	WED / 12-12-18 / MID-DAY (12:15 - 2:00)
GRISSOM ROAD							
WILKES PL TO LAS BOLSAS ST	25	-	28.4	25.2	20-29	87.3	TUES / 12-11-18 / MID-DAY (12:15 – 2:00)
NELLIE GAIL ROAD							
OSO PKWY TO HIDDEN TRAIL RD	25	-	34.8	30.9	26-35	77.0	WED / 12-12-18 / MID-DAY (11:00 – 12:00)
WILKES PLACE							
ALICIA PKWY TO GRISSOM RD	25	-	30.0	25.0	21-30	74.1	TUES / 12-11-18 / MID-DAY (10:45 – 12:15)

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL INC.
Consulting Traffic Engineers
17592 Irvine Blvd., Suite 122 Tustin CA. 92680
(714) 731-9455

AGENCY: CITY OF LAGUNA HILLS
STREET: BRIDLEWOOD
LOCATION: VISTA VIEJO RD TO LAUREL CREST DR

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 12-12-18
START TIME: 12:15 PM
END TIME: 2:00 PM

DIRECTION: SOUTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47	/	1
46		0
45		0
44	/	1
43	/	1
42		0
41		0
40	/	1
39	//	2
38		0
37		0
36		0
35	/	1
34	///	3
33	/	1
32	/	1
31	////	5
30	///	3
29	//	2
28	/////	5
27	///////	8
26	///	3
25	/////	6
24	///	3
23	/	1
22		0
21		0
20	/	1
19		
18		
17		
16		
15		

AVERAGE SPEED: _____
CRITICAL SPEED: _____
PACE SPEED: _____

DIRECTION: NORTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL	CUMULATIVE TOTAL	MPH
60				60
59				59
58				58
57				57
56				56
55				55
54				54
53				53
52				52
51				51
50				50
49				49
48				48
47	/	1	2	47
46		0	0	46
45	/	1	1	45
44		0	1	44
43		0	1	43
42		0	0	42
41	//	2	2	41
40		0	1	40
39	//	2	4	39
38		0	0	38
37	///	3	3	37
36		0	0	36
35	///	4	5	35
34	/	1	4	34
33	///	4	5	33
32	/////	6	7	32
31	///	4	9	31
30	///	3	6	30
29	//	2	4	29
28	/////	6	11	28
27		0	8	27
26	//	2	5	26
25	/////	5	11	25
24	/	1	4	24
23	//	2	3	23
22	/	1	1	22
21			0	21
20	/	1	1	20
19				19
18				18
17				17
16				16
15				15

AVERAGE SPEED: _____
CRITICAL SPEED: _____
PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

RADAR SPEED DISTRIBUTION SHEET

HCI

CITY OF LAGUNA HILLS

BRIDLEWOOD DRIVE — LAUREL CREST DR TO VISTA VIEJO

DATE: 12/12/2018 — SURVEY BY: C. BUENDIA

TIME: 12:15 PM - 2:00 PM — CHECKED BY: JERRY STOCK

SPEED	NUMBER OF VEHICLES (5 / 10 / 15 / 20 / 25)	VEH.	PCT.	CUM. PCT.
60				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
55				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
50				100.0%
				100.0%
				100.0%
	XX	2	2.0%	100.0%
		0	0.0%	98.0%
45	X	1	1.0%	98.0%
	X	1	1.0%	97.0%
	X	1	1.0%	96.0%
		0	0.0%	94.9%
	XX	2	2.0%	94.9%
40	X	1	1.0%	92.9%
	XXXX	4	4.0%	91.9%
		0	0.0%	87.9%
	XXX	3	3.0%	87.9%
		0	0.0%	84.8%
35	XXXXX	5	5.1%	84.8%
	XXXX	4	4.0%	79.8%
	XXXXX	5	5.1%	75.8%
	XXXXXXX	7	7.1%	70.7%
	XXXXXXXXX	9	9.1%	63.6%
30	XXXXXX	6	6.1%	54.5%
	XXXX	4	4.0%	48.5%
	XXXXXXXXXXX	11	11.1%	44.4%
	XXXXXXXX	8	8.1%	33.3%
	XXXXX	5	5.1%	25.3%
25	XXXXXXXXXXX	11	11.1%	20.2%
	XXXX	4	4.0%	9.1%
	XXX	3	3.0%	5.1%
	X	1	1.0%	2.0%
		0	0.0%	1.0%
20	X	1	1.0%	1.0%
				0.0%
				0.0%
				0.0%
				0.0%
15				0.0%
	TOTAL VEHICLES	99		

UPPER LIMIT 10 MPH PACE:	34	MPH			
LOWER LIMIT 10 MPH PACE:	25	MPH	85th PERCENTILE SPEED:	36.1	MPH
PERCENT OVER PACE:	24.2	%	MEDIAN SPEED:	29.3	MPH
PERCENT IN PACE:	70.7	%	15th PERCENTILE SPEED:	24.5	MPH
PERCENT UNDER PACE:	9.1	%			

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL INC.
Consulting Traffic Engineers
11592 Irvine Blvd., Suite 122 Tustin CA. 92680
(714) 731-9455

AGENCY: CITY OF LAGUNA HILLS
STREET: GRISSOM ROAD
LOCATION: WILKES PL TO LAS BOLSAS ST.

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 12-11-18
START TIME: 12:15 PM
END TIME: 2:00 PM

DIRECTION: WESTBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43		
42		
41		
40		
39		
38		
37		
36		
35	/	1
34		0
33		0
32		0
31	//	2
30	/	1
29	/	1
28	/	1
27	////	4
26	///	3
25	////	4
24	/////	5
23	//	2
22	/	1
21	/	1
20	//	2
19		
18		
17		
16		
15		

AVERAGE SPEED: _____
CRITICAL SPEED: _____
PACE SPEED: _____

DIRECTION: EASTBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43		
42		
41		
40		
39		
38		
37		
36	/	1
35		0
34	/	1
33	/	1
32		0
31		0
30		0
29	/	1
28	////	5
27	///	2
26	////	5
25	////	4
24	////	4
23		0
22	//	2
21	/	1
20		
19		
18		
17		
16		
15		

CUMULATIVE TOTAL	MPH
	60
	59
	58
	57
	56
	55
	54
	53
	52
	51
	50
	49
	48
	47
	46
	45
	44
	43
	42
	41
	40
	39
	38
	37
1	36
1	35
1	34
1	33
0	32
2	31
1	30
2	29
6	28
6	27
8	26
8	25
9	24
2	23
3	22
2	21
2	20
	19
	18
	17
	16
	15

AVERAGE SPEED: _____
CRITICAL SPEED: _____
PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

RADAR SPEED DISTRIBUTION SHEET

HCI

CITY OF LAGUNA HILLS

GRISSOM ROAD — WILKES PLACE TO LAS BOLSAS ST

DATE: 12/11/2018 — SURVEY BY: C. BUENDIA

TIME: 12:15 PM - 2:00 PM — CHECKED BY: JERRY STOCK

SPEED	NUMBER OF VEHICLES (5 / 10 / 15 / 20 / 25)	VEH.	PCT.	CUM. PCT.
60				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
55				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
50				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
45				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
40				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
	X	1	1.8%	100.0%
35	X	1	1.8%	98.2%
	X	1	1.8%	96.4%
	X	1	1.8%	94.5%
		0	0.0%	92.7%
	X X	2	3.6%	92.7%
30	X	1	1.8%	89.1%
	X X	2	3.6%	87.3%
	X X X X X X	6	10.9%	83.6%
	X X X X X X	6	10.9%	72.7%
	X X X X X X X X	8	14.5%	61.8%
25	X X X X X X X X	8	14.5%	47.3%
	X X X X X X X X X	9	16.4%	32.7%
	X X	2	3.6%	16.4%
	X X X	3	5.5%	12.7%
	X X	2	3.6%	7.3%
20	X X	2	3.6%	3.6%
				0.0%
				0.0%
				0.0%
				0.0%
15				0.0%
	TOTAL VEHICLES	55		

UPPER LIMIT 10 MPH PACE:	29	MPH		
LOWER LIMIT 10 MPH PACE:	20	MPH	85th PERCENTILE SPEED:	28.4 MPH
PERCENT OVER PACE:	12.7	%	MEDIAN SPEED:	25.2 MPH
PERCENT IN PACE:	87.3	%	15th PERCENTILE SPEED:	22.6 MPH
PERCENT UNDER PACE:	0.0	%		

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL INC.
Consulting Traffic Engineers
17592 Irvine Blvd., Suite 122 Tustin CA. 92680
(714) 731-9455

AGENCY: CITY OF LAGUNA HILLS
STREET: NELLIE GAIL ROAD
LOCATION: OSO PKWY TO HIDDEN TRAIL RD

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 12-12-18
START TIME: 11:00 AM
END TIME: 12:00 PM ✓ GK

DIRECTION: SOUTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43	//	2
42		0
41	/	1
40		0
39		0
38	/	1
37	////	4
36		0
35	///// //	7
34	////	4
33	////	4
32	///// /	6
31	//	2
30	///	3
29	///// ///	9
28	////	4
27	////	4
26	/////	5
25	////	4
24	//	2
23	/	1
22	/	1
21		0
20	/	1
19		
18		
17		
16		
15		

AVERAGE SPEED: _____
CRITICAL SPEED: _____
PACE SPEED: _____

DIRECTION: NORTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43		
42		
41		
40	/	1
39	//	2
38		0
37	///	4
36	//	2
35	//////	10
34	/////	7
33	/////	5
32	///// ///	8
31	///// ////	9
30	////	4
29	////	4
28	//// //	7
27		0
26	/////	5
25		1
24	///	3
23		0
22	/	1
21	/	1
20		
19		
18		
17		
16		
15		

CUMULATIVE TOTAL	MPH
	60
	59
	58
	57
	56
	55
	54
	53
	52
	51
	50
	49
	48
	47
	46
	45
	44
2	43
0	42
1	41
1	40
2	39
1	38
8	37
2	36
17	35
11	34
9	33
14	32
11	31
7	30
13	29
11	28
4	27
10	26
5	25
5	24
1	23
2	22
1	21
1	20
	19
	18
	17
	16
	15

AVERAGE SPEED: _____
CRITICAL SPEED: _____
PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

RADAR SPEED DISTRIBUTION SHEET

HCI

CITY OF LAGUNA HILLS

NELLIE GAIL ROAD — OSO PKWY TO HIDDEN TRAIL RD

DATE: 12/12/2018 — SURVEY BY: C. BUENDIA

TIME: 11:00 AM - 12:00 PM — CHECKED BY: JERRY STOCK

SPEED	NUMBER OF VEHICLES (5 / 10 / 15 / 20 / 25)	VEH.	PCT.	CUM. PCT.
60				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
55				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
50				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
45				100.0%
				100.0%
	XX	2	1.4%	100.0%
		0	0.0%	98.6%
	X	1	0.7%	98.6%
40	X	1	0.7%	97.8%
	XX	2	1.4%	97.1%
	X	1	0.7%	95.7%
	XXXXXXXX	8	5.8%	95.0%
	XX	2	1.4%	89.2%
35	XXXXXXXXXXXXXXXXX	17	12.2%	87.8%
	XXXXXXXXXX	11	7.9%	75.5%
	XXXXXXXXX	9	6.5%	67.6%
	XXXXXXXXXXXXXX	14	10.1%	61.2%
	XXXXXXXXXX	11	7.9%	51.1%
30	XXXXXXX	7	5.0%	43.2%
	XXXXXXXXXXXXX	13	9.4%	38.1%
	XXXXXXXXXX	11	7.9%	28.8%
	XXXX	4	2.9%	20.9%
	XXXXXXXXXX	10	7.2%	18.0%
25	XXXXX	5	3.6%	10.8%
	XXXXX	5	3.6%	7.2%
	X	1	0.7%	3.6%
	XX	2	1.4%	2.9%
	X	1	0.7%	1.4%
20	X	1	0.7%	0.7%
				0.0%
				0.0%
				0.0%
				0.0%
15				0.0%
	TOTAL VEHICLES	139		

UPPER LIMIT 10 MPH PACE:	35	MPH			
LOWER LIMIT 10 MPH PACE:	26	MPH	85th PERCENTILE SPEED:	34.8	MPH
PERCENT OVER PACE:	12.2	%	MEDIAN SPEED:	30.9	MPH
PERCENT IN PACE:	77.0	%	15th PERCENTILE SPEED:	25.6	MPH
PERCENT UNDER PACE:	10.8	%			

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL INC.
Consulting Traffic Engineers
17592 Irvine Blvd., Suite 122 Tustin CA. 92680
(714) 731-9455

AGENCY: CITY OF LAGUNA HILLS
STREET: WILKES PLACE
LOCATION: ALICIA PKWY TO GRISSOM RD

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 12-11-18
START TIME: 10:45 AM
END TIME: 12:15 PM

DIRECTION: SOUTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43		
42		
41		
40		
39		
38		
37		
36	/	1
35		0
34		0
33	//	2
32	//	2
31		0
30	//	2
29	/	1
28		0
27	///	3
26		0
25	///	3
24	/	1
23	//	2
22	/	1
21	/////	5
20	////	4
19		0
18	/	1
17		
16		
15		

AVERAGE SPEED: _____
CRITICAL SPEED: _____
PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

DIRECTION:

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL	CUMULATIVE TOTAL	MPH
60				60
59				59
58				58
57				57
56				56
55				55
54				54
53				53
52				52
51				51
50				50
49				49
48				48
47				47
46				46
45				45
44				44
43				43
42				42
41				41
40				40
39				39
38	/	1	1	38
37		0	1	37
36		0	1	36
35		0	1	35
34		0	1	34
33		0	3	33
32	/	1	4	32
31	/	1	5	31
30	////	4	9	30
29	///	3	12	29
28	///	4	16	28
27	/	1	17	27
26	//	2	19	26
25	///	3	22	25
24	//	2	24	24
23		0	24	23
22	//	2	26	22
21	//	2	28	21
20		0	28	20
19		0	28	19
18	/	1	29	18
17				17
16				16
15				15

AVERAGE SPEED: _____
CRITICAL SPEED: _____
PACE SPEED: _____

RADAR SPEED DISTRIBUTION SHEET

HCI

CITY OF LAGUNA HILLS

WILKES PLACE — ALICIA PKWY TO GRISSOM ROAD

DATE: 12/11/2018 — SURVEY BY: C. BUENDIA

TIME: 10:45 AM - 12:15 PM — CHECKED BY: JERRY STOCK

SPEED	NUMBER OF VEHICLES (5 / 10 / 15 / 20 / 25)	VEH.	PCT.	CUM. PCT.
60				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
55				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
50				100.0%
				100.0%
				100.0%
				100.0%
45				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
40				100.0%
				100.0%
	X	1	1.9%	100.0%
		0	0.0%	98.1%
	X	1	1.9%	98.1%
35		0	0.0%	96.3%
		0	0.0%	96.3%
	X X	2	3.7%	96.3%
	X X X	3	5.6%	92.6%
	X	1	1.9%	87.0%
30	X X X X X X	6	11.1%	85.2%
	X X X	3	5.6%	74.1%
	X X X X	4	7.4%	68.5%
	X X X X	4	7.4%	61.1%
	X X	2	3.7%	53.7%
25	X X X X X X	6	11.1%	50.0%
	X X X	3	5.6%	38.9%
	X X	2	3.7%	33.3%
	X X X	3	5.6%	29.6%
	X X X X X X X	7	13.0%	24.1%
20	X X X X	4	7.4%	11.1%
		0	0.0%	3.7%
	X X	2	3.7%	3.7%
				0.0%
				0.0%
15				0.0%
	TOTAL VEHICLES	54		

UPPER LIMIT 10 MPH PACE:	30	MPH
LOWER LIMIT 10 MPH PACE:	21	MPH
PERCENT OVER PACE:	14.8	%
PERCENT IN PACE:	74.1	%
PERCENT UNDER PACE:	11.1	%

85th PERCENTILE SPEED:	30.0	MPH
MEDIAN SPEED:	25.0	MPH
15th PERCENTILE SPEED:	20.3	MPH

ADT Traffic Volume Data

Prepared by NDS/ATD

VOLUME

Wilkes Pl Bet. Alicia Pkwy & Grissom Rd

Day: Wednesday
Date: 12/12/2018

City: Laguna Hills
Project #: CA18_1262_001

DAILY TOTALS	NB	SB	EB	WB	Total
	465	373	0	0	838

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00	2		2						4		12:00	10		6						16	
00:15	1		1						2		12:15	6		3						9	
00:30	0		1						1		12:30	3		7						10	
00:45	0	3	0	4					0	7	12:45	3	22	9	25					12	47
01:00	0		0						0		13:00	6		21						27	
01:15	0		1						1		13:15	55		12						67	
01:30	0		0						0		13:30	15		4						19	
01:45	0		0	1					0	1	13:45	3	79	6	43					9	122
02:00	0		0						0		14:00	6		1						7	
02:15	0		0						0		14:15	3		0						3	
02:30	1		0						1		14:30	3		7						10	
02:45	0	1	0						0	1	14:45	5	17	3	11					8	28
03:00	0		1						1		15:00	6		6						12	
03:15	0		0						0		15:15	1		6						7	
03:30	0		0						0		15:30	4		5						9	
03:45	0		0	1					0	1	15:45	5	16	1	18					6	34
04:00	0		0						0		16:00	6		2						8	
04:15	1		1						2		16:15	5		8						13	
04:30	0		0						0		16:30	8		7						15	
04:45	1	2	1	2					2	4	16:45	5	24	7	24					12	48
05:00	2		0						2		17:00	4		10						14	
05:15	2		1						3		17:15	7		11						18	
05:30	4		0						4		17:30	9		7						16	
05:45	3	11	0	1					3	12	17:45	6	26	2	30					8	56
06:00	1		0						1		18:00	6		9						15	
06:15	2		1						3		18:15	2		5						7	
06:30	2		2						4		18:30	2		6						8	
06:45	7	12	2	5					9	17	18:45	5	15	8	28					13	43
07:00	3		2						5		19:00	0		5						5	
07:15	6		3						9		19:15	1		2						3	
07:30	7		4						11		19:30	5		3						8	
07:45	12	28	11	20					23	48	19:45	3	9	10	20					13	29
08:00	68		29						97		20:00	2		8						10	
08:15	34		3						37		20:15	2		3						5	
08:30	13		5						18		20:30	1		5						6	
08:45	11	126	7	44					18	170	20:45	3	8	6	22					9	30
09:00	2		7						9		21:00	4		3						7	
09:15	4		5						9		21:15	0		5						5	
09:30	3		1						4		21:30	0		2						2	
09:45	5	14	4	17					9	31	21:45	2	6	1	11					3	17
10:00	2		1						3		22:00	1		4						5	
10:15	6		6						12		22:15	1		3						4	
10:30	4		6						10		22:30	1		0						1	
10:45	4	16	4	17					8	33	22:45	1	4	0	7					1	11
11:00	5		8						13		23:00	1		0						1	
11:15	8		3						11		23:15	0		2						2	
11:30	6		2						8		23:30	2		2						4	
11:45	4	23	3	16					7	39	23:45	0	3	2	6					2	9
TOTALS		236		128						364	TOTALS		229		245						474
SPLIT %		64.8%		35.2%						43.4%	SPLIT %		48.3%		51.7%						56.6%

DAILY TOTALS	NB	SB	EB	WB	Total
	465	373	0	0	838

AM Peak Hour	07:45	07:45			07:45	PM Peak Hour	12:45	12:30			12:45
AM Pk Volume	127	48			175	PM Pk Volume	79	49			125
Pk Hr Factor	0.467	0.414			0.451	Pk Hr Factor	0.359	0.583			0.466
7 - 9 Volume	154	64	0	0	218	4 - 6 Volume	50	54	0	0	104
7 - 9 Peak Hour	07:45	07:45			07:45	4 - 6 Peak Hour	17:00	16:30			16:45
7 - 9 Pk Volume	127	48	0	0	175	4 - 6 Pk Volume	26	35	0	0	60
Pk Hr Factor	0.467	0.414	0.000	0.000	0.451	Pk Hr Factor	0.722	0.795	0.000	0.000	0.833

Prepared by NDS/ATD

VOLUME

Grissom Rd Bet. Wilkes Pl & Las Bolsas

Day: Wednesday
Date: 12/12/2018

City: Laguna Hills
Project #: CA18_1262_002

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	259	235	494

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			0		0		0		12:00			3		1		4	
00:15			0		0		0		12:15			2		2		4	
00:30			0		0		0		12:30			4		0		4	
00:45			0		0		0		12:45			1	10	5	8	6	18
01:00			0		1		1		13:00			8		4		12	
01:15			0		0		0		13:15			4		16		20	
01:30			0		0		0		13:30			7		1		8	
01:45			0		0	1	0	1	13:45			4	23	2	23	6	46
02:00			1		0		1		14:00			5		3		8	
02:15			0		0		0		14:15			8		4		12	
02:30			0		0		0		14:30			4		4		8	
02:45			0	1	0		0	1	14:45			3	20	6	17	9	37
03:00			0		1		1		15:00			7		3		10	
03:15			0		0		0		15:15			2		2		4	
03:30			0		0		0		15:30			3		4		7	
03:45			0		0	1	0	1	15:45			6	18	8	17	14	35
04:00			0		0		0		16:00			4		2		6	
04:15			1		0		1		16:15			6		3		9	
04:30			0		2		2		16:30			2		5		7	
04:45			1	2	3	5	4	7	16:45			9	21	4	14	13	35
05:00			0		0		0		17:00			8		2		10	
05:15			0		1		1		17:15			13		4		17	
05:30			0		0		0		17:30			3		7		10	
05:45			0		1	2	1	2	17:45			11	35	8	21	19	56
06:00			0		1		1		18:00			8		1		9	
06:15			3		3		6		18:15			6		2		8	
06:30			0		4		4		18:30			4		2		6	
06:45			3	6	4	12	7	18	18:45			1	19	4	9	5	28
07:00			2		1		3		19:00			4		2		6	
07:15			2		5		7		19:15			1		3		4	
07:30			4		8		12		19:30			4		1		5	
07:45			10	18	6	20	16	38	19:45			4	13	6	12	10	25
08:00			7		5		12		20:00			4		1		5	
08:15			4		11		15		20:15			1		1		2	
08:30			4		4		8		20:30			3		1		4	
08:45			2	17	4	24	6	41	20:45			0	8	0	3	0	11
09:00			6		2		8		21:00			3		1		4	
09:15			3		5		8		21:15			0		0		0	
09:30			0		5		5		21:30			3		1		4	
09:45			2	11	3	15	5	26	21:45			2	8	1	3	3	11
10:00			2		2		4		22:00			0		1		1	
10:15			4		3		7		22:15			1		1		2	
10:30			4		4		8		22:30			1		0		1	
10:45			2	12	2	11	4	23	22:45			0	2	0	2	0	4
11:00			6		5		11		23:00			0		0		0	
11:15			2		4		6		23:15			0		0		0	
11:30			3		3		6		23:30			0		2		2	
11:45			3	14	1	13	4	27	23:45			1	1	0	2	1	3
TOTALS				81		104		185	TOTALS				178		131		309
SPLIT %				43.8%		56.2%		37.4%	SPLIT %				57.6%		42.4%		62.6%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	259	235	494

AM Peak Hour			07:30	07:30	07:30	PM Peak Hour			17:00	12:45	17:00
AM Pk Volume			25	30	55	PM Pk Volume			35	26	56
Pk Hr Factor			0.625	0.682	0.859	Pk Hr Factor			0.673	0.406	0.737
7 - 9 Volume	0	0	35	44	79	4 - 6 Volume	0	0	56	35	91
7 - 9 Peak Hour			07:30	07:30	07:30	4 - 6 Peak Hour			17:00	17:00	17:00
7 - 9 Pk Volume	0	0	25	30	55	4 - 6 Pk Volume	0	0	35	21	56
Pk Hr Factor	0.000	0.000	0.625	0.682	0.859	Pk Hr Factor	0.000	0.000	0.673	0.656	0.737

Collision History Data

CITY OF LAGUNA HILLS
5-YEAR SWITRS COLLISION DATABASE
WILKES PLACE, FROM ALICIA PARKWAY TO GRISSOM ROAD
JAN. 1, 2013 - NOV. 30, 2018

CASE ID	COLLISION DATE	COLL. TIME	PRIMARY ROAD	SECONDARY ROAD	DIST.	DIR.	INTERS.	WEATH. 1	COLL. SEVERITY	PRIM. COLL. FACT.	PCF VIOL CAT.	PCF VIOL.	HIT AND RUN	TYPE OF COLL.	MOTOR VEHICLE INVOLVED WITH	ROAD SURF.
8090227	20160704	2315	ALICIA PKWY	WILKES PL	0		Y	A	4	D	0		N	A	C	A
8180551	20161113	2008	ALICIA PKWY	WILKES PL	0		Y	A	3	A	12	21453	N	D	C	A
8197315	20161122	935	ALICIA PKWY	WILKES PL	0		Y	A	4	A	12	21453	N	D	C	A

NOTES:

Weather 1
A - Clear
B - Cloudy
C - Raining
D - Snowing
E - Fog
F - Other
G - Wind
- - Not Stated

Collision Severity
1 - Fatal
2 - Injury (Severe)
3 - Injury (Other Visible)
4 - Injury (Complaint of Pain)
0 - PDO (Property Damage On

Primary Collision Factor
A - (Vehicle) Code Violation
B - Other Improper Driving
C - Other Than Driver
D - Unknown
E - Fell Asleep
- - Not Stated

Motor Vehicle Involved With:
A - Non-Collision
B - Pedestrian
C - Other Motor Vehicle
D - Motor Vehicle on Other Roadway
E - Parked Motor Vehicle
F - Train
G - Bicycle
H - Animal
I - Fixed Object
J - Other Object
- - Not Stated

PCF Violation Category
01 - Driving or Bicycling Under Ir
02 - Impeding Traffic
03 - Unsafe Speed
04 - Following Too Closely
05 - Wrong Side of Road
06 - Improper Passing
07 - Unsafe Lane Change
08 - Improper Turning
09 - Automobile ROW
10 - Pedestrian ROW
11 - Pedestrian Violation
12 - Traffic Signals and Signs
13 - Hazardous Parking
14 - Lights
15 - Brakes
16 - Other Equipment
17 - Other Hazardous Violation
18 - Other Than Driver (or Ped)
19 -
20 -
21 - Unsafe Starting or Backing
22 - Other Improper Driving
23 - Pedestrian or "Other" Under the Influence
24 - Fell Asleep
00 - Unknown
- - Not Stated

Hit and Run
F - Felony
M - Misdemeanor
N - Not Hit & Run

Road Surface
A - Dry
B - Wet
C - Snowy or Icy
D - Slippery
- - Not Stated

Type of Collision
A - Head-On
B - Sideswipe
C - Rear-End
D - Broadside
E - Hit Object
F - Overturned
G - Vehicle/Pedestrian
H - Other
- - Not Stated

CITY OF LAGUNA HILLS
5-YEAR SWITRS COLLISION DATABASE
GRISSOM ROAD, FROM WILKES PLACE TO LAS BOLSAS AVENUE
JAN. 1, 2013 - NOV. 30, 2018

CASE ID	COLLISION DATE	COLL. TIME	PRIMARY ROAD	SECONDARY ROAD	DIST.	DIR.	INTERS.	WEATH. 1	COLL. SEVERITY	PRIM. COLL. FACT.	PCF VIOL CAT.	PCF VIOL.	HIT AND RUN	TYPE OF COLL.	MOTOR VEHICLE INVOLVED WITH	ROAD SURF.
8636969	20180503	1229	GRISSOM RD	LAS BOLSAS AV	0		Y	A	0	A	8	22107	M	D	E	A

NOTES:

Weather 1
A - Clear
B - Cloudy
C - Raining
D - Snowing
E - Fog
F - Other
G - Wind
- - Not Stated

Collision Severity
1 - Fatal
2 - Injury (Severe)
3 - Injury (Other Visible)
4 - Injury (Complaint of Pain)
0 - PDO (Property Damage On

Primary Collision Factor
A - (Vehicle) Code Violation
B - Other Improper Driving
C - Other Than Driver
D - Unknown
E - Fell Asleep
- - Not Stated

Motor Vehicle Involved With:
A - Non-Collision
B - Pedestrian
C - Other Motor Vehicle
D - Motor Vehicle on Other Roadway
E - Parked Motor Vehicle
F - Train
G - Bicycle
H - Animal
I - Fixed Object
J - Other Object
- - Not Stated

PCF Violation Category
01 - Driving or Bicycling Under Ir
02 - Impeding Traffic
03 - Unsafe Speed
04 - Following Too Closely
05 - Wrong Side of Road
06 - Improper Passing
07 - Unsafe Lane Change
08 - Improper Turning
09 - Automobile ROW
10 - Pedestrian ROW
11 - Pedestrian Violation
12 - Traffic Signals and Signs
13 - Hazardous Parking
14 - Lights
15 - Brakes
16 - Other Equipment
17 - Other Hazardous Violation
18 - Other Than Driver (or Ped)
19 -
20 -
21 - Unsafe Starting or Backing
22 - Other Improper Driving
23 - Pedestrian or "Other" Under the Influence
24 - Fell Asleep
00 - Unknown
- - Not Stated

Hit and Run
F - Felony
M - Misdemeanor
N - Not Hit & Run

Road Surface
A - Dry
B - Wet
C - Snowy or Icy
D - Slippery
- - Not Stated

Type of Collision
A - Head-On
B - Sideswipe
C - Rear-End
D - Broadside
E - Hit Object
F - Overturned
G - Vehicle/Pedestrian
H - Other
- - Not Stated

Origin-Destination Study Data

Prepared by National Data and Surveying Services

Origin and Destination Study

Day: Wednesday

Date: 12/12/2018

City: Laguna Hills

Project: 18-1263

Path	7:00:00 AM	7:05:00 AM	7:45:00 AM	7:50:00 AM	8:05:00 AM	8:10:00 AM	8:15:00 AM	8:50:00 AM	8:55:00 AM	Total
2 to 1	1	1	1		3		1			**7**
1 to 2				2	1	2	1	1	1	**8**
Grand Total	**1**	**1**	**1**	**2**	**4**	**2**	**2**	**1**	**1**	**15**

Location ID	Street
1	Wilkes Place S/O Alicia Pkwy
2	Velasquez Road N/O Paseo de Valencia

*All times correspond to vehicle origin time

City of Laguna Hills

Traffic Commission

Staff Report

DATE: July 18, 2018

TO: Traffic Commissioners

FROM: Kenneth H. Rosenfield P.E.
Assistant City Manager/Director of Public Services

ISSUE: Review of Traffic Conditions on Bridlewood Drive and Devonshire Road

RECOMMENDATION: That the Traffic Commission Request Staff Monitor the Speed of Vehicles and Repeat the Speed Survey of Bridlewood Drive Between Vista Viejo Road and Laurel Crest Drive in Six Months Time.

SUMMARY:

Staff was recently contacted by a resident of Moulton Ranch regarding concerns of vehicular speeding and traffic collisions on Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive, and on Devonshire Road, between Falling Leaf Drive and Nottingham Court. Please see the attached Vicinity Map. Based upon the resident's concern and in accordance with the Residential Streets Management Policy, staff initiated a review of the travel speeds, traffic volume and traffic collision history on Bridlewood Drive and on Devonshire Road.

The Traffic Engineers of Hartzog & Crabill, Inc., (HCI) completed the attached June 1, 2018, study of the traffic attributes of Bridlewood Drive from Vista Viejo Road to Laurel Crest Drive and Devonshire Road from Falling Leaf Drive to Nottingham Court. The speed surveys, performed by HCI, as shown in the study, determined the 85th percentile speeds on Bridlewood Drive and Devonshire Road as 37.1 mph and 32.9 mph, respectively.

The 85th percentile speed measurement of Bridlewood Drive is higher than expected and considered to be unacceptable for a residential character street. The study also determined 24.6% of the vehicles on Bridlewood Drive were exceeding 34 mph, which is also a higher percentage than the expected percentage, typically at approximately 15%.

The 85th percentile speed measurement of Devonshire Road was fully within the expected range. Staff's long term experience has found the typical prevailing speed range for such streets to be between 32 and 34 mph, without adverse traffic collision history. Hence, the 85th percentile speed on Devonshire of 32 mph is not of concern for this residential character street.

The traffic count data, for both Bridlewood Drive and Devonshire Road, revealed the 24-hr volumes to be very low for a typical residential street that is a connecting, or through, street to other neighborhoods. The traffic volumes are not significant and no action is needed in response to this data.

A five-year traffic collision history review of Bridlewood Drive was also included in the study which determined three traffic collisions, including one not identified in the collision data from SWITRS but noted based on the attached photographic evidence provided by a resident, had occurred on Bridlewood Drive during this time. None of the traffic collisions were identified as speed-related.

The five-year traffic collision history review of Devonshire Road identified a single traffic collision which was not identified as speed-related and is not considered significant for the purposes of this report.

Concentrated police enforcement of driver behavior is the best and appropriate remedy for residential streets vehicular speeding and is recommended for Bridlewood Drive. Staff will work with the Orange County Sheriff's Department on enforcement activity in this area and will also post the radar trailer in this area to increase driver education as to the appropriate speed on Bridlewood Drive. Staff will also provide the Moulton Ranch Homeowners Association (HOA) with a traffic safety article to be included in their newsletter for the residents of their HOA. In addition, a follow-up speed survey is recommended to be performed in six months. Should the speeding issue remain, the next incremental action will be evaluated. Currently, there are 25 mph pavement

legends and 25 mph signs posted at multiple locations along Bridlewood Drive between Vista Viejo Road and Laurel Crest Drive. While no changes to existing traffic controls are currently proposed, the number and locations of speed limit signage and pavement markings will also be reviewed following the repeat speed survey.

ATTACHMENTS:

- Vicinity Map
- Photograph
- Traffic Evaluation

VICINITY MAP - BRIDLEWOOD DRIVE & DEVONSHIRE ROAD

NORTH

0 0.0275 0.055 0.11 mi

Attachment: Vicinity Map (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

HARTZOG & CRABILL, Inc.

Trammell Hartzog, President
Gerald J. Stock, PE, TE,
Executive Vice President

17852 E. 17th Street
Suite 101
Tustin, CA 92780

Phone: (714) 731-9455
FAX: (714) 731-9498

www.hartzog-crabill.com

June 1, 2018

Mr. Kenneth H. Rosenfield, PE
Assistant City Manager/Public Services Director
City of Laguna Hills
24035 El Toro Road
Laguna Hills, CA 92653

Subject: Traffic Data Evaluation - Letter of Opinion - Speeding and Collision Concerns along Bridlewood Drive and Also along Devonshire Road

Dear Mr. Rosenfield,

Pursuant to your request, Hartzog & Crabill, Inc. (HCI) has prepared this traffic engineering evaluation regarding residential concerns of speeding and collisions along the following two (2) street segments:

1) Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive
2) Devonshire Road, between Falling Leaf Drive and Nottingham Court

BACKGROUND

Bridlewood Drive

Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive, is a 40-foot wide, 2-lane, north-south residential collector roadway. At the project limits, there is a 1-way stop at Vista Viejo Road and a 3-way stop at Laurel Crest Drive. There is no centerline striping along the entire segment, with exception of a short length of double-yellow centerline at the project limits.

There are posted 25 MPH speed limit signs along Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive. There are also '25' pavement markings adjacent to the sign postings. On-street parking is allowed along both sides of Bridlewood Drive.

Devonshire Road

Devonshire Road, between Falling Leaf Drive and Nottingham Court, is a 40-foot wide, 2-lane, north-south residential collector roadway. At the project limits, both intersections have 1-way stop controls. There is no centerline striping along the entire segment, with exception of a short length of double-yellow centerline at the project limits.

There are posted 25 MPH speed limit signs along Devonshire Road between Falling Leaf Drive and Nottingham Court. There are also '25' pavement markings adjacent to the sign postings. On-street parking is allowed along both sides of Devonshire Road.

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

TRAVEL SPEED DATA

To determine travel speeds on Bridlewood Drive and on Devonshire Road, a spot speed radar survey was conducted along each of these residential collector roadways on Wednesday, May 16, 2018, and Thursday, May 17, 2018, respectively. Tables 1 & 2 below summarize the radar speed data.

TABLE 1
SPEED SURVEY SUMMARY
BRIDLEWOOD DRIVE, FROM VISTA VIEJO ROAD TO LAUREL CREST DRIVE

Speed-Count Summary	From Vista Viejo Road to Laurel Crest Drive
85th Percentile Speed	37.1 MPH
Median Speed	29.5 MPH
15th Percentile Speed	25.0 MPH
10 MPH Pace Speed	25-34 MPH
Average Daily Traffic (ADT)	722 vehicles

As shown above, the 85th percentile speed on Bridlewood Drive was recorded at 37.1 MPH. This data shows that higher than typical travel speeds are occurring above the posted 25 MPH speed limit.

TABLE 2
SPEED SURVEY SUMMARY
DEVONSHIRE ROAD, FROM FALLING LEAF DRIVE TO NOTTINGHAM COURT

Speed-Count Summary	From Falling Leaf Drive to Nottingham Court
85th Percentile Speed	32.9 MPH
Median Speed	27.9 MPH
15th Percentile Speed	25.0 MPH
10 MPH Pace Speed	25-34 MPH
Average Daily Traffic (ADT)	590 vehicles

As shown above, the 85th percentile speed on Devonshire Road was recorded at 32.9 MPH. This data shows that typical travel speeds are occurring for a posted 25 MPH speed limit street. All radar survey data is attached to this letter.

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

TRAFFIC VOLUME DATA

Bridlewood Drive

Average Daily Traffic (ADT) counts were collected for the segment of Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive, on Wednesday, May 2, 2018. The ADT, or 24-hour two-way traffic volume, along this segment resulted in 722 vehicles.

A two-lane collector street generally has a Level-of-Service (LOS) 'D' capacity of 11,300 vehicles per day. Consequently, the existing traffic volume is well under the roadway capacity.

Devonshire Road

Average Daily Traffic (ADT) counts were collected for the segment of Devonshire Road, between Falling Leaf Drive and Nottingham Court, on Wednesday, May 2, 2018. The ADT, or 24-hour two-way traffic volume, along this segment resulted in 590 vehicles.

As mentioned, a two-lane collector street generally has a Level-of-Service (LOS) 'D' capacity of 11,300 vehicles per day. Consequently, the existing traffic volume is well under the roadway capacity. All traffic volume data is included in the appendix.

COLLISION DATA

Bridlewood Drive

HCI obtained collision data for the past five (5) years, between January 1, 2013 – February 28, 2018, from the Statewide Integrated Traffic Records System website (*i*-SWITRS) database to determine the number of collisions occurring on this segment of Bridlewood Drive. Table 3 below presents the summary collision data.

TABLE 3
TRAFFIC COLLISION DATA SUMMARY
BRIDLEWOOD DRIVE, FROM VISTA VIEJO ROAD TO LAUREL CREST DRIVE

YEAR	NUMBER OF COLLISIONS	FATAL	INJURY	PROPERTY DAMAGE ONLY
2013	1	0	1	0
2014	0	0	0	0
2015	0	0	0	0
2016	0	0	0	0
2017	1	0	0	1
2018 *	1	0	0	1

* Available SWITRS data was only up to February 2018 at the time of report preparation.

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

COLLISION DATA (*continued*)

As shown above, there were a total of three (3) collisions reported along this segment within the last (5) years. The collisions were recorded as Rear End and Head-On types, and categorized as Driving or Bicycling Under Influence and Automobile ROW. As such, there were no collisions determined as 'speed-related'. Consequently, there are no other recommendations regarding collisions at this time.

It is noted, a resident provided the City with photographic evidence of a two vehicle traffic collision having occurred on Bridlewood Drive on April 5, 2018. The Sheriff's Department reported that no police report was written as the parties described no injuries and stated they would settle the matter on their own. Accordingly, we have no details on the cause of this traffic collision.

Devonshire Road

HCI also obtained collision data for the past five (5) years, between January 1, 2013 – February 28, 2018, from the Statewide Integrated Traffic Records System website (*i*-SWITRS) database to determine the number of collisions occurring on the subject segment of Devonshire Road. Table 4 below presents the summary collision data.

TABLE 4
TRAFFIC COLLISION DATA SUMMARY
DEVONSHIRE ROAD, FROM FALLING LEAF DRIVE TO NOTTINGHAM COURT

YEAR	NUMBER OF COLLISIONS	FATAL	INJURY	PROPERTY DAMAGE ONLY
2013	0	0	0	0
2014	0	0	0	0
2015	0	0	0	0
2016	0	0	0	0
2017	1	0	1	0
2018 *	0	0	0	0

* Available SWITRS data was only up to February 2018 at the time of report preparation.

As shown above, there was only one (1) collision reported along this segment within the last (5) years. This collision was recorded as a Rear End type, and categorized as Improper Turning. As such, there were no collisions determined as 'speed-related'. Consequently, there are no other recommendations regarding collisions at this time. The comprehensive 5-year segment collision history reports are attached to this letter.

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

RECOMMENDATIONS

As speeding was verified on Bridlewood Drive, it is recommended that an incremental approach be taken to address the higher travel speeds. Initial steps include:

- increased law enforcement.
- deployment of portable radar speed-feedback trailers.
- neighborhood watch committee meeting to help make all residents aware of speeding.

It has been our pleasure to prepare this letter of opinion regarding speeds, traffic volumes, and collisions on Bridlewood Drive, and also on Devonshire Road. If you may have any questions or need additional information, please feel free to call us anytime at (714) 731-9455.

Sincerely,
HARTZOG & CRABILL, INC.

Gerald J. Stock, PE, TE
Executive Vice President

Attachments: Radar Speed Data (Qty. 2)
ADT Volume Data (Qty. 2)
Collision History (Qty. 2)

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

Speed Data

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

RADAR SPEED DISTRIBUTION SHEET

HCI

CITY OF LAGUNA HILLS

BRIDLEWOOD DRIVE — LAUREL CREST DR TO VISTA VIEJO

DATE: 5/16/2018 — SURVEY BY: C. BUENDIA

TIME: 9:00 AM - 10:00 AM — CHECKED BY: JERRY STOCK

SPEED	CUMMULATIVE PERCENT 20	40	60	80	100		
60					x	100.0%	
59					x	100.0%	
58					x	100.0%	
57					x	100.0%	
56					x	100.0%	
55					x	100.0%	
54					x	100.0%	
53					x	100.0%	
52					x	100.0%	
51					x	100.0%	
50					x	100.0%	
49					x	100.0%	
48					x	100.0%	
47					x	100.0%	
46					x	100.0%	
45					x	100.0%	
44					x	100.0%	
43					x	100.0%	
42					x	98.1%	
41					x	98.1%	
40					x	96.2%	
39					x	94.3%	
38					x	92.5%	
37					x	86.8%	
36					x	83.0%	---85PCT
35				x		77.4%	
34				x		75.5%	}PACE
33				x		67.9%	}PACE
32				x		64.2%	}PACE
31			x			56.6%	}PACE
30			x			49.1%	}PACE ---MEAN
29			x			41.5%	}PACE
28		x				34.0%	}PACE
27		x				28.3%	}PACE
26	x					18.9%	}PACE
25	x					17.0%	}PACE
24	x					5.7%	---15PCT
23	x					3.8%	
22	x					3.8%	
21	x					1.9%	
20	x					1.9%	
19	x					0.0%	
18	x					0.0%	
17	x					0.0%	
16	x					0.0%	
15	x					0.0%	

UPPER LIMIT 10 MPH PACE:	34	MPH			
LOWER LIMIT 10 MPH PACE:	25	MPH	85th PERCENTILE SPEED:	36.5	MPH
PERCENT OVER PACE:	24.5	%	MEDIAN SPEED:	30.1	MPH
PERCENT IN PACE:	69.8	%	15th PERCENTILE SPEED:	24.8	MPH
PERCENT UNDER PACE:	5.7	%			

wood Spot Spd 2018-01

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL
Consulting Traffic Engineers
17592 Irvine Blvd., Suite 122 Tustin CA, 92
(714) 734-9455

AGENCY: CITY OF LAGUNA HILLS
STREET: BRIDLEWOOD
LOCATION: LAUREL CREST DR TO VISTA VIEJO

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 5-16-18
START TIME: 9:00 AM
END TIME: 10:00 AM VM

DIRECTION: SOUTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43		
42		
41		
40	/	1
39		0
38	/	1
37	/	1
36		0
35		0
34	/	1
33		0
32	/	1
31	///	3
30	/	1
29	/	1
28	///	3
27	//	2
26		0
25	///	3
24	/	1
23		
22		
21		
20		
19		
18		
17		
16		
15		

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

DIRECTION: NORTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL	CUMULATIVE TOTAL	MPH
60				60
59				59
58				58
57				57
56				56
55				55
54				54
53				53
52				52
51				51
50				50
49				49
48				48
47				47
46				46
45				45
44				44
43	/	1	1	43
42		0	0	42
41	/	1	1	41
40		0	1	40
39	/	1	2	39
38	//	2	3	38
37	/	1	3	37
36	///	3	3	36
35	/	1	4	35
34	///	3	7	34
33	///	3	10	33
32	///	3	13	32
31	/	1	14	31
30	///	3	17	30
29	///	3	20	29
28		0	20	28
27	///	3	23	27
26	/	1	24	26
25	///	3	27	25
24		0	27	24
23		0	27	23
22	/	1	28	22
21		0	28	21
20	/	1	29	20
19				19
18				18
17				17
16				16
15				15

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire

RADAR SPEED DISTRIBUTION SHEET

HCI

CITY OF LAGUNA HILLS

BRIDLEWOOD DRIVE — LAUREL CREST DR TO VISTA VIEJO

DATE: 5/16/2018 — SURVEY BY: C. BUENDIA

TIME: 10:00 AM - 11:00 AM — CHECKED BY: JERRY STOCK

SPEED	CUMMULATIVE PERCENT (20 / 40 / 60 / 80 / 100)		
60	x	100.0%	
59	x	100.0%	
58	x	100.0%	
57	x	100.0%	
56	x	100.0%	
55	x	100.0%	
54	x	100.0%	
53	x	100.0%	
52	x	100.0%	
51	x	100.0%	
50	x	98.4%	
49	x	98.4%	
48	x	98.4%	
47	x	98.4%	
46	x	98.4%	
45	x	98.4%	
44	x	98.4%	
43	x	98.4%	
42	x	98.4%	
41	x	96.7%	
40	x	95.1%	
39	x	93.4%	
38	x	91.8%	
37	x	82.0%	- - -85PCT
36	x	78.7%	
35	x	78.7%	
34	x	75.4%	}PACE
33	x	67.2%	}PACE
32	x	63.9%	}PACE
31	x	60.7%	}PACE
30	x	57.4%	}PACE
29	x	50.8%	}PACE
28	x	45.9%	}PACE - - -MEAN
27	x	34.4%	}PACE
26	x	18.0%	}PACE
25	x	13.1%	}PACE - - -15PCT
24	x	8.2%	
23	x	6.6%	
22	x	4.9%	
21	x	4.9%	
20	x	3.3%	
19	x	1.6%	
18	x	0.0%	
17	x	0.0%	
16	x	0.0%	
15	x	0.0%	

UPPER LIMIT 10 MPH PACE:	34	MPH			
LOWER LIMIT 10 MPH PACE:	25	MPH	85th PERCENTILE SPEED:	37.3	MPH
PERCENT OVER PACE:	24.6	%	MEDIAN SPEED:	28.8	MPH
PERCENT IN PACE:	67.2	%	15th PERCENTILE SPEED:	25.4	MPH
PERCENT UNDER PACE:	8.2	%			

wood Spot Spd 2018-02

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

BSPD-HCL.dwg

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL
Consulting Traffic Engineers
17592 Irvine Blvd., Suite 122 Tustin CA 92
(714) 731-9458

AGENCY: CITY OF LAGUNA HILLS
STREET: BRIDLEWOOD
LOCATION: LAUREL CREST DR TO VISTA VIEJO

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 5-16-18
START TIME: 10:00AM
END TIME: 11:00AM

DIRECTION: SOUTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43		
42		
41	/	1
40		0
39		0
38	/	1
37	/	1
36		0
35	/	1
34	//	2
33	/	1
32		0
31	/	1
30	//	2
29	//	2
28	///	3
27	////	4
26		5
25	///	3
24	/	1
23		
22		
21		
20		
19		
18		
17		
16		
15		

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

DIRECTION: NORTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51	/	1
50		0
49		0
48		0
47		0
46		0
45		0
44		0
43		0
42	/	1
41		0
40	/	1
39	/	1
38	/////	5
37		0
36		0
35	/	1
34	///	3
33	//	2
32	//	2
31	/	1
30	//	2
29	//	2
28	////	4
27	/////	5
26	//	2
25		0
24	//	2
23	/	1
22		0
21	/	1
20	/	1
19	/	1
18		
17		
16		
15		

CUMULATIVE TOTAL	MPH
	60
	59
	58
	57
	56
	55
	54
	53
	52
1	51
1	50
1	49
1	48
1	47
1	46
1	45
1	44
2	43
3	42
4	41
6	40
7	39
12	38
13	37
15	36
16	35
19	34
21	33
23	32
24	31
26	30
27	29
31	28
33	27
35	26
36	25
37	24
38	23
39	22
40	21
41	20
42	19
43	18
44	17
45	16
46	15

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

1000 0001122294339468710549211121

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire

RADAR SPEED DISTRIBUTION SHEET

HCI

CITY OF LAGUNA HILLS

BRIDLEWOOD DRIVE — LAUREL CREST DR TO VISTA VIEJO

DATE: 5/16/2018 — SURVEY BY: C. BUENDIA

TIME: 9:00 AM - 11:00 AM — CHECKED BY: JERRY STOCK

SPEED	CUMMULATIVE PERCENT (20 / 40 / 60 / 80 / 100)						
60					x	100.0%	
59					x	100.0%	
58					x	100.0%	
57					x	100.0%	
56					x	100.0%	
55					x	100.0%	
54					x	100.0%	
53					x	100.0%	
52					x	100.0%	
51					x	100.0%	
50					x	99.1%	
49					x	99.1%	
48					x	99.1%	
47					x	99.1%	
46					x	99.1%	
45					x	99.1%	
44					x	99.1%	
43					x	99.1%	
42					x	98.2%	
41					x	97.4%	
40					x	95.6%	
39					x	93.9%	
38					x	92.1%	
37					x	84.2%	- - -85PCT
36					x	80.7%	
35					x	78.1%	
34				x		75.4%	}PACE
33				x		67.5%	}PACE
32				x		64.0%	}PACE
31			x			58.8%	}PACE
30			x			53.5%	}PACE
29			x			46.5%	}PACE - - -MEAN
28			x			40.4%	}PACE
27		x				31.6%	}PACE
26	x					18.4%	}PACE
25	x					14.9%	}PACE - - -15PCT
24	x					7.0%	
23	x					5.3%	
22	x					4.4%	
21	x					3.5%	
20	x					2.6%	
19	x					0.9%	
18	x					0.0%	
17	x					0.0%	
16	x					0.0%	
15	x					0.0%	

UPPER LIMIT 10 MPH PACE:	34	MPH			
LOWER LIMIT 10 MPH PACE:	25	MPH	85th PERCENTILE SPEED:	37.1	MPH
PERCENT OVER PACE:	24.6	%	MEDIAN SPEED:	29.5	MPH
PERCENT IN PACE:	68.4	%	15th PERCENTILE SPEED:	25.0	MPH
PERCENT UNDER PACE:	7.0	%			

›od Spot Spd 2018-CUM

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

RADAR SPEED DISTRIBUTION SHEET

CITY OF LAGUNA HILLS

HCI

DEVONSHIRE ROAD — FALLING LEAF DR TO NOTTINGHAM CT

DATE: 5/17/2018 — SURVEY BY: C. BUENDIA

TIME: 9:00 AM - 10:00 AM — CHECKED BY: JERRY STOCK

SPEED	CUMMULATIVE PERCENT 20	40	60	80	100		
60					x	100.0%	
59					x	100.0%	
58					x	100.0%	
57					x	100.0%	
56					x	100.0%	
55					x	100.0%	
54					x	100.0%	
53					x	100.0%	
52					x	100.0%	
51					x	100.0%	
50					x	100.0%	
49					x	100.0%	
48					x	100.0%	
47					x	100.0%	
46					x	100.0%	
45					x	100.0%	
44					x	100.0%	
43					x	100.0%	
42					x	100.0%	
41					x	100.0%	
40					x	100.0%	
39					x	100.0%	
38					x	100.0%	
37					x	96.9%	
36					x	96.9%	
35					x	96.9%	
34					x	93.8%	}PACE
33				x		78.1%	}PACE - - -85PCT
32				x		78.1%	}PACE
31				x		75.0%	}PACE
30				x		71.9%	}PACE
29			x			62.5%	}PACE
28			x			50.0%	}PACE - - - -MEAN
27			x			46.9%	}PACE
26		x				28.1%	}PACE
25		x				21.9%	}PACE
24	x					9.4%	- - -15PCT
23	x					9.4%	
22	x					3.1%	
21	x					3.1%	
20	x					0.0%	
19	x					0.0%	
18	x					0.0%	
17	x					0.0%	
16	x					0.0%	
15	x					0.0%	

UPPER LIMIT 10 MPH PACE:	34	MPH			
LOWER LIMIT 10 MPH PACE:	25	MPH	85th PERCENTILE SPEED:	33.4	MPH
PERCENT OVER PACE:	6.3	%	MEDIAN SPEED:	28.0	MPH
PERCENT IN PACE:	84.4	%	15th PERCENTILE SPEED:	24.5	MPH
PERCENT UNDER PACE:	9.4	%			

Devonshire 2018-01

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

$SPD-RCI.dwg

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL II
Consulting Traffic Engineers
17592 Irvine Blvd, Suite 122 Tustin CA 92780
(714) 731-9450

AGENCY: CITY OF LAGUNA HILLS
STREET: DEVONSHIRE ROAD
LOCATION: FALLING LEAF DR. TO NOTTINGHAM CT

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 05-17-18
START TIME: 9:00 AM
END TIME: 10:00 AM

DIRECTION: SOUTHBOUND

MPH	NUMBER OF VEHICLES (5 / 10 / 15 / 20 / 25 / 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43		
42		
41		
40		
39		
38		
37		
36		
35	/	1
34	////	4
33		0
32	/	1
31	/	1
30	////	4
29	////	4
28	/	1
27	////	4
26		0
25	/	1
24		0
23	/	1
22		0
21	/	1
20		
19		
18		
17		
16		
15		

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

DIRECTION:

MPH	NUMBER OF VEHICLES (5 / 10 / 15 / 20 / 25 / 30)	TOTAL	CUMULATIVE TOTAL	MPH
60				60
59				59
58				58
57				57
56				56
55				55
54				54
53				53
52				52
51				51
50				50
49				49
48				48
47				47
46				46
45				45
44				44
43				43
42				42
41				41
40				40
39				39
38	/	1	1	38
37		0	0	37
36		0	0	36
35		0	0	35
34	/	1	5	34
33		0	0	33
32		0	0	32
31		0	0	31
30		0	3	30
29	/	1	4	29
28		0	0	28
27	//	2	6	27
26	//	2	4	26
25	///	3	4	25
24		0	0	24
23	/	1	2	23
22			0	22
21			1	21
20				20
19				19
18				18
17				17
16				16
15				15

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire

RADAR SPEED DISTRIBUTION SHEET

HCI

CITY OF LAGUNA HILLS

DEVONSHIRE ROAD — FALLING LEAF DR TO NOTTINGHAM CT

DATE: 5/17/2018 — SURVEY BY: C. BUENDIA

TIME: 10:00 AM - 11:00 AM — CHECKED BY: JERRY STOCK

SPEED	CUMMULATIVE PERCENT 20	40	60	80	100		
60					x	100.0%	
59					x	100.0%	
58					x	100.0%	
57					x	100.0%	
56					x	100.0%	
55					x	100.0%	
54					x	100.0%	
53					x	100.0%	
52					x	100.0%	
51					x	100.0%	
50					x	100.0%	
49					x	100.0%	
48					x	100.0%	
47					x	100.0%	
46					x	100.0%	
45					x	100.0%	
44					x	100.0%	
43					x	100.0%	
42					x	100.0%	
41					x	100.0%	
40					x	100.0%	
39					x	100.0%	
38					x	100.0%	
37					x	95.7%	
36					x	95.7%	
35					x	95.7%	
34					x	95.7%	}PACE
33					x	95.7%	}PACE
32				x		87.0%	}PACE
31				x		87.0%	}PACE
30				x		78.3%	}PACE - - 85PCT
29			x			60.9%	}PACE
28			x			52.2%	}PACE
27		x				39.1%	}PACE - - -MEAN
26		x				21.7%	}PACE
25	x					4.3%	}PACE - - -15PCT
24	x					0.0%	
23	x					0.0%	
22	x					0.0%	
21	x					0.0%	
20	x					0.0%	
19	x					0.0%	
18	x					0.0%	
17	x					0.0%	
16	x					0.0%	
15	x					0.0%	

UPPER LIMIT 10 MPH PACE:	34	MPH			
LOWER LIMIT 10 MPH PACE:	25	MPH	85th PERCENTILE SPEED:	30.8	MPH
PERCENT OVER PACE:	4.3	%	MEDIAN SPEED:	27.8	MPH
PERCENT IN PACE:	95.7	%	15th PERCENTILE SPEED:	25.6	MPH
PERCENT UNDER PACE:	0.0	%			

Devonshire 2018-02

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

BSPD-HCL.dwg

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL
Consulting Traffic Engineers
12532 Irvine Blvd., Suite 102 Tustin CA. 92
(714) 731-9450

AGENCY: CITY OF LAGUNA HILLS
STREET: DEVONSHIRE ROAD
LOCATION: FALLING LEAF DR TO NOTTINGHAM CT

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 5-17-18
START TIME: 10:00 AM
END TIME: 11:00 AM VLM

DIRECTION: SOUTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43		
42		
41		
40		
39		
38	/	1
37		0
36		0
35		0
34		0
33	/	1
32		0
31	/	1
30	///	3
29		0
28		0
27	///	3
26	//	2
25	/	1
24		
23		
22		
21		
20		
19		
18		
17		
16		
15		

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

DIRECTION: NORTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL	CUMULATIVE TOTAL	MPH
60				60
59				59
58				58
57				57
56				56
55				55
54				54
53				53
52				52
51				51
50				50
49				49
48				48
47				47
46				46
45				45
44				44
43				43
42				42
41				41
40				40
39				39
38			1	38
37			0	37
36			0	36
35			0	35
34			0	34
33	/	1	1	33
32		0	1	32
31	/	1	2	31
30	/	1	3	30
29	/	1	4	29
28	///	3	7	28
27	///	3	10	27
26	//	2	12	26
25			12	25
24				24
23				23
22				22
21				21
20				20
19				19
18				18
17				17
16				16
15				15

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

20015213764106502021

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire

RADAR SPEED DISTRIBUTION SHEET

HCI

CITY OF LAGUNA HILLS

DEVONSHIRE ROAD — FALLING LEAF DR TO NOTTINGHAM CT

DATE: 5/17/2018 — SURVEY BY: C. BUENDIA

TIME: 9:00 AM - 11:00 AM — CHECKED BY: JERRY STOCK

SPEED	CUMMULATIVE PERCENT 20	40	60	80	100		
60					x	100.0%	
59					x	100.0%	
58					x	100.0%	
57					x	100.0%	
56					x	100.0%	
55					x	100.0%	
54					x	100.0%	
53					x	100.0%	
52					x	100.0%	
51					x	100.0%	
50					x	100.0%	
49					x	100.0%	
48					x	100.0%	
47					x	100.0%	
46					x	100.0%	
45					x	100.0%	
44					x	100.0%	
43					x	100.0%	
42					x	100.0%	
41					x	100.0%	
40					x	100.0%	
39					x	100.0%	
38					x	100.0%	
37					x	96.4%	
36					x	96.4%	
35					x	96.4%	
34					x	94.5%	}PACE
33				x		85.5%	}PACE
32				x		81.8%	}PACE - - -85PCT
31				x		80.0%	}PACE
30				x		74.5%	}PACE
29			x			61.8%	}PACE
28			x			50.9%	}PACE
27		x				43.6%	}PACE - - -MEAN
26		x				25.5%	}PACE
25	x					14.5%	}PACE - - -15PCT
24	x					5.5%	
23	x					5.5%	
22	x					1.8%	
21	x					1.8%	
20	x					0.0%	
19	x					0.0%	
18	x					0.0%	
17	x					0.0%	
16	x					0.0%	
15	x					0.0%	

UPPER LIMIT 10 MPH PACE:	34	MPH			
LOWER LIMIT 10 MPH PACE:	25	MPH	85th PERCENTILE SPEED:	32.9	MPH
PERCENT OVER PACE:	5.5	%	MEDIAN SPEED:	27.9	MPH
PERCENT IN PACE:	89.1	%	15th PERCENTILE SPEED:	25.0	MPH
PERCENT UNDER PACE:	5.5	%			

Devonshire 2018 CUM

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

ADT Volume Data

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

Prepared by NDS/ATD

VOLUME

Bridlewood Dr Bet. Vista Viejo Rd & Laurel Crest Dr

Day: Wednesday
Date: 5/2/2018

City: Laguna Hills
Project #: CA18_1093_001

DAILY TOTALS	NB	SB	EB	WB	Total
	454	268	0	0	722

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00	0		0						0		12:00	5		10						15	
00:15	1		1						2		12:15	6		9						15	
00:30	0		0						0		12:30	7		3						10	
00:45	0	1	0	1					0	2	12:45	7	25	4	26					11	51
01:00	0		0						0		13:00	5		2						7	
01:15	0		0						0		13:15	6		4						10	
01:30	0		0						0		13:30	8		4						12	
01:45	0		0						0		13:45	2	21	9	19					11	40
02:00	0		0						0		14:00	8		7						15	
02:15	0		0						0		14:15	7		4						11	
02:30	0		0						0		14:30	7		5						12	
02:45	0		0						0		14:45	9	31	5	21					14	52
03:00	0		0						0		15:00	5		7						12	
03:15	0		0						0		15:15	9		5						14	
03:30	0		0						0		15:30	3		6						9	
03:45	0		0						0		15:45	8	25	4	22					12	47
04:00	1		1						2		16:00	12		5						17	
04:15	0		0						0		16:15	10		7						17	
04:30	1		0						1		16:30	6		3						9	
04:45	1	3	0	1					1	4	16:45	11	39	3	18					14	57
05:00	1		1						2		17:00	4		2						6	
05:15	0		0						0		17:15	4		3						7	
05:30	2		0						2		17:30	15		10						25	
05:45	1	4	0	1					1	5	17:45	9	32	5	20					14	52
06:00	2		1						3		18:00	4		2						6	
06:15	1		1						2		18:15	10		8						18	
06:30	5		0						5		18:30	10		4						14	
06:45	2	10	1	3					3	13	18:45	7	31	6	20					13	51
07:00	9		3						12		19:00	12		7						19	
07:15	8		5						13		19:15	3		1						4	
07:30	7		4						11		19:30	4		4						8	
07:45	15	39	4	16					19	55	19:45	4	23	3	15					7	38
08:00	11		7						18		20:00	4		1						5	
08:15	11		4						15		20:15	4		1						5	
08:30	16		5						21		20:30	4		3						7	
08:45	7	45	2	18					9	63	20:45	3	15	1	6					4	21
09:00	9		6						15		21:00	4		1						5	
09:15	11		1						12		21:15	3		2						5	
09:30	8		4						12		21:30	2		4						6	
09:45	4	32	4	15					8	47	21:45	1	10	0	7					1	17
10:00	4		2						6		22:00	0		4						4	
10:15	6		4						10		22:15	0		2						2	
10:30	11		4						15		22:30	2		0						2	
10:45	8	29	5	15					13	44	22:45	1	3	0	6					1	9
11:00	6		8						14		23:00	1		1						2	
11:15	7		4						11		23:15	0		0						0	
11:30	13		2						15		23:30	0		0						0	
11:45	8	34	3	17					11	51	23:45	1	2	0	1					1	3
TOTALS		197		87						284	TOTALS		257		181						438
SPLIT %		69.4%		30.6%						39.3%	SPLIT %		58.7%		41.3%						60.7

DAILY TOTALS	NB	SB	EB	WB	Total
	454	268	0	0	722

AM Peak Hour	07:45	11:45			07:45	PM Peak Hour	16:00	12:00			18:1
AM Pk Volume	53	25			73	PM Pk Volume	39	26			64
Pk Hr Factor	0.828	0.625			0.869	Pk Hr Factor	0.813	0.650			0.84
7 - 9 Volume	84	34	0	0	118	4 - 6 Volume	71	38	0	0	109
7 - 9 Peak Hour	07:45	07:15			07:45	4 - 6 Peak Hour	16:00	17:00			16:0
7 - 9 Pk Volume	53	20	0	0	73	4 - 6 Pk Volume	39	20	0	0	57
Pk Hr Factor	0.828	0.714	0.000	0.000	0.869	Pk Hr Factor	0.813	0.500	0.000	0.000	0.83

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

Prepared by NDS/ATD

VOLUME

Devonshire Rd Bet. Falling Leaf Dr & Nottingham Ct

Day: Wednesday
Date: 5/2/2018

City: Laguna Hills
Project #: CA18_1093_002

DAILY TOTALS	NB	SB	EB	WB	Total
	174	416	0	0	590

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00	0		0						0		12:00	2		9						11	
00:15	0		0						0		12:15	2		7						9	
00:30	0		0						0		12:30	3		6						9	
00:45	0		0						0		12:45	4	11	8	30					12	41
01:00	0		0						0		13:00	2		5						7	
01:15	0		0						0		13:15	5		7						12	
01:30	0		0						0		13:30	3		5						8	
01:45	0		0						0		13:45	5	15	3	20					8	35
02:00	0		0						0		14:00	6		7						13	
02:15	0		0						0		14:15	4		7						11	
02:30	0		0						0		14:30	5		5						10	
02:45	0		0						0		14:45	2	17	6	25					8	42
03:00	1		0						1		15:00	3		10						13	
03:15	0		0						0		15:15	6		9						15	
03:30	0		0						0		15:30	7		10						17	
03:45	0	1	0						0	1	15:45	1	17	7	36					8	53
04:00	0		0						0		16:00	0		6						6	
04:15	0		0						0		16:15	8		4						12	
04:30	0		0						0		16:30	4		9						13	
04:45	0		1	1					1	1	16:45	7	19	12	31					19	50
05:00	0		0						0		17:00	3		11						14	
05:15	1		1						2		17:15	6		14						20	
05:30	0		0						0		17:30	3		12						15	
05:45	0	1	1	2					1	3	17:45	2	14	14	51					16	65
06:00	1		1						2		18:00	2		14						16	
06:15	0		0						0		18:15	4		19						23	
06:30	0		5						5		18:30	2		7						9	
06:45	0	1	2	8					2	9	18:45	3	11	8	48					11	59
07:00	1		2						3		19:00	3		8						11	
07:15	0		3						3		19:15	2		4						6	
07:30	5		1						6		19:30	4		4						8	
07:45	2	8	5	11					7	19	19:45	1	10	3	19					4	29
08:00	2		6						8		20:00	1		6						7	
08:15	2		7						9		20:15	2		3						5	
08:30	6		4						10		20:30	1		1						2	
08:45	2	12	5	22					7	34	20:45	1	5	3	13					4	18
09:00	3		10						13		21:00	0		2						2	
09:15	0		7						7		21:15	3		5						8	
09:30	4		4						8		21:30	1		4						5	
09:45	3	10	6	27					9	37	21:45	1	5	1	12					2	17
10:00	1		9						10		22:00	0		6						6	
10:15	0		3						3		22:15	1		3						4	
10:30	2		5						7		22:30	0		0						0	
10:45	2	5	6	23					8	28	22:45	2	3	0	9					2	12
11:00	2		7						9		23:00	1		1						2	
11:15	1		5						6		23:15	0		3						3	
11:30	3		5						8		23:30	0		0						0	
11:45	2	8	5	22					7	30	23:45	0	1	2	6					2	7
TOTALS		46		116						162	TOTALS		128		300						428
SPLIT %		28.4%		71.6%						27.5%	SPLIT %		29.9%		70.1%						72.5

DAILY TOTALS	NB	SB	EB	WB	Total
	174	416	0	0	590

AM Peak Hour	08:15	09:00			08:15	PM Peak Hour	16:15	17:30			17:3
AM Pk Volume	13	27			39	PM Pk Volume	22	59			70
Pk Hr Factor	0.542	0.675			0.750	Pk Hr Factor	0.688	0.776			0.76
7 - 9 Volume	20	33	0	0	53	4 - 6 Volume	33	82	0	0	115
7 - 9 Peak Hour	07:45	07:45			07:45	4 - 6 Peak Hour	16:15	17:00			16:4
7 - 9 Pk Volume	12	22	0	0	34	4 - 6 Pk Volume	22	51	0	0	68
Pk Hr Factor	0.500	0.786	0.000	0.000	0.850	Pk Hr Factor	0.688	0.911	0.000	0.000	0.85

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

Collision History

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire Road)

CITY OF LAGUNA HILLS
SWITRS COLLISION DATABASE
BRIDLEWOOD DRIVE, FROM VISTA VIEJO ROAD TO LAUREL CREST DRIVE
JAN. 1, 2013 - FEB. 28, 2018

CASE ID	COLL. DATE	COLL. TIME	PRIMARY ROAD	SECONDARY ROAD	DIST.	DIR.	INTERS.	WEATH. 1	COLL. SEVERITY	PRIM. COLL. FACT.	PCF VIOL CAT.	PCF VIOL.	HIT AND RUN	TYPE OF COLL.	MOTOR VEHICLE INVOLVED WITH	ROA SURI
8361526	20170326	10	BRIDLEWOOD DR	VISTA VIEJO RD	488	N	N	A	0	A	1	23152	N	C	E	A
6174038	20130806	1741	VISTA VIEJO	BRIDLEWOOD LN	0		Y	A	4	A	9	21801	N	A	C	A

NOTES:

Weather 1
- A - Clear
- B - Cloudy
- C - Raining
- D - Snowing
- E - Fog
- F - Other
- G - Wind
- - - Not Stated

Collision Severity
- 1 - Fatal
- 2 - Injury (Severe)
- 3 - Injury (Other Visible)
- 4 - Injury (Complaint of Pain)
- 0 - PDO (Property Damage Only)

Primary Collision Factor
- A - (Vehicle) Code Violation
- B - Other Improper Driving
- C - Other Than Driver
- D - Unknown
- E - Fell Asleep
- - - Not Stated

PCF Violation Category
- 01 - Driving or Bicycling Under Influence
- 02 - Impeding Traffic
- 03 - Unsafe Speed
- 04 - Following Too Closely
- 05 - Wrong Side of Road
- 06 - Improper Passing
- 07 - Unsafe Lane Change
- 08 - Improper Turning
- 09 - Automobile ROW
- 10 - Pedestrian ROW
- 11 - Pedestrian Violation
- 12 - Traffic Signals and Signs
- 13 - Hazardous Parking
- 14 - Lights
- 15 - Brakes
- 16 - Other Equipment
- 17 - Other Hazardous Violation
- 18 - Other Than Driver (or Ped)
- 19 -
- 20 -
- 21 - Unsafe Starting or Backing
- 22 - Other Improper Driving
- 23 - Pedestrian or "Other" Under the Influence
- 24 - Fell Asleep
- 00 - Unknown
- - - Not Stated

Hit and Run
- F - Felony
- M - Misdemeanor
- N - Not Hit & Run

Type of Collision
- A - Head-On
- B - Sideswipe
- C - Rear-End
- D - Broadside
- E - Hit Object
- F - Overturned
- G - Vehicle/Pedestrian
- H - Other
- - - Not Stated

Motor Vehicle Involved With:
- A - Non-Collision
- B - Pedestrian
- C - Other Motor Vehicle
- D - Motor Vehicle on Other Roadway
- E - Parked Motor Vehicle
- F - Train
- G - Bicycle
- H - Animal
- I - Fixed Object
- J - Other Object
- - - Not Stated

Road Surface
- A - Dry
- B - Wet
- C - Snowy or Icy
- D - Slippery
- - - Not Stated

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire

CITY OF LAGUNA HILLS
SWITRS COLLISION DATABASE
DEVONSHIRE ROAD, FROM FALLING LEAF DRIVE TO NOTTINGHAM COURT
JAN. 1, 2013 - FEB. 28, 2018

CASE ID	COLL. DATE	COLL. TIME	PRIMARY ROAD	SECONDARY ROAD	DIST.	DIR.	INTERS.	WEATH. 1	COLL. SEVERITY	PRIM. COLL. FACT.	PCF VIOL CAT.	PCF VIOL.	HIT AND RUN	TYPE OF COLL.	MOTOR VEHICLE INVOLVED WITH	ROA SURI
8326285	20170220	2256	DEVONSHIRE RD	NORTH ELM BANK DR	175		N	A	4	A	8	22107	N	C	E	A

NOTES:

Weather 1
- A - Clear
- B - Cloudy
- C - Raining
- D - Snowing
- E - Fog
- F - Other
- G - Wind
- - - Not Stated

Collision Severity
- 1 - Fatal
- 2 - Injury (Severe)
- 3 - Injury (Other Visible)
- 4 - Injury (Complaint of Pain)
- 0 - PDO (Property Damage Only)

Primary Collision Factor
- A - (Vehicle) Code Violation
- B - Other Improper Driving
- C - Other Than Driver
- D - Unknown
- E - Fell Asleep
- - - Not Stated

PCF Violation Category
- 01 - Driving or Bicycling Under Influence
- 02 - Impeding Traffic
- 03 - Unsafe Speed
- 04 - Following Too Closely
- 05 - Wrong Side of Road
- 06 - Improper Passing
- 07 - Unsafe Lane Change
- 08 - Improper Turning
- 09 - Automobile ROW
- 10 - Pedestrian ROW
- 11 - Pedestrian Violation
- 12 - Traffic Signals and Signs
- 13 - Hazardous Parking
- 14 - Lights
- 15 - Brakes
- 16 - Other Equipment
- 17 - Other Hazardous Violation
- 18 - Other Than Driver (or Ped)
- 19 -
- 20 -
- 21 - Unsafe Starting or Backing
- 22 - Other Improper Driving
- 23 - Pedestrian or "Other" Under the Influence
- 24 - Fell Asleep
- 00 - Unknown
- - - Not Stated

Hit and Run
- F - Felony
- M - Misdemeanor
- N - Not Hit & Run

Type of Collision
- A - Head-On
- B - Sideswipe
- C - Rear-End
- D - Broadside
- E - Hit Object
- F - Overturned
- G - Vehicle/Pedestrian
- H - Other
- - - Not Stated

Motor Vehicle Involved With:
- A - Non-Collision
- B - Pedestrian
- C - Other Motor Vehicle
- D - Motor Vehicle on Other Roadway
- E - Parked Motor Vehicle
- F - Train
- G - Bicycle
- H - Animal
- I - Fixed Object
- J - Other Object
- - - Not Stated

Road Surface
- A - Dry
- B - Wet
- C - Snowy or Icy
- D - Slippery
- - - Not Stated

Attachment: Traffic Evaluation (1635 : Review of Traffic Conditions on Bridlewood Drive and Devonshire

City of Laguna Hills
Traffic Commission
Staff Report

DATE: **November 20, 2019**

TO: **TRAFFIC COMMISSIONERS**

FROM: **Amber M. Shah, P.E.**
Associate Civil Engineer

ISSUE: **REPEAT SPEED SURVEY ON BRIDLEWOOD DRIVE**

RECOMMENDATION: **TRAFFIC COMMISSION RECEIVE AND FILE**

SUMMARY:

Staff was previously contacted by a resident of Moulton Ranch in April 2018 regarding concerns of vehicular speeding and collisions on Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive. Please see the attached Vicinity Map. Based upon the resident's concerns and in accordance with the Residential Streets Management Policy, staff subsequently initiated a traffic engineering evaluation of Bridlewood Drive between Vista Viejo Road and Laurel Crest Drive. The report presented at the July 18, 2018 meeting of the Traffic Commission concluded the 85th percentile speed measurement of Bridlewood Drive was higher than expected and considered to be unacceptable. Additional traffic speed enforcement and use of the radar trailer were utilized to address this issue. The Traffic Commission requested staff repeat the speed survey of Bridlewood Drive in six months' time.

In accordance with the Traffic Commission's request, a follow-up speed survey was performed in December 2018. Although the prevailing speed of traffic was lower than previous measurements, it was still higher than expected for a residential street. Therefore, staff recommended and subsequently installed additional signs and pavement legends on Bridlewood Drive. Continued concentrated police enforcement was also recommended in addition to a follow-up speed survey in six months' time.

In accordance with the recommendation at the January 16, 2019, meeting of the Traffic Commission, a new speed survey was performed in October 2019. This speed survey determined the prevailing speed of traffic was in the acceptable range in the morning but remained higher than expected in the afternoon time period. The City has already taken incremental steps to address this speeding issue and implemented all non-physical traffic control devices appropriate for this location. Based upon a collision history of two collisions

reported in the past 5 years with none categorized as unsafe speed, staff recommends continued concentrated police enforcement and posting of the radar trailer in this area.

BACKGROUND:

Staff was contacted by a resident of Moulton Ranch in April 2018 regarding concerns of vehicular speeding and traffic collisions on Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive, and on Devonshire Road, between Falling Leaf Drive and Nottingham Court. Please see the attached Vicinity Map. Based upon the resident's concern and in accordance with the Residential Streets Management Policy, staff subsequently initiated a review of the vehicular speeds, traffic volume and traffic collision history on Bridlewood Drive and separately on Devonshire Road. The report presented at the July 18, 2018 meeting of the Traffic Commission concluded the 85th percentile speed measurement of Bridlewood Drive was higher than expected and considered to be unacceptable for a residential character street. Additional traffic speed enforcement and use of the radar trailer were utilized to address this issue. The report concluded the 85th percentile speed on Devonshire Road was within expectations and no further action on that street was needed. The Traffic Commission requested staff repeat the speed survey of Bridlewood Drive in six months' time.

In accordance with the Traffic Commission's request, the Traffic Engineers of Hartzog & Crabill, Inc., (HCI) completed a speed survey of Bridlewood Drive from Vista Viejo Road to Laurel Crest Drive in December 2018. The report presented at the January 16, 2019, meeting of the Traffic Commission concluded the 85th percentile speed on Bridlewood Drive reduced from 37.1 mph, as recorded in the first speed survey in May 2018, to 36.1 mph in December 2018. Based upon the results of the December 2018 speed survey indicating vehicular speed continued to be an issue, staff field reviewed the existing number and locations of speed limit signage and pavement markings. Staff recommended and subsequently had painted two "25" mph pavement legends adjacent to the posted speed limits signs along southbound Bridlewood Drive and "Stop Ahead" pavement markings in advance of the stop sign at Vista Viejo Road. Continued concentrated police enforcement was also recommended in addition to a follow-up speed survey in six months' time.

In accordance with the recommendation at the January 16, 2019, meeting of the Traffic Commission, the Traffic Engineers of Hartzog & Crabill, Inc., (HCI) completed the attached November 7, 2019, speed survey of Bridlewood Drive from Vista Viejo Road to Laurel Crest Drive. This speed survey determined the 85th percentile speed on Bridlewood Drive in the morning was within the typical range of 34 – 36 mph but remained higher than expected at 37.3 mph in the afternoon. The results of this speed survey indicate vehicular speed remains an issue on Bridlewood Drive. The City has taken the incremental steps necessary to address this speeding issue and implemented all non-physical traffic control devices appropriate for this location. Based upon a collision history of two collisions reported in the past 5 years with none categorized as unsafe speed, staff recommends continued concentrated police enforcement of driver behavior is the best and appropriate remedy for Bridlewood Drive. Staff will continue to work with the Sheriff's Department on

enforcement activity in this area and will continue to post the radar trailer in this area to increase driver education as to the appropriate speed on Bridlewood Drive.

ATTACHMENT:

- Vicinity Map
- Hartzog & Crabill, Inc. November 7, 2019, Traffic Data Evaluation – Letter of Opinion – Speeding Data Follow-Up along Bridlewood Drive

VICINITY MAP - BRIDLEWOOD DRIVE

NORTH

0 0.02750.055 0.11 mi

HARTZOG & CRABILL, Inc.

Trammell Hartzog, President
Gerald J. Stock, PE, TE,
Executive Vice President

17852 E. 17th Street
Suite 101
Tustin, CA 92780

Phone: (714) 731-9455
FAX: (714) 731-9498

www.hartzog-crabill.com

November 7, 2019

Mr. Kenneth H. Rosenfield, PE
Assistant City Manager/Public Services Director
City of Laguna Hills
24035 El Toro Road
Laguna Hills, CA 92653

Subject: Traffic Data Evaluation - Letter of Opinion - Speeding Data Follow-Up along Bridlewood Drive

Dear Mr. Rosenfield,

Pursuant to your request, Hartzog & Crabill, Inc. (HCI) has prepared this traffic engineering evaluation as a follow-up to our June 1, 2018 and January 9, 2019 evaluations regarding residential concerns of speeding along the street segment of Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive.

The following data was gathered/performed as part of this evaluation:

1) Two (2) radar speed surveys on Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive.

BACKGROUND

Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive, is a 40-foot wide, 2-lane, north-south residential collector roadway. At the project limits, there is a 1-way stop at Vista Viejo Road and a 3-way stop at Laurel Crest Drive. There is no centerline striping along the entire segment, with exception of a short length of double-yellow centerline at the project limits.

There are posted 25 MPH speed limit signs along Bridlewood Drive, between Vista Viejo Road and Laurel Crest Drive. There are also '25' pavement markings adjacent to the sign postings. On-street parking is allowed along both sides of Bridlewood Drive.

TRAVEL SPEED DATA

To determine current travel speeds on Bridlewood Drive, two spot speed radar surveys were conducted along this residential collector roadway on Thursday, October 24, 2019 (see attached). The tables below summarize the recent radar speed data collected.

SPEED SURVEY SUMMARY
BRIDLEWOOD DRIVE, FROM VISTA VIEJO ROAD TO LAUREL CREST DRIVE

9:00-10:00AM **Radar Speed Data Summary**	**Between Vista Viejo Road and Laurel Crest Drive**
85th Percentile Speed	36.3 MPH
Median Speed	29.6 MPH
15th Percentile Speed	24.0 MPH
10 MPH Pace Speed	23 - 32 MPH
Percent in Pace Speed	63.8%

4:00-5:00PM **Radar Speed Data Summary**	**Between Vista Viejo Road and Laurel Crest Drive**
85th Percentile Speed	37.3 MPH
Median Speed	30.8 MPH
15th Percentile Speed	25.7 MPH
10 MPH Pace Speed	29 - 38 MPH
Percent in Pace Speed	63.9%

Source: Hartzog & Crabill, Inc., 2019.

As shown in the two tables above, the highest 85th-percentile speed on Bridlewood Drive was recorded in the afternoon at 37.3 MPH. This data shows that higher than typical travel speeds are occurring above the posted 25 MPH speed limit.

The critical speeds also appear to be consistently high when compared to the highest critical speeds recorded back in June 2018 and January 2019, which were 37.1 MPH and 36.1 MPH, respectively.

COLLISION DATA

HCI obtained the most recent, citywide collision data that was reported during the past five (5+) years from the Statewide Integrated Traffic Records System website (*i*-SWITRS) database.

HCI prepared an updated 5-year collision history report to determine the number of collisions occurring on this particular segment of Bridlewood Drive. The table below presents the summary collision data.

TRAFFIC COLLISION DATA SUMMARY
BRIDLEWOOD DRIVE, FROM VISTA VIEJO ROAD TO LAUREL CREST DRIVE

Year	Number of Collisions	Fatal	Injury	Property Damage Only
2014	0	0	0	0
2015	0	0	0	0
2016	0	0	0	0
2017	1	0	0	1
2018	0	0	0	0
2019 *	1	0	0	1
TOTAL	**2**	**0**	**0**	**2**

* Available SWITRS data was up to June 30, 2019 at the time of report preparation.

As shown above, there were a total of two (2) collisions reported along this segment within the prior (5-1/2) years. These collisions were recorded as Rear End and Hit Object types. The two collisions were also categorized with primary collision factors that include Driving Under the Influence and Unsafe Starting or Backing. None (0) were categorized as Unsafe Speed; therefore, there are no other recommendations in regards to collisions at this time.

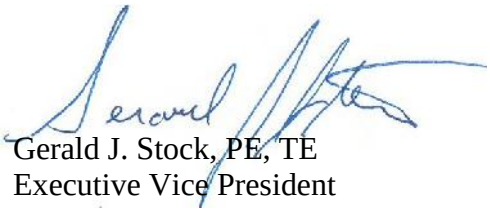
RECOMMENDATIONS

As speeding above the 25 MPH speed limit was verified on Bridlewood Drive, it is recommended to continue the incremental approach in order to address and lower the overall travel speeds. These incremental steps include:

- increased law enforcement of this segment.
- frequent deployment of portable radar speed-feedback trailers.
- neighborhood watch committee meeting to help make all residents aware of speeding.
- additional speed limit signage and pavement markings.

It has been our pleasure to prepare this follow-up letter of opinion regarding speeding concerns along Bridlewood Drive. If you may have any questions or need additional information, please feel free to call us anytime at (714) 731-9455.

Sincerely,
HARTZOG & CRABILL, INC.



Gerald J. Stock, PE, TE
Executive Vice President

Attachment: Radar Speed Data

Speed Data

SUMMARY OF SPOT SPEED SURVEYS
OCTOBER 2019

STREET LOCATION	EXISTING SPEED LIMIT	RECOMMENDED SPEED LIMIT	85TH PERCENTILE SPEED	AVERAGE SPEED	10 MPH PACE RANGE	PERCENT OF VEHICLES IN PACE	DAY / DATE / TIME PERIOD
BRIDLEWOOD DRIVE							
LAUREL CREST TO VISTA VIEJO							
9:00 AM -10:00 AM	25	-	36.3	29.6	23-32	63.8	THURS / 10-24-2019 / **AM**
10:00 AM – 11:00 AM	25	-	34.9	30.2	26-35	74.5	THURS / 10-24-2019 / **AM**
3:00 PM – 4:00 PM	25	-	36.2	29.9	26-35	67.9	THURS / 10-24-2019 / **PM**
4:00 PM – 5:00 PM	25	-	37.3	30.8	29-38	63.9	THURS / 10-24-2019 / **PM**
SANTA VITTORIA DRIVE							
CAMINITO JALISCO TO CAMINTO COSTA							
9:00 AM -10:00 AM	25	-	34.9	31.2	27-36	78.4	TUES / 10-29-2019 / **AM**
10:00 AM – 11:00 AM	25	-	34.9	30.5	27-36	82.9	TUES / 10-29-2019 / **AM**
3:00 PM – 4:00 PM	25	-	38.1	32.9	28-37	69.3	TUES / 10-29-2019 / **PM**
4:00 PM – 5:00 PM	25	-	38.0	33.7	30-39	77.0	TUES / 10-29-2019 / **PM**

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL INC.
Consulting Traffic Engineers
17592 Irvine Blvd, Suite 122 Tustin CA. 92680
(714) 731-9455

AGENCY: CITY OF LAGUNA HILLS
STREET: BRIDLEWOOD
LOCATION: VISTA VIEJO TO LAUREL CREST

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 10/24/19
START TIME: 9:00 AM
END TIME: 10:00 AM VM

DIRECTION: SOUTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56	/	1
55	/	
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43		
42	/	1
41	/	0
40	/	1
39		0
38		0
37	/	1
36		0
35	/	1
34		0
33		0
32		0
31	//	2
30	//	2
29	/	1
28		0
27		0
26	/	1
25	/	1
24	/	1
23	//	2
22		
21		
20		
19		
18		
17		
16		
15	/	

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

DIRECTION: NORTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL	CUMULATIVE TOTAL	MPH
60				60
59				59
58				58
57				57
56			1	56
55				55
54				54
53				53
52				52
51				51
50				50
49				49
48				48
47				47
46				46
45				45
44				44
43				43
42	/	1	2	42
41	/	1	1	41
40		0	1	40
39		0	0	39
38	/	1	1	38
37	//	2	3	37
36	//	2	3	36
35	/	1	2	35
34	/	1	1	34
33	///	3	3	33
32	//	2	3	32
31	//	2	4	31
30	//	2	4	30
29	//	2	3	29
28	//	2	2	28
27	////	4	4	27
26	/	1	2	26
25	//	2	3	25
24		0	1	24
23	///	3	5	23
22	/	1	1	22
21				21
20				20
19				19
18				18
17				17
16				16
15				15

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

AM-1

RADAR SPEED DISTRIBUTION SHEET

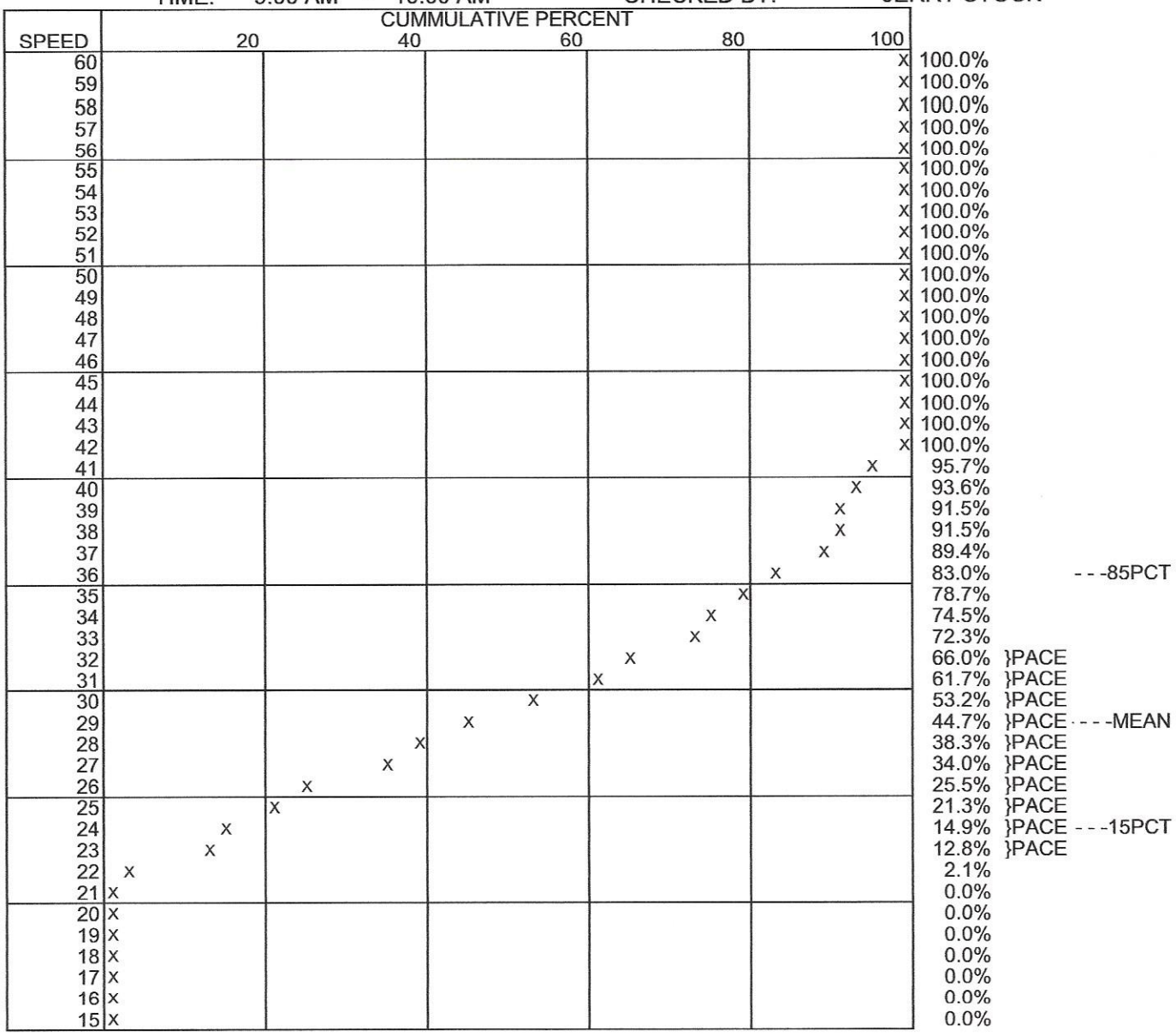
CITY OF LAGUNA HILLS

HCI

BRIDLEWOOD DRIVE — LAUREL CREST DR TO VISTA VIEJO

DATE: 10/24/2019 — SURVEY BY: C. BUENDIA

TIME: 9:00 AM - 10:00 AM — CHECKED BY: JERRY STOCK



UPPER LIMIT 10 MPH PACE:	32	MPH	
LOWER LIMIT 10 MPH PACE:	23	MPH	85th PERCENTILE SPEED: 36.3 MPH
PERCENT OVER PACE:	34.0	%	MEDIAN SPEED: 29.6 MPH
PERCENT IN PACE:	63.8	%	15th PERCENTILE SPEED: 24.0 MPH
PERCENT UNDER PACE:	2.1	%	

Bridlewood Spot Spd 2019-AM1

$SPD-HCI.dwg

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL INC.
Consulting Traffic Engineers
17592 Irvine Blvd, Suite 122 Tustin CA. 92680
(714) 731-9455

AGENCY: CITY OF LAGUNA HILLS
STREET: BRIDLEWOOD
LOCATION: VISTA VIEJO TO LAUREL CREST

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 10/24/19
START TIME: 10:00 AM
END TIME: 11:00 AM VAL

DIRECTION: SOUTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43		
42		
41		
40		
39		
38	/	1
37		0
36		0
35	/	1
34		0
33	//	2
32	/	1
31	///	3
30	///	3
29		0
28	////	4
27	/	1
26	///	3
25	/	1
24	/	
23	/	1
22		0
21		0
20	/	1
19		0
18		0
17	/	1
16		
15		

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

DIRECTION: NORTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL	CUMULATIVE TOTAL	MPH
60				60
59				59
58				58
57				57
56				56
55				55
54				54
53				53
52				52
51				51
50				50
49				49
48				48
47				47
46	/	1	1	46
45		0	0	45
44		0	0	44
43		0	0	43
42	/	1	1	42
41	/		1	41
40		0	0	40
39	/	1	1	39
38		0	1	38
37	///	3	3	37
36		0	0	36
35	//	2	3	35
34	//	2	2	34
33	///	3	5	33
32	/	1	2	32
31	/////	6	9	31
30	////	4	7	30
29	//	2	2	29
28		0	4	28
27	//	2	3	27
26	/	1	4	26
25		0	1	25
24	/		2	24
23			1	23
22			0	22
21			0	21
20			1	20
19			0	19
18			0	18
17				17
16				16
15				15

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

AM-2

RADAR SPEED DISTRIBUTION SHEET

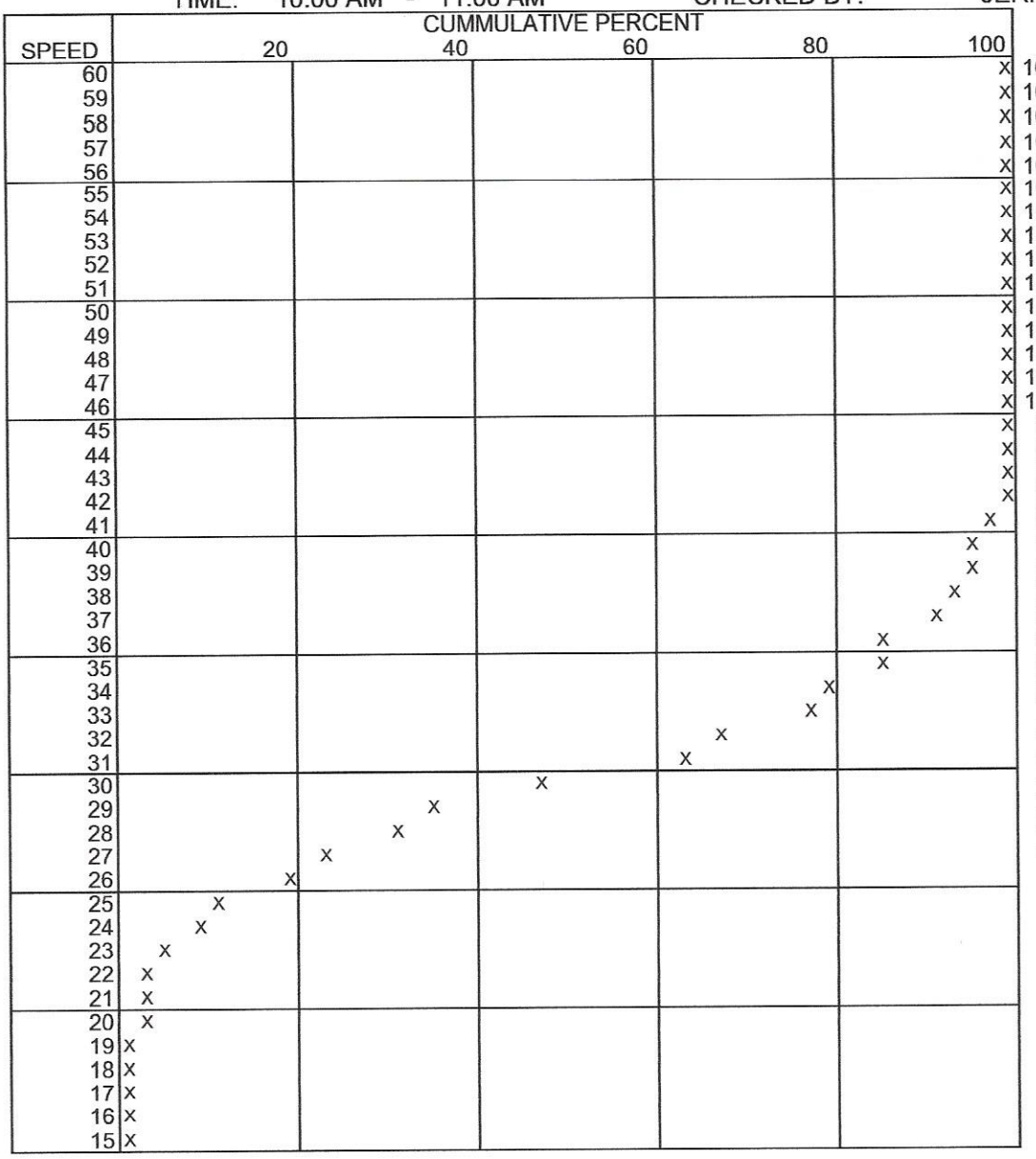
CITY OF LAGUNA HILLS

HCI

BRIDLEWOOD DRIVE — LAUREL CREST DR TO VISTA VIEJO

DATE: 10/24/2019 — SURVEY BY: C. BUENDIA

TIME: 10:00 AM - 11:00 AM — CHECKED BY: JERRY STOCK



SPEED	CUMMULATIVE PERCENT						
60						X	100.0%
59						X	100.0%
58						X	100.0%
57						X	100.0%
56						X	100.0%
55						X	100.0%
54						X	100.0%
53						X	100.0%
52						X	100.0%
51						X	100.0%
50						X	100.0%
49						X	100.0%
48						X	100.0%
47						X	100.0%
46						X	100.0%
45						X	98.2%
44						X	98.2%
43						X	98.2%
42						X	98.2%
41						X	96.4%
40						X	94.5%
39						X	94.5%
38						X	92.7%
37						X	90.9%
36						X	85.5%
35						X	85.5% }PACE
34					X		80.0% }PACE - - -85PCT
33					X		76.4% }PACE
32				X			67.3% }PACE
31				X			63.6% }PACE
30			X				47.3% }PACE - - - -MEAN
29		X					34.5% }PACE
28		X					30.9% }PACE
27	X						23.6% }PACE
26	X						18.2% }PACE
25	X						10.9% - - -15PCT
24	X						9.1%
23	X						5.5%
22	X						3.6%
21	X						3.6%
20	X						3.6%
19	X						1.8%
18	X						1.8%
17	X						1.8%
16	X						0.0%
15	X						0.0%

UPPER LIMIT 10 MPH PACE:	35	MPH
LOWER LIMIT 10 MPH PACE:	26	MPH
PERCENT OVER PACE:	14.5	%
PERCENT IN PACE:	74.5	%
PERCENT UNDER PACE:	10.9	%

85th PERCENTILE SPEED:	34.9	MPH
MEDIAN SPEED:	30.2	MPH
15th PERCENTILE SPEED:	25.6	MPH

Bridlewood Spot Spd 2019-AM2

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL INC.
Consulting Traffic Engineers
17592 Irvine Blvd, Suite 122 Tustin CA. 92680
(714) 731-9455

AGENCY: CITY OF LAGUNA HILLS
STREET: BRIDLEWOOD
LOCATION: VISTA VIEJO TO LAUREL CREST

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 10/24/19
START TIME: 3:00 PM
END TIME: 4:00 PM VAL

DIRECTION: SOUTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44		
43		
42		
41		
40	/	1
39		0
38	//	2
37	/	1
36	/	1
35	//	2
34	/	1
33	//	2
32		0
31	//	2
30	///	3
29	/	1
28	///	3
27	//	2
26	///	3
25	//	2
24	/	1
23		0
22		0
21	/	1
20	/	1
19		
18		
17		
16		
15		

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

DIRECTION: NORTHBOUND

MPH	NUMBER OF VEHICLES (5 10 15 20 25 30)	TOTAL	CUMULATIVE TOTAL	MPH
60				60
59				59
58				58
57				57
56				56
55				55
54				54
53				53
52	/	1	1	52
51		0	0	51
50		0	0	50
49		0	0	49
48		0	0	48
47		0	0	47
46		0	0	46
45		0	0	45
44	//	2	2	44
43		0	0	43
42		0	0	42
41	//	2	2	41
40	/	1	2	40
39		0	0	39
38	/	1	3	38
37	/	1	2	37
36	//	2	3	36
35	/////	5	8	35
34	////	4	5	34
33	//	2	4	33
32	//	2	2	32
31	//	2	4	31
30	////	4	7	30
29	////	4	5	29
28	/////	5	8	28
27	////	4	6	27
26	/	1	4	26
25	//	2	3	25
24	//	2	3	24
23		0	0	23
22		0	0	22
21	/	1	2	21
20	/	1	2	20
19				19
18				18
17				17
16				16
15				15

AVERAGE SPEED: _____ CRITICAL SPEED: _____ PACE SPEED: _____

PM-1

RADAR SPEED DISTRIBUTION SHEET

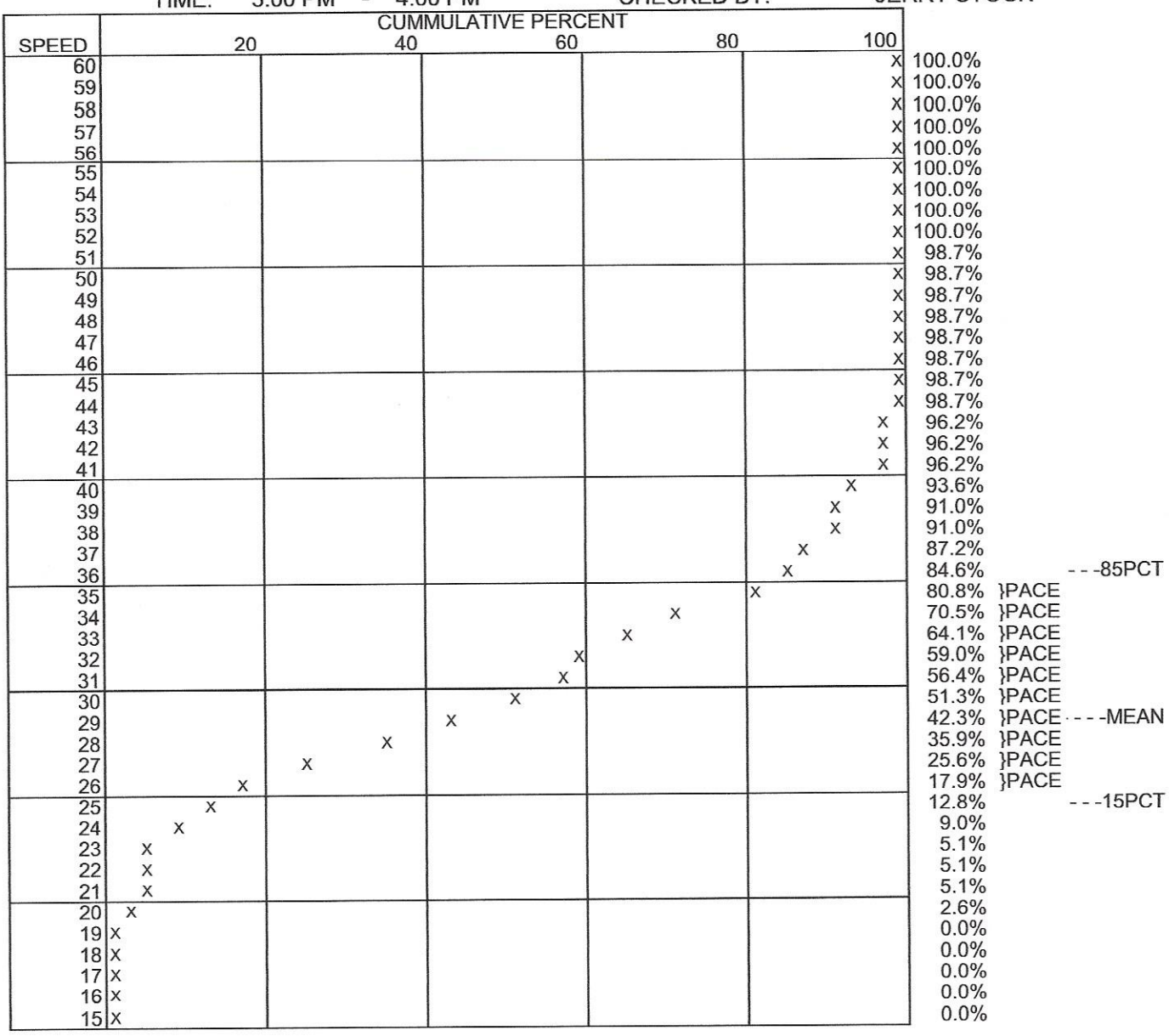
CITY OF LAGUNA HILLS

HCI

BRIDLEWOOD DRIVE — LAUREL CREST DR TO VISTA VIEJO

DATE: 10/24/2019 — SURVEY BY: C. BUENDIA

TIME: 3:00 PM - 4:00 PM — CHECKED BY: JERRY STOCK



UPPER LIMIT 10 MPH PACE:	35	MPH	
LOWER LIMIT 10 MPH PACE:	26	MPH	
PERCENT OVER PACE:	19.2	%	
PERCENT IN PACE:	67.9	%	
PERCENT UNDER PACE:	12.8	%	
85th PERCENTILE SPEED:	36.2	MPH	
MEDIAN SPEED:	29.9	MPH	
15th PERCENTILE SPEED:	25.4	MPH	

Bridlewood Spot Spd 2019-PM1

Radar Speed Survey Field Sheet

HARTZOG AND CRABILL INC.
Consulting Traffic Engineers
17592 Irvine Blvd., Suite 122 Tustin CA. 92680
(714) 731-9455

AGENCY: CITY OF LAGUNA HILLS
STREET: BRIDLEWOOD
LOCATION: VISTA VIEJO TO LAUREL CREST

WEATHER: SUNNY
ROAD CONDITION: DRY
OBSERVER: CATHY BUENDIA

DATE: 10/24/19
START TIME: 4:00 PM
END TIME: 5:00 PM

DIRECTION: SOUTHBOUND

MPH	NUMBER OF VEHICLES (5 / 10 / 15 / 20 / 25 / 30)	TOTAL
60		
59		
58		
57		
56		
55		
54		
53		
52		
51		
50		
49		
48		
47		
46		
45		
44	/	1
43		0
42		0
41		0
40		0
39		0
38	/	1
37	//	2
36	///	3
35	/	1
34	/	1
33	/	1
32	/	1
31	//	2
30	/	1
29	/	1
28	///	3
27	//	2
26	//	2
25	///	3
24	//	2
23		
22		
21		
20		
19		
18		
17		
16		
15		

AVERAGE SPEED: _____
CRITICAL SPEED: _____
PACE SPEED: _____

CUMULATIVE (BOTH DIRECTIONS) _____

DIRECTION: NORTHBOUND

MPH	NUMBER OF VEHICLES (5 / 10 / 15 / 20 / 25 / 30)	TOTAL	CUMULATIVE TOTAL	MPH
60				60
59				59
58				58
57				57
56				56
55				55
54				54
53				53
52				52
51				51
50				50
49				49
48				48
47				47
46				46
45				45
44			1	44
43			0	43
42	/	1	1	42
41		0	0	41
40	/	1	1	40
39	//	2	2	39
38	////	5	6	38
37	/	1	3	37
36	/	1	4	36
35	//	2	3	35
34	//	2	3	34
33	//	2	2	33
32	//	2	3	32
31	/////	6	8	31
30	///	3	4	30
29	//	2	3	29
28	//	2	5	28
27		0	2	27
26	/	1	3	26
25	//	2	5	25
24			2	24
23				23
22				22
21				21
20				20
19				19
18				18
17				17
16				16
15				15

AVERAGE SPEED: _____
CRITICAL SPEED: _____
PACE SPEED: _____

PM-2

RADAR SPEED DISTRIBUTION SHEET

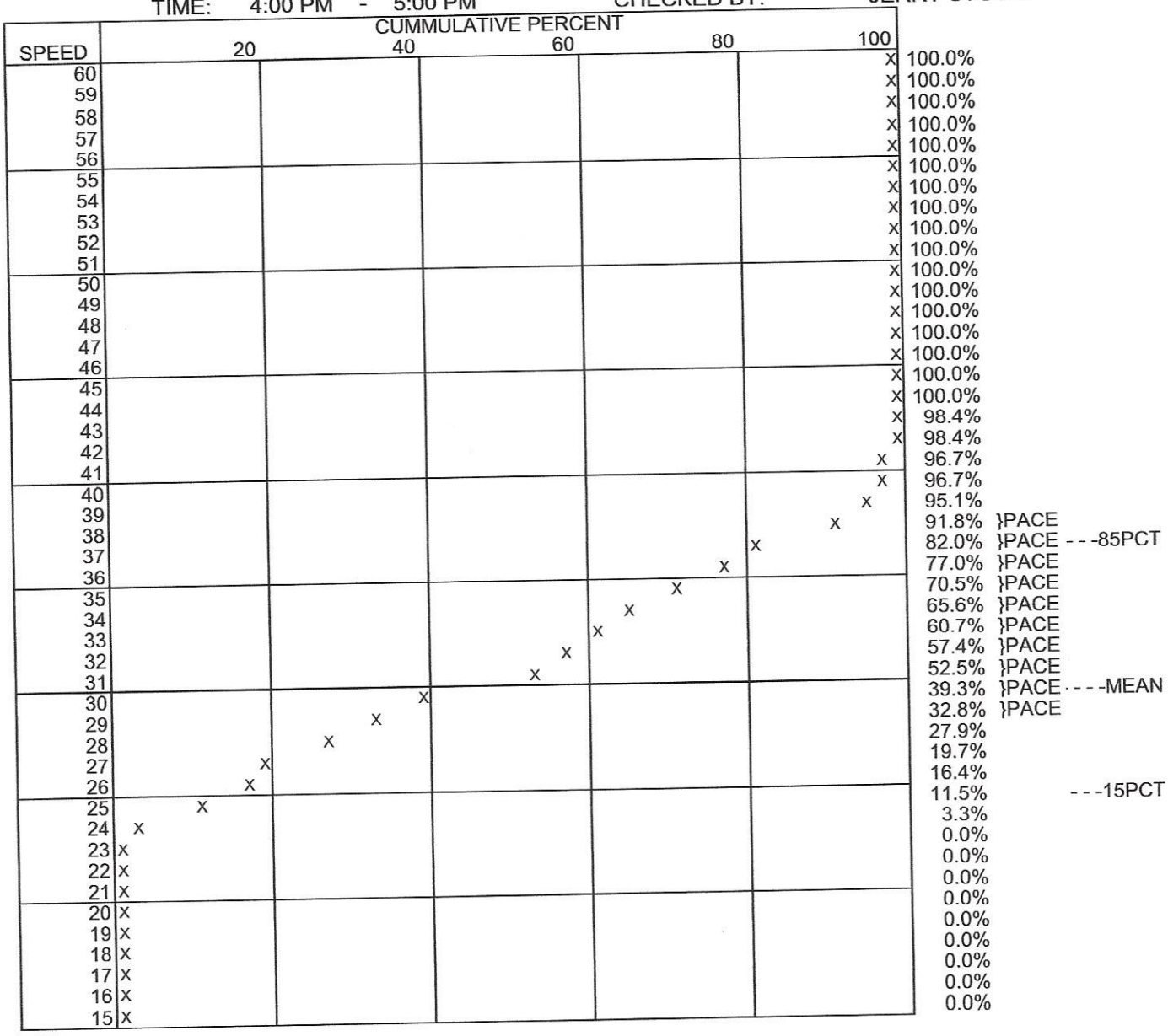
HCI

CITY OF LAGUNA HILLS

BRIDLEWOOD DRIVE — LAUREL CREST DR TO VISTA VIEJO

DATE: 10/24/2019 — SURVEY BY: C. BUENDIA

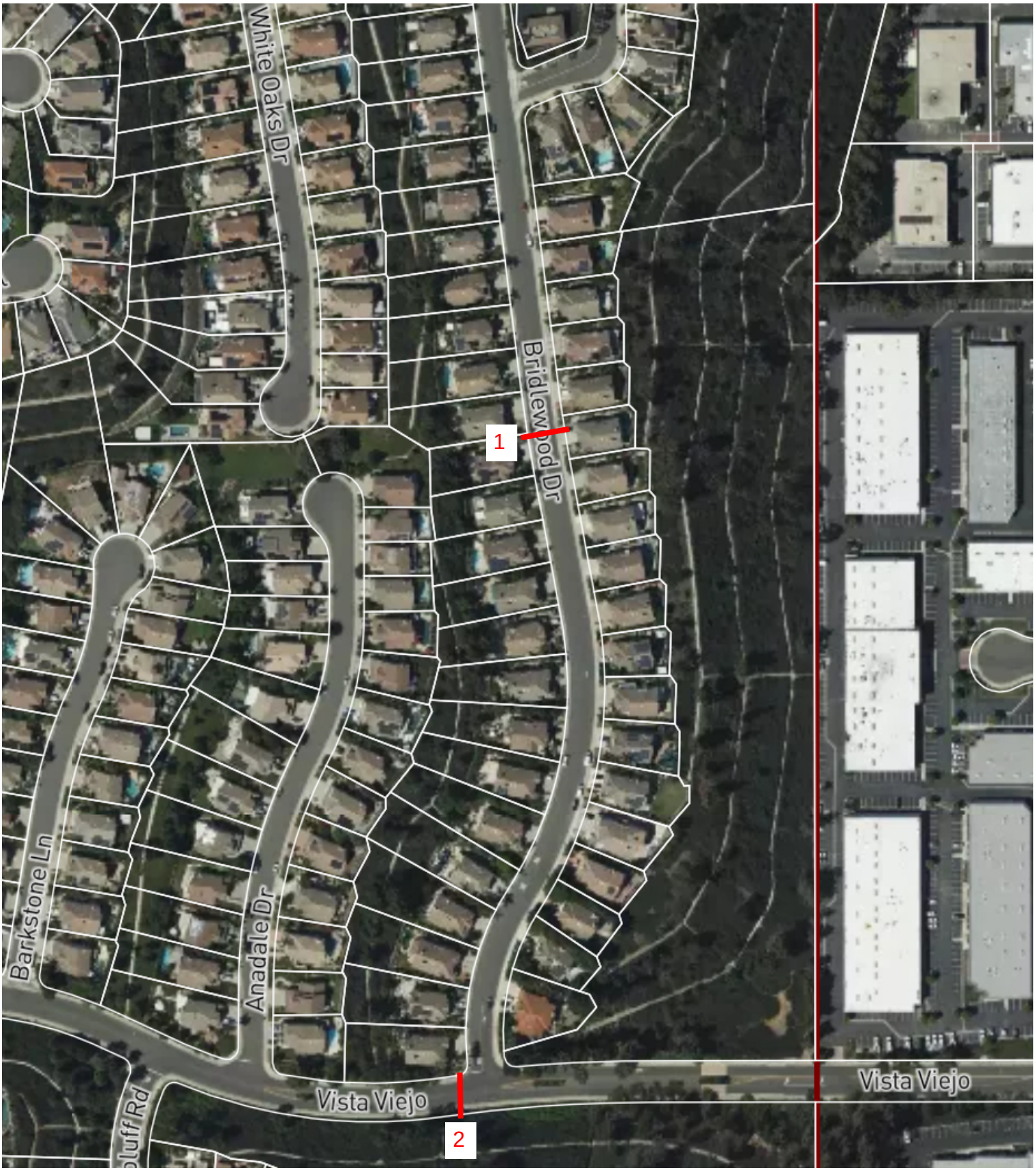
TIME: 4:00 PM - 5:00 PM — CHECKED BY: JERRY STOCK



UPPER LIMIT 10 MPH PACE:	38	MPH	
LOWER LIMIT 10 MPH PACE:	29	MPH	
PERCENT OVER PACE:	8.2	%	
PERCENT IN PACE:	63.9	%	
PERCENT UNDER PACE:	27.9	%	
85th PERCENTILE SPEED:	37.3	MPH	
MEDIAN SPEED:	30.8	MPH	
15th PERCENTILE SPEED:	25.7	MPH	

Bridlewood Spot Spd 2019-PM2

Speed Study Locations



1" = 200 ft	Bridlewood and Vista Viejo	12/23/2024	

This map may represents a visual display of related geographic information. Data provided here on is not guarantee of actual field conditions. To be sure of complete accuracy, please contact the responsible staff for most up-to-date information.

Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Laguna Hills
Bridlewood Drive
N/ Vista Viejo
4 Day Directional Speed Survey

LHS001
Site Code: 241-25007

Northbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/03/25	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	1	4	4	2	0	0	0	0	0	0	0	0	0	11
07:00	0	0	3	9	5	2	0	0	0	0	0	0	0	0	19
08:00	0	2	1	10	15	2	2	0	0	0	0	0	0	0	32
09:00	1	0	4	12	15	2	1	0	0	0	0	0	0	0	35
10:00	1	1	6	10	14	4	2	0	0	0	0	0	0	0	38
11:00	0	2	4	7	16	5	0	0	0	0	0	0	0	0	34
12 PM	2	1	8	15	19	5	2	1	0	0	0	0	0	0	53
13:00	0	1	1	15	18	4	1	0	0	0	0	0	0	0	40
14:00	0	0	5	7	18	12	0	0	0	0	0	0	0	0	42
15:00	0	1	4	13	10	6	1	0	0	0	0	0	0	0	35
16:00	0	2	8	16	12	7	1	0	0	0	0	0	0	0	46
17:00	1	0	7	11	12	5	0	0	0	0	0	0	0	0	36
18:00	0	1	2	7	10	3	1	0	0	0	0	0	0	0	24
19:00	0	1	1	6	4	1	0	0	0	0	0	0	0	0	13
20:00	0	1	5	1	4	2	0	0	0	0	0	0	0	0	13
21:00	0	1	0	3	2	1	1	0	0	0	0	0	0	0	8
22:00	0	1	2	2	3	0	2	0	0	0	0	0	0	0	10
23:00	0	0	0	3	1	1	0	0	0	0	0	0	0	0	5
Total	5	16	65	152	181	62	14	1	0	0	0	0	0	0	496

Daily

15th Percentile :	24 MPH
50th Percentile :	30 MPH
85th Percentile :	35 MPH
95th Percentile :	39 MPH

Statistics

Mean Speed(Average) :	30 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	333
Percent in Pace :	67.1%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Laguna Hills
Bridlewood Drive
N/ Vista Viejo
4 Day Directional Speed Survey

LHS001
Site Code: 241-25007

Northbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/04/25	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
06:00	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
07:00	1	0	1	5	2	1	0	1	0	0	0	0	0	0	11
08:00	2	2	3	5	5	2	0	0	0	0	0	0	0	0	19
09:00	0	0	6	5	6	0	0	0	0	0	0	0	0	0	17
10:00	1	0	6	15	11	3	0	0	0	0	0	0	0	0	36
11:00	0	2	4	6	13	9	0	0	0	0	0	0	0	0	34
12 PM	1	0	3	7	9	3	0	1	0	0	0	0	0	0	24
13:00	2	1	4	15	12	7	2	1	0	0	0	0	0	0	44
14:00	1	0	3	9	9	4	1	0	0	0	0	0	0	0	27
15:00	0	2	2	14	21	4	0	0	0	0	0	0	0	0	43
16:00	2	1	4	9	12	5	2	0	0	0	0	0	0	0	35
17:00	2	0	4	7	5	1	0	0	0	0	0	0	0	0	19
18:00	0	1	3	8	5	4	0	0	0	0	0	0	0	0	21
19:00	2	0	6	6	2	5	0	0	0	0	0	0	0	0	21
20:00	0	2	0	3	6	2	0	1	0	0	0	0	0	0	14
21:00	0	0	0	1	2	0	1	0	0	0	0	0	0	0	4
22:00	1	0	3	1	0	2	0	0	0	0	0	0	0	0	7
23:00	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
Total	15	12	53	118	122	55	6	4	0	0	0	0	0	0	385

Daily

15th Percentile :	22 MPH
50th Percentile :	29 MPH
85th Percentile :	35 MPH
95th Percentile :	39 MPH

Statistics

Mean Speed(Average) :	30 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	240
Percent in Pace :	62.3%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Laguna Hills
Bridlewood Drive
N/ Vista Viejo
4 Day Directional Speed Survey

LHS001
Site Code: 241-25007

Northbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/05/25	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:00	0	0	1	1	1	0	0	0	0	0	0	0	0	0	3
06:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
07:00	0	0	1	3	3	1	0	0	0	0	0	0	0	0	8
08:00	0	0	0	8	7	2	0	1	0	0	0	0	0	0	18
09:00	0	0	1	2	10	6	0	0	0	0	0	0	0	0	19
10:00	0	0	1	1	13	8	0	1	0	0	0	0	0	0	24
11:00	0	0	3	4	9	3	1	0	0	0	0	0	0	0	20
12 PM	0	1	5	8	13	7	0	0	0	0	0	0	0	0	34
13:00	1	1	2	5	11	4	1	0	0	0	0	0	0	0	25
14:00	0	1	5	13	13	5	3	0	0	0	0	0	0	0	40
15:00	0	3	3	10	9	5	0	0	0	0	0	0	0	0	30
16:00	0	2	5	11	9	2	1	0	0	0	0	0	0	0	30
17:00	1	2	5	13	7	6	0	0	0	0	0	0	0	0	34
18:00	1	0	2	8	6	1	0	0	0	0	0	0	0	0	18
19:00	0	2	3	2	2	0	0	0	0	0	0	0	0	0	9
20:00	0	0	0	5	3	1	0	0	0	0	0	0	0	0	9
21:00	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4
22:00	0	1	1	1	0	0	0	0	0	0	0	0	0	0	3
23:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Total	3	13	39	96	120	52	7	2	0	0	0	0	0	0	332

Daily

15th Percentile :	24 MPH
50th Percentile :	30 MPH
85th Percentile :	36 MPH
95th Percentile :	39 MPH

Statistics

Mean Speed(Average) :	31 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	216
Percent in Pace :	65.1%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Laguna Hills
Bridlewood Drive
N/ Vista Viejo
4 Day Directional Speed Survey

LHS001
Site Code: 241-25007

Northbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/06/25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	1	3	1	1	1	0	0	0	0	0	0	0	0	7
07:00	0	0	0	8	13	6	1	0	0	0	0	0	0	0	28
08:00	0	2	2	7	20	4	1	0	0	0	0	0	0	0	36
09:00	0	1	4	10	13	5	0	0	0	0	0	0	0	0	33
10:00	0	0	0	4	14	3	1	1	0	0	0	0	0	0	23
11:00	2	0	0	6	9	5	2	0	0	0	0	0	0	0	24
12 PM	0	0	2	9	12	6	1	0	0	0	0	0	0	0	30
13:00	2	0	4	9	13	8	4	0	0	0	0	0	0	0	40
14:00	0	0	3	11	16	9	4	0	0	0	0	0	0	0	43
15:00	1	0	1	1	12	6	1	0	1	0	0	0	0	0	23
16:00	0	2	4	16	15	6	0	0	0	0	0	0	0	0	43
17:00	0	0	5	16	4	2	2	0	0	0	0	0	0	0	29
18:00	1	0	6	4	11	4	0	0	0	0	0	0	0	0	26
19:00	1	0	7	5	7	2	1	0	0	0	0	0	0	0	23
20:00	0	1	0	2	4	0	0	1	0	0	0	0	0	0	8
21:00	0	0	1	2	1	1	0	1	0	0	0	0	0	0	6
22:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
23:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
Total	7	7	42	112	168	69	18	3	1	0	0	0	0	0	427

Daily

15th Percentile :	25 MPH
50th Percentile :	31 MPH
85th Percentile :	36 MPH
95th Percentile :	40 MPH

Statistics

Mean Speed(Average) :	31 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	280
Percent in Pace :	65.6%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

Counts Unlimited, Inc.
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City of Laguna Hills
Bridlewood Drive
N/ Vista Viejo
4 Day Directional Speed Survey

LHS001
Site Code: 241-25007

Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/03/25	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
01:00	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
07:00	0	1	0	3	3	2	0	0	0	0	0	0	0	0	9
08:00	0	0	1	2	3	1	0	0	0	0	0	0	0	0	7
09:00	6	1	5	8	4	3	1	0	0	0	0	0	0	0	28
10:00	0	3	4	9	4	3	0	0	0	0	0	0	0	0	23
11:00	0	1	4	5	2	0	0	0	0	0	0	0	0	0	12
12 PM	3	1	7	5	6	1	0	0	0	0	0	0	0	0	23
13:00	1	2	4	5	9	2	0	0	0	0	0	0	0	0	23
14:00	2	0	3	6	5	2	1	0	0	0	0	0	0	0	19
15:00	0	4	8	5	9	2	0	0	0	0	0	0	0	0	28
16:00	0	1	2	7	5	2	3	0	0	0	0	0	0	0	20
17:00	2	3	2	5	5	2	0	0	0	0	0	0	0	0	19
18:00	0	1	3	5	7	2	0	0	0	0	0	0	0	0	18
19:00	1	2	0	4	1	0	0	0	0	0	0	0	0	0	8
20:00	1	0	1	1	1	0	0	0	0	0	0	0	0	0	4
21:00	0	0	1	1	0	2	0	0	0	0	0	0	0	0	4
22:00	0	1	1	1	0	0	0	0	0	0	0	0	0	0	3
23:00	0	1	1	1	0	2	0	0	0	0	0	0	0	0	5
Total	16	22	48	74	67	27	5	0	0	0	0	0	0	0	259

Daily

15th Percentile :	20 MPH
50th Percentile :	27 MPH
85th Percentile :	34 MPH
95th Percentile :	38 MPH

Statistics

Mean Speed(Average) :	28 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	141
Percent in Pace :	54.4%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

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City of Laguna Hills
Bridlewood Drive
N/ Vista Viejo
4 Day Directional Speed Survey

LHS001
Site Code: 241-25007

Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/04/25	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
07:00	2	0	1	3	1	3	0	0	0	0	0	0	0	0	10
08:00	1	2	0	0	3	1	0	0	0	0	0	0	0	0	7
09:00	0	1	4	11	0	1	0	0	0	0	0	0	0	0	17
10:00	2	1	5	5	3	0	0	0	0	0	0	0	0	0	16
11:00	1	0	3	8	2	2	0	0	0	0	0	0	0	0	16
12 PM	0	0	5	4	2	3	0	0	0	0	0	0	0	0	14
13:00	3	5	4	6	2	3	0	0	0	0	0	0	0	0	23
14:00	0	1	3	5	9	5	1	0	0	0	0	0	0	0	24
15:00	1	1	4	4	5	4	0	0	0	0	0	0	0	0	19
16:00	0	2	4	1	5	1	2	0	0	0	0	0	0	0	15
17:00	0	0	4	5	2	0	0	0	0	0	0	0	0	0	11
18:00	0	0	0	8	2	2	0	0	0	0	0	0	0	0	12
19:00	0	0	2	6	2	0	0	0	0	0	0	0	0	0	10
20:00	1	0	0	2	2	2	0	0	0	0	0	0	0	0	7
21:00	0	0	1	2	2	0	0	0	0	0	0	0	0	0	5
22:00	1	0	1	2	2	1	0	0	0	0	0	0	0	0	7
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	13	13	41	74	44	28	3	0	0	0	0	0	0	0	216

Daily

15th Percentile :	20 MPH
50th Percentile :	27 MPH
85th Percentile :	34 MPH
95th Percentile :	38 MPH

Statistics

Mean Speed(Average) :	28 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	118
Percent in Pace :	54.6%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

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City of Laguna Hills
Bridlewood Drive
N/ Vista Viejo
4 Day Directional Speed Survey

LHS001
Site Code: 241-25007

Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/05/25	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
07:00	1	0	1	1	1	0	0	0	0	0	0	0	0	0	4
08:00	2	0	1	2	1	0	0	0	0	0	0	0	0	0	6
09:00	0	0	0	2	5	0	0	0	0	0	0	0	0	0	7
10:00	0	0	1	4	0	3	0	0	0	0	0	0	0	0	8
11:00	1	0	2	3	6	0	1	0	1	0	0	0	0	0	14
12 PM	1	0	1	5	4	4	0	0	0	0	0	0	0	0	15
13:00	0	0	2	4	6	0	1	0	0	0	0	0	0	0	13
14:00	1	3	1	6	6	1	0	0	0	0	0	0	0	0	18
15:00	1	2	4	6	3	2	0	0	0	0	0	0	0	0	18
16:00	0	2	1	5	10	4	0	0	0	0	0	0	0	0	22
17:00	1	1	2	5	3	1	0	0	0	0	0	0	0	0	13
18:00	1	1	0	1	1	0	0	0	0	0	0	0	0	0	4
19:00	0	0	0	2	2	1	0	0	0	0	0	0	0	0	5
20:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
21:00	0	0	0	1	0	0	1	0	0	0	0	0	0	0	2
22:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	10	9	18	47	51	17	4	0	1	0	0	0	0	0	157

Daily

15th Percentile :	21 MPH
50th Percentile :	29 MPH
85th Percentile :	34 MPH
95th Percentile :	39 MPH

Statistics

Mean Speed(Average) :	29 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	98
Percent in Pace :	62.4%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

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City of Laguna Hills
Bridlewood Drive
N/ Vista Viejo
4 Day Directional Speed Survey

LHS001
Site Code: 241-25007

Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/06/25	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
05:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
06:00	1	0	0	0	1	2	0	0	0	0	0	0	0	0	4
07:00	2	2	0	3	3	2	0	0	0	0	0	0	0	0	12
08:00	0	0	3	4	5	3	0	0	0	0	0	0	0	0	15
09:00	0	0	1	4	8	1	2	0	0	0	0	0	0	0	16
10:00	0	2	4	5	6	2	0	0	0	0	0	0	0	0	19
11:00	2	0	3	4	3	2	0	0	0	0	0	0	0	0	14
12 PM	0	0	0	3	9	5	1	0	0	0	0	0	0	0	18
13:00	0	2	1	6	11	4	1	0	0	0	0	0	0	0	25
14:00	0	2	5	3	6	2	1	0	0	0	0	0	0	0	19
15:00	1	0	2	5	3	0	0	0	0	0	0	0	0	0	11
16:00	0	1	5	13	7	2	1	0	0	0	0	0	0	0	29
17:00	0	2	6	5	7	2	1	0	0	0	0	0	0	0	23
18:00	0	2	2	4	6	2	0	1	0	0	0	0	0	0	17
19:00	1	1	1	4	3	0	0	0	0	0	0	0	0	0	10
20:00	0	0	1	0	0	2	0	0	0	0	0	0	0	0	3
21:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
22:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	7	15	34	64	79	32	8	1	0	0	0	0	0	0	240

Daily

15th Percentile :	22 MPH
50th Percentile :	29 MPH
85th Percentile :	35 MPH
95th Percentile :	39 MPH

Statistics

Mean Speed(Average) :	30 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	143
Percent in Pace :	59.6%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

Counts Unlimited, Inc.

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City of Laguna Hills
Bridlewood Drive
N/ Vista Viejo
4 Day Directional Speed Survey

LHS001
Site Code: 241-25007

Northbound, Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/03/25	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
01:00	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
02:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	1	5	5	2	0	0	0	0	0	0	0	0	0	13
07:00	0	1	3	12	8	4	0	0	0	0	0	0	0	0	28
08:00	0	2	2	12	18	3	2	0	0	0	0	0	0	0	39
09:00	7	1	9	20	19	5	2	0	0	0	0	0	0	0	63
10:00	1	4	10	19	18	7	2	0	0	0	0	0	0	0	61
11:00	0	3	8	12	18	5	0	0	0	0	0	0	0	0	46
12 PM	5	2	15	20	25	6	2	1	0	0	0	0	0	0	76
13:00	1	3	5	20	27	6	1	0	0	0	0	0	0	0	63
14:00	2	0	8	13	23	14	1	0	0	0	0	0	0	0	61
15:00	0	5	12	18	19	8	1	0	0	0	0	0	0	0	63
16:00	0	3	10	23	17	9	4	0	0	0	0	0	0	0	66
17:00	3	3	9	16	17	7	0	0	0	0	0	0	0	0	55
18:00	0	2	5	12	17	5	1	0	0	0	0	0	0	0	42
19:00	1	3	1	10	5	1	0	0	0	0	0	0	0	0	21
20:00	1	1	6	2	5	2	0	0	0	0	0	0	0	0	17
21:00	0	1	1	4	2	3	1	0	0	0	0	0	0	0	12
22:00	0	2	3	3	3	0	2	0	0	0	0	0	0	0	13
23:00	0	1	1	4	1	3	0	0	0	0	0	0	0	0	10
Total	21	38	113	226	248	89	19	1	0	0	0	0	0	0	755

Daily

15th Percentile :	22 MPH
50th Percentile :	29 MPH
85th Percentile :	34 MPH
95th Percentile :	39 MPH

Statistics

Mean Speed(Average) :	29 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	474
Percent in Pace :	62.8%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

Counts Unlimited, Inc.

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City of Laguna Hills
Bridlewood Drive
N/ Vista Viejo
4 Day Directional Speed Survey

LHS001
Site Code: 241-25007

Northbound, Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/04/25	1	0	0	0	0	2	0	0	0	0	0	0	0	0	3
01:00	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2
02:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
06:00	0	0	0	2	1	0	0	0	0	0	0	0	0	0	3
07:00	3	0	2	8	3	4	0	1	0	0	0	0	0	0	21
08:00	3	4	3	5	8	3	0	0	0	0	0	0	0	0	26
09:00	0	1	10	16	6	1	0	0	0	0	0	0	0	0	34
10:00	3	1	11	20	14	3	0	0	0	0	0	0	0	0	52
11:00	1	2	7	14	15	11	0	0	0	0	0	0	0	0	50
12 PM	1	0	8	11	11	6	0	1	0	0	0	0	0	0	38
13:00	5	6	8	21	14	10	2	1	0	0	0	0	0	0	67
14:00	1	1	6	14	18	9	2	0	0	0	0	0	0	0	51
15:00	1	3	6	18	26	8	0	0	0	0	0	0	0	0	62
16:00	2	3	8	10	17	6	4	0	0	0	0	0	0	0	50
17:00	2	0	8	12	7	1	0	0	0	0	0	0	0	0	30
18:00	0	1	3	16	7	6	0	0	0	0	0	0	0	0	33
19:00	2	0	8	12	4	5	0	0	0	0	0	0	0	0	31
20:00	1	2	0	5	8	4	0	1	0	0	0	0	0	0	21
21:00	0	0	1	3	4	0	1	0	0	0	0	0	0	0	9
22:00	2	0	4	3	2	3	0	0	0	0	0	0	0	0	14
23:00	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
Total	28	25	94	192	166	83	9	4	0	0	0	0	0	0	601

Daily

15th Percentile :	21 MPH
50th Percentile :	28 MPH
85th Percentile :	35 MPH
95th Percentile :	38 MPH

Statistics

Mean Speed(Average) :	29 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	358
Percent in Pace :	59.6%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

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City of Laguna Hills
Bridlewood Drive
N/ Vista Viejo
4 Day Directional Speed Survey

LHS001
Site Code: 241-25007

Northbound, Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/05/25	0	0	1	0	1	1	0	0	0	0	0	0	0	0	3
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
05:00	0	0	1	1	1	0	0	0	0	0	0	0	0	0	3
06:00	0	0	1	0	1	0	1	0	0	0	0	0	0	0	3
07:00	1	0	2	4	4	1	0	0	0	0	0	0	0	0	12
08:00	2	0	1	10	8	2	0	1	0	0	0	0	0	0	24
09:00	0	0	1	4	15	6	0	0	0	0	0	0	0	0	26
10:00	0	0	2	5	13	11	0	1	0	0	0	0	0	0	32
11:00	1	0	5	7	15	3	2	0	1	0	0	0	0	0	34
12 PM	1	1	6	13	17	11	0	0	0	0	0	0	0	0	49
13:00	1	1	4	9	17	4	2	0	0	0	0	0	0	0	38
14:00	1	4	6	19	19	6	3	0	0	0	0	0	0	0	58
15:00	1	5	7	16	12	7	0	0	0	0	0	0	0	0	48
16:00	0	4	6	16	19	6	1	0	0	0	0	0	0	0	52
17:00	2	3	7	18	10	7	0	0	0	0	0	0	0	0	47
18:00	2	1	2	9	7	1	0	0	0	0	0	0	0	0	22
19:00	0	2	3	4	4	1	0	0	0	0	0	0	0	0	14
20:00	0	0	0	5	4	2	0	0	0	0	0	0	0	0	11
21:00	0	0	0	1	4	0	1	0	0	0	0	0	0	0	6
22:00	1	1	1	1	0	0	0	0	0	0	0	0	0	0	4
23:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Total	13	22	57	143	171	69	11	2	1	0	0	0	0	0	489

Daily

15th Percentile :	23 MPH
50th Percentile :	30 MPH
85th Percentile :	35 MPH
95th Percentile :	39 MPH

Statistics

Mean Speed(Average) :	30 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	314
Percent in Pace :	64.2%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

Counts Unlimited, Inc.

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City of Laguna Hills
Bridlewood Drive
N/ Vista Viejo
4 Day Directional Speed Survey

LHS001
Site Code: 241-25007

Northbound, Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/06/25	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	2	0	1	0	0	0	0	0	0	0	3
05:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
06:00	1	1	3	1	2	3	0	0	0	0	0	0	0	0	11
07:00	2	2	0	11	16	8	1	0	0	0	0	0	0	0	40
08:00	0	2	5	11	25	7	1	0	0	0	0	0	0	0	51
09:00	0	1	5	14	21	6	2	0	0	0	0	0	0	0	49
10:00	0	2	4	9	20	5	1	1	0	0	0	0	0	0	42
11:00	4	0	3	10	12	7	2	0	0	0	0	0	0	0	38
12 PM	0	0	2	12	21	11	2	0	0	0	0	0	0	0	48
13:00	2	2	5	15	24	12	5	0	0	0	0	0	0	0	65
14:00	0	2	8	14	22	11	5	0	0	0	0	0	0	0	62
15:00	2	0	3	6	15	6	1	0	1	0	0	0	0	0	34
16:00	0	3	9	29	22	8	1	0	0	0	0	0	0	0	72
17:00	0	2	11	21	11	4	3	0	0	0	0	0	0	0	52
18:00	1	2	8	8	17	6	0	1	0	0	0	0	0	0	43
19:00	2	1	8	9	10	2	1	0	0	0	0	0	0	0	33
20:00	0	1	1	2	4	2	0	1	0	0	0	0	0	0	11
21:00	0	0	1	2	1	2	0	1	0	0	0	0	0	0	7
22:00	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
23:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
Total	14	22	76	176	247	101	26	4	1	0	0	0	0	0	667

Daily

15th Percentile :	24 MPH
50th Percentile :	30 MPH
85th Percentile :	36 MPH
95th Percentile :	39 MPH

Statistics

Mean Speed(Average) :	31 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	423
Percent in Pace :	63.4%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

Counts Unlimited, Inc.

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City of Laguna Hills
Vista Viejo
W/ Bridlewood Drive
4 Day Directional Speed Survey

LHS002
Site Code: 241-25007

Eastbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/03/25	0	0	1	1	2	1	0	0	0	0	0	0	0	0	5
01:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
02:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
03:00	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
04:00	0	0	0	1	0	2	0	1	0	0	0	0	0	0	4
05:00	0	0	1	2	1	3	0	1	0	0	0	0	0	0	8
06:00	1	0	2	9	19	4	1	0	0	0	0	0	0	0	36
07:00	1	2	11	18	15	9	2	0	0	0	0	0	0	0	58
08:00	0	3	16	23	23	20	3	2	1	0	0	0	0	0	91
09:00	1	2	19	25	32	18	6	1	0	0	0	0	0	0	104
10:00	1	6	23	26	40	16	3	0	0	0	0	0	0	0	115
11:00	1	3	18	24	38	12	10	0	0	0	0	0	0	0	106
12 PM	3	7	18	28	43	12	1	0	0	0	0	0	0	0	112
13:00	1	9	19	24	34	17	3	1	0	0	0	0	0	0	108
14:00	1	4	16	30	29	16	4	0	0	0	0	0	0	0	100
15:00	1	5	8	23	30	22	3	0	0	0	0	0	0	0	92
16:00	0	5	26	18	28	11	0	1	0	0	0	0	0	0	89
17:00	0	5	19	14	30	16	5	0	0	0	0	0	0	0	89
18:00	0	2	10	15	22	13	4	0	0	0	0	0	0	0	66
19:00	0	4	6	6	20	6	3	1	0	0	0	0	0	0	46
20:00	0	1	8	3	11	4	2	0	1	0	0	0	0	0	30
21:00	0	0	3	5	7	7	2	0	0	0	0	0	0	0	24
22:00	0	0	6	2	11	3	0	0	0	0	0	0	0	0	22
23:00	0	2	2	5	6	4	1	0	0	0	0	0	0	0	20
Total	11	60	232	304	442	217	54	8	2	0	0	0	0	0	1330

Daily

15th Percentile :	22 MPH
50th Percentile :	30 MPH
85th Percentile :	36 MPH
95th Percentile :	39 MPH

Statistics

Mean Speed(Average) :	31 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	746
Percent in Pace :	56.1%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

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City of Laguna Hills
Vista Viejo
W/ Bridlewood Drive
4 Day Directional Speed Survey

LHS002
Site Code: 241-25007

Eastbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/04/25	0	0	0	1	1	1	0	1	0	0	0	0	0	0	4
01:00	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
02:00	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2
03:00	0	0	1	0	0	1	0	1	0	0	0	0	0	0	3
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	3	4	0	0	0	0	0	0	0	0	0	7
06:00	0	0	2	3	5	4	0	1	0	0	0	0	0	0	15
07:00	0	2	4	5	11	7	2	0	0	0	0	0	0	0	31
08:00	0	2	9	11	26	20	6	1	0	0	0	0	0	0	75
09:00	0	4	9	22	28	14	7	0	0	0	0	0	0	0	84
10:00	0	8	16	20	32	27	6	1	0	0	0	0	0	0	110
11:00	0	3	16	24	36	18	3	2	0	0	0	0	0	0	102
12 PM	0	3	12	17	27	22	6	0	0	0	0	0	0	0	87
13:00	0	3	12	25	33	24	6	0	0	0	0	0	0	0	103
14:00	0	4	10	25	25	14	5	0	0	0	0	0	0	0	83
15:00	2	5	15	24	16	20	2	0	0	0	0	0	0	0	84
16:00	1	3	15	31	24	11	3	0	0	0	0	0	0	0	88
17:00	1	5	10	17	28	10	4	0	0	0	0	0	0	0	75
18:00	0	2	9	8	18	11	7	0	0	0	0	0	0	0	55
19:00	0	0	5	13	22	9	2	1	0	0	0	0	0	0	52
20:00	1	0	7	8	17	5	0	0	0	0	0	0	0	0	38
21:00	0	1	6	10	8	3	1	0	0	0	0	0	0	0	29
22:00	1	0	3	5	6	4	0	0	0	0	0	0	0	0	19
23:00	0	1	1	2	2	1	0	0	0	0	0	0	0	0	7
Total	6	46	163	275	370	227	60	8	0	0	0	0	0	0	1155

Daily

15th Percentile :	23 MPH
50th Percentile :	31 MPH
85th Percentile :	37 MPH
95th Percentile :	40 MPH

Statistics

Mean Speed(Average) :	31 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	645
Percent in Pace :	55.8%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

Counts Unlimited, Inc.

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City of Laguna Hills
Vista Viejo
W/ Bridlewood Drive
4 Day Directional Speed Survey

LHS002
Site Code: 241-25007

Eastbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/05/25	0	0	1	1	4	3	1	0	0	0	0	0	0	0	10
01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
03:00	0	1	0	0	4	0	2	0	0	0	0	0	0	0	7
04:00	0	0	1	1	1	1	0	0	0	0	0	0	0	0	4
05:00	0	0	1	3	3	0	0	0	0	0	0	0	0	0	7
06:00	0	0	1	4	4	2	2	0	0	0	0	0	0	0	13
07:00	0	1	4	13	10	6	2	1	0	0	0	0	0	0	37
08:00	0	1	11	13	9	11	2	0	0	0	0	0	0	0	47
09:00	0	1	11	18	17	23	3	0	0	0	0	0	0	0	73
10:00	0	0	9	27	31	30	14	0	0	0	0	0	0	0	111
11:00	0	0	7	20	24	18	1	1	0	0	0	0	0	0	71
12 PM	1	5	7	28	26	11	9	0	0	0	0	0	0	0	87
13:00	1	4	10	23	24	15	5	0	0	0	0	0	0	0	82
14:00	1	1	17	26	25	18	3	0	0	0	0	0	0	0	91
15:00	0	3	15	18	25	16	3	0	0	0	0	0	0	0	80
16:00	2	1	23	12	24	10	4	0	0	0	0	0	0	0	76
17:00	0	3	14	23	29	13	3	0	0	0	0	0	0	0	85
18:00	0	1	8	12	20	5	3	0	1	0	0	0	0	0	50
19:00	1	0	2	7	16	13	3	1	0	0	0	0	0	0	43
20:00	0	0	2	14	7	1	3	0	0	0	0	0	0	0	27
21:00	0	0	3	3	6	5	1	0	0	0	0	0	0	0	18
22:00	0	0	0	1	4	1	1	0	0	0	0	0	0	0	7
23:00	0	0	1	0	2	2	0	0	0	0	0	0	0	0	5
Total	6	22	148	267	315	207	65	3	1	0	0	0	0	0	1034

Daily

15th Percentile :	24 MPH
50th Percentile :	31 MPH
85th Percentile :	37 MPH
95th Percentile :	41 MPH

Statistics

Mean Speed(Average) :	32 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	582
Percent in Pace :	56.3%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

Counts Unlimited, Inc.

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City of Laguna Hills
Vista Viejo
W/ Bridlewood Drive
4 Day Directional Speed Survey

LHS002
Site Code: 241-25007

Eastbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/06/25	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
01:00	0	0	1	0	1	1	0	0	0	0	0	0	0	0	3
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
04:00	0	0	2	4	4	4	0	0	0	0	0	0	0	0	14
05:00	0	0	0	5	7	6	0	0	0	0	0	0	0	0	18
06:00	0	1	2	14	20	7	3	1	0	0	0	0	0	0	48
07:00	0	2	17	20	35	25	9	1	0	0	0	0	0	0	109
08:00	0	1	17	27	38	27	9	0	0	0	0	0	0	0	119
09:00	0	2	7	26	26	26	8	0	0	0	0	0	0	0	95
10:00	0	1	11	14	29	21	9	1	0	0	0	0	0	0	86
11:00	0	2	8	11	28	17	5	2	0	0	0	0	0	0	73
12 PM	0	2	6	21	29	20	5	0	0	0	0	0	0	0	83
13:00	0	6	15	24	26	16	5	0	0	0	0	0	0	0	92
14:00	0	3	15	28	42	21	5	0	0	0	0	0	0	0	114
15:00	0	3	13	17	30	21	7	1	0	0	0	0	0	0	92
16:00	0	7	8	38	32	14	2	0	0	0	0	0	0	0	101
17:00	1	3	9	29	22	19	5	0	0	0	0	0	0	0	88
18:00	0	2	8	20	24	13	2	0	0	0	0	0	0	0	69
19:00	1	1	11	8	21	6	1	0	0	0	0	0	0	0	49
20:00	0	1	4	10	10	4	0	0	0	0	0	0	0	0	29
21:00	0	0	1	4	5	1	0	0	0	0	0	0	0	0	11
22:00	0	0	0	2	2	3	0	0	0	0	0	0	0	0	7
23:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Total	2	37	155	324	432	272	75	6	0	0	0	0	0	0	1303

Daily

15th Percentile :	25 MPH
50th Percentile :	31 MPH
85th Percentile :	37 MPH
95th Percentile :	41 MPH

Statistics

Mean Speed(Average) :	32 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	756
Percent in Pace :	58.0%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

Counts Unlimited, Inc.

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City of Laguna Hills
Vista Viejo
W/ Bridlewood Drive
4 Day Directional Speed Survey

LHS002
Site Code: 241-25007

Westbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/03/25	0	1	2	3	3	1	0	0	0	0	0	0	0	0	10
01:00	0	1	1	0	1	0	0	0	0	0	0	0	0	0	3
02:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	1	0	1	1	0	0	0	0	0	0	0	0	0	3
06:00	1	0	3	4	1	2	0	0	0	0	0	0	0	0	11
07:00	1	5	8	8	3	0	0	0	0	0	0	0	0	0	25
08:00	1	1	15	21	6	0	0	0	0	0	0	0	0	0	44
09:00	8	10	38	24	6	0	0	0	0	0	0	0	0	0	86
10:00	1	12	26	25	9	0	0	0	0	0	0	0	0	0	73
11:00	2	7	32	20	7	1	0	0	0	0	0	0	0	0	69
12 PM	3	7	26	17	9	1	0	0	0	0	0	0	0	0	63
13:00	3	14	30	28	18	0	0	0	0	0	0	0	0	0	93
14:00	3	4	9	34	22	15	0	0	0	0	0	0	0	0	87
15:00	1	4	11	31	25	8	1	0	0	0	0	0	0	0	81
16:00	0	4	10	39	31	5	3	0	0	0	0	0	0	1	93
17:00	1	1	13	30	36	5	1	0	0	0	0	0	0	0	87
18:00	0	1	18	31	28	4	1	0	0	0	0	0	0	0	83
19:00	1	1	7	14	29	7	6	0	0	0	0	0	0	0	65
20:00	1	2	8	12	21	7	1	0	0	0	0	0	0	0	52
21:00	0	0	7	14	10	2	0	0	0	0	0	0	0	0	33
22:00	0	1	7	10	12	6	0	0	0	0	0	0	0	0	36
23:00	0	1	5	6	5	2	1	0	0	0	0	0	0	0	20
Total	27	78	276	372	285	66	14	0	0	0	0	0	0	1	1119

Daily

15th Percentile :	21 MPH
50th Percentile :	27 MPH
85th Percentile :	33 MPH
95th Percentile :	36 MPH

Statistics

Mean Speed(Average) :	28 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	657
Percent in Pace :	58.7%
Number of Vehicles > 55 MPH :	1
Percent of Vehicles > 55 MPH :	0.1%

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City of Laguna Hills
Vista Viejo
W/ Bridlewood Drive
4 Day Directional Speed Survey

LHS002
Site Code: 241-25007

Westbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/04/25	0	0	1	0	8	1	1	0	0	0	0	0	0	0	11
01:00	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3
02:00	0	1	1	1	1	0	0	0	0	0	0	0	0	0	4
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
05:00	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4
06:00	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2
07:00	1	3	4	6	4	2	0	0	0	0	0	0	0	0	20
08:00	2	1	5	7	5	3	0	0	0	0	0	0	0	0	23
09:00	2	9	11	17	14	2	2	0	0	0	0	0	0	0	57
10:00	0	1	8	30	25	5	0	0	0	0	0	0	0	0	69
11:00	0	4	11	20	23	8	0	0	0	0	0	0	0	0	66
12 PM	0	2	12	31	23	5	1	0	0	0	0	0	0	0	74
13:00	0	11	12	34	32	8	0	0	0	0	0	0	0	0	97
14:00	0	6	11	38	22	7	0	0	0	0	0	0	0	0	84
15:00	0	5	9	21	22	9	0	0	0	0	0	0	0	0	66
16:00	5	4	10	25	17	8	0	0	0	0	0	0	0	0	69
17:00	1	1	6	28	22	8	1	0	0	0	0	0	0	0	67
18:00	0	4	14	21	20	6	1	0	0	0	0	0	0	0	66
19:00	0	1	8	29	31	7	1	0	0	0	0	0	0	0	77
20:00	0	2	10	19	18	3	0	0	0	0	0	0	0	0	52
21:00	0	1	5	8	9	2	1	0	0	0	0	0	0	0	26
22:00	0	1	1	12	8	2	0	0	0	0	0	0	0	0	24
23:00	0	0	2	4	8	2	0	0	0	0	0	0	0	0	16
Total	12	57	142	351	320	88	8	0	0	0	0	0	0	0	978

Daily

15th Percentile :	22 MPH
50th Percentile :	28 MPH
85th Percentile :	34 MPH
95th Percentile :	37 MPH

Statistics

Mean Speed(Average) :	29 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	671
Percent in Pace :	68.6%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

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City of Laguna Hills
Vista Viejo
W/ Bridlewood Drive
4 Day Directional Speed Survey

LHS002
Site Code: 241-25007

Westbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/05/25	0	1	0	2	3	0	0	0	0	0	0	0	0	0	6
01:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
02:00	0	0	1	3	1	0	0	0	0	0	0	0	0	0	5
03:00	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2
04:00	0	1	1	1	1	0	0	0	0	0	0	0	0	0	4
05:00	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2
06:00	0	0	0	2	2	1	0	0	0	0	0	0	0	0	5
07:00	0	2	1	2	3	1	1	0	0	0	0	0	0	0	10
08:00	0	2	5	10	8	1	0	0	0	0	0	0	0	0	26
09:00	0	2	4	7	8	8	0	0	0	0	0	0	0	0	29
10:00	0	2	3	17	22	6	2	0	0	0	0	0	0	0	52
11:00	0	2	12	24	13	3	2	0	0	0	0	0	0	0	56
12 PM	0	8	9	26	30	4	4	0	0	0	0	0	0	0	81
13:00	0	1	7	31	22	12	0	0	0	0	0	0	0	0	73
14:00	0	4	10	28	27	8	0	0	0	0	0	0	0	0	77
15:00	0	4	13	20	18	4	3	0	0	0	0	0	0	0	62
16:00	2	5	9	33	37	4	0	0	0	0	0	0	0	0	90
17:00	0	1	10	23	29	8	0	0	0	0	0	0	0	0	71
18:00	0	0	5	19	26	7	0	1	0	0	0	0	0	0	58
19:00	0	1	7	25	22	6	1	0	0	0	0	0	0	0	62
20:00	0	1	2	14	8	5	1	0	0	0	0	0	0	0	31
21:00	0	2	1	8	10	1	0	0	0	0	0	0	0	0	22
22:00	0	0	0	7	7	2	0	0	0	0	0	0	0	0	16
23:00	0	0	0	6	6	1	0	0	0	0	0	0	0	0	13
Total	2	39	101	309	305	83	14	1	0	0	0	0	0	0	854

Daily

15th Percentile :	24 MPH
50th Percentile :	29 MPH
85th Percentile :	34 MPH
95th Percentile :	38 MPH

Statistics

Mean Speed(Average) :	30 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	614
Percent in Pace :	71.9%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

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City of Laguna Hills
Vista Viejo
W/ Bridlewood Drive
4 Day Directional Speed Survey

LHS002
Site Code: 241-25007

Westbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/06/25	0	0	0	3	2	1	0	0	0	0	0	0	0	0	6
01:00	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
05:00	0	0	2	4	1	0	0	0	0	0	0	0	0	0	7
06:00	0	1	0	4	4	0	0	0	0	0	0	0	0	0	9
07:00	2	0	6	11	10	6	0	0	0	0	0	0	0	0	35
08:00	1	4	9	20	19	5	0	0	0	0	0	0	0	0	58
09:00	1	5	10	15	19	9	1	0	0	0	0	0	0	0	60
10:00	1	3	8	28	25	5	0	0	0	0	0	0	0	0	70
11:00	0	2	11	17	15	6	2	0	0	0	0	0	0	0	53
12 PM	1	4	12	19	29	5	0	0	0	0	0	0	0	0	70
13:00	0	3	7	24	26	6	2	0	0	0	0	0	0	0	68
14:00	0	3	16	22	27	8	1	0	0	0	0	0	0	0	77
15:00	1	4	17	28	33	11	1	0	0	0	0	0	0	0	95
16:00	0	7	20	38	27	7	1	0	0	0	0	0	0	0	100
17:00	0	4	17	63	33	6	0	0	0	0	0	0	0	0	123
18:00	1	1	13	41	31	8	0	0	0	0	0	0	0	0	95
19:00	0	1	11	20	25	7	0	0	0	0	0	0	0	0	64
20:00	0	0	6	16	20	6	0	0	0	0	0	0	0	0	48
21:00	0	0	4	11	9	3	0	0	0	0	0	0	0	0	27
22:00	0	1	3	4	8	1	0	0	0	0	0	0	0	0	17
23:00	0	0	1	2	0	0	1	0	0	0	0	0	0	0	4
Total	8	43	174	393	363	100	9	0	0	0	0	0	0	0	1090

Daily

15th Percentile :	23 MPH
50th Percentile :	29 MPH
85th Percentile :	34 MPH
95th Percentile :	37 MPH

Statistics

Mean Speed(Average) :	29 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	756
Percent in Pace :	69.4%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

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City of Laguna Hills
Vista Viejo
W/ Bridlewood Drive
4 Day Directional Speed Survey

LHS002
Site Code: 241-25007

Eastbound, Westbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/03/25	0	1	3	4	5	2	0	0	0	0	0	0	0	0	15
01:00	0	1	1	0	1	0	1	0	0	0	0	0	0	0	4
02:00	0	0	0	0	2	1	0	0	0	0	0	0	0	0	3
03:00	0	0	0	2	1	0	0	0	0	0	0	0	0	0	3
04:00	0	0	0	1	0	2	0	1	0	0	0	0	0	0	4
05:00	0	1	1	3	2	3	0	1	0	0	0	0	0	0	11
06:00	2	0	5	13	20	6	1	0	0	0	0	0	0	0	47
07:00	2	7	19	26	18	9	2	0	0	0	0	0	0	0	83
08:00	1	4	31	44	29	20	3	2	1	0	0	0	0	0	135
09:00	9	12	57	49	38	18	6	1	0	0	0	0	0	0	190
10:00	2	18	49	51	49	16	3	0	0	0	0	0	0	0	188
11:00	3	10	50	44	45	13	10	0	0	0	0	0	0	0	175
12 PM	6	14	44	45	52	13	1	0	0	0	0	0	0	0	175
13:00	4	23	49	52	52	17	3	1	0	0	0	0	0	0	201
14:00	4	8	25	64	51	31	4	0	0	0	0	0	0	0	187
15:00	2	9	19	54	55	30	4	0	0	0	0	0	0	0	173
16:00	0	9	36	57	59	16	3	1	0	0	0	0	0	1	182
17:00	1	6	32	44	66	21	6	0	0	0	0	0	0	0	176
18:00	0	3	28	46	50	17	5	0	0	0	0	0	0	0	149
19:00	1	5	13	20	49	13	9	1	0	0	0	0	0	0	111
20:00	1	3	16	15	32	11	3	0	1	0	0	0	0	0	82
21:00	0	0	10	19	17	9	2	0	0	0	0	0	0	0	57
22:00	0	1	13	12	23	9	0	0	0	0	0	0	0	0	58
23:00	0	3	7	11	11	6	2	0	0	0	0	0	0	0	40
Total	38	138	508	676	727	283	68	8	2	0	0	0	0	1	2449

Daily

15th Percentile :	21 MPH
50th Percentile :	28 MPH
85th Percentile :	34 MPH
95th Percentile :	39 MPH

Statistics

Mean Speed(Average) :	29 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	1403
Percent in Pace :	57.3%
Number of Vehicles > 55 MPH :	1
Percent of Vehicles > 55 MPH :	0.0%

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City of Laguna Hills
Vista Viejo
W/ Bridlewood Drive
4 Day Directional Speed Survey

LHS002
Site Code: 241-25007

Eastbound, Westbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/04/25	0	0	1	1	9	2	1	1	0	0	0	0	0	0	15
01:00	0	0	0	1	4	0	0	0	0	0	0	0	0	0	5
02:00	0	1	2	1	1	1	0	0	0	0	0	0	0	0	6
03:00	0	0	1	0	0	1	0	1	0	0	0	0	0	0	3
04:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
05:00	0	0	0	3	8	0	0	0	0	0	0	0	0	0	11
06:00	1	0	3	3	5	4	0	1	0	0	0	0	0	0	17
07:00	1	5	8	11	15	9	2	0	0	0	0	0	0	0	51
08:00	2	3	14	18	31	23	6	1	0	0	0	0	0	0	98
09:00	2	13	20	39	42	16	9	0	0	0	0	0	0	0	141
10:00	0	9	24	50	57	32	6	1	0	0	0	0	0	0	179
11:00	0	7	27	44	59	26	3	2	0	0	0	0	0	0	168
12 PM	0	5	24	48	50	27	7	0	0	0	0	0	0	0	161
13:00	0	14	24	59	65	32	6	0	0	0	0	0	0	0	200
14:00	0	10	21	63	47	21	5	0	0	0	0	0	0	0	167
15:00	2	10	24	45	38	29	2	0	0	0	0	0	0	0	150
16:00	6	7	25	56	41	19	3	0	0	0	0	0	0	0	157
17:00	2	6	16	45	50	18	5	0	0	0	0	0	0	0	142
18:00	0	6	23	29	38	17	8	0	0	0	0	0	0	0	121
19:00	0	1	13	42	53	16	3	1	0	0	0	0	0	0	129
20:00	1	2	17	27	35	8	0	0	0	0	0	0	0	0	90
21:00	0	2	11	18	17	5	2	0	0	0	0	0	0	0	55
22:00	1	1	4	17	14	6	0	0	0	0	0	0	0	0	43
23:00	0	1	3	6	10	3	0	0	0	0	0	0	0	0	23
Total	18	103	305	626	690	315	68	8	0	0	0	0	0	0	2133

Daily

15th Percentile :	23 MPH
50th Percentile :	30 MPH
85th Percentile :	36 MPH
95th Percentile :	39 MPH

Statistics

Mean Speed(Average) :	30 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	1316
Percent in Pace :	61.7%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

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City of Laguna Hills
Vista Viejo
W/ Bridlewood Drive
4 Day Directional Speed Survey

LHS002
Site Code: 241-25007

Eastbound, Westbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
01/05/25	0	1	1	3	7	3	1	0	0	0	0	0	0	0	16
01:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
02:00	0	0	1	3	1	2	0	0	0	0	0	0	0	0	7
03:00	0	1	1	0	5	0	2	0	0	0	0	0	0	0	9
04:00	0	1	2	2	2	1	0	0	0	0	0	0	0	0	8
05:00	0	0	1	4	3	1	0	0	0	0	0	0	0	0	9
06:00	0	0	1	6	6	3	2	0	0	0	0	0	0	0	18
07:00	0	3	5	15	13	7	3	1	0	0	0	0	0	0	47
08:00	0	3	16	23	17	12	2	0	0	0	0	0	0	0	73
09:00	0	3	15	25	25	31	3	0	0	0	0	0	0	0	102
10:00	0	2	12	44	53	36	16	0	0	0	0	0	0	0	163
11:00	0	2	19	44	37	21	3	1	0	0	0	0	0	0	127
12 PM	1	13	16	54	56	15	13	0	0	0	0	0	0	0	168
13:00	1	5	17	54	46	27	5	0	0	0	0	0	0	0	155
14:00	1	5	27	54	52	26	3	0	0	0	0	0	0	0	168
15:00	0	7	28	38	43	20	6	0	0	0	0	0	0	0	142
16:00	4	6	32	45	61	14	4	0	0	0	0	0	0	0	166
17:00	0	4	24	46	58	21	3	0	0	0	0	0	0	0	156
18:00	0	1	13	31	46	12	3	1	1	0	0	0	0	0	108
19:00	1	1	9	32	38	19	4	1	0	0	0	0	0	0	105
20:00	0	1	4	28	15	6	4	0	0	0	0	0	0	0	58
21:00	0	2	4	11	16	6	1	0	0	0	0	0	0	0	40
22:00	0	0	0	8	11	3	1	0	0	0	0	0	0	0	23
23:00	0	0	1	6	8	3	0	0	0	0	0	0	0	0	18
Total	8	61	249	576	620	290	79	4	1	0	0	0	0	0	1888

Daily

15th Percentile :	24 MPH
50th Percentile :	30 MPH
85th Percentile :	36 MPH
95th Percentile :	39 MPH

Statistics

Mean Speed(Average) :	31 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	1196
Percent in Pace :	63.3%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

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City of Laguna Hills
Vista Viejo
W/ Bridlewood Drive
4 Day Directional Speed Survey

LHS002
Site Code: 241-25007

Eastbound, Westbound

Start	1	16	21	26	31	36	41	46	51	56	61	66	71	76	
Time	15	20	25	30	35	40	45	50	55	60	65	70	75	999	Total
01/06/25	0	0	0	4	2	1	0	0	0	0	0	0	0	0	7
01:00	0	0	1	2	1	1	0	0	0	0	0	0	0	0	5
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
04:00	0	0	3	5	4	4	0	0	0	0	0	0	0	0	16
05:00	0	0	2	9	8	6	0	0	0	0	0	0	0	0	25
06:00	0	2	2	18	24	7	3	1	0	0	0	0	0	0	57
07:00	2	2	23	31	45	31	9	1	0	0	0	0	0	0	144
08:00	1	5	26	47	57	32	9	0	0	0	0	0	0	0	177
09:00	1	7	17	41	45	35	9	0	0	0	0	0	0	0	155
10:00	1	4	19	42	54	26	9	1	0	0	0	0	0	0	156
11:00	0	4	19	28	43	23	7	2	0	0	0	0	0	0	126
12 PM	1	6	18	40	58	25	5	0	0	0	0	0	0	0	153
13:00	0	9	22	48	52	22	7	0	0	0	0	0	0	0	160
14:00	0	6	31	50	69	29	6	0	0	0	0	0	0	0	191
15:00	1	7	30	45	63	32	8	1	0	0	0	0	0	0	187
16:00	0	14	28	76	59	21	3	0	0	0	0	0	0	0	201
17:00	1	7	26	92	55	25	5	0	0	0	0	0	0	0	211
18:00	1	3	21	61	55	21	2	0	0	0	0	0	0	0	164
19:00	1	2	22	28	46	13	1	0	0	0	0	0	0	0	113
20:00	0	1	10	26	30	10	0	0	0	0	0	0	0	0	77
21:00	0	0	5	15	14	4	0	0	0	0	0	0	0	0	38
22:00	0	1	3	6	10	4	0	0	0	0	0	0	0	0	24
23:00	0	0	1	2	1	0	1	0	0	0	0	0	0	0	5
Total	10	80	329	717	795	372	84	6	0	0	0	0	0	0	2393

Daily

15th Percentile :	24 MPH
50th Percentile :	30 MPH
85th Percentile :	36 MPH
95th Percentile :	39 MPH

Statistics

Mean Speed(Average) :	31 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	1512
Percent in Pace :	63.2%
Number of Vehicles > 55 MPH :	0
Percent of Vehicles > 55 MPH :	0.0%

City of Laguna Hills
Traffic Commission
Staff Report

Date: March 19, 2025
To: Chair and Commission Members
From: Joe Ames, Public Works Director/City Engineer
Issue: Establishment of Speed Limit for Del Lago Drive between Lake Forest Drive and La Cadena Drive

Recommendation: That the Traffic Commission recommends the City Council adopt an ordinance establishing a speed limit of 30 MPH for Del Lago Drive between Lake Forest Drive and La Cadena Drive, and the posting of 25 MPH speed limit signs on El Pacifico Drive, Peralta Drive, and Plaza Pointe Drive at the entry points to the North Laguna Hills commercial/industrial area.

Background:

A representative of a business owner in the North Laguna Hills commercial/industrial area requested that speed limit signs be posted on every street in the area due to motorists potentially speeding on these streets and being unaware of CVC Section 22352, which sets the prima facie speed limit of 25 MPH on streets within business and residential areas. See attached map.

City staff contacted its traffic engineering consultant, Hartzog & Crabill, Inc. (HCI), to provide an evaluation and analysis regarding posting of 25 MPH speed limits on public streets within the industrial/commercial area (hereinafter “business district area”).

The four (4) entry points to this business district area and the ten (10) roadways within this business district area are as follows:

1) Alcalde Drive
2) Del Lago Drive (entry point)
3) El Pacifico Drive (entry point)
4) La Cadena Drive

5) Peralta Drive (entry point)
6) Plaza Pointe Drive (entry point)
7) South Pointe Drive
8) Terra Drive
9) Verdugo Drive
10) Vista Grande

The above roadways are considered a "business district," as they are not included in the City's Engineering & Traffic (E&T) Speed Limit Survey and meet specified density roadside development per the California Vehicle Code (CVC).

Below is an excerpt from page 13 of the California Department of Transportation *California Manual for Setting Speed Limits*, Revised February 2020, explaining 'prima facie' speed limits:

"Prima Facie Speed Limits by Statute:
CVC Section 22352 sets the prima facie speed limits in California. The term "prima facie", as used in the CVC, is a speed limit that applies when no other specific speed limit is posted. It is a Latin term meaning "at first face" or "at first appearance". It sets two speed limits covering six classes of location. The first speed limit is 15 mph; and it is applicable to uncontrolled railway crossings; blind, uncontrolled intersections; and alleyways. The second speed limit is 25 mph; and it is applicable to business and residential areas without other posted speed limits; school zones, and areas immediately around senior centers."

Per the above excerpt, since it has been field-verified that the roadways within the business district are not posted with any other specific speed limit signs, the prima facie speed limit of 25 MPH is applicable to these roadways. As such, speed limit sign postings are not required.

However, HCI prepared the attached 5-Year Statewide Integrated Traffic Records System (SWITRS) data to show collisions reported on any of the above business district roadways. During the past five (5) years there have been only two (2) collisions categorized as 'Unsafe Speed' reported on any of these (10) roadways. Both of these collisions occurred along La Cadena Drive. One of the collisions occurred very close to the intersection with Del Lago Drive (entry point), while the other collision occurred near Peralta Drive.

After reviewing the collision data, HCI concluded the City may consider installing 25 MPH speed limit signs at/near the business district entry point of Del Lago Drive at La Cadena Drive (i.e., applicable for the segments east of, west of, and south of the intersection). In addition, the City may consider installing 25 MPH speed limit signs at the other three (3) entry points to the business neighborhood to serve as a reminder to drivers that the speed limit is 25 MPH (see attached).

- Del Lago Drive (entry point)
- El Pacifico Drive (entry point)
- Peralta Drive (entry point)
- Plaza Pointe Drive (entry point)

Regarding the segment of Del Lago Drive, north of La Cadena Drive, HCI recommended an E&T survey be completed to establish the speed limit for this section of roadway. Although this segment is a business district, the prima facie 25 MPH speed limit did not seem reasonable in HCI's opinion because the roadway characteristics suggested a higher speed limit. This segment of Del Lago Drive has four (4) lanes with a painted median, serves as a primary entry point to the business neighborhood, and has a 50 MPH speed limit in the adjacent segment to the north (in the City of Irvine). The California Manual of Traffic Control Devices (CA MUTCD) advises against abrupt speed limit changes from one segment to another. Upon completion of the E&T, HCI advised the City can post an applicable speed limit to step down from the 50 MPH speed limit to the 25 MPH speed limit south of La Cadena Drive.

Based upon Hartzog & Crabill's recommendation to complete an E&T, City staff authorized the completion of the E&T. The analysis, attached, shows that the speed limit of Del Lago Drive between Lake Forest Drive and La Cadena should be set at 30 MPH.

Therefore, City staff recommends the Traffic Commission recommend the City Council adopt an ordinance establishing a speed limit of 30 MPH for Del Lago Drive between Lake Forest Drive and La Cadena Drive, and the posting of 25 MPH speed limit signs on El Pacifico Drive, Peralta Drive, and Plaza Pointe Drive at the entry points to the North Laguna Hills commercial/industrial area.

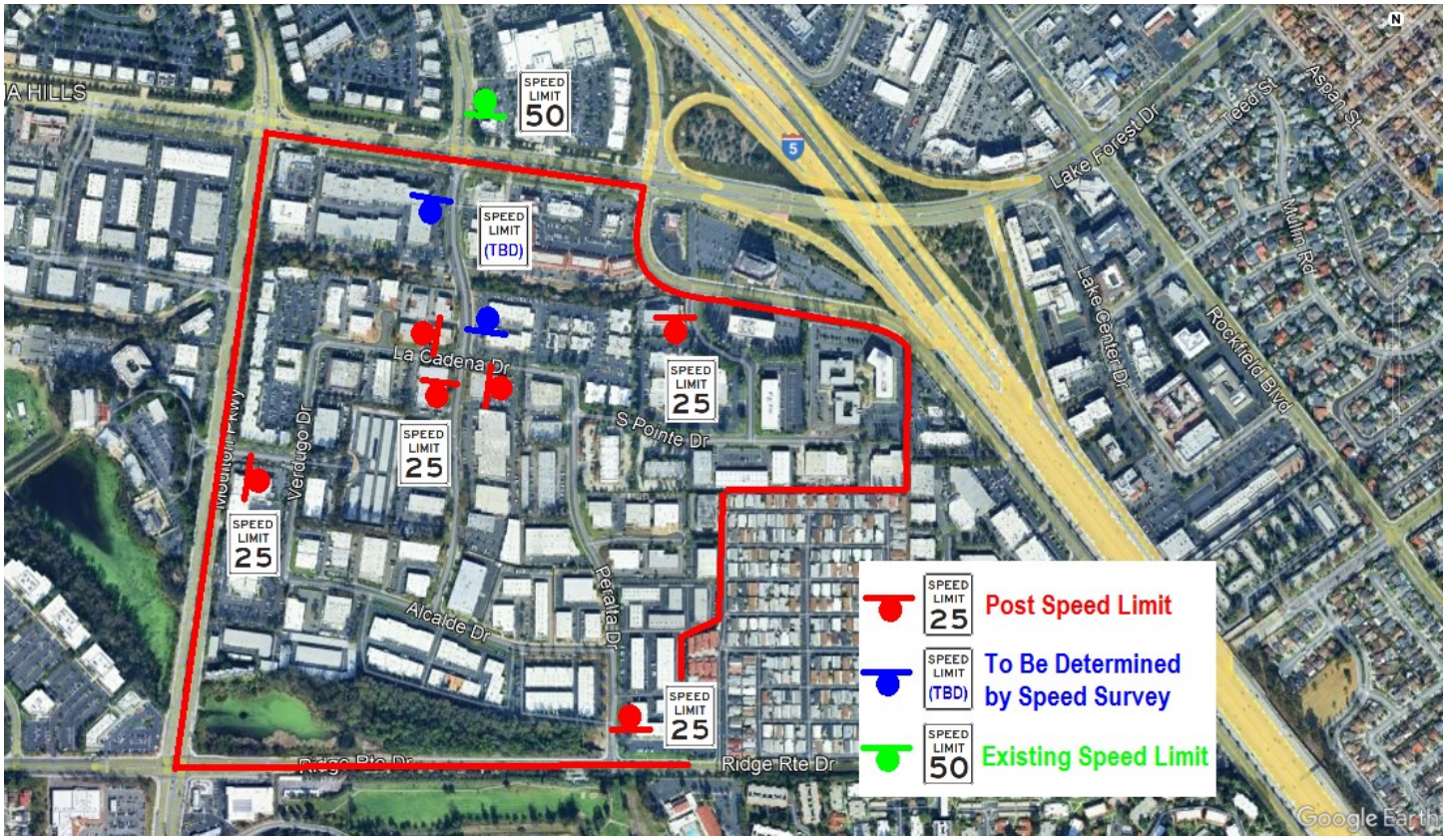
If the recommended action is adopted by the Traffic Commission, City staff would proceed with presenting an agenda report and ordinance to City Council for approval establishing the new 30 MPH speed limit for Del Lago Drive between Lake Forest Drive and La Cadena Drive in conformance with Chapter 11.20 of the Laguna Hills Municipal Code. The 25 MPH speed limits for El Pacifico Drive, Peralta Drive, Plaza Pointe Drive are already established by CVC Section 22352 and do not require an ordinance to post these signs.

Fiscal Impact:

The estimated cost for the signing is approximately $2,500.00, which can be paid out of the City's existing operations and maintenance budget.

Attachments:

1. Map of the North Laguna Hills Commercial/Industrial Area
2. 5-Year Statewide Integrated Traffic Records System (SWITRS) Report
3. HCI Report Recommending the Establishment of a 30 MPH Speed Limit for Del Lago between Lake Forest Drive and La Cadena Drive


SPEED LIMIT 50
SPEED LIMIT (TBD)
SPEED LIMIT 25
SPEED LIMIT 25
SPEED LIMIT 25
SPEED LIMIT 25
La Cadena Dr
S Pointe Dr
Verdugo Dr
Alcalde Dr
Peralta Dr
Ridge Rte Dr
Lake Forest Dr
Reed St
Aspen St
Mulin Rd
Lake Center Dr
Rockfield Blvd
Post Speed Limit
To Be Determined by Speed Survey
Existing Speed Limit
Google Earth

CITY OF LAGUNA HILLS
NORTH LAGUNA HILLS BUSINESS DISTRICT ROADWAYS
5-YEAR SWITRS COLLISION DATABASE
JAN. 1, 2019 - JUN. 30, 2024

CASE ID	COLL. DATE	COLL. TIME	PRIMARY ROAD	SECONDARY ROAD	DIST.	DIR.	INTERS.	WEATH. 1	COLL. SEVERITY	PRIM. COLL. FACT.	PCF VIOL CAT.	PCF VIOL.	HIT AND RUN	TYPE OF COLL.	MOTOR VEHICLE INVOLVED WITH	ROAD SURF.
8845554	20190412	745	VERDUGO DR	EL PACIFICO DR	125		N	A	0	A	1	23152	N	C	C	A
9054525	20191211	1422	DEL LAGO DR	LAKE FOREST DR	166	S	N	A	4	A	9	21804	N	D	C	A
9155306	20200801	233	LA CADENA DR	PERALTA DR	56	W	N	A	0	A	3	22350	M	E	I	A
9264551	20210420	1452	VERDUGO DR	LA CADENA DR	255	S	N	A	0	A	21	22106	N	H	I	-
9291489	20210630	1510	PLAZA POINTE DR	AVENIDA DE LA CARI	0		Y	A	3	A	9	21802	N	D	C	A
9542925	20221213	811	PLAZA POINTE DR	SOUTH POINTE DR	324	E	N	A	0	-	-		N	D	C	A
9616918	20230922	1230	DEL LAGO DR	LA CADENA DR	24	N	N	A	4	A	3	22350	N	F	A	A
9617194	20230926	1058	DEL LAGO DR	ALCALDE DR	354	N	N	A	0	A	1	23152	N	C	C	A
9618918	20231119	2055	VERDUGO DR	EL PACIFICO DR	250	N	N	A	3	A	8	22107	N	C	E	A
9704895	20240514	532	SOUTH POINTE DR	PLAZA POINTE DR	506	S	N	B	0	A	21	22106	N	E	I	A

NOTES:

Weather 1
A - Clear
B - Cloudy
C - Raining
D - Snowing
E - Fog
F - Other
G - Wind
- - Not Stated

Collision Severity
1 - Fatal
2 - Injury (Severe)
3 - Injury (Other Visible)
4 - Injury (Complaint of Pain)
0 - PDO (Property Damage Only)

Primary Collision Factor
A - (Vehicle) Code Violation
B - Other Improper Driving
C - Other Than Driver
D - Unknown
E - Fell Asleep
- - Not Stated

Motor Vehicle Involved With:
A - Non-Collision
B - Pedestrian
C - Other Motor Vehicle
D - Motor Vehicle on Other Roadway
E - Parked Motor Vehicle
F - Train
G - Bicycle
H - Animal
I - Fixed Object
J - Other Object
- - Not Stated

PCF Violation Category
01 - Driving or Bicycling Under Influence
02 - Impeding Traffic
03 - Unsafe Speed
04 - Following Too Closely
05 - Wrong Side of Road
06 - Improper Passing
07 - Unsafe Lane Change
08 - Improper Turning
09 - Automobile ROW
10 - Pedestrian ROW
11 - Pedestrian Violation
12 - Traffic Signals and Signs
13 - Hazardous Parking
14 - Lights
15 - Brakes
16 - Other Equipment
17 - Other Hazardous Violation
18 - Other Than Driver (or Ped)
19 -
20 -
21 - Unsafe Starting or Backing
22 - Other Improper Driving
23 - Pedestrian or "Other" Under the Influence
24 - Fell Asleep
00 - Unknown
- - Not Stated

Hit and Run
F - Felony
M - Misdemeanor
N - Not Hit & Run

Road Surface
A - Dry
B - Wet
C - Snowy or Icy
D - Slippery
- - Not Stated

Type of Collision
A - Head-On
B - Sideswipe
C - Rear-End
D - Broadside
E - Hit Object
F - Overturned
G - Vehicle/Pedestrian
H - Other
- - Not Stated

HARTZOG & CRABILL, Inc.

Gerald J. Stock, PE, TE,
Executive Vice President

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Suite 245
Tustin, CA 92780

Phone: (714) 731-9455
FAX: (714) 731-9498

www.hartzog-crabill.com

March 10, 2025

Mr. Joe Ames, P.E., T.E.
Public Works Director/City Engineer
City of Laguna Hills
24035 El Toro Road
Laguna Hills, CA 92653

Subject: Supplemental Engineering & Traffic Survey for Del Lago Drive Between Lake Forest Drive and La Cadena Drive

Dear Mr. Ames:

As requested by the City of Laguna Hills, we have prepared this Supplemental Engineering and Traffic Survey (E&TS) to determine the recommended speed limit for Del Lago Drive between Lake Forest Drive and La Cadena Street. It followed the procedures and guidelines prescribed in the California Vehicle Code (CVC) and California Manual on Uniform Traffic Control Device (CA MUTCD) for determining speed limits. These are described in detail in the *Citywide Engineering and Traffic Survey for Speed Limits* (Hartzog & Crabill, Inc., April 2020).

SPEED SURVEY EVALUATION:

Del Lago Drive between Lake Forest Drive and La Cadena Street is a four-lane road with a painted median. It has business and offices on both sides of the street. On-street parking is prohibited on both sides; and there is no posted speed limit.

As shown in the attached Speed Survey for Del Lago Drive, the 85th percentile speed was 32.5 miles per hour (mph). Therefore, the recommended speed limit for Del Lago Drive between Lake Forest Drive and La Cadena Street is 30 mph.

We look forward to your review and acceptance of our recommendations. If you may have any questions or need further information, please feel free to call our office at (714) 731-9455. Thank you again for the opportunity to serve your community.

Sincerely,
Hartzog & Crabill, Inc.

Scott Ma

Scott Ma, P.E., T.E.
Senior Engineer

Attachment: Speed Survey Summary Sheets

ENGINEERING AND TRAFFIC SURVEY

CITY OF LAGUNA HILLS

HCI

DEL LAGO DRIVE — **LAKE FOREST DR TO LA CADENA DR**

DATE: 2/20/2025 — SURVEY BY: C. BUENDIA

TIME: 12:30 PM - 1:10 PM — CHECKED BY: SCOTT MA

PREVAILING SPEED DATA	
LOCATION OF SURVEY	SOUTH OF LAKE FOREST
DATE OF SURVEY	2/20/2025
85th PERCENTILE	32.5 MPH
10 MPH PACE	25 - 34 MPH
PERCENT IN PACE	81.9 %
POSTED SPEED LIMIT	NOT POSTED

ACCIDENT HISTORY	
NO. OF MONTHS OBSERVED	24
SPEED-RELATED ACCIDENTS	0
TOTAL ACCIDENTS	2
ANNUAL ACCIDENT RATE	0.00 ACCIDENTS PER YEAR (SPEED RELATED ONLY)
ACC./MILLION VEH. MILES	0.00 ACCIDENTS PER MVM (SPEED RELATED ONLY)

TRAFFIC FACTORS	
AVERAGE DAILY TRAFFIC	6,300
LANE CONFIGURATION	2 LANES PER DIRECTION
TRAFFIC CONTROLS	SIGNAL -LAKE FOREST, STOP - LA CADENA
CROSSWALKS	AT LAKE FOREST
PEDESTRIAN/BICYCLES	YES / NO
TRUCK TRAFFIC	NO
ON-STREET PARKING	NO STOPPING ANYTIME
OTHER	NO SHOULDERS

ROADWAY FACTORS	
LENGTH OF SEGMENT (MILES)	0.18
VERTICAL CURVE	NONE
HORIZONTAL CURVE	CONSTANT GRADUAL "S" CURVES
LATERAL VISIBILITY	GOOD
ROAD CONDITIONS	GOOD
SIDEWALKS/DRIVEWAYS	YES / YES
STREET LIGHTING	YES
OTHER	TWO WAY LEFT TURN LANE

ADJACENT LAND USE	COMMERCIAL / BUSINESS / INDUSTRIAL

RECOMMENDED SPEED LIMIT	30 MPH

SPEED LIMIT CHANGE	POST

JUSTIFICATION:

This portion of Del Lago Drive is a four lane roadway. Currently, this section does not have a speed limit sign posted for this segment. The adjacent land uses are commercial, business, and industrial. The roadway has graudual "S" curves. The speed data revealed an 85th percentile speed of Based upon the 85th percentile speed of 32.5 mph and a median speed of 28.9 mph. With that, it is recommended that a 30 mph speed limit be posted for this area.

File: Del Lago 2025-01

RADAR SPEED DISTRIBUTION SHEET

HCI

CITY OF LAGUNA HILLS

DEL LAGO DRIVE — LAKE FOREST DR TO LA CADENA DR

DATE: 2/20/2025 — SURVEY BY: C. BUENDIA

TIME: 12:30 PM - 1:10 PM — CHECKED BY: SCOTT MA

SPEED	NUMBER OF VEHICLES (5 / 10 / 15 / 20 / 25)	VEH.	PCT.	CUM. PCT.
60				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
55				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
50				100.0%
				100.0%
				100.0%
				100.0%
				100.0%
45				100.0%
				100.0%
	X	1	0.6%	100.0%
	X X	2	1.3%	99.4%
	X	1	0.6%	98.1%
40		0	0.0%	97.4%
		0	0.0%	97.4%
	X X	2	1.3%	97.4%
	X X X X	4	2.6%	96.1%
	X	1	0.6%	93.5%
35	X X X	3	1.9%	92.9%
	X X X X X	5	3.2%	91.0%
	X X X X X X X X	8	5.2%	87.7%
	X X X X X X X X X X X	11	7.1%	82.6%
	X X X X X X X X X X X X X X X X X	18	11.6%	75.5%
30	X X X X X X X X X X X X X X X X X X X X	20	12.9%	63.9%
	X X X X X X X X X X X	11	7.1%	51.0%
	X X X X X X X X X X X X X X X X X X X X X X	22	14.2%	43.9%
	X X X X X X X X X X X X X X X X	16	10.3%	29.7%
	X X X X X X X	7	4.5%	19.4%
25	X X X X X X X X X	9	5.8%	14.8%
	X X X	3	1.9%	9.0%
		0	0.0%	7.1%
	X X X	3	1.9%	7.1%
	X X X X X	5	3.2%	5.2%
20	X X	2	1.3%	1.9%
	X	1	0.6%	0.6%
				0.0%
				0.0%
				0.0%
15				0.0%
	TOTAL VEHICLES	155		

UPPER LIMIT 10 MPH PACE:	34	MPH			
LOWER LIMIT 10 MPH PACE:	25	MPH	85th PERCENTILE SPEED:	32.5	MPH
PERCENT OVER PACE:	9.0	%	MEDIAN SPEED:	28.9	MPH
PERCENT IN PACE:	81.9	%	15th PERCENTILE SPEED:	25.0	MPH
PERCENT UNDER PACE:	9.0	%			

RADAR SPEED DISTRIBUTION SHEET

HCI

CITY OF LAGUNA HILLS

DEL LAGO DRIVE — LAKE FOREST DR TO LA CADENA DR

DATE: 2/20/2025 — SURVEY BY: C. BUENDIA

TIME: 12:30 PM - 1:10 PM — CHECKED BY: SCOTT MA

SPEED	CUMMULATIVE PERCENT 20	40	60	80	100		
60					x	100.0%	
59					x	100.0%	
58					x	100.0%	
57					x	100.0%	
56					x	100.0%	
55					x	100.0%	
54					x	100.0%	
53					x	100.0%	
52					x	100.0%	
51					x	100.0%	
50					x	100.0%	
49					x	100.0%	
48					x	100.0%	
47					x	100.0%	
46					x	100.0%	
45					x	100.0%	
44					x	100.0%	
43					x	100.0%	
42					x	99.4%	
41					x	98.1%	
40					x	97.4%	
39					x	97.4%	
38					x	97.4%	
37					x	96.1%	
36					x	93.5%	
35					x	92.9%	
34					x	91.0%	}PACE
33					x	87.7%	}PACE
32					x	82.6%	}PACE - - -85PCT
31				x		75.5%	}PACE
30				x		63.9%	}PACE
29			x			51.0%	}PACE
28			x			43.9%	}PACE - - - -MEAN
27		x				29.7%	}PACE
26		x				19.4%	}PACE
25	x					14.8%	}PACE - - -15PCT
24	x					9.0%	
23	x					7.1%	
22	x					7.1%	
21	x					5.2%	
20	x					1.9%	
19	x					0.6%	
18	x					0.0%	
17	x					0.0%	
16	x					0.0%	
15	x					0.0%	

UPPER LIMIT 10 MPH PACE:	34	MPH			
LOWER LIMIT 10 MPH PACE:	25	MPH	85th PERCENTILE SPEED:	32.5	MPH
PERCENT OVER PACE:	9.0	%	MEDIAN SPEED:	28.9	MPH
PERCENT IN PACE:	81.9	%	15th PERCENTILE SPEED:	25.0	MPH
PERCENT UNDER PACE:	9.0	%			

Del Lago 2025-01

CITY OF LAGUNA HILLS

SUMMARY OF RECOMMENDATIONS

STREET LOCATION	EXISTING SPEED LIMIT	RECOMMENDED SPEED LIMIT	85TH PERCENTILE SPEED	AVERAGE SPEED	10 MPH PACE RANGE	PERCENT OF VEHICLES IN PACE	RECOMMENDATION - JUSTIFICATION
DEL LAGO DRIVE							
LAKE FOREST DR TO LA CADENA DR	NP	**30**	32.5	28.9	25-34	81.9	POST SPEED LIMIT – 85TH PERCENTILE

NP = Not Posted

City of Laguna Hills
Traffic Commission
Staff Report

Date: March 19, 2025
To: Chair and Commission Members
From: Joe Ames, Public Works Director/City Engineer
Issue: La Paz Road & Appaloosa Place – Installation of Acceleration Lane

Recommendation: That the Traffic Commission receive and file the report.

Background:

For many years, the intersection of La Paz Road and Appaloosa Place has been on the traffic signal warrant list. This means that the intersection qualifies for the installation of a traffic signal based upon one or more of the nine (9) traffic signal warrants contained in the California Manual of Uniform Traffic Control Devices (MUTCD). This need has been documented in both the 2007 and the 2016 Traffic Signal Master Plan (TSMP) to verify the locations that meet the California MUTCD. Four other locations meeting California MUTCD traffic signal warrants include: Alicia/Via Lomas; Paseo de Valencia/Alisal Avenue; Paseo de Valencia/Ericson Way; and La Paz Road/Alameda Avenue.

City staff recommended as part of the November 16, 2022 Traffic Commission meeting agenda report on “Traffic Signal Master Plan Update and Construction of New Traffic Signals” that the TSMP be updated as the first step in prioritizing the use of $1.28 million in available developer-paid Coastal Area Roadway Improvements and Traffic Signals (CARITS) funding to construct traffic signals based upon the needs identified in the TSMP; however, the Traffic Commission voted against this recommendation. Consequently, the available CARITS funding has been reallocated to CIP 168, Traffic Signal Improvements, for matching funds for several traffic signal improvement projects that will seek to upgrade existing traffic signals.

Recently, the City received a request from a resident to install a median acceleration lane at this location to improve the safety of motorists turning from Appaloosa Place onto westbound La Paz Road. The City requested its traffic engineering consultant, Hartzog & Crabill, to review the location and the request to verify this action would be beneficial as an interim measure while the City awaits other grant funding that may be available for construction of a traffic signal at this location. Hartzog & Crabill indicated it would be beneficial; therefore, as part of the City's semi-annual roadway restriping efforts, the restriping crew modified the intersection as shown in the attached drawing.

Fiscal Impact:

The estimated cost for the striping plan produced by Hartzog & Crabill was approximately $4,000.00. There was no cost for installing the striping because the work was accomplished under the City's semi-annual roadway restriping efforts, which is paid on a lump sum basis to the City's striping contractor.

Attachments:

1. Signing and Striping Plan for La Paz Road and Appaloosa Place
2. November 16, 2022 Agenda Report: Traffic Signal Master Plan Update and Construction of New Traffic Signals

SIGNING AND STRIPING GENERAL NOTES:

1. SIGNING AND STRIPING INSTALLATION SHALL CONFORM TO THE LATEST EDITION OF THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (CA MUTCD), THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS) STANDARD PLANS AND SPECIFICATIONS (2024 EDITIONS), THE CITY OF LAGUNA HILLS STANDARD PLANS, AND ALL ADDENDUMS THERETO.
2. REFLECTORIZE ALL STRIPES AND LEGENDS. STRIPING, PAVEMENT MARKINGS AND LEGENDS SHALL CONFORM TO THE 2024 CALTRANS STANDARD PLANS A20A–G AND A24A–L.
3. PRIOR TO FINAL ACCEPTANCE OF STREET IMPROVEMENTS, ALL STREET STRIPING AND STENCILING WITHIN THE PERIMETER OF THE CONSTRUCTION AREA WILL BE RESTORED TO LIKE NEW CONDITION, IN A MANNER MEETING THE APPROVAL OF THE CITY ENGINEER.
4. THE CONTRACTOR SHALL RE–STRIPE EXISTING STRIPING AND CURB MARKINGS OBLITERATED BY NEW CONSTRUCTION, WHETHER OR NOT SHOWN ON THE PLANS FOR REPLACEMENT, WITHIN 300' OF THE INTERSECTION (ALL APPROACHES).
5. AT LOCATIONS WHERE EXISTING PAINTED CURB IS TO BE RECONSTRUCTED, THE CONTRACTOR SHALL PAINT THE NEW CURB AS SHOWN ON THE PLANS WITHIN 10 WORKING DAYS OF CURB CONSTRUCTION OR AS DIRECTED BY THE CITY ENGINEER. THE PAINT SHALL BE WATER–BASED WITH 2–YEAR GUARANTEE AGAINST COLOR FADING. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT TO THE CITY WRITTEN PROOF OF THE MANUFACTURER'S 2–YEAR GUARANTEE.
6. THE CONTRACTOR SHALL FURNISH TO THE CITY ENGINEER SAMPLES OF MATERIALS NOT LESS THAN 3 WEEKS IN ADVANCE OF THE DATE THE MATERIALS ARE TO BE APPLIED.
7. THE CONTRACTOR SHALL NOTIFY THE CITY ENGINEER AFTER COMPLETING LAYOUT AND AT LEAST 3 WORKING DAYS BEFORE COMMENCING INSTALLATION OF STRIPING, MARKINGS AND MARKERS.
8. ALL NEW STRIPING SHALL BE CAT TRACKED AND APPROVED BY THE CITY ENGINEER PRIOR TO FINAL INSTALLATION.
9. TRAFFIC STRIPES AND MARKINGS SHALL BE PAINT AND BE APPLIED IN TWO COATS. A MINIMUM OF SEVEN DAYS SHALL BE PROVIDED BETWEEN FIRST AND SECOND COATS.
10. FIRST STRIPING COAT SHALL BE APPLIED WITHIN 24 HOURS OF SURFACE COURSE REPLACEMENT ON STREETS OPEN TO THE PUBLIC. IN NO CASE SHALL A NEWLY PAVED STREET OPEN TO THE PUBLIC BE LEFT WITHOUT STRIPING OVER A WEEKEND OR HOLIDAY.
11. INSTALL BLUE RETROREFLECTIVE RAISED PAVEMENT MARKER AT ALL FIRE HYDRANTS PER THE CA MUTCD FIGURE 3B– 102(CA).
12. SIGNS SHALL BE STANDARD SIZE UNLESS NOTED OTHERWISE. PRIOR TO INSTALLATION, NEW SIGNS SHALL BE APPROVED BY THE CITY ENGINEER. EXACT LOCATIONS OF SIGNS SHALL BE DETERMINED BY THE CITY ENGINEER.
13. NEW SIGN POSTS SHALL BE GALVANIZED STEEL, EASY ERECT BREAKAWAY OR SQUARE STEEL TUBING WITH BREAK–AWAY BASE, "UNI–STRUT" PERFORATED TYPE (QUICK PUNCH) OR APPROVED EQUAL, UNLESS OTHERWISE NOTED.
14. SIGN INSTALLATION HEIGHT AND LATERAL LOCATIONS (NEW AND EXISTING WITHIN THE PROJECT LIMITS) SHALL BE PER THE CA MUTCD FIGURE 2A–2(CA) AND SECTION 6F.03 "SIGN PLACEMENT".
15. THE CONTRACTOR SHALL INSTALL AND MAINTAIN CONSTRUCTION BMP'S TO PROTECT THE STORM DRAIN SYSTEM.
16. ALL SALVAGED EQUIPMENT SHALL BE DELIVERED TO THE CITY YARD.

L E G E N D:

= EXISTING STRIPING & MARKINGS TO REMAIN.

XX = EXISTING STRIPING, MARKINGS & PAVEMENT MARKERS TO BE REMOVED BY WET SANDBLASTING.

= PROPOSED STRIPING & MARKINGS TO BE INSTALLED BY CONTRACTOR.

= INSTALL TYPE VI ARROW (AS SHOWN) PER CALTRANS STANDARD PLAN A24A.

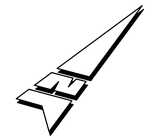
(#) = INSTALL PAVEMENT DELINEATION DETAIL NUMBER/PAVEMENT MARKINGS PER CALTRANS STANDARD PLANS, 2024 EDITION.

[1] = FIELD VERIFY PULL BOXES ARE TRAFFIC–RATED PULL BOXES. AS NECESSARY, COORDINATE WITH OWNERS OF PULL BOXES TO REMOVE AND REPLACE TWO (2) EXISTING PULL BOXES WITH TWO (2) TRAFFIC–RATED PULL BOXES NO. 3 1/2(T) PER CALTRANS STD. PLAN ES–8B OR APPROVED EQUAL.

[XX] = WET SANDBLAST.

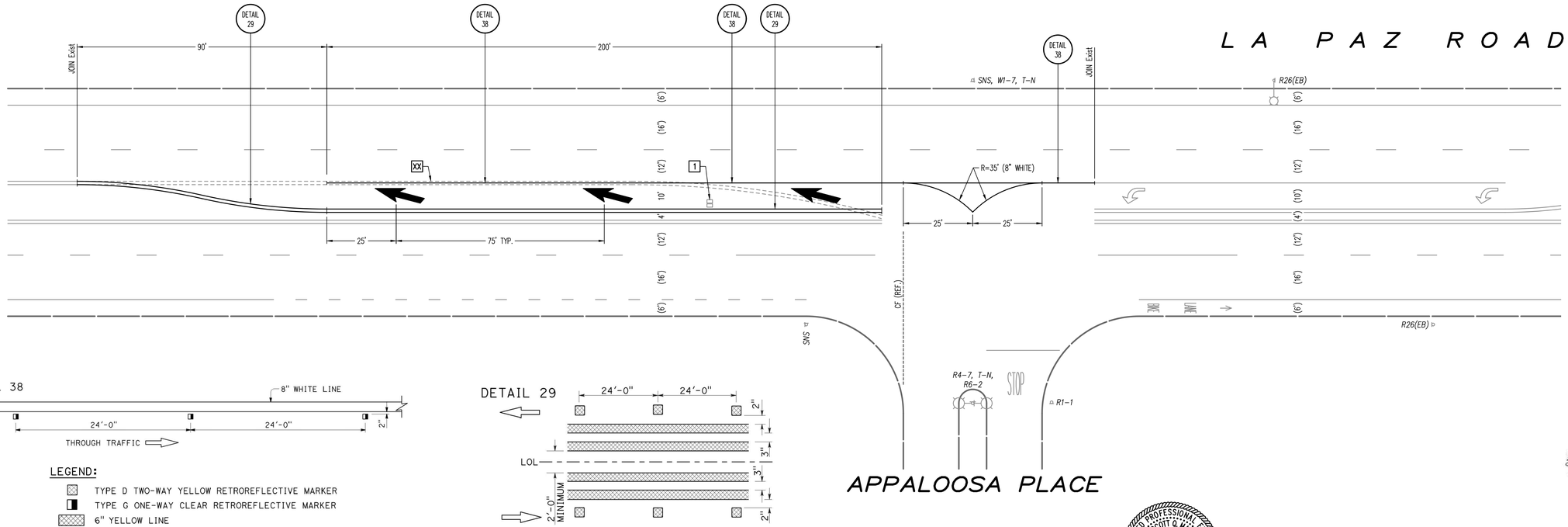
(XX') = EXISTING LANE WIDTH.

XX' = PROPOSED LANE WIDTH.



SCALE: 1" = 20'

0 5 10 20



DETAIL 38

LEGEND:

- TYPE D TWO–WAY YELLOW RETROREFLECTIVE MARKER
- TYPE G ONE–WAY CLEAR RETROREFLECTIVE MARKER
- 6" YELLOW LINE

DETAIL 29

HCI CAD FILE: LA PAZ-APPALOOSA_ACCEL.dwg

UNAUTHORIZED CHANGES AND USES:
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REVISIONS

NUMBER	DATE	INITIALS	DESCRIPTION	APP'V'D

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CHECKED BY:	M.V.	2-21-25
DESIGNED BY:	D.M.	2-21-25
APPROVED:		

SIGNING AND STRIPING PLAN

La Paz Road and Appaloosa Place

CITY OF LAGUNA HILLS

Sheet 1 of 1

City of Laguna Hills

Traffic Commission

Staff Report

DATE: November 16, 2022

TO: Traffic Commissioners

FROM: Joe Ames
Public Works Director/City Engineer

ISSUE: Traffic Signal Master Plan Update and Construction of New Traffic Signals

RECOMMENDATION: That the Traffic Commission recommend: 1) City staff and its Traffic Engineering Consultant update the Traffic Signal Master Plan; and 2) City staff return to the Traffic Commission with recommendations on traffic signals to construct using available CARITS funding for approval by City Council.

SUMMARY:

The new Public Works Director/City Engineer contacted the County of Orange regarding the City's existing $1.27M balance within the Coastal Road Area Improvements and Traffic Signal (CARITS) fund. Based upon discussions with County staff, this funding may be used to construct new traffic signals to increase driver safety on arterial highways and/or replace traffic signal equipment that will reduce delays on arterial highways. The Public Works Director/City Engineer is recommending using the CARITS funds to construct some of the traffic signals that are on the City's traffic signal warrant lists.

BACKGROUND:

The new Public Works Director/City Engineer contacted the County of Orange regarding the City's existing $1.27M balance within the Coastal Road Area Improvements and Traffic Signal (CARITS) fund. This housing developer paid funding program was established by the County in 1990 to fund arterial highway widenings and the

installation of traffic signals to alleviate the effects of the construction of new residential housing generally west of I-5 and south of El Toro Road. Based upon discussions with County staff, this funding may be used to construct new traffic signals to increase driver safety on arterial highways and/or replace traffic signal equipment that will reduce delays on arterial highways. The Public Works Director/City Engineer is recommending using the CARITS funds to construct some of the traffic signals that are on the City's traffic signal warrant lists.

Under the previous City administration, the CARITS funds were intended to be used for the addition of a southbound lane on Paseo de Valencia between Kennington Drive and Laguna Hills Drive to help alleviate peak flow afternoon traffic turning from southbound Paseo de Valencia onto Laguna Hills Drive. However, due to environmental issues encountered after the design was complete that increased the estimated project cost to $4M, the project was abandoned in 2018.

The Public Works Director/City Engineer investigated if the abandoned Paseo de Valencia project would qualify for OC Go (Measure M one-half cent sales tax) competitive grant funds to make up for the CARITS funding shortfall; however, the project did not meet the minimum traffic volume requirements for funding under the recently closed call for Arterial Capacity Enhancement projects.

In reviewing allowable uses of CARITS funds, the Public Works Director/City Engineer negotiated with the County to allow the City to use the entire $1.27M balance to fund the construction of new traffic signals at locations where none exist today that have been backlogged on the traffic signal warrant list for approximately 20 years.

The Public Works Director/City Engineer recommends using the City's on-call traffic engineering consultant, Hartzog & Crabill, to update the 2016 Traffic Signal Master Plan (TSMP) to verify the locations that meet the California Manual of Uniform Traffic Control Devices-based traffic signal warrant analysis warrants for the installation of new traffic signals.

The City utilizes a TSMP to aid in the planning of potential future installations of new traffic signals where warranted and which meet other factors. Traffic signals are only to be installed if they meet one or more "warrants" as established in the Traffic Manual of

the State of California. However, traffic signals are not required to be installed solely because the site has met one or more warrants. The TSMP applies readily measurable warrants against data that was collected as a part of the analysis. This information primarily relies upon traffic volume counts, traffic collision history and the physical conditions of the site. The data analysis is followed by scoring criteria to aid in the prioritization of new traffic signals.

Provided that the Traffic Commission and City Council approve of this use of CARITS funds to update the TSMP and to construct new traffic signals, the Public Works Department anticipates being able to construct at least three new traffic signals using the CARITS funds currently on deposit with the City. If any leftover funds are available after the conclusion of the traffic signal construction projects, City staff recommends upgrading existing controllers and/or traffic signal interconnect cables in an effort to improve traffic flow.

The two most recent versions of the TSMP, the 2007 TSMP and the 2016 TSMP, are provided for the review of the Traffic Commission. Combined, the documents identify up to five new traffic signals as meeting one or more State warrants. Locations identified in the 2007 or 2016 TSMP as noted below include:

1. Alicia Parkway/Via Lomas (2007, 2016)
2. Paseo de Valencia/Alisal Avenue (2016)
3. Paseo de Valencia/Ericson Way (2016)
4. La Paz Road/Appaloosa Place (2007, 2016)
5. La Paz Road/Alameda Avenue (2007)

La Paz Road at Alameda Avenue, which was on the 2007 TSMP list for traffic signal installation, did not meet the CA MUTCD warrants in the 2016 TSMP assessment. However, the Public Works Director/City Engineer, as part of performing an updated TSMP recommends evaluating this intersection again.

Coincidentally, recently, a citizen contacted Mayor Wheeler asking for a pedestrian crossing at Paseo de Valencia/Alisal Avenue. Construction of a traffic signal at this location would provide a safe, marked crosswalk at the intersection.

Ericson Way and Alisal Avenue are contiguous to one another on Paseo de Valencia. Theoretically, the implementation of a traffic signal at one of these intersections would help provide a gap in traffic for traffic turning from the other intersection; therefore, both intersections may not require signalization if one of the locations has a traffic signal. The same scenario may hold true for Appaloosa Place and Alameda Avenue on La Paz Road.

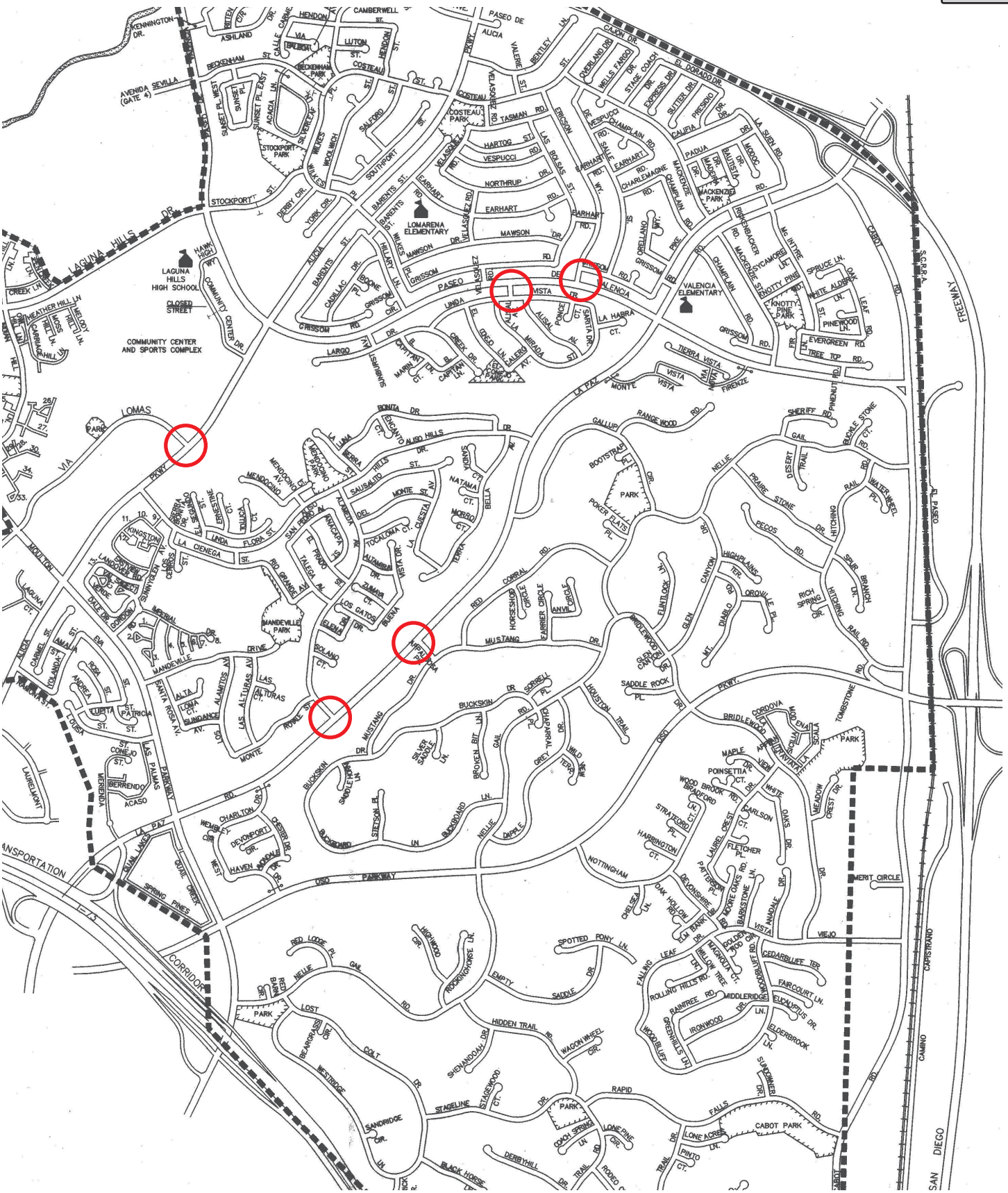
Consequently, City staff recommends that Hartzog & Crabill update the TSMP and, if both signals on Paseo de Valencia and on La Paz Road are warranted, include an engineering analysis in the TSMP determining if both traffic signals on Paseo de Valencia at Alisal Avenue and Ericson Way and on La Paz Road at Appaloosa Place and Alameda Avenue would be required.

FISCAL IMPACT:

The update to the TSMP could be accomplished within the existing Traffic Engineering budget for the Public Works Department. If recommended by the Traffic Commission, the construction of three new traffic signals and associated improvements has an anticipated cost of approximately $1.2 million. This funding will need to be authorized by City Council for this work as a FY 2022-2023 capital improvement project budget amendment.

ATTACHMENTS:

- Vicinity Map
- 2007 Traffic Signal Master Plan
- 2016 Traffic Signal Master Plan



Attachment: Vicinity Map (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

2007 and 2016 Traffic Signal Warrant Locations

CITY OF LAGUNA HILLS

AGENDA REPORT
PUBLIC SERVICES DEPARTMENT

ISSUE: **TRAFFIC SIGNAL MASTER PLAN UPDATE**

SUMMARY:

On a periodic basis, the City prepares a Traffic Signal Master Plan Update to evaluate intersections at which new traffic signals may meet minimum established standards for installation. This evaluation provides assistance to the City Council in prioritizing future traffic signal installations. It is noted that intersections meeting the minimum standard for a traffic signal installation are not required to have a traffic signal installed. Rather, this information is a tool for considering such installations. The consulting Traffic Engineers of Hartzog & Crabill have completed the Traffic Signal Master Plan Update for City Council review and approval. The Traffic Commission, at the meeting of September 19, 2007, reviewed the Traffic Signal Master Plan and took two actions. The first action was to accept the report as presented. The second action was to recommend to the City Council that no new traffic signals be constructed without further additional detailed study at any selected location.

BACKGROUND:

The Traffic Signal Master Plan, attached, has been updated by the consulting Traffic Engineers of Hartzog & Crabill. The Master Plan, followed the procedures in previous editions, evaluated potential new traffic signal installations against the minimum standards (warrants) used by the State of California for traffic signals. The City currently operates 47 traffic signals. A total of 19 additional arterial highway intersections without traffic signals were evaluated for traffic signal needs. Four locations were found to meet the minimum standards for traffic signal installation. Following an established prioritization procedure, these four locations were rated and then ranked in priority order as follows:

1. Moulton Parkway at Gordon Road
2. Alicia Parkway at Via Lomas
3. La Paz Road at Appaloosa Place
4. La Paz Road at Alameda Avenue

RECOMMENDATION: **THAT THE CITY COUNCIL RECEIVE AND FILE THE TRAFFIC SIGNAL MASTER PLAN UPDATE.**

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Intersections that meet the minimum warrants for traffic signal installation do not require that a traffic signal be installed. Rather, this information is a planning tool used to consider the future installation of a traffic signal. At the above four intersections, the minimum warrants were met related to traffic volumes but none of the locations met the warrant for traffic collision history. The installation of a traffic signal can lead to increased numbers of traffic collisions although the severity may be different than at non-signalized intersection. Alternatives to a traffic signal include converting Tee intersections into right turn only intersections thereby eliminating either one or both of the left turn movements currently allowed. This can improve traffic flow and reduce traffic collision events. All four of the above intersections are Tee intersections.

The Traffic Commission, at the meeting of September 19, 2007, reviewed the Traffic Signal Master Plan and took two actions. The first action was to accept the report as presented. The second action was to recommend to the City Council that no new traffic signals be constructed without further additional detailed study at any selected location. The Traffic Commission expressed a desire to evaluate alternative traffic controls to traffic signal installations, particularly at Tee intersections that might be adequately served with right turn only movements, before a new traffic signal is constructed.

FISCAL IMPACT:

The construction cost of a traffic signal is approximately $250,000 with annual maintenance and power costs of about $3,000. The Capital Improvement Program Budget includes funding for a new traffic signal in the "future" budget category.

RECOMMENDATION: THAT THE CITY COUNCIL RECEIVE AND FILE THE TRAFFIC SIGNAL MASTER PLAN UPDATE.

ATTACHMENTS:

- Traffic Signal Master Plan Update

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

City of Laguna Hills
Traffic Signal Master Plan
Plan Update

Prepared for:
City of Laguna Hills
24035 El Toro Road
Laguna Hills, Ca. 92653

Prepared by:
Hartzog & Crabill, Inc .
275 Centennial Way, St. 208
Tustin, CA. 92680
(714) 731 – 9455

August 2007

OCT 09 2007 ITEM 4.5

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

HARTZOG & CRABILL, Inc.

August 10, 2007

Mr. Kenneth H. Rosenfield, P.E.
City Engineer
City of Laguna Hills
24035 El Toro Road
Laguna Hills, CA. 92653

Subject: ***Traffic Signal Master Plan – 2007***

Dear Ken:

In accordance the City's recent authorization, Hartzog & Crabill, Inc. is pleased to submit this 2007 update of the Laguna Hills Traffic Signal Master Plan. The procedure followed established formats of (1) an evaluation of existing conditions, (2) a review of intersection locations that could eventually become warranted for construction, and (3) the prioritization of the warranted signals.

The evaluation shows that four intersections have become either new candidates for construction or remain so from earlier updates. Of those, the highest rank for this time period is Moulton Parkway at Gordon road. This is followed by Alicia Parkway at Via Lomas. Given the numerous elements that have been used in prioritizing those signals, we recommend that they be considered for construction as funds are available. The other two that were found to be warranted, but of a lesser construction priority are La Paz Road at Appaloosa Place and La Paz Road at Alameda Avenue.

In terms of future traffic signals, we recommend that new counts be taken each year along with an assessment of accidents at the unsignalized intersections. Then, through a relatively simple process, the numbers of this report, along with the various point scores shown in the tables, can be updated. As always, we appreciate the opportunity of preparing this administrative document for you use. During your review of its contents, please do not hesitate to call for added detail or other clarifications.

Very Truly Yours:

Hartzog & Crabill, Inc.

Jerry Crabill, P.E.

275 Centennial Way, Suite 208, Tustin, CA 92780 Phone: (714) 731-9455

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Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

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Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

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Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

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Executive Summary

Goals and Objectives

Similar to earlier versions of the City's Traffic Signal Master Plan, the goal of the year 2007 assessment was to provide City staff with a useful and logical planning tool for traffic signal construction. Our objective was to create a prioritized intersection signalization list for existing locations. While changeable depending on future conditions, the list would clearly show the many reasons behind (1) our decision for prioritization of traffic signal installations and (2) supporting documentation toward City decisions for future budgeting.

Study Methodology

The study's methodology was straightforward and consistent with previous Traffic Signal Master Plans. Since most signal construction decisions are based on warrant satisfaction described by Caltrans, our work relied on new 2007 traffic counts at 19 candidate intersection locations. Those volumes were input into signal construction criteria relating to traffic entering the various intersections. Other criteria also used included evaluating cross traffic needs to enter the main traffic flow on the City's arterial highways. A detailed evaluation of accidents at all locations was also conducted. Since the "types" of accidents that most often can be corrected by a traffic signal is the broadside, left turn or pedestrian involved accidents, the City's computer database of accidents was investigated for those elements.

All of the data collected and analyzed via the above was then compiled into a logical process of construction prioritization. This involves a list showing the City where signals are currently needed, why such needs have materialized since the last update (year 2003), and the order by which the new signals should be constructed.

The same rating system was used as in previous studies. This involved the preparation of several tables that present existing traffic volumes and accidents in different comparative ways. Using that information, and coupled with our experience as to the best location for traffic signals, the priority rating system was used as an aid in making final traffic signal construction priority recommendations.

The Need For Warranted Traffic Signals

It is noted that the primary use of the results in this report is to assist City planners in the decision process toward the installation of traffic signals. While good justification for the installation of a signal is based on Caltrans' warrants, signals are not factually required simply because they meet certain warrants. The final decision to install a signal should not be based solely thereon. Since traffic signals may increase certain types of collisions, other elements such as delay, congestion, approach conditions, driver confusion, future land use, and other evidence for the need for such driver right a way assignment must also be factored into the results of this assessment.

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Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

SIGNAL MASTER PLAN RESULTS FOR 2007

The evaluation of existing 2007 traffic volumes, accidents, and other important elements revealed that four intersections have become or remain (from the 2003 assessment) candidates for signalization.. These locations are:

(1) ***Moulton Parkway at Gordon Road,***
(2) ***Alicia Parkway at Via Lomas***
(3) ***La Paz Road At Appaloosa Place***
(4) ***La Paz Road at Alameda Avenue.***

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

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City of Laguna Hills
Traffic Signal Master Plan Update
August 2007

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

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City of Laguna Hills
2007 Traffic Signal Master Plan

Introduction

The City of Laguna Hills requested that the 2003 City-wide Traffic Signal Master Plan be updated to reflect changes in traffic conditions. Since those conditions are directly related to the need for traffic signals at various locations, it follows that new requirements for signalization may now be necessary. To that end, the following information prepared by Hartzog & Crabill identifies those changes along with any new intersections where signalization should be considered.

The Importance of Traffic Signals and Growth Monitoring

The control of traffic by means of signalized intersection operation has long proven to be an effective technique to reduce accidents and generally improve the quality of traffic flow. To assist the City in the maintenance of a satisfactory signal monitoring program, this report has been prepared as part of a continuing series of periodic signal evaluations: assisting in signal improvement decisions as well as the necessary municipal budgeting process. This plan will also be useful to maintain and/or upgrade/prioritize the existing signal system and to provide a prioritization of future traffic signal installations.

The importance of traffic signals is clearly exemplified by their significant influence over the orderly flow of area traffic volumes. When justified, properly designed and maintained, a signal may achieve one or more of the following:

Reduce the frequency of certain types of accidents
Effect orderly traffic movement
Provide for a continuous platoon of traffic flow
Allow vehicle and pedestrians to better cross opposing directions of traffic

However, should a signal be unjustified or poorly maintained, one or more of the following may result:

Increased accident frequency
Excessive delay (driver frustration)
Disregard of signal indications
Circuitous travel by alternate routes

Therefore, it is evident that a reduced intersection accident potential, and in particular, the maintenance of optimal traffic flow, is not possible without properly selected and maintained signal equipment. To achieve those goals, it is the intent of this update document to provide Laguna Hills decision makers with a logical and defendable document as to the time frame for eventual traffic signal construction. Exhibit 1 shows signals that currently exist in the City.

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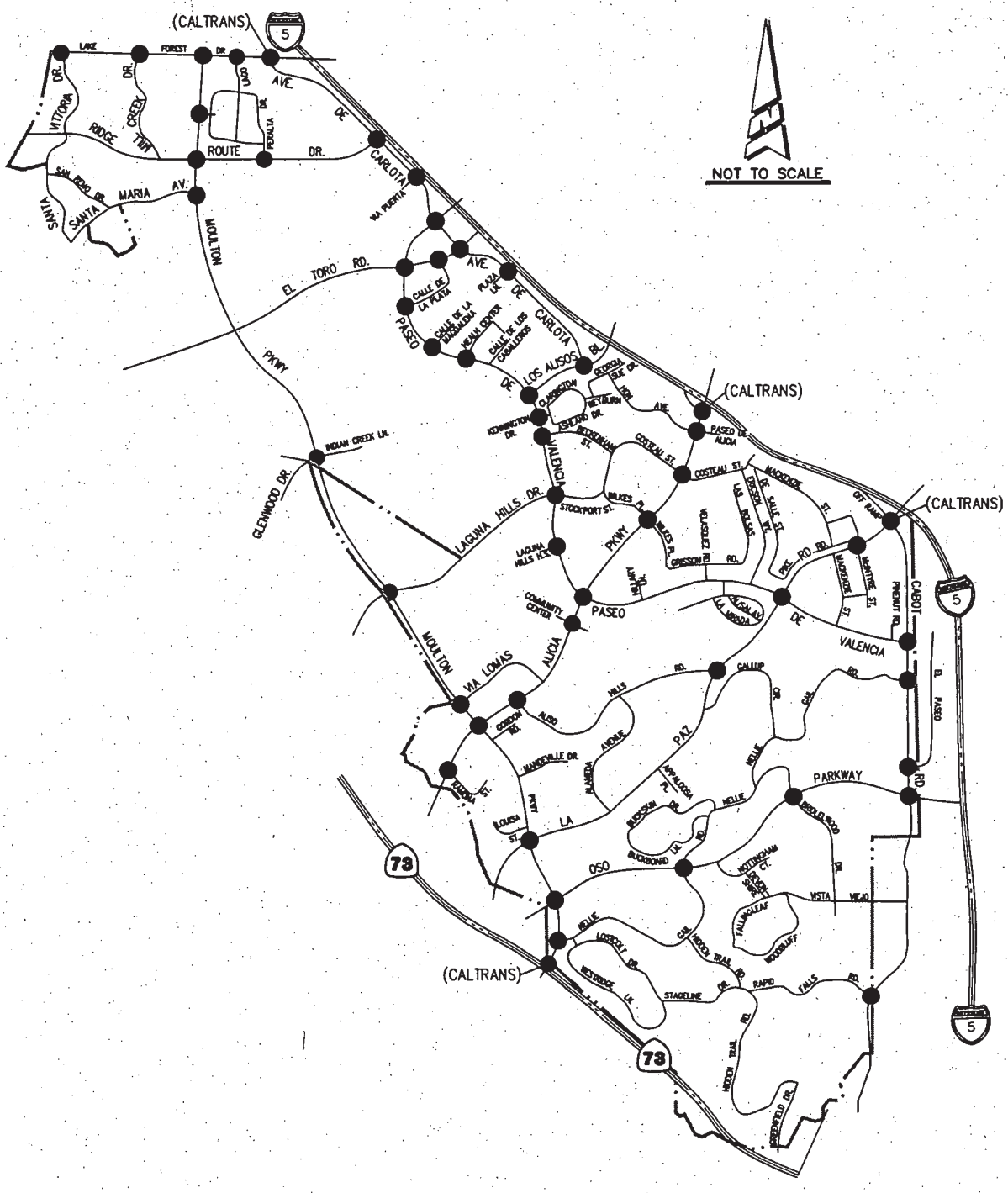
Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)



EXISTING SIGNAL LOCATIONS
2007 SIGNAL MASTER PLAN

CITY OF LAGUNA HILLS

EXHIBIT 1

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Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

The Need for Warranted Traffic Signals

It is noted that the primary use of the results in this report is to assist City planners in the decision process toward the installation of traffic signals. While good justification for the installation of a signal is based on Caltrans warrants, signals are not factually required simply because they meet certain warrants. The final decision to install a signal should not be based solely thereon. Since traffic signals may increase certain types of collisions, other elements such as delay, congestion, approach conditions, driver confusion, future land use, and other evidence for the need for such driver right a way assignment must also be factored into the results of this assessment.

2007 Traffic Signal Update Methodology

Inasmuch as several Master Plans and Updates have been prepared for the City, all having been used to track and identify when and where traffic signals should be constructed (prioritized to recognize budget limitations), this update re-evaluates the various analysis elements used in previous reports to provide for a consistent analysis and comparison. In all, the process involved about 15 steps. Using a continuation of the City's logical process in monitoring traffic volumes and accidents, new traffic counts at key locations were collected (those intersections where signals have been projected for the future). Further, recognizing that intersection conditions may have changed for locations never before considered for signalization, the new count program also includes those intersections as well. All of the new traffic counts are presented in Table 1 – covering 19 candidate signal locations.

Table 1
Traffic Volumes At Potential Signal Locations
(Presents Volumes for All Studied Locations Regardless of Warrant Satisfaction)

Loc	Major Street	Traffic Volumes		Minor Street	Traffic Volumes	
	Name (Speed Limit)	Approach Direction	2007 Volumes	Name (Speed Limit)	Approach Direction	2007 Volume
1	St. Vittoria (45 mph)	NB	807	Ridge Route Dr.	EB	N/A
		SB	2468		WB	2122
		Total	3215		Total	2122
2	Ridge Rt. Dr (45 mph)	EB	2252	Mill Creek Dr.	NB	N/A
		WB	2122		SB	938
		Total	4374		Total	938
3	St .Maria Ave. (45 mpg)	EB	4281	San Remo Dr.	NB	N/A
		WB	3116		SB	1388
		Total	7397		Total	1388
4	P.D.V. (45 mph)	EB	N/A	Calle Caballeros (Right Turn Only)	NB	N/A
		WB	N/A		SB	N/A
		Total	N/A		Total	N/A

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Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Table 1 (Continued)

5	P.D.V. (45mph)	EB	5651	Hillary Lane	NB	N/A
		WB	5759		SB	416
		Total	11,410		Total	416
6	P.D.V. (45 mph)	EB	5651	Velasquez Road	NB	N/A
		WB	5759		SB	335
		Total	11,410		Total	335
7	P.D.V. (45 mph)	NB	5651	Alisal Ave.	NB	1194
		SB	5759		SB	N/A
		Total	11,410		Total	1194
8	P.D.V. (45 mph)	EB	5651	Ericson Way	NB	N/A
		WB	5759		SB	759
		Total	11,410		Total	759
9	P.D.V. (45 mph)	EB	3269	Mackenzie St.	NB	N/A
		WB	2813		SB	172
		Total	6082		Total	172
10	P.D.V. (45 mph)	EB	3269	Pine Nut Rd.	NB	N/A
		WB	2813		SB	517
		Total	6082		Total	517
11	Oso Parkway (50 mph)	EB	N/A	Nottingham Ct (Right turn Only)	NB	N/A
		WB	N/A		SB	N/A
		Total	N/A		Total	N/A
12	La Paz Rd. (45 mph)	EB	8410	Alameda Ave.	NB	N/A
		WB	8136		SB	868
		Total	16,546		Total	868
13	La Paz Rd. (45 mph)	EB	7373	Appaloosa Place	NB	1094
		WB	8136		SB	N/A
		Total	15,509		Total	1094
14	La Paz Rd. (45 mph)	NB	7373	Gallup Dr.	EB	N/A
		SB	8136		WB	588
		Total	15,509		Total	588
15	Alicia Pkwy. (45 mph)	NB	22,991	Via Lomas	EB	2447
		SB	21,600		WB	N/A
		Total	44,591		Total	2447
16	Moulton Pkwy (45 mph)	NB	10,469	Gordon Rd.	EB	N/A
		SB	10.636		WB	1003
		Total	21,105		Total	1003
17	Moulton Pkwy (45mph)	NB	10,469	Mandeville Drive	EB	N/A
		SB	10.636		WB	740
		Total	21,105		Total	740
18	Moulton Pkwy (45 mph)	NB	10,469	Louisa St.	EB	607
		SB	10.636		WB	N/A
		Total	21,105		Total	607
19	Moulton Pkwy (45 mph)	NB	10,469	Indian Hill Lane	EB	N/A
		SB	10,636		WB	577
		Total	21,105		Total	577

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Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

In a manner identical to previous Signal Master Plans, the primary determination of the need for the construction of a traffic signal is via the use of Caltrans warranting criteria; with the new 2007 volumes being first input in "Warrant 1 and 2" worksheets published by Caltrans. Briefly, Warrant 1 is satisfied when the traffic volumes given in Table 2a (either hourly or daily depending on data availability) exist on the major street and on the higher volume minor street approach to the intersection. Warrant 2 (Table 2b) is brought into play when traffic volumes on the major street are so heavy that traffic on the minor intersection street suffers excessive delay or hazard in entering or crossing the major street.

This update analysis produced a list of locations (not yet prioritized) where traffic signals are currently warranted. These locations are shown on Exhibit 2 as well as Table 3. It is noted that in order to maintain consistency with the earlier Signal Master Plans, Table 3 and the several others in this report show all of the candidate locations for signals – however, those locations that are warranted with this update are shown via highlight. Once complete, the various data are then used to prioritize the intersections that warrant a signal.

Table 2a
Minimum Daily Traffic Volumes – Warrant 1

(Warrant 1 Based on Estimated Average Daily Traffic)

Approach Lanes On Major Street	Approach Lanes On Minor Street	Vehicles/day on Major Street (Total both approaches)		Vehicles/day on higher volume Minor street (one direction only)	
Number	Number	Urban	Rural	Urban	Rural
1	1	8,000	5,600	2,400	1,680
2 or more	1	9,600	6,720	2,400	1,680
2 or more	2 or more	9,600	6,720	3,200	2,240
1	2 or more	8,000	5,600	3,200	2,240

(Warrant 1 Based on Hourly Volumes – Eighth Highest hour)

Approach Lanes On Major Street	Approach Lanes On Minor Street	Major Street Total Approach Volumes		Minor Street Highest Approach Volumes	
Number	Number	Urban	Rural	Urban	Rural
1	1	500	350	150	105
2 or more	1	600	420	150	105
2 or more	2 or more	600	420	200	140
1	2 or more	500	350	200	140

OCT 09 2007 ITEM

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Table 2b
Interruption of Continuous Traffic – Warrant 2
(Warrant 2 Based on Estimated Average Daily Traffic)

Approach Lanes On Major Street	Approach Lanes On Minor Street	Vehicles/day on Major Street (Total both approaches)		Vehicles/day on higher volume Minor street (one direction only)	
Number	Number	Urban	Rural	Urban	Rural
1	1	12,000	8,400	1,200	850
2 or more	1	14,400	10,800	1,200	850
2 or more	2 or more	14,400	10,800	1,600	1,120
1	2 or more	12,000	8,400	1,600	1,120

(Warrant 2 Based on Hourly Volumes – Eighth Highest Hour))

Approach Lanes On Major Street	Approach Lanes On Minor Street	Major Street Total Approach Volumes		Minor Street Highest Approach Volumes	
Number	Number	Urban	Rural	Urban	Rural
1	1	750	525	75	53
2 or more	1	900	630	75	53
2 or more	2 or more	900	630	100	70
1	2 or more	750	525	100	70

Because an intersection theoretically could be signalized if it is 80% or more warranted (per Caltrans warranting procedures), Table 4 shows the "percentage warranted" values for each location. As discussed later in this report, Warrant 6 measures an intersection's recent accident history where a signal could be considered for construction depending on the number and severity of collision that are correctable by a signal. In this 2007 case, the results show that none of the candidate intersections for signals are warranted via their accident experience. Warrant 8 is included because of the fact that under certain circumstances, a signal may be constructed if warrants 1 and 2 are 80% satisfied.

Table 5 presents the indicated list of non-prioritized intersections where signals are now warranted.

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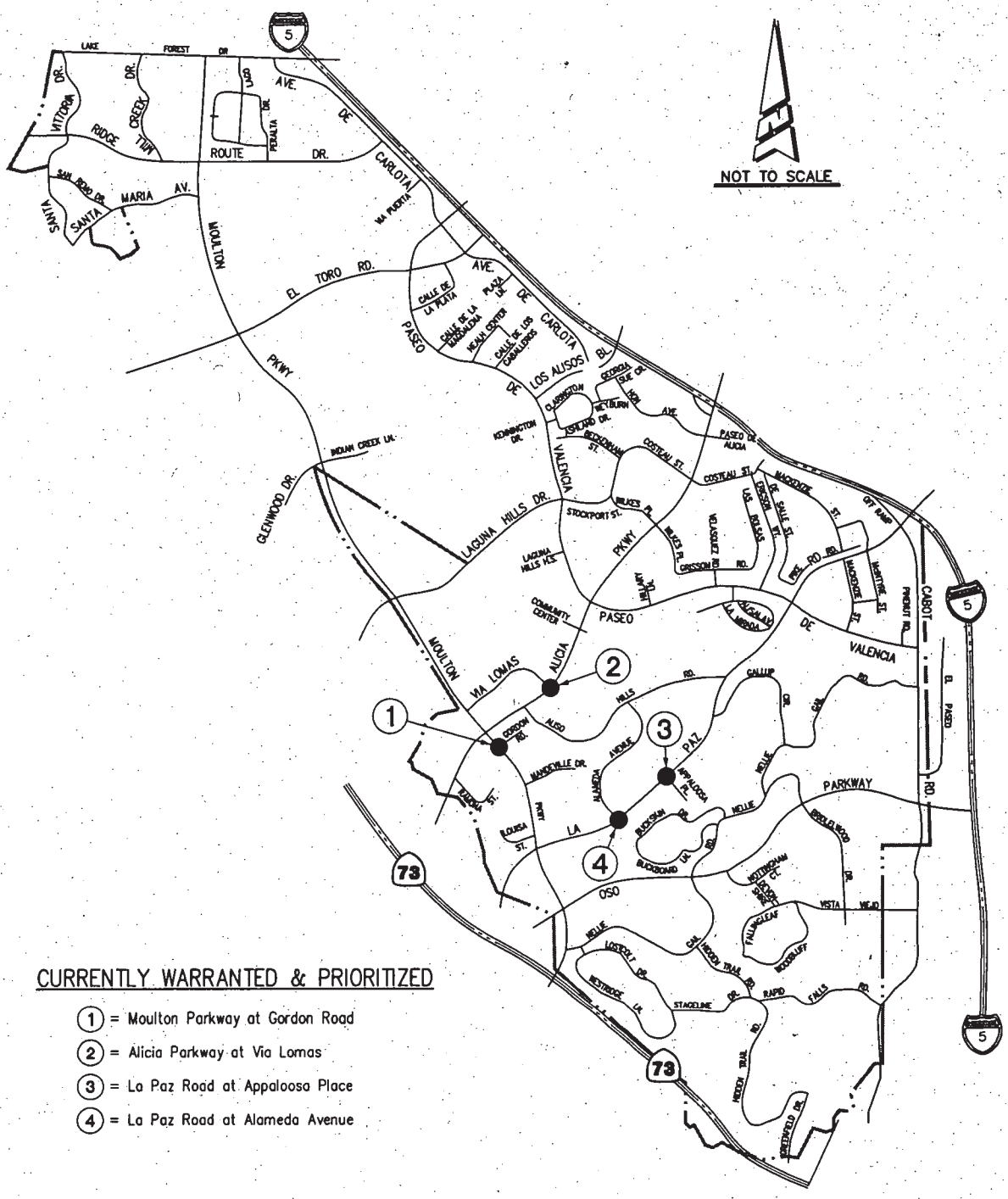

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Table 3
Signal Warrants – Existing Volumes

Loc	Major Street	Minor Street	Warrant Satisfied (12 Month Period)			
			1	2	6	8
1	Santa Vittoria	Ridge Route Dr.	NO	NO	NO	YES
2	Ridge Route Dr.	Mill Creek Dr.	NO	NO	NO	YES
3	St. Maria Ave.	San Remo Dr.	NO	NO	NO	NO
4(a)	P.D. Valencia	Calle Caballeros	N/A	N/A	N/A	N/A
5	P.D. Valencia	Hillary Lane	NO	NO	NO	NO
6	P.D. Valencia	Velasquez Road	NO	NO	NO	NO
7	P.D. Valencia	Alisal Ave.	NO	NO	NO	NO
8	P.D. Valencia	Ericson Way	NO	NO	NO	NO
9	P.D. Valencia	Mackenzie Street	NO	NO	NO	NO
10	P.D. Valencia	Pine Nut Road	NO	NO	NO	NO
11(b)	Oso Parkway	Nottingham Court	N/A	N/A	N/A	N/A
12	La Paz Road	Alameda Avenue	NO	YES	NO	N/A
13	La Paz Road	Appaloosa Place	NO	YES	NO	N/A
14	La Paz Road	Gallup Drive	NO	NO	NO	NO
15	Alicia Parkway	Via Lomas	YES	YES	NO	N/A
16	Moulton Pkwy	Gordon Road	NO	YES	NO	N/A
17	Moulton Pkwy	Mandeville Drive	NO	NO	NO	NO
18	Moulton Pkwy	Louisa Street	NO	NO	NO	NO
19	Moulton Pkwy	Indian Hill	NO	NO	NO	NO

(a) This location is right turn only for sb Calle Caballeros at PDV
(b) This location is right turn only for nb Nottingham at Oso Parkway
(c) Warrant 8 looks at signals that are not fully warranted by 1/2/6 but where warrants 1 and 2 are both 80% satisfied.

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Table 4
Signal Warrants – Percentage Satisfied

Loc	Major Street	Minor Street	Percentage Warrant Satisfied			
			1	2	6(1)	8 (3)
1	Santa Vittoria	Ridge Route Dr.	48/100	32/100	0	100
2	Ridge Route Dr.	Mill Creek Dr.	65/56	43/98	0	100
3	St. Maria Ave.	San Remo Dr.	100/83	73/100	0	N/a
4	P.D. Valencia	Calle Caballeros	N/a	N/a	N/a	N/a
5	P.D. Valencia	Hillary Lane	100/25	100/49	0	50
6	P.D. Valencia	Velasquez Road	100/20	100/39	0	50
7	P.D. Valencia	Alisal Ave.	100/71	100/80	0	N/a
8	P.D. Valencia	Ericson Way	100/45	100/89	0	N/a
9	P.D. Valencia	Mackenzie Street	91/10	60/20	0	50
10	P.D. Valencia	Pine Nut Road	91/31	60/61	0	0
11	Oso Parkway	Nottingham Court	N/a	N/a	N/a	N/a
12	La Paz Road	Alameda Avenue	100/52	100/100	0	0
13	La Paz Road	Appaloosa Place	100/65	100/100	1	N/a
14	La Paz Road	Gallup Drive	100/35	100/69	1	0
15	Alicia Parkway	Via Lomas	100/10 0	100/100	3	N/a
16	Moulton Pkwy	Gordon Road	100/60	100/100	4	N/a
17	Moulton Pkwy	Mandeville Drive	100/44	100/88	0	N/a
18	Moulton Pkwy	Louisa Street	100/36	100/71	1	0
19	Moulton Pkwy	Indian Hill	100/34	100/68	0	0

1. Recent 36-month accident period, number of which correctable by signal.
2. Calle Caballeros and Nottingham have been restricted to right turns only (4 & 11)
3. 100% means that both warrants 1 and 2 are 80% satisfied.

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Table 5
Intersections that Are Currently Warranted for a Traffic Signal
(Not Prioritized – See Table 13 for Prioritization)

1. La Paz Road at Alameda Avenue
2. La Paz Road at Appaloosa Place
3. Alicia Parkway at Via Lomas
4. Moulton Parkway at Gordon Road

Priority Rating System (Identifies Possible Order of Construction Per Available Funds)

With the above information in place, the next step involved the prioritization of the warranted signals. This was done by reviewing traffic and safety characteristics identified in seven "rating items." Again, the following was done in an identical manner as the earlier Traffic Signal Master Plans prepared for the City.

Rating Item 1 – Satisfaction of Caltrans Warrant 2 (Interruption of Continuous Traffic)

By using the data of Warrant 2, a rating item is created by using volumes of major street traffic. The reason centers on the fact that by such traffic being so large, it creates a danger for crossing vehicles or pedestrians. Table 6 shows the information relative to Warrant 2.

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Table 6 – Rating Item 1
Warrant 2 Satisfaction
(Interruption of Continuous Traffic)

	Loc	Major Street				Minor Street				Points
		Name	Lanes	Volume		Name	Lanes	Volumes		
				Leg 1	Leg 2			Leg 1	Leg 2	
	1	Santa Vittoria	2	807	2468	Ridge Route	1	2122	-	1
	2	Ridge Route	2	2252	2122	Mill Creek	1	938	-	0
	3	Santa Maria	2	4281	3116	San Remo	1	1388	-	9
	4	PDV	N/A	N/A	N/A	Calle Caballeros	Right	Turn	Only	
	5	PDV	2	5651	5759	Hillary Lane	1	416	-	9
	6	PDV	2	5651	5659	Velasquez Road	1	335	-	9
	7	PDV	2	5651	5659	Alisal Avenue	1	1194	-	9
	8	PDV	2	5651	5659	Ericson Way	1	759	-	9
	9	PDV	2	3269	2813	Mackenzie Street	1	172	-	3
	10	PDV	2	3269	3813	Pine Nut Road	1	517	-	3
	11	Oso Parkway	N/A	N/A	N/A	Nottingham Court	Right	Turn	Only	
	12	La Paz Road	2	8410	8136	Alameda Avenue	1	868	-	9
	13	La Paz Road	2	7373	8136	Appaloosa Pl.	1	1094	-	
	14	La Paz Road	2	7373	8136	Gallup Drive	1	588	-	10
	15	Alicia Parkway	2	21,600	22,991	Via Lomas	1	2447	-	10
	16	Moulton Parkway	2	10,469	10,636	Gordon Road	1	1003		
	17	Moulton Parkway	2	10,469	10,636	Mandeville Drive	1	740	-	10
	18	Moulton Pkwy	2	10,469	10,636	Louisa Street	1	607	-	10
	19	Moulton Parkway	2	10,469	10,636	Indian Hill	1	577	-	0

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Rating Item 2 – Coordinated Movement

This rating item takes into account how a particular signal would impact the orderly flow of traffic. A higher rating is given to a signal if it produces a disbursed flow of traffic. A lower rating occurs if the signal contributes to concentrated flow. Table 7 presents our conclusion for this rating item.

Table 7 – Rating Item 2
Coordinated Movement
(Signals Currently Warranted are Highlighted)

Loc	Major Street	Minor Street	Approaching Platoon			Points
			Intact	Spread	Disburse	
1	Santa Vittoria	Ridge Route			X	
2	Ridge Route	Mill Creek			X	
3	Santa Maria	San Remo			X	
4 (a)	PDV	Calle Caballeros	N/a	N/a	N/a	
5	PDV	Hillary Lane			X	
6	PDV	Valasquez Road			X	
7	PDV	Alisal Avenue			X	
8	PDV	Ericson Way			X	
9	PDV	Mackenzie St.			X	
10	PDV	Pine Nut Road	X			
11(b)	Oso Parkway	Nottingham Ct.	N/a	N/a	N/a	
12	La Paz Road	Alameda Ave.			X	5
13	La Paz Road	Appaloosa Pl.			X	5
14	La Paz Road	Gallup Drive			X	
15	Alicia Pkwy	Via Lomas		X		3
16	Moulton Pkwy	Gordon Road		X		3
17	Moulton Pkwy	Mandeville Dr.		X		
18	Moulton Pkwy	Louisa Street		X		
19	Moulton Pkwy	Indian Hill Ln.	X			

(a) This location is sb right turn only for Calle Caballeros at PDV
(b) This locations is nb right turn only for Nottingham at Oso.

Rating Item 3 – Accident Evaluation Results

A high intersection accident rate can be a sign of vehicles trying to enter the flow of traffic or cross the street when there are insufficient gaps in major street traffic. Therefore, the signal's potential to reduce or eliminate certain types of accidents generates points that can be used in the rating system – points that are consistent for all locations studied. Table 8 presents the results of this analysis element.

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Table 8 – Rating Item 3
Traffic Accidents
(Evaluates All Study Intersections Regardless of Warrant Satisfaction. Includes Broadsides, Left Turns and Ped Involvement)
(Intersections Currently Warranted Via 2007 Volumes Are Highlighted)

	Location	Major Street	Minor Street	Correctable Accidents 3 Year Period		Points
				Total	Ave.	
	15	Alicia Parkway	Via Lomas	3	1.0	10
	16	Moulton Pkwy	Gordon Road	4	1.33	13
	18	Moulton Parkway	Louisa Street	1	0.33	3
	2	Ridge Route	Mill Creek	0	0	0
	5	PDV	Hillary Lane	0	0	0
	10	PDV	Pine Nut Road	0	0	0
	17	Moulton Pkwy	Mandeville Drive	0	0	0
	7	PDV	Alisal Avenue	0	0	0
	6	PDV	Velasquez Road	0	0	0
	3	Santa Maria	San Remo	0	0	0
	8	PDV	Ericson Way	1	0.33	3
	9	PDV	Mackenzie Street	0	0	0
	12	La Paz Road	Alameda Avenue	0	0	0
	13	La Paz Road	Appaloosa Place	1	0.33	3
	14	La Paz Road	Gallup Drive	1	0.33	3
	1	Santa Vittoria	Ridge Route	0	0	0
	4 (a)	PDV	Calle Caballeros	N/a	N/a	N/a
	11 (a)	Oso Parkway	Nottingham Court	N/a	N/a	N/a
	19	Moulton Pkwy	Indian Hill Ln.	0	0	0

(a) Right Turn Only Location

Rating Item 4 – Special Conditions

This rating item considers extenuating circumstances that are not covered in other rating items or warrants. These could include for example the presence of school, churches, parks, and other public buildings. The various items found that relate to this rating item are in the following table.

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Table 9 - Rating Item 4
Special Conditions

Loc	Major St.	Minor Street	Special Conditions						Pts.
			Sch	Chch	Pub Bldg/Park	Curve	Hill	Sight Distance	
1	St. Vittoria	Ridge Route			X		x	x	7
2	Ridge Rt.	Mill Creek			X		x	x	7
3	St. Maria	San Remo	x			x	x	x	10
4	PDV	Calle Caballeros							N/A
5	PDV	Hillary Lane	x			x	x	x	10
6	PDV	Velasquez	x			x	x	x	10
7	PDV	Alisal Ave.				x	x	x	7
8	PDV	Ericson Way				x	x	x	7
9	PDV	Mackenzie Street	x			x	x	x	10
10	PDV	Pine Nut Rd.	x			x	x	x	10
11	Oso Pkwy	Nottingham Ct.							N/A
12	La Paz Rd.	Alameda Ave.					x	x	5
13	La Paz Rd.	Appaloosa Pl.					x		2
14	La Paz Rd.	Gallup Rd.				x	x	x	7
15	Alicia Pkwy	Via Lomas			x				2
16	Moulton Pkwy	Gordon Road				x	x	x	7
17	Moulton Pkwy	Mandeville Dr.			X	x	x	x	10
18	Moulton Pkwy	Louisa St.				x	x	x	7
19	Moulton Pkwy	Indian Hill Lane				x	x	x	7

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Rating Item 5 – Safety Index

This rating item uses accident totals to create a Benefit/Cost ratio. Since there are always several types of costs associated with accidents, it follows that the benefit of installing a traffic signal can be compared and rated to the cost of the different types of accidents. Table 10 provides the indicated safety index data.

Table 10 – Rating Item 5
Safety Index

Loc	Major Street	Minor Street	Three Year Accidents			
			Fatal	Injury	PDO	Pts
1	Santa Vittoria	Ridge Route Dr.	0	0	0	0
2	Ridge Route Dr.	Mill Creek Dr.	0	0	2	0
3	St. Maria Ave.	San Remo Dr.	0	0	1	0
4	P.D. Valencia	Calle Caballeros	N/A	Right	Turn	Only
5	P.D. Valencia	Hillary Lane	0	0	0	0
6	P.D. Valencia	Velasquez Road	0	0	0	0
7	P.D. Valencia	Alisal Ave.	0	0	1	0
8	P.D. Valencia	Ericson Way	0	3	0	8
9	P.D. Valencia	Mackenzie Street	0	0	0	0
10	P.D. Valencia	Pine Nut Road	0	0	0	0
11	Oso Parkway	Nottingham Court	N/A	Right	Turn	Only
12	La Paz Road	Alameda Avenue	0	0	1	0
13	La Paz Road	Appaloosa Place	0	1	2	3
14	La Paz Road	Gallup Drive	0	3	1	8
15	Alicia Parkway	Via Lomas	0	3	6	8
16	Moulton Pkwy	Gordon Road	0	4	6	10
17	Moulton Pkwy	Mandeville Drive	0	2	0	5
18	Moulton Pkwy	Louisa Street	0	3	1	8
19	Moulton Pkwy	Indian Hill Lane	0	0	0	0

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Rating Item 6 – Environmental Conditions

This evaluation looks at the environmental ramifications of a signal such as time delays, pollutant generation, aesthetic values and resource losses. Table 11 provides the information and the various rating points assigned to each.

Table 11 – Rating Item 6
Environmental Impact Assessment

Loc	Major Street	Minor Street	Environmental Impact			Pts.
			Minimal	Moderate	Substantial	
1	Santa Vittoria	Ridge Route	X			5
2	Ridge Route	Mill Creek	X			5
3	Santa Maria	San Remo	X			5
4	PDV	Calle Caballeros	N/a	Right	Turn Only	N/a
5	PDV	Hillary Lane	X			5
6	PDV	Velasquez Road	X			5
7	PDV	Alisal Avenue	X			5
8	PDV	Ericson Way	X			5
9	PDV	Mackenzie Street	X			5
10	PDV	Pine Nut Road	X			5
11	Oso Parkway	Nottingham Court	N/a	Right	Turn Only	N/a
12	La Paz Road	Alameda Avenue		X		2
13	La Paz Road	Appaloosa Place	X			2
14	La Paz Road	Gallup Drive	X			2
15	Alicia Parkway	Via Lomas	X			5
16	Moulton Parkway	Gordon Road	X			2
17	Moulton Parkway	Mandeville Drive	X			2
18	Moulton Parkway	Louisa Street	X			2
19	Moulton	Indian Hill Ln.	X			2

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Rating Item 7 – Highway Geometry

In general, it is more cost effective and more productive to signalize a four – legged intersection than one of the "TEE" configuration. Also, a signal at the intersection of two arterial streets will better serve the community than will a signal at the intersection of two local residential streets. (Table 12).

Table 12 – Rating Item 7
Highway Geometry

Loc.	Inter Type	Major Street		Minor Street		Pts.
		Name	Class.	Name	Class.	
1	4	Santa Vittoria	Arterial	Ridge Route Dr.	Collector	4
2	T	Ridge Route	Arterial	Mill Creek Dr.	Collector	3
3	T	Santa Maria	Arterial	San Remo Dr.	Collector	3
4	T	PDV	Arterial	Calle Caballeros	Collector	N/A
5	T	PDV	Arterial	Hillary Lane	Collector	3
6	T	PDV	Arterial	Velasquez Road	Collector	3
7	T	PDV	Arterial	Alisal Avenue	Collector	3
8	T	PDV	Arterial	Ericson Way	Collector	3
9	T	PDV	Arterial	Mackenzie Street	Collector	3
10	T	PDV	Arterial	Pine Nut Road	Collector	3
11	T	Oso Parkway	Arterial	Nottingham Court	Collector	N/A
12	T	La Paz Road	Arterial	Alameda Avenue	Collector	3
13	T	La Paz Road	Arterial	Appaloosa Place	Collector	3
14	T	La Paz Road	Arterial	Gallup Drive	Collector	3
15	T	Alicia Parkway	Arterial	Via Lomas	Collector	3
16	T	Moulton Pkwy	Arterial	Gordon Road	Collector	3
17	T	Moulton Pkwy	Arterial	Mandeville Drive	Collector	3
18	T	Moulton Pkwy	Arterial	Louisa Street	Collector	3
19		Moulton Pkwy	Arterial	Indian Hill Ln.	Collector	3

N/A = Right Turn Only Intersection

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Taking all of the above rating criteria into consideration, existing unsignalized intersections that satisfy Caltrans warrants for signalization can be prioritized for possible construction. Those prioritized locations are shown in list below with Table 13 showing the greater detail of the prioritization process.

1. Moulton Parkway at Gordon Road
2. Alicia Parkway at Via Lomas
3. La Paz Road at Appaloosa Place
4. La Paz Road at Alameda Avenue

Table 13
Priority Ranking of Unsignalized Intersections Meeting Warrants
(Prioritized)

			Rating Item Number Maximum Points							
			1	2	3	4	5	6	7	Total
Loc	Major Street	Minor Street	10	5	20	15	10	5	5	70
16	Moulton Parkway	Gordon Road	10	3	13	7	10	2	3	48
15	Alicia Parkway	Via Lomas	10	3	10	2	8	5	3	41
13	La Paz Rd.	Appaloosa Place	9	5	3	2	3	2	3	27
12	La Paz Rd.	Alameda Avenue	9	5	0	5	0	2	3	24

Note: For reference/comparison to the above in non – prioritized format, refer to Table 5.

In terms of future traffic signals, it is recommended that this update be performed on a periodic basis. The reason concerns fluctuating traffic volumes along with accident levels that change from year to year. For that reason, we recommend that new counts be taken each year along with an assessment of accidents at the unsignalized intersections. Then, through a relatively simple process, the numbers of this report, along with the various point scores shown in the tables can be updated.

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RATING ITEMS

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RATING ITEM 1
INTERUPTION OF CONTINUOUS TRAFFIC (10 POINTS MAXIMUM)
(Warrant 2)

Vehicles attempting to cross the major flow of traffic or enter that flow can cause the traffic on the through street to be delayed or slow down unnecessarily. The installation of a signal at such locations can actually speed up the traffic flow on the major street. Table A1 shows the percent of the maximum assigned points based on the major street daily volume. For example, an intersection where the traffic volume on the major street average 11,000 vehicles per day would receive 70% of the maximum allowed. In the above example, the intersection would receive 7 points for this rating area.

Table A1 – Percent of Maximum Points – Interruption of Continuous Traffic

Major Street Volume Of at Least…	Percent of Maximum
4,700	0 (0)
5,600	10 (1)
6,400	20 (2)
7,300	30 (3)
8,200	40 (4)
9,000	50 (5)
10.000	60 (6)
10,700	70 (7)
11,600	80 (8)
12,400	90 (9)
17,500	100 (10)

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RATING ITEM 2
COORDINATED MOVEMENT (5 POINTS MAXIMUM)

When a traffic signal turns green and the waiting vehicles start down the roadway, they are in a relatively compact grouping referred to as a "platoon". As this group of vehicles progress down the street, they become more and more disbursed due to difference in driving speeds. As a result, some of the cars in the original platoon are unable to make it through the next signal and are forced to stop. In some cases, the installation of a signal between the original two can keep this platoon intact and actually reduce the overall driving delay. This item depends on engineering judgment and should include present and future traffic demands of the area.

A signal may be justified when it forms a part of an interconnected or coordinated system and would serve the purpose of maintaining traffic volumes in relatively concentrated platoons of vehicle. Typically, the following question could be asked: "Would a signal at this location cause the platoon approaching the next signal to be concentrated (5 points), moderately concentrated (2 points) or disbursed (0 points)?"

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RATING ITEM 3
ACCIDENT HAZARDS

A high intersection accident rate can be a sign of vehicles (and pedestrians) trying to enter the flow of traffic or cross the street when there are insufficient gaps in the major street traffic. Only those accidents susceptible to correction by traffic signals should be considered when evaluating this item. And even the, only if less restrictive measures such as warning signs, proper lighting, painted markings, etc., have failed. Accidents which are susceptible to correction by a traffic signal are normally considered to be "broadside" or right-angle accidents, left turn accidents and those accidents involving pedestrians. In this item, the maximum number of points is assigned to the intersection with the highest number of correctable accidents and 0 is assigned to the lowest. Table A5 illustrates the points that would be assigned if the highest intersection had six accidents and the lowest intersection had none.

TABLE A5 - Percent of Maximum Points - Accident Hazard

Correctable Accidents	Points
6	(20)
5	(16)
4	(13)
3	(10)
2	(6)
1	(3)
0	(0)

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RATING ITEM 4
SPECIAL CONDITIONS (15 POINTS MAXIMUM)

This item considers extenuating circumstances that are not covered in other items in this rating system. These may include the proximity of schools, churches, public buildings, and other traffic and pedestrian generators; an abrupt change from a rural to an urban area; the need for police control during portions of the day; a steep hill; a horizontal curve; or restricted sight distance. This requires engineering judgment based on physical inspection of the site. Equal weights should be given to each of the items considered here. In table A6, the percentages and points based on how many of 6 conditions were located.

TABLE A6 - Percent of Maximum Points - Special Conditions

Conditions Located	Points
6	100(15)
5	83(12)
4	67(10)
3	50(7)
2	33(5)
1	17(2)
0	0(0)

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RATING ITEM 5
SAFETY INDEX (15 POINTS MAXIMUM)

A safety index is the Benefit /Cost ratio for a safety improvement expressed as a number. The costs and benefits are directly related to the number of accidents at a location, which are susceptible to correction, by a traffic signal. Points are assigned by setting the highest Benefit/Cost ratio to the maximum allowed points and the minimum Benefit/Cost ratio to zero. Ratings in between are allocated a proportion of the number of points between zero and the maximum. Normally, a two-year accident history is used to derive the benefit that would be achieved if those accidents were prevented through the installation of a traffic signal. The accidents are grouped into categories with costs and weighted. The "benefit" portion of the ratio is actually the estimated cost of the various severity categories as listed below.

Table A7 – "Costs" of Traffic Accidents

Category	Cost
Fatal Accidents	$287,175
Injury Accidents	$8,085
Property Damage Accidents	$520

Table A8 – Typical Signal Installation Costs in Southern California

Intersection Type	Cost
Four Leg Intersection	$250,000
T Intersection	$200,000

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Rating Item 6
Environmental (5 Points Maximum)

This is the only rating item that can actually be assigned negative points. An evaluation of the environmental considerations should be made including time delays, pollutant generation, aesthetic values and resource losses. A project that minimizes problems would receive the maximum 5 points while a project that has a substantial adverse effect would receive a negative 5 points. Gradations may be employed between the two limits.

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Rating Item 7
Highway Geometry (5 Points Maximum)

In general, it is more cost effective and more productive to signalize a four – legged intersection than one of the "TEE" Configuration. Also, a signal at the intersection of two arterial streets will better serve the community than will a signal at the intersection of two local residential streets.

HigherVolume Street Is…	Lower Volume Street Is….	Percent of Maximum Points if….	
		Intersection is T	Intersection is 4 Legged
Local	Local	0	0
Collector	Local	10 (0)	20 (1)
	Collector	30 (1)	40 (2)
Arterial	Local	50 (2)	60 (3)
	Collector	70 (3)	80 (4)
	Arterial	90 (4)	100 (5)

OCT 09 2007 ITEM 4.5

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

CITY OF LAGUNA HILLS
TRAFFIC COMMISSION
AGENDA REPORT
TRAFFIC ENGINEER DEPARTMENT

ISSUE: TRAFFIC SIGNAL MASTER PLAN – AUGUST 2007 DRAFT

SUMMARY:

On a periodic basis, the City prepares a Traffic Signal Master Plan Update to evaluate intersections at which new traffic signals may meet minimum established standards for installation. This evaluation further provides assistance to the City Council in prioritizing future traffic signal installations. It is noted that intersections meeting the minimum standard for a traffic signal installation are not required to have a traffic signal installed. Rather, this information provides a tool for considering such installations. The consulting Traffic Engineers of Hartzog and Crabill have completed the August 2007 Draft Traffic Signal Master Plan and is provided to the Traffic Commission for review and acceptance of recommendations.

BACKGROUND:

The Traffic Signal Master Plan has been updated since its last issue in April 2003. The consulting Traffic Engineers of Hartzog and Crabill have completed this August 2007 draft report, attached. The Master Plan, following the procedures in previous editions, evaluated potential new traffic signal installations against the minimum standards (warrants) used by the State of California for traffic signals. The City currently operates 47 traffic signals. A total of 19 arterial highway intersections without traffic signals were evaluated. Four locations were found to meet the minimum standards for traffic signal installation. Following an established prioritization procedure, these four locations were rated and then ranked in priority order as follows:

1. Moulton Parkway at Gordon Road
2. Alicia Parkway at Via Lomas
3. La Paz Road at Appaloosa Place
4. La Paz Road at Alameda Avenue

RECOMMENDATION: THAT THE TRAFFIC COMMISSION APPROVE THE TRAFFIC SIGNAL MASTER PLAN UPDATE AND RECOMMEND TO THE CITY COUNCIL THE ACCEPTANCE OF THE TRAFFIC SIGNAL PRIORITIZATION LISTING.

SEPTEMBER 19, 2007, ITEM NO. 4.1

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Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Intersections that meet the minimum warrants for traffic signal installation do not require that a traffic signal be installed. Rather, this information is a planning tool used to consider the future installation of a traffic signal. At the above four intersections, the minimum warrants being met related to traffic volumes but none of the locations met the warrant for traffic collision history. Often, the installation of a traffic signal can lead to increased numbers of traffic collisions although the severity may be different than at non-signalized intersection. Alternatives to a traffic signal include converting Tee intersections into right turn only intersections thereby eliminating either one or both of the left turn movements currently allowed. This can improve traffic flow and reduce traffic collision events. All four of the above intersections are Tee intersections.

The Traffic Commission is requested to review the Traffic Signal Master Plan Update – August 2007 Draft and approve the recommended traffic signal prioritization. The report is planned to be presented to the City Council in October 2007.

FISCAL IMPACT:

The construction cost of a traffic signal is approximately $250,000 with annual maintenance and power costs of about $3,000. The Capital Improvement Program Budget includes funding for a new traffic signal in the "future" budget category.

RECOMMENDATION: THAT THE TRAFFIC COMMISSION APPROVE THE TRAFFIC SIGNAL MASTER PLAN UPDATE AND RECOMMEND TO THE CITY COUNCIL THE ACCEPTANCE OF THE TRAFFIC SIGNAL PRIORITIZATION LISTING.

ATTACHMENTS:

Master Plan of Traffic Signals Update – August 2007 Draft

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

City of Laguna Hills
Traffic Signal Master Plan
Plan Update

Prepared for:
City of Laguna Hills
24035 El Toro Road
Laguna Hills, Ca. 92653

Prepared by:
Hartzog & Crabill, Inc .
275 Centennial Way, St. 208
Tustin, CA. 92680
(714) 731 – 9455

August 2007

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

August 10, 2007

Mr. Kenneth H. Rosenfield, P.E.
City Engineer
City of Laguna Hills
24035 El Toro Road
Laguna Hills, CA. 92653

Subject: ***Traffic Signal Master Plan – 2007***

Dear Ken:

In accordance the City's recent authorization, Hartzog & Crabill, Inc. is pleased to submit this 2007 update of the Laguna Hills Traffic Signal Master Plan. The procedure followed established formats of (1) an evaluation of existing conditions, (2) a review of intersection locations that could eventually become warranted for construction, and (3) the prioritization of the warranted signals.

The evaluation shows that four intersections have become either new candidates for construction or remain so from earlier updates. Of those, the highest rank for this time period is Moulton Parkway at Gordon road. This is followed by Alicia Parkway at Via Lomas. Given the numerous elements that have been used in prioritizing those signals, we recommend that they be considered for construction as funds are available. The other two that were found to be warranted, but of a lesser construction priority are La Paz Road at Appaloosa Place and La Paz Road at Alameda Avenue.

In terms of future traffic signals, we recommend that new counts be taken each year along with an assessment of accidents at the unsignalized intersections. Then, through a relatively simple process, the numbers of this report, along with the various point scores shown in the tables, can be updated.

As always, we appreciate the opportunity of preparing this administrative document for you use. During your review of its contents, please do not hesitate to call for added detail or other clarifications.

Very Truly Yours:

Hartzog & Crabill, Inc.

Jerry Crabill, P.E.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

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Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

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Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Executive Summary

Goals and Objectives

Similar to earlier versions of the City's Traffic Signal Master Plan, the goal of the year 2007 assessment was to provide City staff with a useful and logical planning tool for traffic signal construction. Our objective was to create a prioritized intersection signalization list for existing locations. While changeable depending on future conditions, the list would clearly show the many reasons behind (1) our decision for prioritization of traffic signal installations and (2) supporting documentation toward City decisions for future budgeting.

Study Methodology

The study's methodology was straightforward and consistent with previous Traffic Signal Master Plans. Since most signal construction decisions are based on warrant satisfaction described by Caltrans, our work relied on new 2007 traffic counts at 19 candidate intersection locations. Those volumes were input into signal construction criteria relating to traffic entering the various intersections. Other criteria also used included evaluating cross traffic needs to enter the main traffic flow on the City's arterial highways. A detailed evaluation of accidents at all locations was also conducted. Since the "types" of accidents that most often can be corrected by a traffic signal is the broadside, left turn or pedestrian involved accidents, the City's computer database of accidents was investigated for those elements.

All of the data collected and analyzed via the above was then compiled into a logical process of construction prioritization. This involves a list showing the City where signals are currently needed, why such needs have materialized since the last update (year 2003), and the order by which the new signals should be constructed.

The same rating system was used as in previous studies. This involved the preparation of several tables that present existing traffic volumes and accidents in different comparative ways. Using that information, and coupled with our experience as to the best location for traffic signals, the priority rating system was used as an aid in making final traffic signal construction priority recommendations.

The Need For Warranted Traffic Signals

It is noted that the primary use of the results in this report is to assist City planners in the decision process toward the installation of traffic signals. While good justification for the installation of a signal is based on Caltrans warrants, signals are not factually required simply because they meet certain warrants. The final decision to install a signal should not be based solely thereon. Since traffic signals may increase certain types of collisions, other elements such as delay, congestion, approach conditions, driver confusion, future land use, and other evidence for the need for such driver right a way assignment must also be factored into the results of this assessment.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

SIGNAL MASTER PLAN RESULTS FOR 2007

The evaluation of existing 2007 traffic volumes, accidents, and other important elements revealed that four intersections have become or remain (from the 2003 assessment) candidates for signalization. These locations are:

(1) ***Moulton Parkway at Gordon Road,***
(2) ***Alicia Parkway at Via Lomas***
(3) ***La Paz Road At Appaloosa Place***
(4) ***La Paz Road at Alameda Avenue.***

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

City of Laguna Hills
Traffic Signal Master Plan Update
August 2007

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

City of Laguna Hills
2007 Traffic Signal Master Plan

Introduction

The City of Laguna Hills requested that the 2003 City-wide Traffic Signal Master Plan be updated to reflect changes in traffic conditions. Since those conditions are directly related to the need for traffic signals at various locations, it follows that new requirements for signalization may now be necessary. To that end, the following information prepared by Hartzog & Crabill identifies those changes along with any new intersections where signalization should be considered.

The Importance of Traffic Signals and Growth Monitoring

The control of traffic by means of signalized intersection operation has long proven to be an effective technique to reduce accidents and generally improve the quality of traffic flow. To assist the City in the maintenance of a satisfactory signal monitoring program, this report has been prepared as part of a continuing series of periodic signal evaluations: assisting in signal improvement decisions as well as the necessary municipal budgeting process. This plan will also be useful to maintain and/or upgrade/prioritize the existing signal system and to provide a prioritization of future traffic signal installations.

The importance of traffic signals is clearly exemplified by their significant influence over the orderly flow of area traffic volumes. When justified, properly designed and maintained, a signal may achieve one or more of the following:

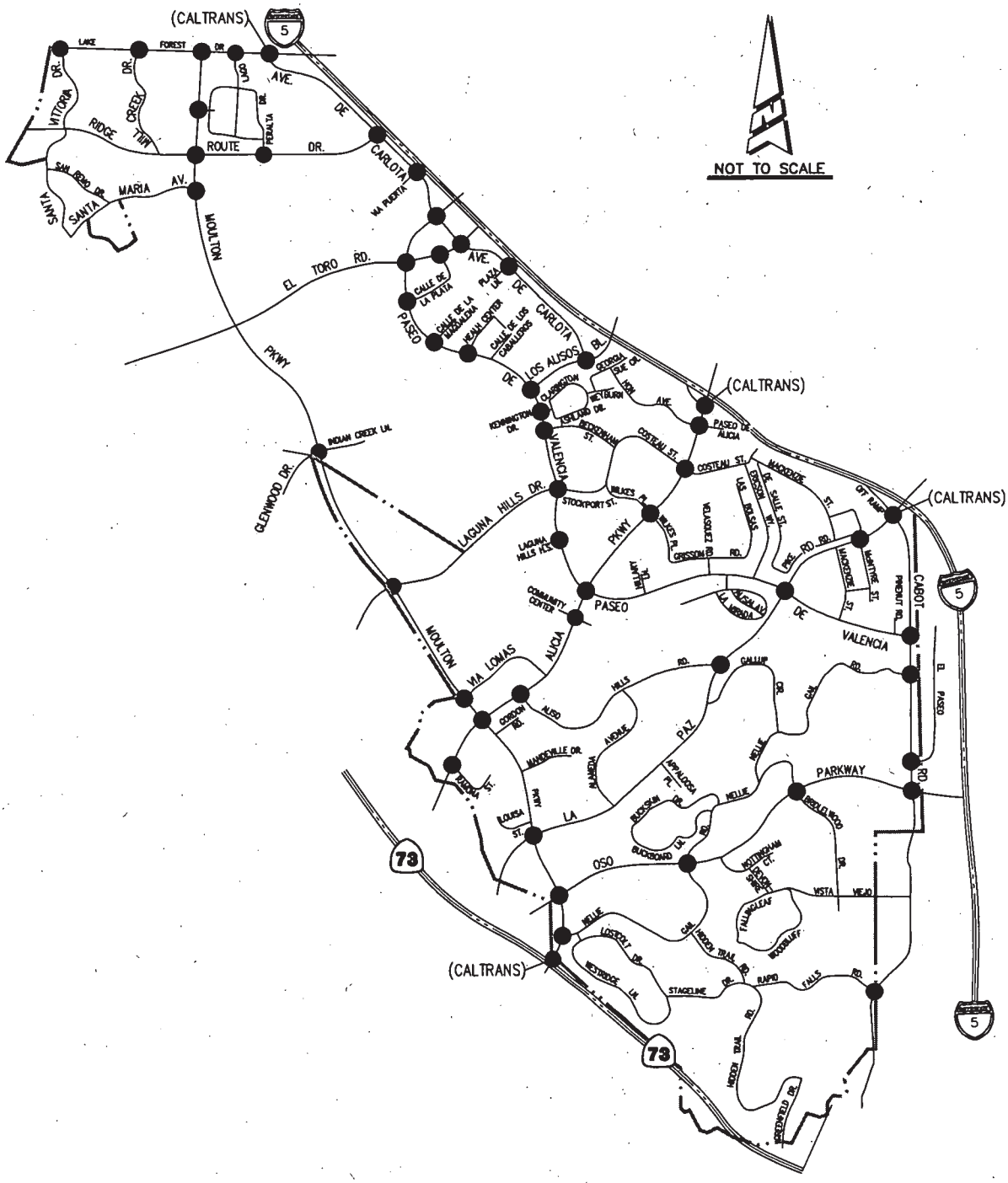
Reduce the frequency of certain types of accidents
Effect orderly traffic movement
Provide for a continuous platoon of traffic flow
Allow vehicle and pedestrians to better cross opposing directions of traffic

However, should a signal be unjustified or poorly maintained, one or more of the following may result:

Increased accident frequency
Excessive delay (driver frustration)
Disregard of signal indications
Circuitous travel by alternate routes

Therefore, it is evident that a reduced intersection accident potential, and in particular, the maintenance of optimal traffic flow, is not possible without properly selected and maintained signal equipment. To achieve those goals, it is the intent of this update document to provide Laguna Hills decision makers with a logical and defendable document as to the time frame for eventual traffic signal construction. Exhibit 1 shows signals that currently exist in the City.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)



EXISTING SIGNAL LOCATIONS
2007 SIGNAL MASTER PLAN

CITY OF LAGUNA HILLS

EXHIBIT 1

HCI CAD FILE: SIGNAL-MASTERPLAN_07.dwg

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

The Need for Warranted Traffic Signals

It is noted that the primary use of the results in this report is to assist City planners in the decision process toward the installation of traffic signals. While good justification for the installation of a signal is based on Caltrans warrants, signals are not factually required simply because they meet certain warrants. The final decision to install a signal should not be based solely thereon. Since traffic signals may increase certain types of collisions, other elements such as delay, congestion, approach conditions, driver confusion, future land use, and other evidence for the need for such driver right a way assignment must also be factored into the results of this assessment.

2007 Traffic Signal Update Methodology

Inasmuch as several Master Plans and Updates have been prepared for the City, all having been used to track and identify when and where traffic signals should be constructed (prioritized to recognize budget limitations), this update re-evaluates the various analysis elements used in previous reports to provide for a consistent analysis and comparison. In all, the process involved about 15 steps. Using a continuation of the City's logical process in monitoring traffic volumes and accidents, new traffic counts at key locations were collected (those intersections where signals have been projected for the future). Further, recognizing that intersection conditions may have changed for locations never before considered for signalization, the new count program also includes those intersections as well. All of the new traffic counts are presented in Table 1 – covering 19 candidate signal locations.

Table 1
Traffic Volumes At Potential Signal Locations
(Presents Volumes for All Studied Locations Regardless of Warrant Satisfaction)

Loc	Major Street	Traffic Volumes		Minor Street	Traffic Volumes	
	Name (Speed Limit)	Approach Direction	2007 Volumes	Name (Speed Limit)	Approach Direction	2007 Volume
1	St. Vittoria (45 mph)	NB	807	Ridge Route Dr.	EB	N/A
		SB	2468		WB	2122
		Total	3215		Total	2122
2	Ridge Rt. Dr (45 mph)	EB	2252	Mill Creek Dr.	NB	N/A
		WB	2122		SB	938
		Total	4374		Total	938
3	St .Maria Ave. (45 mpg)	EB	4281	San Remo Dr.	NB	N/A
		WB	3116		SB	1388
		Total	7397		Total	1388
4	P.D.V. (45 mph)	EB	N/A	Calle Caballeros (Right Turn Only)	NB	N/A
		WB	N/A		SB	N/A
		Total	N/A		Total	N/A

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Table 1 (Continued)

5	P.D.V. (45mph)	EB	5651	Hillary Lane	NB	N/A
		WB	5759		SB	416
		Total	11,410		Total	416
6	P.D.V. (45 mph)	EB	5651	Velasquez Road	NB	N/A
		WB	5759		SB	335
		Total	11,410		Total	335
7	P.D.V. (45 mph)	NB	5651	Alisal Ave.	NB	1194
		SB	5759		SB	N/A
		Total	11,410		Total	1194
8	P.D.V. (45 mph)	EB	5651	Ericson Way	NB	N/A
		WB	5759		SB	759
		Total	11,410		Total	759
9	P.D.V. (45 mph)	EB	3269	Mackenzie St.	NB	N/A
		WB	2813		SB	172
		Total	6082		Total	172
10	P.D.V. (45 mph)	EB	3269	Pine Nut Rd.	NB	N/A
		WB	2813		SB	517
		Total	6082		Total	517
11	Oso Parkway (50 mph)	EB	N/A	Nottingham Ct (Right turn Only)	NB	N/A
		WB	N/A		SB	N/A
		Total	N/A		Total	N/A
12	La Paz Rd. (45 mph)	EB	8410	Alameda Ave.	NB	N/A
		WB	8136		SB	868
		Total	16,546		Total	868
13	La Paz Rd. (45 mph)	EB	7373	Appaloosa Place	NB	1094
		WB	8136		SB	N/A
		Total	15,509		Total	1094
14	La Paz Rd. (45 mph)	NB	7373	Gallup Dr.	EB	N/A
		SB	8136		WB	588
		Total	15,509		Total	588
15	Alicia Pkwy. (45 mph)	NB	22,991	Via Lomas	EB	2447
		SB	21,600		WB	N/A
		Total	44,591		Total	2447
16	Moulton Pkwy (45 mph)	NB	10,469	Gordon Rd.	EB	N/A
		SB	10.636		WB	1003
		Total	21,105		Total	1003
17	Moulton Pkwy (45mph)	NB	10,469	Mandeville Drive	EB	N/A
		SB	10.636		WB	740
		Total	21,105		Total	740
18	Moulton Pkwy (45 mph)	NB	10,469	Louisa St.	EB	607
		SB	10.636		WB	N/A
		Total	21,105		Total	607
19	Moulton Pkwy (45 mph)	NB	10,469	Indian Hill Lane	EB	N/A
		SB	10,636		WB	577
		Total	21,105		Total	577

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

In a manner identical to previous Signal Master Plans, the primary determination of the need for the construction of a traffic signal is via the use of Caltrans warranting criteria; with the new 2007 volumes being first input in "Warrant 1 and 2" worksheets published by Caltrans. Briefly, Warrant 1 is satisfied when the traffic volumes given in Table 2a (either hourly or daily depending on data availability) exist on the major street and on the higher volume minor street approach to the intersection. Warrant 2 (Table 2b) is brought into play when traffic volumes on the major street are so heavy that traffic on the minor intersection street suffers excessive delay or hazard in entering or crossing the major street.

This update analysis produced a list of locations (not yet prioritized) where traffic signals are currently warranted. These locations are shown on Exhibit 2 as well as Table 3. It is noted that in order to maintain consistency with the earlier Signal Master Plans, Table 3 and the several others in this report show all of the candidate locations for signals – however, those locations that are warranted with this update are shown via highlight. Once complete, the various data are then used to prioritize the intersections that warrant a signal.

Table 2a
Minimum Daily Traffic Volumes – Warrant 1

(Warrant 1 Based on Estimated Average Daily Traffic)

Approach Lanes On Major Street	Approach Lanes On Minor Street	Major Street Total Approach Volumes		Minor Street Highest Approach Volumes	
Number	Number	Urban	Rural	Urban	Rural
1	1	8,000	5,600	2,400	1,680
2 or more	1	9,600	6,720	2,400	1,680
2 or more	2 or more	9,600	6,720	3,200	2,240
1	2 or more	8,000	5,600	3,200	2,240

(Warrant 1 Based on Hourly Volumes – Eighth Highest hour)

Approach Lanes On Major Street	Approach Lanes On Minor Street	Major Street Total Approach Volumes		Minor Street Highest Approach Volumes	
Number	Number	Urban	Rural	Urban	Rural
1	1	500	350	150	105
2 or more	1	600	420	150	105
2 or more	2 or more	600	420	200	140
1	2 or more	500	350	200	140

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Table 2b
Interruption of Continuous Traffic – Warrant 2
(Warrant 2 Based on Estimated Average Daily Traffic)

Approach Lanes On Major Street	Approach Lanes On Minor Street	Major Street Total Approach Volumes		Minor Street Highest Approach Volumes	
Number	Number	Urban	Rural	Urban	Rural
1	1	12,000	8,400	1,200	850
2 or more	1	14,400	10,800	1,200	850
2 or more	2 or more	14,400	10,800	1,600	1,120
1	2 or more	12,000	8,400	1,600	1,120

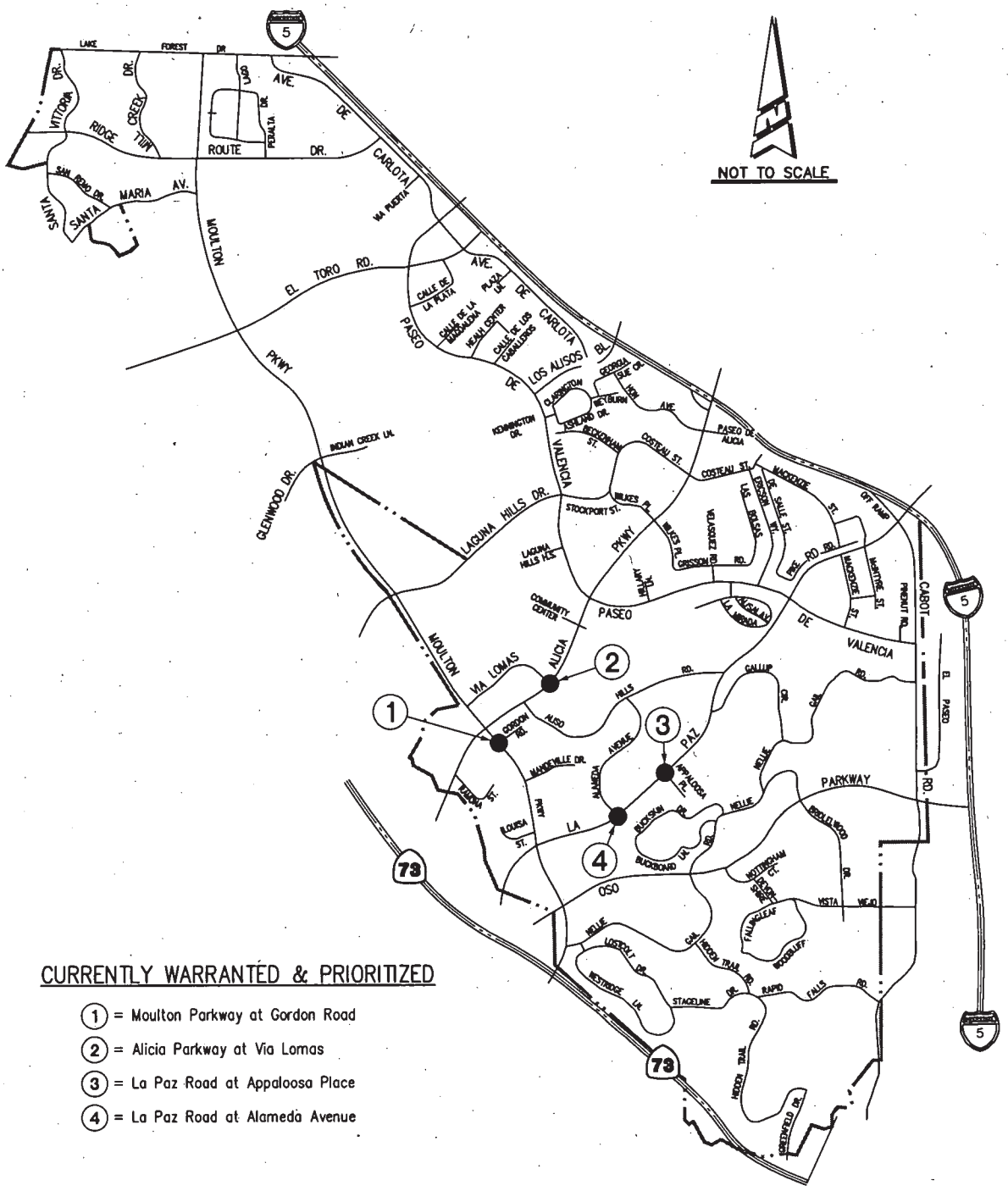
(Warrant 2 Based on Hourly Volumes – Eighth Highest Hour))

Approach Lanes On Major Street	Approach Lanes On Minor Street	Major Street Total Approach Volumes		Minor Street Highest Approach Volumes	
Number	Number	Urban	Rural	Urban	Rural
1	1	750	525	75	53
2 or more	1	900	630	75	53
2 or more	2 or more	900	630	100	70
1	2 or more	750	525	100	70

Because an intersection theoretically could be signalized if it is 80% or more warranted (per Caltrans warranting procedures), Table 4 shows the "percentage warranted" values for each location. As discussed later in this report, Warrant 6 measures an intersection's recent accident history where a signal could be considered for construction depending on the number and severity of collision that are correctable by a signal. In this 2007 case, the results show that none of the candidate intersections for signals are warranted via their accident experience. Warrant 8 is included because of the fact that under certain circumstances, a signal may be constructed if warrants 1 and 2 are 80% satisfied.

Table 5 presents the indicated list of non-prioritized intersections where signals are now warranted.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)



CURRENTLY WARRANTED & PRIORITIZED

(1) = Moulton Parkway at Gordon Road

(2) = Alicia Parkway at Via Lomas

(3) = La Paz Road at Appaloosa Place

(4) = La Paz Road at Alameda Avenue

INTERSECTIONS CURRENTLY WARRANTED FOR SIGNALS 2007 SIGNAL MASTER PLAN

CITY OF LAGUNA HILLS

EXHIBIT 2

HCI CAD FILE: SIGNAL-MASTERPLAN_07.dwg

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Table 3
Signal Warrants – Existing Volumes

Loc	Major Street	Minor Street	Warrant Satisfied (12 Month Period)			
			1	2	6	8
1	Santa Vittoria	Ridge Route Dr.	NO	NO	NO	YES
2	Ridge Route Dr.	Mill Creek Dr.	NO	NO	NO	YES
3	St. Maria Ave.	San Remo Dr.	NO	NO	NO	NO
4(a)	P.D. Valencia	Calle Caballeros	N/A	N/A	N/A	N/A
5	P.D. Valencia	Hillary Lane	NO	NO	NO	NO
6	P.D. Valencia	Velasquez Road	NO	NO	NO	NO
7	P.D. Valencia	Alisal Ave.	NO	NO	NO	NO
8	P.D. Valencia	Ericson Way	NO	NO	NO	NO
9	P.D. Valencia	Mackenzie Street	NO	NO	NO	NO
10	P.D. Valencia	Pine Nut Road	NO	NO	NO	NO
11(b)	Oso Parkway	Nottingham Court	N/A	N/A	N/A	N/A
12	La Paz Road	Alameda Avenue	NO	YES	NO	N/A
13	La Paz Road	Appaloosa Place	NO	YES	NO	N/A
14	La Paz Road	Gallup Drive	NO	NO	NO	NO
15	Alicia Parkway	Via Lomas	YES	YES	NO	N/A
16	Moulton Pkwy	Gordon Road	NO	YES	NO	N/A
17	Moulton Pkwy	Mandeville Drive	NO	NO	NO	NO
18	Moulton Pkwy	Louisa Street	NO	NO	NO	NO
19	Moulton Pkwy	Indian Hill	NO	NO	NO	NO

(a) This location is right turn only for sb Calle Caballeros at PDV
(b) This location is right turn only for nb Nottingham at Oso Parkway
(c) Warrant 8 looks at signals that are not fully warranted by 1/2/6 but where warrants 1 and 2 are both 80% satisfied.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Table 4
Signal Warrants – Percentage Satisfied

Loc	Major Street	Minor Street	Percentage Warrant Satisfied			
			1	2	6(1)	8 (3)
1	Santa Vittoria	Ridge Route Dr.	48/100	32/100	0	100
2	Ridge Route Dr.	Mill Creek Dr.	65/56	43/98	0	100
3	St. Maria Ave.	San Remo Dr.	100/83	73/100	0	N/a
4	P.D. Valencia	Calle Caballeros	N/a	N/a	N/a	N/a
5	P.D. Valencia	Hillary Lane	100/25	100/49	0	50
6	P.D. Valencia	Velasquez Road	100/20	100/39	0	50
7	P.D. Valencia	Alisal Ave.	100/71	100/80	0	N/a
8	P.D. Valencia	Ericson Way	100/45	100/89	0	N/a
9	P.D. Valencia	Mackenzie Street	91/10	60/20	0	50
10	P.D. Valencia	Pine Nut Road	91/31	60/61	0	0
11	Oso Parkway	Nottingham Court	N/a	N/a	N/a	N/a
12	La Paz Road	Alameda Avenue	100/52	100/100	0	0
13	La Paz Road	Appaloosa Place	100/65	100/100	1	N/a
14	La Paz Road	Gallup Drive	100/35	100/69	1	0
15	Alicia Parkway	Via Lomas	100/10 0	100/100	3	N/a
16	Moulton Pkwy	Gordon Road	100/60	100/100	4	N/a
17	Moulton Pkwy	Mandeville Drive	100/44	100/88	0	N/a
18	Moulton Pkwy	Louisa Street	100/36	100/71	1	0
19	Moulton Pkwy	Indian Hill	100/34	100/68	0	0

1. Recent 36-month accident period, number of which correctable by signal.
2. Calle Caballeros and Nottingham have been restricted to right turns only (4 & 11)
3. 100% means that both warrants 1 and 2 are 80% satisfied.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Table 5
Intersections that Are Currently Warranted for a Traffic Signal
(Not Prioritized – See Table 13 for Prioritization)

1. La Paz Road at Alameda Avenue
2. La Paz Road at Appaloosa Place
3. Alicia Parkway at Via Lomas
4. Moulton Parkway at Gordon Road

Priority Rating System (Identifies Possible Order of Construction Per Available Funds)

With the above information in place, the next step involved the prioritization of the warranted signals. This was done by reviewing traffic and safety characteristics identified in seven "rating items." Again, the following was done in an identical manner as the earlier Traffic Signal Master Plans prepared for the City.

Rating Item 1 – Satisfaction of Caltrans Warrant 2 (Interruption of Continuous Traffic)

By using the data of Warrant 2, a rating item is created by using volumes of major street traffic. The reason centers on the fact that by such traffic being so large, it creates a danger for crossing vehicles or pedestrians. Table 6 shows the information relative to Warrant 2.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Table 6 – Rating Item 1
Warrant 2 Satisfaction
(Interruption of Continuous Traffic)

	Loc	Major Street				Minor Street				Points
		Name	Lanes	Volume		Name	Lanes	Volumes		
				Leg 1	Leg 2			Leg 1	Leg 2	
	1	Santa Vittoria	2	807	2468	Ridge Route	1	2122	-	1
	2	Ridge Route	2	2252	2122	Mill Creek	1	938	-	0
	3	Santa Maria	2	4281	3116	San Remo	1	1388	-	9
	4	PDV	N/A	N/A	N/A	Calle Caballeros	Right	Turn	Only	
	5	PDV	2	5651	5759	Hillary Lane	1	416	-	9
	6	PDV	2	5651	5659	Velasquez Road	1	335	-	9
	7	PDV	2	5651	5659	Alisal Avenue	1	1194	-	9
	8	PDV	2	5651	5659	Ericson Way	1	759	-	9
	9	PDV	2	3269	2813	Mackenzie Street	1	172	-	3
	10	PDV	2	3269	3813	Pine Nut Road	1	517	-	3
	11	Oso Parkway	N/A	N/A	N/A	Nottingham Court	Right	Turn	Only	
	12	La Paz Road	2	8410	8136	Alameda Avenue	1	868	-	9
	13	La Paz Road	2	7373	8136	Appaloosa Pl.	1	1094		
	14	La Paz Road	2	7373	8136	Gallup Drive	1	588	-	10
	15	Alicia Parkway	2	21,600	22,991	Via Lomas	1	2447	-	10
	16	Moulton Parkway	2	10,469	10,636	Gordon Road	1	1003		
	17	Moulton Parkway	2	10,469	10,636	Mandeville Drive	1	740	-	10
	18	Moulton Pkwy	2	10,469	10,636	Louisa Street	1	607	-	10
	19	Moulton Parkway	2	10,469	10,636	Indian Hill	1	577	-	0

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Rating Item 2 – Coordinated Movement

This rating item takes into account how a particular signal would impact the orderly flow of traffic. A higher rating is given to a signal if it produces a disbursed flow of traffic. A lower rating occurs if the signal contributes to concentrated flow. Table 7 presents our conclusion for this rating item.

Table 7 – Rating Item 2
Coordinated Movement
(Signals Currently Warranted are Highlighted)

Loc	Major Street	Minor Street	Approaching Platoon			Points
			Intact	Spread	Disburse	
1	Santa Vittoria	Ridge Route			X	
2	Ridge Route	Mill Creek			X	
3	Santa Maria	San Remo			X	
4 (a)	PDV	Calle Caballeros	N/a	N/a	N/a	
5	PDV	Hillary Lane			X	
6	PDV	Valasquez Road			X	
7	PDV	Alisal Avenue			X	
8	PDV	Ericson Way			X	
9	PDV	Mackenzie St.			X	
10	PDV	Pine Nut Road	X			
11(b)	Oso Parkway	Nottingham Ct.	N/a	N/a	N/a	
12	La Paz Road	Alameda Ave.			X	5
13	La Paz Road	Appaloosa Pl.			X	5
14	La Paz Road	Gallup Drive			X	
15	Alicia Pkwy	Via Lomas		X		3
16	Moulton Pkwy	Gordon Road		X		3
17	Moulton Pkwy	Mandeville Dr.		X		
18	Moulton Pkwy	Louisa Street		X		
19	Moulton Pkwy	Indian Hill Ln.	X			

(a) This location is sb right turn only for Calle Caballeros at PDV
(b) This locations is nb right turn only for Nottingham at Oso.

Rating Item 3 – Accident Evaluation Results

A high intersection accident rate can be a sign of vehicles trying to enter the flow of traffic or cross the street when there are insufficient gaps in major street traffic. Therefore, the signal's potential to reduce or eliminate certain types of accidents generates points that can be used in the rating system – points that are consistent for all locations studied. Table 8 presents the results of this analysis element.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Table 8 – Rating Item 3
Traffic Accidents
(Evaluates All Study Intersections Regardless of Warrant Satisfaction. Includes Broadsides, Left Turns and Ped Involvement)
(Intersections Currently Warranted Via 2007 Volumes Are Highlighted)

	Location	Major Street	Minor Street	Correctable Accidents 3 Year Period		Points
				Total	Ave.	
	15	Alicia Parkway	Via Lomas	3	1.0	9
	16	Moulton Pkwy	Gordon Road	4	1.33	12
	18	Moulton Parkway	Louisa Street	1	0.33	3
	2	Ridge Route	Mill Creek	0	0	0
	5	PDV	Hillary Lane	0	0	0
	10	PDV	Pine Nut Road	0	0	0
	17	Moulton Pkwy	Mandeville Drive	0	0	0
	7	PDV	Alisal Avenue	0	0	0
	6	PDV	Velasquez Road	0	0	0
	3	Santa Maria	San Remo	0	0	0
	8	PDV	Ericson Way	1	0.33	3
	9	PDV	Mackenzie Street	0	0	0
	12	La Paz Road	Alameda Avenue	0	0	0
	13	La Paz Road	Appaloosa Place	1	0.33	3
	14	La Paz Road	Gallup Drive	1	0.33	3
	1	Santa Vittoria	Ridge Route	0	0	0
	4 (a)	PDV	Calle Caballeros	N/a	N/a	N/a
	11 (a)	Oso Parkway	Nottingham Court	N/a	N/a	N/a
	19	Moulton Pkwy	Indian Hill Ln.	0	0	0

(a) Right Turn Only Location

Rating Item 4 – Special Conditions

This rating item considers extenuating circumstances that are not covered in other rating items or warrants. These could include for example the presence of school, churches, parks, and other public buildings. The various items found that relate to this rating item are in the following table.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Table 9 - Rating Item 4
Special Conditions

Loc	Major St.	Minor Street	Special Conditions						Pts.
			Sch	Chch	Pub Bldg/Park	Curve	Hill	Sight Distance	
1	St. Vittoria	Ridge Route			X		x	x	7
2	Ridge Rt.	Mill Creek			X		x	x	7
3	St. Maria	San Remo	x			x	x	x	10
4	PDV	Calle Caballeros							N/A
5	PDV	Hillary Lane	x			x	x	x	10
6	PDV	Velasquez	x			x	x	x	10
7	PDV	Alisal Ave.				x	x	x	7
8	PDV	Ericson Way				x	x	x	7
9	PDV	Mackenzie Street	x			x	x	x	10
10	PDV	Pine Nut Rd.	x			x	x	x	10
11	Oso Pkwy	Nottingham Ct.							N/A
12	La Paz Rd.	Alameda Ave.					x	x	5
13	La Paz Rd.	Appaloosa Pl.					x		2
14	La Paz Rd.	Gallup Rd.				x	x	x	7
15	Alicia Pkwy	Via Lomas			X				2
16	Moulton Pkwy	Gordon Road				x	x	x	7
17	Moulton Pkwy	Mandeville Dr.			X	x	x	x	10
18	Moulton Pkwy	Louisa St.				x	x	x	7
19	Moulton Pkwy	Indian Hill Lane				x	x	x	7

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Rating Item 5 – Safety Index

This rating item uses accident totals to create a Benefit/Cost ratio. Since there are always several types of costs associated with accidents, it follows that the benefit of installing a traffic signal can be compared and rated to the cost of the different types of accidents. Table 10 provides the indicated safety index data.

Table 10 – Rating Item 5
Safety Index

Loc	Major Street	Minor Street	Three Year Accidents			
			Fatal	Injury	PDO	Pts
1	Santa Vittoria	Ridge Route Dr.	0	0	0	0
2	Ridge Route Dr.	Mill Creek Dr.	0	0	2	0
3	St. Maria Ave.	San Remo Dr.	0	0	1	0
4	P.D. Valencia	Calle Caballeros	N/A	Right	Turn	Only
5	P.D. Valencia	Hillary Lane	0	0	0	0
6	P.D. Valencia	Velasquez Road	0	0	0	0
7	P.D. Valencia	Alisal Ave.	0	0	1	0
8	P.D. Valencia	Ericson Way	0	3	0	8
9	P.D. Valencia	Mackenzie Street	0	0	0	0
10	P.D. Valencia	Pine Nut Road	0	0	0	0
11	Oso Parkway	Nottingham Court	N/A	Right	Turn	Only
12	La Paz Road	Alameda Avenue	0	0	1	0
13	La Paz Road	Appaloosa Place	0	1	2	3
14	La Paz Road	Gallup Drive	0	3	1	8
15	Alicia Parkway	Via Lomas	0	3	6	8
16	Moulton Pkwy	Gordon Road	0	4	6	10
17	Moulton Pkwy	Mandeville Drive	0	2	0	5
18	Moulton Pkwy	Louisa Street	0	3	1	8
19	Moulton Pkwy	Indian Hill Lane	0	0	0	0

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Rating Item 6 – Environmental Conditions

This evaluation looks at the environmental ramifications of a signal such as time delays, pollutant generation, aesthetic values and resource losses. Table 11 provides the information and the various rating points assigned to each.

Table 11 – Rating Item 6
Environmental Impact Assessment

Loc	Major Street	Minor Street	Environmental Impact			Pts.
			Minimal	Moderate	Substantial	
1	Santa Vittoria	Ridge Route	X			5
2	Ridge Route	Mill Creek	X			5
3	Santa Maria	San Remo	X			5
4	PDV	Calle Caballeros	N/a	Right	Turn Only	N/a
5	PDV	Hillary Lane	X			5
6	PDV	Velasquez Road	X			5
7	PDV	Alisal Avenue	X			5
8	PDV	Ericson Way	X			5
9	PDV	Mackenzie Street	X			5
10	PDV	Pine Nut Road	X			5
11	Oso Parkway	Nottingham Court	N/a	Right	Turn Only	N/a
12	La Paz Road	Alameda Avenue		X		2
13	La Paz Road	Appaloosa Place	X			2
14	La Paz Road	Gallup Drive	X			2
15	Alicia Parkway	Via Lomas	X			5
16	Moulton Parkway	Gordon Road	X			2
17	Moulton Parkway	Mandeville Drive	X			2
18	Moulton Parkway	Louisa Street	X			2
19	Moulton	Indian Hill Ln.	X			2

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Rating Item 7 – Highway Geometry

In general, it is more cost effective and more productive to signalize a four – legged intersection than one of the "TEE" configuration. Also, a signal at the intersection of two arterial streets will better serve the community than will a signal at the intersection of two local residential streets. (Table 12).

Table 12 – Rating Item 7
Highway Geometry

Loc.	Inter Type	Major Street		Minor Street		Pts.
		Name	Class.	Name	Class.	
1	4	Santa Vittoria	Arterial	Ridge Route Dr.	Collector	4
2	T	Ridge Route	Arterial	Mill Creek Dr.	Collector	3
3	T	Santa Maria	Arterial	San Remo Dr.	Collector	3
4	T	PDV	Arterial	Calle Caballeros	Collector	N/A
5	T	PDV	Arterial	Hillary Lane	Collector	3
6	T	PDV	Arterial	Velasquez Road	Collector	3
7	T	PDV	Arterial	Alisal Avenue	Collector	3
8	T	PDV	Arterial	Ericson Way	Collector	3
9	T	PDV	Arterial	Mackenzie Street	Collector	3
10	T	PDV	Arterial	Pine Nut Road	Collector	3
11	T	Oso Parkway	Arterial	Nottingham Court	Collector	N/A
12	T	La Paz Road	Arterial	Alameda Avenue	Collector	3
13	T	La Paz Road	Arterial	Appaloosa Place	Collector	3
14	T	La Paz Road	Arterial	Gallup Drive	Collector	3
15	T	Alicia Parkway	Arterial	Via Lomas	Collector	3
16	T	Moulton Pkwy	Arterial	Gordon Road	Collector	3
17	T	Moulton Pkwy	Arterial	Mandeville Drive	Collector	3
18	T	Moulton Pkwy	Arterial	Louisa Street	Collector	3
19		Moulton Pkwy	Arterial	Indian Hill Ln.	Collector	3

N/A = Right Turn Only Intersection

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Taking all of the above rating criteria into consideration, existing unsignalized intersections that satisfy Caltrans warrants for signalization can be prioritized for possible construction. Those prioritized locations are shown in list below with Table 13 showing the greater detail of the prioritization process.

1. Moulton Parkway at Gordon Road
2. Alicia Parkway at Via Lomas
3. La Paz Road at Appaloosa Place
4. La Paz Road at Alameda Avenue

Table 13
Priority Ranking of Unsignalized Intersections Meeting Warrants
(Prioritized)

			Rating Item Number Maximum Points							
			1	2	3	4	5	6	7	Total
Loc	Major Street	Minor Street	10	5	20	15	10	5	5	70
16	Moulton Parkway	Gordon Road	10	3	12	7	10	2	3	47
15	Alicia Parkway	Via Lomas	10	3	9	2	8	5	3	40
13	La Paz Rd.	Appaloosa Place	9	5	3	2	3	2	3	27
12	La Paz Rd.	Alameda Avenue	9	5	0	5	0	2	3	24

Note: For reference/comparison to the above in non – prioritized format, refer to Table 5.

In terms of future traffic signals, it is recommended that this update be performed on a periodic basis. The reason concerns fluctuating traffic volumes along with accident levels that change from year to year. For that reason, we recommend that new counts be taken each year along with an assessment of accidents at the unsignalized intersections. Then, through a relatively simple process, the numbers of this report, along with the various point scores shown in the tables can be updated.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

RATING ITEMS

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

RATING ITEM 1
INTERUPTION OF CONTINUOUS TRAFFIC (10 POINTS MAXIMUM)
(Warrant 2)

Vehicles attempting to cross the major flow of traffic or enter that flow can cause the traffic on the through street to be delayed or slow down unnecessarily. The installation of a signal at such locations can actually speed up the traffic flow on the major street. Table A1 shows the percent of the maximum assigned points based on the major street daily volume. For example, an intersection where the traffic volume on the major street average 11,000 vehicles per day would receive 70% of the maximum allowed. In the above example, the intersection would receive 7 points for this rating area.

Table A1 – Percent of Maximum Points – Interruption of Continuous Traffic

Major Street Volume Of at Least…	Percent of Maximum
4,700	0 (0)
5,600	10 (1)
6,400	20 (2)
7,300	30 (3)
8,200	40 (4)
9,000	50 (5)
10.000	60 (6)
10,700	70 (7)
11,600	80 (8)
12,400	90 (9)
17,500	100 (10)

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

RATING ITEM 2
COORDINATED MOVEMENT (5 POINTS MAXIMUM)

When a traffic signal turns green and the waiting vehicles start down the roadway, they are in a relatively compact grouping referred to as a "platoon". As this group of vehicles progress down the street, they become more and more disbursed due to difference in driving speeds. As a result, some of the cars in the original platoon are unable to make it through the next signal and are forced to stop. In some cases, the installation of a signal between the original two can keep this platoon intact and actually reduce the overall driving delay. This item depends on engineering judgment and should include present and future traffic demands of the area.

A signal may be justified when it forms a part of an interconnected or coordinated system and would serve the purpose of maintaining traffic volumes in relatively concentrated platoons of vehicle. Typically, the following question could be asked: "Would a signal at this location cause the platoon approaching the next signal to be concentrated (5 points), moderately concentrated (2 points) or disbursed (0 points)?"

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

RATING ITEM 3
ACCIDENT HAZARDS

A high intersection accident rate can be a sign of vehicles (and pedestrians) trying to enter the flow of traffic or cross the street when there are insufficient gaps in the major street traffic. Only those accidents susceptible to correction by traffic signals should be considered when evaluating this item. And even the, only if less restrictive measures such as warning signs, proper lighting, painted markings, etc., have failed. Accidents which are susceptible to correction by a traffic signal are normally considered to be "broadside" or right-angle accidents, left turn accidents and those accidents involving pedestrians. In this item, the maximum number of points is assigned to the intersection with the highest number of correctable accidents and 0 is assigned to the lowest. Table A5 illustrates the points that would be assigned if the highest intersection had six accidents and the lowest intersection had none.

TABLE A5 - Percent of Maximum Points - Accident Hazard

Correctable Accidents	Points
6	(20)
5	(16)
4	(13)
3	(10)
2	(6)
1	(3)
0	(0)

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

RATING ITEM 4
SPECIAL CONDITIONS (15 POINTS MAXIMUM)

This item considers extenuating circumstances that are not covered in other items in this rating system. These may include the proximity of schools, churches, public buildings, and other traffic and pedestrian generators; an abrupt change from a rural to an urban area; the need for police control during portions of the day; a steep hill; a horizontal curve; or restricted sight distance. This requires engineering judgment based on physical inspection of the site. Equal weights should be given to each of the items considered here. In table A6, the percentages and points based on how many of 6 conditions were located.

TABLE A6 - Percent of Maximum Points - Special Conditions

Conditions Located	Points
6	100(15)
5	83(12)
4	67(10)
3	50(7)
2	33(5)
1	17(2)
0	0(0)

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

RATING ITEM 5
SAFETY INDEX (15 POINTS MAXIMUM)

A safety index is the Benefit /Cost ratio for a safety improvement expressed as a number. The costs and benefits are directly related to the number of accidents at a location, which are susceptible to correction, by a traffic signal. Points are assigned by setting the highest Benefit/Cost ratio to the maximum allowed points and the minimum Benefit/Cost ratio to zero. Ratings in between are allocated a proportion of the number of points between zero and the maximum. Normally, a two-year accident history is used to derive the benefit that would be achieved if those accidents were prevented through the installation of a traffic signal. The accidents are grouped into categories with costs and weighted. The "benefit" portion of the ratio is actually the estimated cost of the various severity categories as listed below.

Table A7 – "Costs" of Traffic Accidents

Category	Cost
Fatal Accidents	$287,175
Injury Accidents	$8,085
Property Damage Accidents	$520

Table A8 – Typical Signal Installation Costs in Southern California

Intersection Type	Cost
Four Leg Intersection	$250,000
T Intersection	$200,000

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Rating Item 6
Environmental (5 Points Maximum)

This is the only rating item that can actually be assigned negative points. An evaluation of the environmental considerations should be made including time delays, pollutant generation, aesthetic values and resource losses. A project that minimizes problems would receive the maximum 5 points while a project that has a substantial adverse effect would receive a negative 5 points. Gradations may be employed between the two limits.

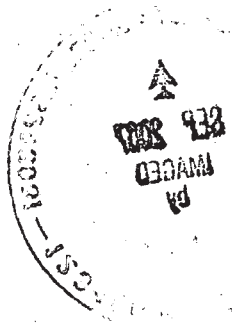
Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Rating Item 7
Highway Geometry (5 Points Maximum)

In general, it is more cost effective and more productive to signalize a four – legged intersection than one of the "TEE" Configuration. Also, a signal at the intersection of two arterial streets will better serve the community than will a signal at the intersection of two local residential streets.

HigherVolume Street Is…	Lower Volume Street Is….	Percent of Maximum Points if….	
		Intersection is T	Intersection is 4 Legged
Local	Local	0	0
Collector	Local	10 (0)	20 (1)
	Collector	30 (1)	40 (2)
Arterial	Local	50 (2)	60 (3)
	Collector	70 (3)	80 (4)
	Arterial	90 (4)	100 (5)



HARTZOG & CRABILL, Inc.

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May 7, 2007

Mr. Ken Rosenfield, P.E.
Director of Public Services
City of Laguna Hills
24035 El Toro Road
Laguna Hills, California 92653

SUBJECT: Proposal to Prepare Year 2007 Traffic Signal Master Plan Update

Dear Mr. Rosenfield:

In accordance with the City's recent request, we are pleased to submit this proposal covering the year 2007 update of the Traffic Signal Master Plan. The format of our work will be similar to the 2003 Master Plan. While a considerable amount of data will be reviewed and analyzed in the report, one of its most significant results will be a series of tables providing the City with anticipated timeframes for the warranting of future traffic signal construction.

Briefly, the information in the report will be covered in three sections. These will include:

(1) A detailed Executive Summary,

(2) An explanation of our data collection and analysis efforts for 16 individually discussed aspects of the work, and

(3) A discussion of the procedures and results of the "Priority Rating System".

The latter is significant in that its results will be responsible for the final decisions described in the year 2007 Traffic Signal Master Plan Update.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

ANALYSIS PROCEDURES

Traffic Counts

Historically the City has been using a "Traffic Volume and Growth Chart" to assist in its traffic planning efforts, and a recent citywide traffic count update (ADT update) is in progress as a separate project. Hence, part of our work will include the submittal of the ADT update.

Using the ADT information, we will look at warranting procedures prescribed by the California Manual of Uniform Traffic Control Devices (California MUTCD) that are based on recent daily traffic volumes. Those warrants are "Minimum Daily Traffic Volumes" and "Interruption of Continuous Traffic". Detailed explanations of how the volumes were used will be provided in the report along with numerous tables to ensure clarification. Explanations will also be provided as to how the volumes were used in reaching our conclusions for traffic signal warranting priorities.

Accidents

Given new accident analysis software, we propose to expand our 2003 and year 2006 accident review efforts. By doing so, we can complete another California MUTCD warrant and better define those intersections where signals are possibly needed because of accident frequency and types. Briefly, we will provide the City with accident evaluation data for each intersection that (1) can be used as part of our conclusions in signal warranting priority, and (2) be used by the Sheriff department in targeting high accident locations.

Other Signalization Warrants per California MUTCD

The California MUTCD prescribes that City's look at a total of (8) eight warrants when considering the construction of a traffic signal. Therefore, in addition to the above three warrants, our work will include an assessment of other important issues/warrants such as School Area safety needs, Peak Hour Delay/Volume warrants, and others. This will ensure that the full extent of State requirements will be satisfied.

Priority Rating System

Since the budgeting of signals is always an important annual issue, a significant portion of the update will involve the preparation of seven rating systems. By using those systems (both individually and collectively), a clear, and defendable list of traffic signals, either to be constructed now or in the near/far future can be developed.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Tables and Exhibits

Clear and understandable tables/exhibits will support all work for this project. Traffic volume data will be organized in graphic/tabular form as will the effort behind the creation of the signal construction priority system. Four exhibits will be prepared showing the following:

1. The location of existing traffic signals.
2. Those intersections that are currently warranted per this 2007 update.
3. Intersections whose analysis elements indicate that a signal may be needed sometime in the future.
4. All combined signal scenarios that could eventually materialize in the City.

ESTIMATED PROJECT COST

We anticipate that the cost to prepare the entire project will be **$11,500.00**. The project will be one that pulls together new traffic volumes, a detailed assessment of the citywide accidents, the preparation of a new/updated Traffic Volume Chart and the preparation of the detailed year 2007 Traffic Signal Master Plan Update. The anticipated schedule for this work is a completion as of June 30, 2007.

As always, it has been a pleasure preparing this proposal for the City. Given the importance of the Master Plan, we are confident that the use of the update will be a valuable instrument to assist the City in its administrative decisions toward traffic signal construction timeframes. Should you have any questions, please contact us at (714) 731-9455.

Sincerely yours,
HARTZOG & CRABILL INC.

Gerald J. Stock
Executive Vice President
City and Traffic Engineering Services

Approved:

Bruce E. Channing — Date
City Manager

Laguna Hills-Traffic Signal Master Plan Update 2007
GJS/TH/JC/prh

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

CITY OF LAGUNA HILLS
24035 El Toro Road
Laguna Hills, CA 92653
PHONE: (949) 707-2600 • FAX: (949) 707-2633

LETTER OF TRANSMITTAL

To: Jerry Stock
Hartzog and Crabill

Date: May 7, 2007
Job No.
Project: Turning Movement Counts

Attn:

Via:

Messenger		Express	Blueprinter	
Pickup	x	Mail	Facsimile	# Pages

We are forwarding herewith:

x Originals	Copies	Report	Specifications
Plans		Other	Other

Description:
Map of proposed turning movement counts for citywide traffic circulation study. Counts to be taken morning, noon and evening peak hours.

This material is:

For your approval.	Approved by us.
x For your review.	Returned by us.
For your files.	For use on job.
Per your request.	For Signature

Remarks:
Jerry – would you suggest any other locations? I'd also like a truck classification count on all arterials. Please send a proposal. I want the counts taken before school lets out, before about June 15th.

From: CITY OF LAGUNA HILLS

COPIES TO:

Kenneth H. Rosenfield, P.E.
Director of Public Services/City Engineer

Received By:

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Confirmation Report – Memory Send

Page : 001
Date & Time: 03-30-2007 02:58pm
Line 1 :
Line 2 : +
Machine ID : Laguna Hills

Job number	:	346
Date	:	03-30 02:57pm
To	:	☎917147319498
Number of pages	:	001
Start time	:	03-30 02:57pm
End time	:	03-30 02:58pm
Pages sent	:	001
Status	:	OK

Job number : 346 *** SEND SUCCESSFUL ***

To: Jerry STOCK

HARTZOG & CRABILL, Inc.

Trammell Hartzog, President
Jerry Crabill, P.E. (Retired)
Gerald J. Stock, P.E., Executive Vice President

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Suite 208
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Phone: (714) 731-9455
FAX: (714) 731-9498
www.hartzog-crabill.com

March 28, 2007

3/30/07 Proceed w/ work. Thanks Ken

Mr. Ken Rosenfield, P.E.
City Engineer
City of Laguna Hills
24035 El Toro Road
Laguna Hills, California 92653

Subject: Proposal to Provide Traffic Engineering Services for the 2007 Traffic Flow Map and Volume Table

Dear Mr. Rosenfield:

Hartzog & Crabill, Inc. (HCI) is pleased to submit this proposal to provide professional traffic-engineering services to the City of Laguna Hills for the 2007 Traffic Flow Map update. These services include: collecting the traffic counts as necessary to upgrade the 2005 Traffic Flow Map and Volume Table to 2007 conditions and updating the Traffic Flow Map and Volume Table with the new traffic data.

These tasks are described in further detail in our Scope of Work below:

SCOPE OF WORK

Task 1 – Collect Traffic Counts

Upon the City's Notice-to-Proceed, HCI will secure 24-hour Average Daily Traffic (ADT) directional weekday traffic counts at (82) permanent count station locations.

- All traffic counts will be conducted in the time period between mid-April through mid-May 2007.
- HCI will secure and incorporate the most recent traffic count data from any other applicable agencies into the flow map.
- The City will receive the traffic counts for review before incorporation into the flow map.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

HARTZOG & CRABILL, Inc.

Trammell Hartzog, President
Jerry Crabill, P.E. (Retired)
Gerald J. Stock, P.E., Executive Vice President

275 Centennial Way
Suite 208
Tustin, CA 92780

Phone: (714) 731-9455
FAX: (714) 731-9498
www.hartzog-crabill.com

3/30/07 Proceed w/ work. Thanks Ken

March 28, 2007

Mr. Ken Rosenfield, P.E.
City Engineer
City of Laguna Hills
24035 El Toro Road
Laguna Hills, California 92653

Subject: Proposal to Provide Traffic Engineering Services for the 2007 Traffic Flow Map and Volume Table

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Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

SCOPE OF WORK (continued)

Task 2 – Update Existing City Flow Map and Volume Table

The Traffic Volume Table will be updated with the 2007 traffic count information. As you know, this table lists each roadway alphabetically with all segments of that roadway listed in one column and the corresponding traffic volumes (ADT) in an adjacent column per year.

The Traffic Volume Table task will also include a comparison of 1994, 1996, 1998, 2001, 2003, and 2005 traffic volumes. The volume table will be provided on the back of the Traffic Flow Map for convenience and ease of reference.

Following the table update, the new traffic volumes will be entered into the citywide flow map. This consists of updating the Traffic Flow Map line widths for all major and minor arterials and collector roadway classifications. The flow map uses a graphical method to show the traffic volumes using varied line widths that proportionately correspond to the measured traffic volume for each roadway segment. This method of presentation allows for quick viewing of not only specific roadway volumes, but also a macroscopic view of the surrounding traffic flow characteristics.

Upon completion of Tasks 1 and 2, the updated map and table will be printed and a draft copy of each will be submitted to the City for review and comment. Both the map and the table will be prepared on a full "D" size sheet (24" x 36").

Task 3 – Finalize and Reproduce Traffic Flow Map and Volume Table

Following any changes required by the City of the initial map and table submittals, the original 24" x 36" sheets will be photographically reduced to an 11" x 17" PMT (photomechanical transfer). From the PMT, 75 double-sided copies of the Traffic Flow Map/Volume Table will be generated on 11" x 17" cardstock.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

PRODUCTS

At the completion of this project, the following products shall be provided to the City:

- All 2007 traffic count data in a binder.
- One (1) original 24" x 36" Mylar Final Flow Map and Volume Table
- One (1) original 11" x 17" PMT of Final Flow Map and Volume Table
- Fifty (50) double-sided 11" x 17" Traffic Flow Map/Volume Table on cardstock

SCHEDULE

Following the City's Notice-to-Proceed, HCI estimates that it will require six (6) weeks to secure the traffic count data, two (2) weeks to complete Tasks 2 and 3, one (1) week for City review, and two (2) weeks to finalize and deliver the project products.

Therefore, we estimate project completion in eleven (11) weeks.

PROFESSIONAL FEES

HCI is proposing a fixed fee cost of $1,950.00 for our services outlined above, plus the cost of obtaining and administering all traffic counts. The estimated cost of obtaining the traffic counts is $9,372.50, which includes (82) 1-day ADT count locations and a 15% administration fee. An invoice for the traffic counts from the supplier will also be forwarded to the City. Therefore, the total proposed project cost is **$11,322.50.**

We look forward to the City's acceptance of this proposal and to the beginning of the project. If you should have any questions or need more information, please contact our office at (714) 731-9455.

Very Truly Yours,
HARTZOG & CRABILL, INC.

Gerald J. Stock, P.E.
Vice President
City & Traffic Engineering Services

City Wide Traffic Counts
GJS/prh

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

PATIE R. HERNANDEZ:

Hartzog Crabill, Inc.

Time Sheet

MARCH 2007

Project Name	Job #	PM	1 T	2 F	3 S	4 S	5 M	6 T	7 W	8 T	9 F	10 S	11 S	12 M	13 T	14 W	15 T	16 F	17 S	18 S	19 M	20 T	21 W	22 T	23 F	24 S	25 S	26 M	27 T	28 W	29 T	30 F	31 S	TOTAL TO DATE
Cleaned Lounge/Office/File Rm, Ect	OH	TH	0.25	0.25			0.25	0.25	0.25	0.25	0.25			0.25	0.25	0.25	0.25	0.25			0.25	0.25	0.25	0.25	0.25			0.25	0.25	0.25				5
General Work: Phones, Staff Mtg, Lunch P/U, SOQ, Binding	OH	TH	3	2			2.75	3	3	3	3			2	2.75	2.5	1.75	2			3	2	2	2.75	3.5			3.75	3.5	2				53.25
Faxes/Emails (TH/JS)	OH	TH								0.25				0.25	0.25	0.5	0.5						0.5	0.75				0.25						3.25
Billing-Current Invoices/New System Imputing	OH	TH	1				1.5	4	4	2.75	4			4.5	6.25	4.5	5.75				4.75	5.25	4.75	1.5				2	2.5					59
Billing-Past Due Invoices/Notices	OH	TH	0.5	3.5							0.25																							4.25
Accts Payable-Posting	OH	TH					1											1.5										0.5						3
Accts Receivable-Posting	OH	TH		1						1								1			0.5				1.75			0.5	1					6.75
Update HCI Lists G/Y's	OH	TH	0.25	1			0.25	1.5	1		2			2							1				2.25			0.25						11.5
Inventory Office Supplies Needed	OH	TH																						0.25										0.25
Out-Bank, Vons, Office Depot, Post Office	OH	TH		0.25										0.25				1.75					0.25		1.75									4.25
Expense Sheets reviewed for processing	OH	TH	0.5				0.25			0.25																								1
Timesheets Updated for Staff	OH	TH	0.25								0.25			0.25								0.25	0.25	0.5										1.75
Proposals/Reports-Clean Up or Bound/Copy	OH	TH	1.5																											2				3.5
Review City Accts with TH or JS (Bellflower 1002) (RSM 1448)	OH	TH																						2.5										2.5
Binders Updated-Billing/Payments and Filing & Reorganization. File Cabinets	OH	TH	2	1																				0.75				0.25	1.5	2				7.5
Deliveries or Pick-Ups (BV ENG)	1531	TH								1																								1
Orange Co- B.V.-Haw Gardens - Research for Jerry, preparation on new contract agreement	?	JS																1.5																
Sir-Speedy- Bonding- City of Brea (8 sets) Mike/Jerry (waited)	?	JS																0.75																
Sir-Speedy- Bonding- City of Glendora- (4 sets) Mike/Jerry	?	JS																										0.5						
Resumes Mike-Bureau Veritas																						1												
Overnight-ShipGSO	OH	TH		0.5			0.25	0.25		0.25					0.25		0.75	0.5			0.25		0.25	0.25				0.25	0.25					4
Laguna Hills-Multiple Stop Analysis-Bonding and Processing	1529	JS														1																		1
R/L-Plan Checks with Jstock (Dictated Reports) and-Lori Wolfe/Bellflower	1374	JS												0.5		1.5																		2
Update Sub-Cons Information-Payments & Deposit Records (TH)	OH	TH																											1					1
Sub-Cons Billing to Cities/Clients-Mtg w/JS or TH	OH	TH					1																0.25											1.25
Sir Speedy-SEPAC Manuals-	?	TH		0.25																		1												0.25
Work at Home-To update Y & G	OH	TH									2.25													2										4.25
Tustin Drop Off/Pick Up Plans	1541	TH									0.25				0.25	0.25		0.5				0.25												1.5
Chino-Sir Speedy-Copy and Radar Report Preparation	1492	JSFF					1.75																											1.75
Sir Speedy-City of Monrovia	1433	JSFF	1				1.25		0.75	0.75								0.25																	4
CR-Copies for City of Glendora	?	TH															0.5																	0.5
HOLIDAY																																		0
SICK																																		0
VACATION																																		0
DAILY TOTAL:			10.25	9.75	0	0	10.25	9	9	9.5	12.25	0	0	10	10	10.5	9.5	10	0	0	9.75	9	8.5	11.5	9.5	0	0	8.5	10	6.25	0	0	0	193

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of

HARTZOG & CRABILL, Inc.

Trammell Hartzog, President
Jerry Crabill, P.E. (Retired)
Gerald J. Stock, P.E., Executive Vice President

275 Centennial Way
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April 18, 2007

Mr. Ken Rosenfield, P.E.,
City Engineer
City of Laguna Hills
24035 El Toro Road
Laguna Hills, California 92653

SUBJECT: Request for Proposal – Engineering and Traffic Survey for Speed Limits, City Wide

Dear Mr. Rosenfield,

Per your request, Hartzog & Crabill, Inc. (HCI) is pleased to submit this proposal for an engineering and traffic survey for speed limits in the City of Laguna Hills. We welcome this opportunity to continue our established professional relationship with you and your staff.

The following study approach presents our intended Scope of Work Project Manager, Schedule, and Professional Fees:

SCOPE OF WORK

Task 1 – Initial Meeting

HCI will arrange a meeting with the City to establish/verify lines of communication. The meeting will also include the discussion of other items such as, enforcement, court requirements, traffic laws, the various 47 roadway segments for survey, City criteria, recent changes in the establishment of recommended speed limits contained within the California Manual on Uniform Traffic Control Devices (CA-MUTCD), any information we will need from the City, and the project schedule.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

SCOPE OF WORK (continued)

Task 2 – Speed Data Collection

Radar will be used to collect sample data of 100 or more vehicles, or as many vehicles passing through the 47 identified speed zone study areas over a 1-1/2 hour period of time for each non-peak hour survey location (in each direction of travel for multi-lane or divided roadways). To provide the City with as much supporting information as possible, the city will be provided with photocopies of tally sheets for each of the radar surveys. The structure of the report will match the current formats and maps established by the City, unless directed otherwise. We will of course, offer improvements thereon for the City's consideration if requested.

Task 3 – Accident Evaluations

This task will involve an evaluation of speed related accident record information, which will be collected from the City to determine the extent to which speeding is a casual factor in reported accidents over a three-year period. That information will be utilized in the overall analysis of the individual roadway segments for recommendations of appropriate speed limits. The accident analysis will also be geared toward a comparative review of posted speed limits and whether or not the posting is a casual factor in the area accident picture.

Task 4 – Analyze Speed Data

Vehicular speed data will be analyzed and graphically displayed utilizing a special microcomputer plotting and calculation program. This program is used exclusively for engineering and traffic surveys to develop speed limits. It produces necessary information such as the 85th percentile speed (the critical speed), the 10 mile per hour pace speed range, average vehicle speed, and percentage of vehicles in the pace. All of this information is clearly and concisely formatted and presented by the program, and will be provided for easy reference within the report.

Task 5 – Field Inspections

HCI staff will conduct field inspections to determine whether or not prevailing roadway and/or land use characteristics, as they effect or are affected by speeding, are readily apparent to the driver. These characteristics include residential density, pedestrian activity, and bikeways. It is noted that this task will include a review of the speed limits that are currently posted on streets outside of the City (if applicable for this evaluation). Pursuant to the California Vehicle Code section 627, residential density, pedestrian, and bicycle safety will be considered in the engineering and traffic survey. In this manner, the report submitted to the City will be consistent with posted speed limits on those street limits, which may cross City boundaries.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

SCOPE OF WORK (continued)

Task 6 – Speed Limit Recommendations

Speed survey measurements, accident data, field observations, and the experience that we bring to the project as professional municipal traffic engineers will be used to make professionally acceptable adjustments for the purpose of establishing recommended speed limits within the City. For those areas where streets in the City join roadways of other agencies, appropriate recommendations will be developed to be compatible with both jurisdictions. All findings, conclusions, and recommendations will be combined into a final report document suitable for use in the enforcement of speed limits using radar. The document will be formatted per City report format and according to the desires of the City.

Task 7 – Present Final Report

Mr. Gerald J. Stock will be available to present the results of the study to City staff as well as to answer any questions that may arise.

PROJECT MANAGER

Mr. Gerald J. Stock, P.E., T.E., will serve as project manager and the person responsible in charge. Mr. Stock's experience is based on a background of consulting municipal civil and traffic engineering services. Within the past twelve months alone, he has completed Engineering and Traffic Surveys for the Cities of San Juan Capistrano, Laguna Niguel, Monterey Park, Coto De Caza, Yucaipa, and Moorpark.

SCHEDULE

HCI is prepared to begin work following your notice to proceed. The analytic portion of this project (i.e., all speed surveys, accident analyses, and field investigations) will be completed within four weeks from the receipt of a notice to proceed. Should inclement weather conditions arise, those days will be added to job time.

The final draft report will be submitted to the City within six weeks of the notice to proceed and the final report will be delivered within one week following receipt of comments from the City. Both the draft and final reports will include a letter certifying that a duly Registered Traffic Engineer (Mr. Gerald J. Stock) conducted the surveys.

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

PROFESSIONAL FEES

HCI proposes a lump sum not-to-exceed fee amount of **$11,750.00,** which includes Tasks 1-7, as listed above. Our fee includes the successful completion of all engineering services in conducting the survey for 47 roadway segments, as well as full documentation of radar data collected. Meetings in addition to those described in the above tasks will be billed in addition to the above referenced fees. These fees are **$140.00 per hour** per our current rate schedule.

We appreciate the opportunity to prepare this proposal for your review. We look forward to providing these services for you and the successful completion of the project. Should you have any questions or desire additional information, please contact us at (714) 731–9455.

Sincerely,
HARTZOG & CRABILL, INC.

Gerald J. Stock, P.E.
Executive Vice President
City and Traffic Engineering Services

Laguna Hills Radar – 2007

GJS/prh

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

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HARTZOG & CRABILL, INC.

Gerald J. Stock, P.E.
Executive Vice President
City and Traffic Engineering Services

Laguna Hills Radar – 2007

GJS/prh

APPROVED:

4/23/07

BRUCE E. CHANNING — DATE
CITY MANAGER

Attachment: 2007 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

CITY OF LAGUNA HILLS
TRAFFIC SIGNAL MASTER PLAN
2016 PLAN UPDATE

Prepared for:

City of Laguna Hills
24035 El Toro Road
Laguna Hills, CA 92653

Attention: Mr. Kenneth H. Rosenfield, P.E.
Director of Public Services

Presented by:

Hartzog & Crabill, Inc.
Traffic Engineers
17852 E. 17th Street, Suite 101
Tustin, CA 92780
(714) 731-9455

HARTZOG & CRABILL, Inc.

April 15, 2016

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

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Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

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Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

EXECUTIVE SUMMARY

Goals and Objectives

Similar to earlier versions of the City's Traffic Signal Master Plan (TSMP), the goal of this assessment based upon 2015 data is to provide City staff with a useful and logical planning tool for future traffic signal construction. The objective in developing the assessment is to establish a prioritized listing of those existing intersections that may qualify for future traffic signal installation. While priorities may change depending upon future traffic and demographic conditions, the methodology used in the current analysis will continue to provide a basis for evaluation and relative prioritization of existing and future candidate intersections, and provide supporting documentation for the City's budgeting decisions relative to traffic signal construction.

Study Methodology

The study methodology for this analysis is consistent with previous Traffic Signal Master Plan assessments. Since most traffic signal construction decisions are based on satisfying criteria, or Warrants, as described and specified in the State of California Manual on Uniform Traffic Control Devices (CA MUTCD), new 2015 twenty-four hour, directional traffic counts were conducted at each of the 19 candidate locations. The resulting traffic count data was input into the appropriate CA MUTCD Warrants for the Major and Minor streets at each of the candidate intersections. Also, using the Statewide Integrated Traffic Records System (SWITRS) database, the previous three year accident history at each of the candidate intersections was analyzed and the resulting findings incorporated into the study. Additionally, street and adjacent development characteristics such as horizontal and vertical street alignment, sight distance, lane and intersection configuration, and the candidate intersections' proximity to schools, parks, churches and other land uses that would benefit or be negatively impacted from a traffic signal installation were considered in the prioritization process.

The same basic rating system as used in previous assessments is utilized in the current study, where each element of the study such as traffic volumes, accident history, street characteristics, etc., is given a numerical value based on a variety of factors. The total point values for each of the candidate intersections is compiled and a prioritization is established based on highest to lowest point totals. New intersections or current candidate intersections experiencing a change in characteristics can be comparatively evaluated and prioritized using this methodology.

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

EXECUTIVE SUMMARY
(*continued*)

Traffic Signal Justification

As noted, the intended use of this analysis is to assist City planners in their determination as to where and when traffic signal control is needed and should be installed. While justification for the installation of traffic signals is based on the CA MUTCD warrants, traffic signals are not factually required because they simply meet one or more of the Warrant criteria. An equally important factor in the decision making process is the engineering professionals' judgment based on his/her knowledge of the conditions and circumstances of the location in question, along with community priorities, funding, and other factors.

Study Findings

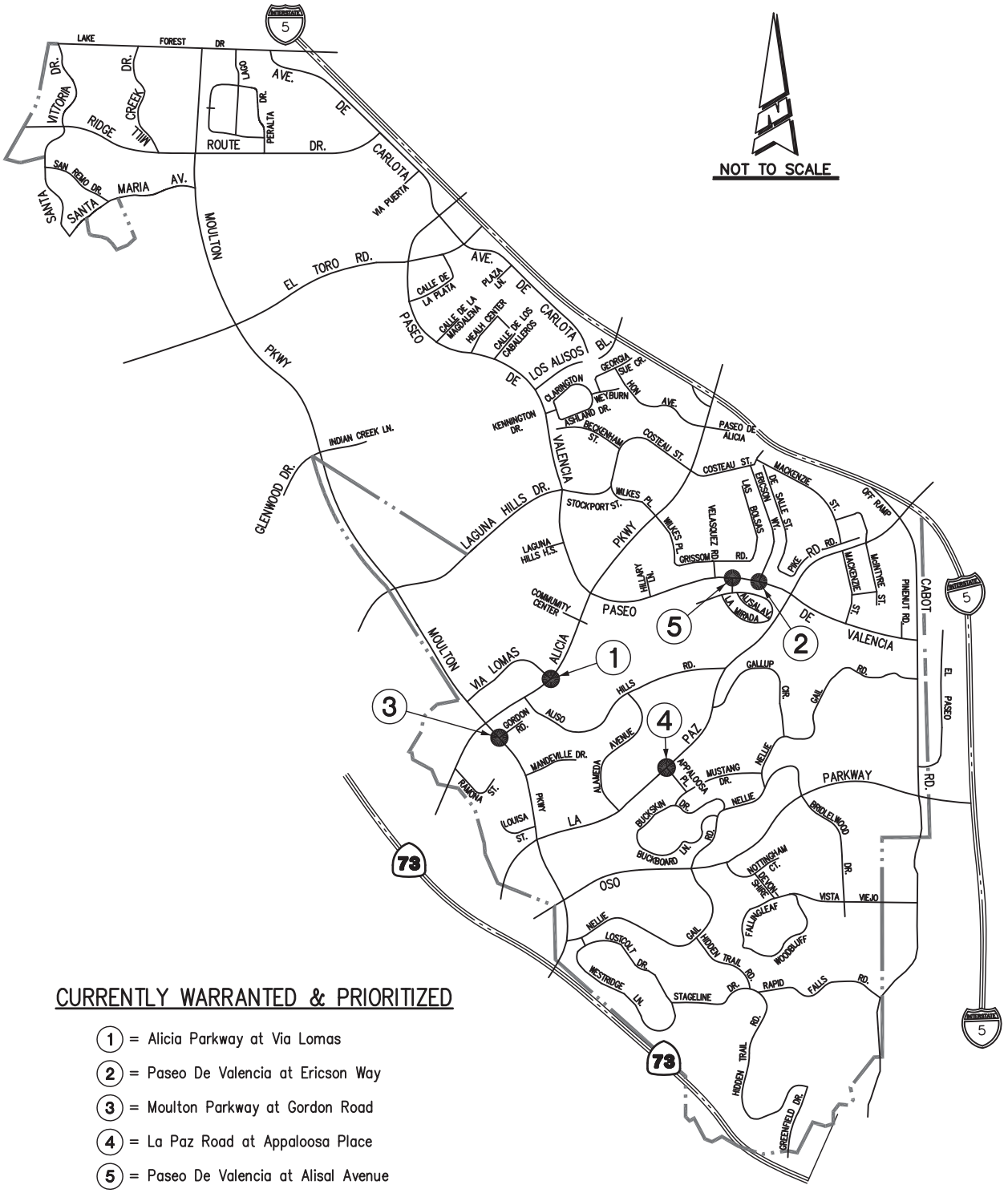
Results of the Traffic Signal Master Plan assessment indicate that the following five (5) candidate locations, in priority order, have met the minimum MUTCD requirements for traffic signal installation:

Location	Intersection
15	Alicia Parkway at Via Lomas
8	Paseo de Valencia at Ericson Way
16	Moulton Parkway at Gordon Road
13	La Paz Road at Appaloosa Place
7	Paseo de Valencia at Alisal Avenue

It should be further noted that Location 12, La Paz Road at Alameda Avenue, which was on the 2007 TSMP list for traffic signal installation, did not meet the CA MUTCD Warrants in this assessment.

Please see Exhibit 1 on the next page for a citywide map overview.

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)



CURRENTLY WARRANTED & PRIORITIZED

1. = Alicia Parkway at Via Lomas
2. = Paseo De Valencia at Ericson Way
3. = Moulton Parkway at Gordon Road
4. = La Paz Road at Appaloosa Place
5. = Paseo De Valencia at Alisal Avenue

INTERSECTIONS CURRENTLY WARRANTED FOR SIGNALS 2015 SIGNAL MASTER PLAN

CITY OF LAGUNA HILLS

EXHIBIT 1

HCI CAD FILE: SIGNAL-MASTERPLAN_2015.dwg

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

ANALYSIS COMPONENTS AND RESULTS

Introduction

The City of Laguna Hills requested that Hartzog & Crabill, Inc. (HCI), Traffic and Transportation Engineers, assist them in upgrading their Citywide Traffic Signal Master Plan (TSMP) to reflect existing traffic and land use conditions. To accomplish this task HCI developed or obtained current traffic counts, accident histories and characteristics, street geometrics and adjacent land uses that may be positively or negatively affected by traffic signal construction; applied this data to recognized standards for traffic signal installation; and, prioritized the 19 candidate intersections provided by the City for possible traffic signal installation.

It is anticipated that the updated TSMP will provide the basis for the City's planning, budgeting and construction of future traffic signals.

The Importance of Traffic Signals and Growth Monitoring

The control of vehicle, pedestrian and bicycle traffic by means of signalized intersection operation has long proven to be an effective technique to reduce accidents and generally improve the quality of traffic flow. To assist the City in the maintenance of a satisfactory signal monitoring program, this report has been prepared as part of a continuing series of periodic signal evaluations with a goal of assisting in future signal improvement decisions and the municipal budgeting process.

The importance of traffic signals is clearly exemplified by their significant influence over the orderly flow of area traffic volumes. When justified, properly designed and maintained, a traffic signal may achieve the following:

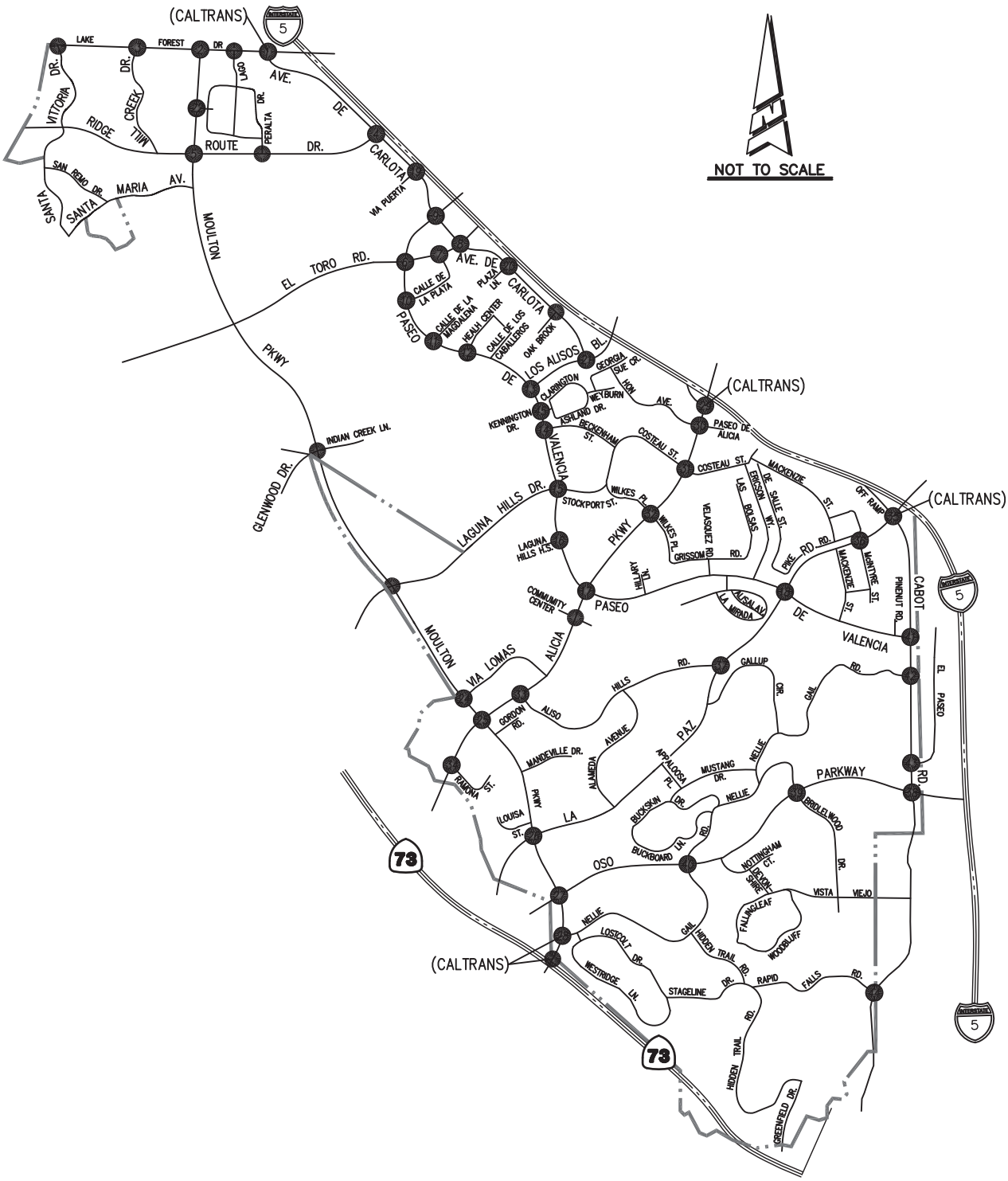
- Reduce the frequency of certain types of accidents
- Effect orderly traffic movement
- Provide for a continuous platoon of traffic flow
- Allow vehicle and pedestrians to better cross opposing directions of traffic

However, should a traffic signal be unjustified or poorly maintained, any or all of the following may result:

- Increased accident frequency
- Excessive delay (driver frustration)
- Disregard of signal indications
- Circuitous travel via alternate routes imparting adjacent increase in traffic

The existing City Traffic Signal System is shown on Exhibit 2 (next page).

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)



EXISTING SIGNAL LOCATIONS
2015 SIGNAL MASTER PLAN

CITY OF LAGUNA HILLS

EXHIBIT 2

HCI CAD FILE: SIGNAL-MASTERPLAN_2015.dwg

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Traffic Signal Justification

While justification for the installation of traffic signals is based, in large part, on the CA MUTCD requirements and Warrants, traffic signals are not factually required because they simply meet one or more of the Warrant criteria. An equally important part of the decision making process is the engineering professionals' judgment based on his/her knowledge of the conditions and circumstances associated with the location in question, along with community priorities, funding, and other factors. However, the CA MUTCD Warrants do have a standing in law and, subsequently, the installation of an unwarranted traffic signal or the failure to install a warranted traffic signal without sound justification or a viable alternative solution can have serious ramifications in respect to liability. Neither action should be taken without legal counsel.

Study Methodology

The study methodology used for this analysis update is generally consistent with previous TSMP assessments with the exception that the State of California Department of Transportation (Caltrans) requirements and Warrants for traffic signal installation have been superseded by those of the CA MUTCD. The study data, tables and exhibits have been modified to reflect this change.

To evaluate the 19 candidate intersections and provide a basis for comparison with the 2007 Traffic Signal Master Plan, new 24-hour, directional traffic counts were conducted at each intersection. The resulting count data was applied to the appropriate CA MUTCD Warrants for traffic signal installation. Also, using the Statewide Integrated Traffic Records System (SWITRS) database, the accident history for the previous three years for each of the intersections was prepared and evaluated to determine if there had been 5 or more reported accidents of a type considered correctible by traffic signal control having occurred during any consecutive twelve months of the 3-year period. No studied locations met this criteria.

Street and adjacent development characteristics such as horizontal or vertical street alignment, sight distance, lane and intersection configuration and the candidate intersections' proximity to schools, parks, churches and other land uses that would benefit or be negatively impacted by traffic installation were considered in the prioritization process.

The same basic rating system as used in previous assessments is utilized in this study whereas each element of the study such as traffic volumes, accident history, street characteristics, etc., is given a numerical value based on a variety of factors. The total point value for each of the candidate intersections is totaled and a priority or ranking of the intersections is established based on highest to lowest point totals. New intersections or current candidate intersections experiencing a change in characteristics can be comparatively evaluated and relatively prioritized using this methodology.

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The 2015 traffic counts per direction of travel for each candidate intersection are shown on Table 1 below.

Table 1
2015 Traffic Volumes at Candidate Intersections

Location	Major Street	Traffic Volumes		Minor Street	Traffic Volumes	
	Name (Speed Limit)	Approach Direction	2015 Volumes	Name (Speed Limit)	Approach Direction	2015 Volumes
1	Santa Vittoria (30 mph)	NB	2,302	Ridge Route Dr.	EB	N/A
		SB	2,857		WB	1,991
		Total	5,159		Total	1,991
2	Ridge Route Dr. (45 mph)	EB	2,141	Mill Creek Dr.	NB	N/A
		WB	2,781		SB	1,192
		Total	4,922		Total	1,192
3	St. Maria (40 mph)	EB	3,640	San Remo Dr.	NB	N/A
		WB	4,381		SB	1,389
		Total	8,021		Total	1,389
4	P.D. Valencia (40 mph)	EB	N/A	Calle Caballeros (RTO)	NB	N/A
		WB	9,291		SB	848
		Total	9,291		Total	848
5	P.D. Valencia (45 mph)	EB	5,784	Hillary Ln.	NB	N/A
		WB	5,300		SB	423
		Total	11,024		Total	423
6	P.D. Valencia (45 mph)	EB	5,623	Velasquez Rd.	NB	N/A
		WB	5,248		SB	353
		Total	10,910		Total	353
7	P.D. Valencia (45 mph)	EB	5,482	Alisal Ave.	NB	1,018
		WB	5,352		SB	N/A
		Total	10,834		Total	1,018
8	P.D. Valencia (45 mph)	EB	5,647	Ericson Wy.	NB	N/A
		WB	5,248		SB	892
		Total	10,895		Total	892

N/A = Non-Applicable. Typically the minor street leg of a "T" intersection.
RTO = Right Turn Only.

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Table 1
(*continued*)

9	P.D. Valencia (45 mph)	EB	2,966	Mackenzie St.	NB	N/A
		WB	2,791		SB	460
		Total	5,697		Total	460
10	P.D. Valencia (45 mph)	EB	2,904	Pine Nut Rd.	NB	N/A
		WB	2,901		SB	397
		Total	5,805		Total	397
11	Oso Pkwy. (50 mph)	EB	14,776	Nottingham Ct. (RTO)	NB	355
		WB	N/A		SB	N/A
		Total	14,776		Total	355
12	La Paz Rd. (50 mph)	EB	8,454	Alameda	NB	N/A
		WB	7,583		SB	813
		Total	16,037		Total	813
13	La Paz Rd. (50 mph)	EB	8,109	Appaloosa Pl.	NB	1,032
		WB	7,905		SB	N/A
		Total	16,014		Total	1,032
14	La Paz Rd. (50 mph)	NB	8,189	Gallup Dr.	EB	N/A
		SB	8,129		WB	549
		Total	16,318		Total	549
15	Alicia Pkwy. (45 mph)	NB	21,144	Via Lomas	EB	1,407
		SB	23,067		WB	N/A
		Total	44,211		Total	1,407
16	Moulton Pkwy. (45 mph)	NB	11,600	Gordon Rd.	EB	N/A
		SB	11,056		WB	1,024
		Total	22,656		Total	1,024
17	Moulton Pkwy. (45 mph)	NB	11,284	Mandeville Dr.	EB	N/A
		SB	11,332		WB	517
		Total	22,616		Total	517
18	Moulton Pkwy. (45 mph)	NB	11,416	Louisa St.	EB	630
		SB	10,763		WB	N/A
		Total	22,179		Total	630
19	Moulton Pkwy. (50 mph)	NB	12,558	Indian Hill	EB	N/A
		SB	11,693		WB	662
		Total	24,251		Total	662

N/A = Non-Applicable. Typically the minor street leg of a “T” intersection.
RTO = Right Turn Only.

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Traffic Volume Warrants

Entering traffic volumes are a major consideration in the determination as to if a traffic signal is needed or justified at an intersection. Over a period of many years and untold hours of research, transportation professionals such as the Institute of Transportation Engineers (ITE) and leading transportation agencies such as Caltrans have established threshold traffic volumes to determine the number of vehicles on a Major street that would preclude the safe access or crossing of that street by traffic on the Minor street. The threshold traffic volumes have been further refined to consider the number of lanes on both the Major and Minor Street and whether the intersection is considered a 'Urban' or 'Rural' environment (i.e., the typical 'Rural' intersection usually experiences higher approach speeds on the Major Street and the threshold volumes on the Minor Street are reduced to compensate for this condition). This reduction can also be applied to Major Streets in an urban environment if the speed on the Major Street exceeds 40MPH, as do all of the Major Streets of the candidate intersections. The threshold volumes are shown on Table 2 as Warrant 1 – Condition A (see next page).

A second factor relative to traffic volumes at an intersection is consideration of the delay experienced by the motorist on the Minor Street as he/she attempts to access or cross the Major Street. The Warrants address this issue through Warrant 1 - Condition B whereas threshold volumes are reduced for the Minor Street and increased for the Major Street. These threshold volumes are also shown on Table 2 (next page).

The 2015 traffic volumes were applied to Warrant 1 – Condition A and Warrant 1-Condition B as shown in Table 3 (following page). As noted, 18 of the 19 Major Streets at the candidate intersections have approach speeds at or in excess of 40 MPH, therefore the Rural criteria of Warrant 1A and 1B is applicable for these streets. The Rural criteria represents 80% of the Urban criteria.

Table 4 further reflects the 80% factor by expressing the Major and Minor Street traffic volumes as the percent of the traffic volume criteria; consequently, when the Major and Minor Street traffic volumes exceed 80%, that warrant is satisfied.

Table 4 also consolidates Table 3 to a single Yes or No relative to meeting the traffic volume warrants, but includes Warrant 7, which considers the accident history of the intersection. As will be explained later in this study, it has a traffic volume component.

Table 5 indicates those intersections that have met the minimum Traffic Volume and Accident Warrants for traffic signal installation.

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Table 2
Minimum Traffic Volumes

Warrant 1 – Condition A
Based on Estimated Average Daily Traffic Volume

Approach Lanes On Major Street	Approach Lanes On Minor Street	Vehicles/day on Major Street (Total both approaches)		Vehicles/day on higher volume Minor Street (one direction only)	
Number	Number	Urban	Rural	Urban	Rural
1	1	8,000	5,600	2,400	1,680
2 or more	1	9,600	6,720	2,400	1,680
2 or more	2 or more	9,600	6,720	3,200	2,240
1	2 or more	8,000	5,600	3,200	2,240

(Warrant 1 Based on Hourly Volumes – Eight Highest Hours)

Approach Lanes On Major Street	Approach Lanes On Minor Street	Major Street Total Approach Volumes		Minor Street Highest Approach Volumes	
Number	Number	Urban	Rural	Urban	Rural
1	1	500	350	150	105
2 or more	1	600	420	150	105
2 or more	2 or more	600	420	200	140
1	2 or more	500	350	200	140

Warrant 1 – Condition B
Interruption of Continuous Traffic

Approach Lanes On Major Street	Approach Lanes On Minor Street	Vehicles/day on Major Street (Total both approaches)		Vehicles/day on higher volume Minor Street (one direction only)	
Number	Number	Urban	Rural	Urban	Rural
1	1	12,000	8,400	1,200	850
2 or more	1	14,400	10,800	1,200	850
2 or more	2 or more	14,400	10,800	1,600	1,120
1	2 or more	12,000	8,400	1,600	1,120

(Warrant 2 Based on Hourly Volumes – Eight Highest Hours)

Approach Lanes On Major Street	Approach Lanes On Minor Street	Major Street Total Approach Volumes		Minor Street Highest Approach Volumes	
Number	Number	Urban	Rural	Urban	Rural
1	1	750	525	75	53
2 or more	1	900	630	75	53
2 or more	2 or more	900	630	100	70
1	2 or more	750	525	100	70

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Table 3
Traffic Signal Warrants – Percentage Satisfied

Location	Major Street	Minor Street	CA MUTCD Warrants							
			Traffic Volume % of Warrant Met						Correctible Accidents	
			1A major/minor	Met	1B major/minor	Met	1A & 1B major/minor	Met	7	Met
1	Santa Vittoria	Ridge Route Dr.	64/83		43/166		61/234		1	
2	Ridge Route Dr.	Mill Creek Dr.	73/71		48/140		N/A		0	
3	St. Maria Ave.	San Remo Dr.	119/83		80/163		N/A		0	
4	P.D. Valencia	*Calle Caballeros	N/A		N/A		N/A		N/A	
5	P.D. Valencia	Hillary Ln.	165/25		110/50		N/A		0	
6	P.D. Valencia	Velasquez Rd.	142/21		108/42		N/A		1	
7	P.D. Valencia	Alisal Ave.	161/61		107/120	✓	N/A		0	
8	P.D. Valencia	Ericson Wy.	162/53		108/105	✓	N/A		1	
9	P.D. Valencia	Mackenzie St.	85/27		57/54		N/A		0	
10	P.D. Valencia	Pine Nut Rd.	86/24		58/47		N/A		1	
11	Oso Pkwy.	*Nottingham Ct.	N/A		N/A		N/A		N/A	
12	La Paz Rd.	Alameda	239/48		148/96		N/A		0	
13	La Paz Rd.	Appaloosa Pl.	238/61		159/121	✓	N/A		0	
14	La Paz Rd.	Gallup Dr.	243/33		147/65		N/A		0	
15	Alicia Pkwy.	Via Lomas	658/84		439/166	✓	N/A		2	
16	Moulton Pkwy.	Gordon Rd.	337/61		225/120	✓	N/A		1	
17	Moulton Pkwy.	Mandeville Dr.	437/31		224/61		N/A		1	
18	Moulton Pkwy.	Louisa St.	330/38		260/74		N/A		1	
19	Moulton Pkwy.	Indian Hill	361/39		241/78		N/A		2	

* Right Turn Only

Warrant 1A – Minimum Vehicle Volume. See Table 2 for threshold traffic volumes.

Warrant 1B – Interruption of Continuous Traffic. See Table 2 for threshold traffic volumes.

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Warrant 1A & 1B Combination – Applicable to Location 1 only as approach speeds at intersection is below 40 mph. Urban criteria applies. Criteria is 80% of 1A and 1B.
Warrant 7 – Correctable Accidents in a previous 12 month period. Minimum Criteria is 5 Correctable Accidents.

Table 4
Signal Warrants – Existing Traffic Volumes

Location	Major Street	Minor Street	Warrant Satisfied (12 Month Period)			
			1A	1B	7	1A & 1B
1	Santa Vittoria	Ridge Route Dr.	NO	NO	NO	NO
2	Ridge Route Dr.	Mill Creek Dr.	NO	NO	NO	N/A
3	St. Maria Ave.	San Remo Dr.	NO	NO	NO	N/A
4	P.D. Valencia	*Calle Caballeros	N/A	N/A	N/A	N/A
5	P.D. Valencia	Hillary Ln.	NO	NO	NO	N/A
6	P.D. Valencia	Velasquez Rd.	NO	NO	NO	N/A
7	P.D. Valencia	Alisal Ave.	NO	YES	NO	N/A
8	P.D. Valencia	Ericson Wy.	NO	YES	NO	N/A
9	P.D. Valencia	Mackenzie St.	NO	NO	NO	N/A
10	P.D. Valencia	Pine Nut Rd.	NO	NO	NO	N/A
11	Oso Pkwy.	*Nottingham Ct.	N/A	N/A	N/A	N/A
12	La Paz Rd.	Alameda	NO	NO	NO	N/A
13	La Paz Rd.	Appaloosa Pl.	NO	YES	NO	N/A
14	La Paz Rd.	Gallup Dr.	NO	NO	NO	N/A
15	Alicia Pkwy.	Via Lomas	NO	YES	NO	N/A
16	Moulton Pkwy.	Gordon Rd.	NO	YES	NO	N/A
17	Moulton Pkwy.	Mandeville Dr.	NO	NO	NO	N/A
18	Moulton Pkwy.	Louisa St.	NO	NO	NO	N/A
19	Moulton Pkwy.	Indian Hill	NO	NO	NO	N/A

* Right Turn Only
Warrant 1A – Minimum Vehicle Volume. See Table 2 for threshold traffic volumes.
Warrant 1B – Interruption of Continuous Traffic. See Table 2 for threshold traffic volumes.
Warrant 1A & 1B Combination – Applicable to Location 1 only as approach speeds at intersection are below 40 mph. Urban criteria applies. Criteria is 80% of 1A and 1B.
Warrant 7 – Correctible Accidents in a previous 12 month period. Minimum Criteria is 5 Correctible Accidents.

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Table 5
Intersections Meeting Minimum Warrants for Traffic Signal Installation
Traffic Signal Warrants – Percentage Satisfied

Location	Intersection
7	Paseo de Valencia at Alisal Avenue
8	Paseo de Valencia at Ericson Way
13	La Paz Road at Appaloosa Place
15	Alicia Parkway at Via Lomas
16	Moulton Parkway at Gordon Road

Priority Rating System

Prioritization of those locations meeting the minimum warrants for traffic signalization in this assessment was accomplished by reviewing the traffic and safety characteristics identified in the seven rating items. This procedure is identical to that used in previous assessments.

Rating Item 1 – Satisfaction of Warrant 1 – Condition B (Interruption of Continuous Traffic)

The greater the traffic volume is on the Major Street the more difficult, and sometimes hazardous, it is for vehicular and pedestrian traffic on the Minor Street to access or cross the Major Street. Using this premise, a rating item is created where points are allocated in ascending order based on the traffic volume on the Major Street. The point allocation for the candidate streets is shown on Table 6 (next page).

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Table 6 – Rating Item 1
Warrant 1B Satisfaction
(Interruption of Continuous Traffic)

Location	Major Street				Minor Street				Points
	Name	Lanes	Volume		Name	Lanes	Volume		
			Leg 1	Leg 2			Leg 1	Leg 2	
1	Santa Vittoria	1/1	2,302	2,857	Ridge Route Dr.	2	1,991	-	0
2	Ridge Route Dr.	2/2	2,141	2,781	Mill Creek Dr.	1	1,192	-	0
3	St. Maria Ave.	2/2	3,640	4,381	San Remo Dr.	1	1,389	-	3
4	P.D. Valencia	N/A	N/A	N/A	*Calle Caballeros	N/A RTO	N/A	-	N/A
5	P.D. Valencia	2/2	5,784	5,300	Hillary Ln.	1	423	-	7
6	P.D. Valencia	2/2	5,623	5,248	Velasquez Rd.	1	353	-	7
7	P.D. Valencia	2/2	5,482	5,352	Alisal Ave.	1	1,018	-	7
8	P.D. Valencia	2/2	5,647	5,248	Ericson Wy.	1	892	-	7
9	P.D. Valencia	2/2	2,900	2,791	Mackenzie St.	1	460	-	1
10	P.D. Valencia	2/2	2,904	2,901	Pine Nut Rd.	1	397	-	1
11	Oso Pkwy.	N/A	N/A	N/A	*Nottingham Ct.	N/A RTO	N/A	-	N/A
12	La Paz Rd.	2/2	8,454	7,583	Alameda	1	813	-	9
13	La Paz Rd.	2/2	8,109	7,905	Appaloosa Pl.	1	1,032	-	9
14	La Paz Rd.	2/2	8,189	8,129	Gallup Dr.	1	546	-	9
15	Alicia Pkwy.	3/3	21,144	23,067	Via Lomas	1	1,407	-	10
16	Moulton Pkwy.	3/3	11,600	11,056	Gordon Rd.	1	1,084	-	10
17	Moulton Pkwy.	3/3	11,284	11,332	Mandeville Dr.	1	517	-	10
18	Moulton Pkwy.	3/3	11,416	10,763	Louisa St.	1	630	-	10
19	Moulton Pkwy.	3/3	12,558	11,693	Indian Hill	2	662	-	10

* Right Turn Only

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Rating Item 2- Coordinated Movement

Points are increased if a proposed traffic signal can be incorporated into a coordinated system without significantly impacting the system operation. Conversely, fewer points are given if a proposed signal cannot be effectively incorporated into a coordinated system and the operation or the system is degraded. Table 7 shows HCI's assessment of this rating item.

Table 7 – Rating Item 2
Coordinated Movement

Loc.	Major Street	Minor Street	Approaching Platoon			Points
			Intact	Spread	Disburse	
1	Santa Vittoria	Ridge Route Dr.			X	0
2	Ridge Route Dr.	Mill Creek Dr.			X	0
3	St. Maria Ave.	San Remo Dr.			X	0
4	P.D. Valencia	*Calle Caballeros	N/A	N/A	N/A	N/A
5	P.D. Valencia	Hillary Ln.			X	0
6	P.D. Valencia	Velasquez Rd.			X	0
7	P.D. Valencia	Alisal Ave.			X	0
8	P.D. Valencia	Ericson Wy.			X	0
9	P.D. Valencia	Mackenzie St.			X	0
10	P.D. Valencia	Pine Nut Rd.			X	0
11	Oso Pkwy.	*Nottingham Ct.	N/A	N/A	N/A	N/A
12	La Paz Rd.	Alameda			X	0
13	La Paz Rd.	Appaloosa Pl.			X	5
14	La Paz Rd.	Gallup Dr.			X	0
15	Alicia Pkwy.	Via Lomas		X		3
16	Moulton Pkwy.	Gordon Rd.		X		3
17	Moulton Pkwy.	Mandeville Dr.		X		2
18	Moulton Pkwy.	Louisa St.		X		2
19	Moulton Pkwy.	Indian Hill	X			5

* Right Turn Only

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Rating Item 3 – Accident Evaluation Results

An elevated intersection accident rate can be an indication that there are insufficient gaps in the traffic stream on the Major Street to allow traffic on the Minor Street to merge onto or cross the Major Street. This condition usually results in increased incidences of broadside, left-turn, and vehicle/pedestrian/bicycle types of collisions occurring at the intersection. As these types of accidents are generally correctible by the installation of a traffic signal, points are allocated in the prioritization process based on the number of potentially correctible accidents a traffic signal installation may preclude. Table 8 represents the results of this analysis factor and incorporates the traffic volume component intended with the Accident Warrant.

Table 8 – Rating Item 3
Accident Evaluation Results

Location	Major Street	Minor Street	Warrant Requirements						
			[1]TOTAL Accidents (12 months)	[2]CORRECTIBLE Accidents (12 months)	[3]One Condition 80% Satisfied			Intersection Satisfies Accident Warrant	Poin
					Warrant 1A Min Vol.	Warrant 1B Interruption	Warrant 4 Peds		
1	Santa Vittoria	Ridge Route Dr.	1	1					3
2	Ridge Route Dr.	Mill Creek Dr.	0	0					0
3	St. Maria Ave.	San Remo Dr.	0	0					0
4	P.D. Valencia	*Calle Caballeros	3	0	N/A	N/A	N/A	N/A	0
5	P.D. Valencia	Hillary Ln.	0	0					0
6	P.D. Valencia	Velasquez Rd.	1	1					3
7	P.D. Valencia	Alisal Ave.	0	0		✓			0
8	P.D. Valencia	Ericson Wy.	1	1		✓			3
9	P.D. Valencia	Mackenzie St.	0	0					0
10	P.D. Valencia	Pine Nut Rd.	0	0					0

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Table 8 – Rating Item 3 (cont'd)
Accident Evaluation Results

Location	Major Street	Minor Street	Warrant Requirements					Intersection Satisfies Accident Warrant	Poin
			(1)TOTAL Accidents (12 months)	(2)CORRECTIBLE Accidents (12 months)	(3)One Condition 80% Satisfied				
					Warrant 1A Min Vol.	Warrant 1B Interruption	Warrant 4 Peds		
11	Oso Pkwy.	*Nottingham Ct.	1	1	N/A	N/A	N/A	N/A	3
12	La Paz Rd.	Alameda	0	0					0
13	La Paz Rd.	Appaloosa Pl.	1	1		✓			3
14	La Paz Rd.	Gallup Dr.	0	0					0
15	Alicia Pkwy.	Via Lomas	5	2		✓			6
16	Moulton Pkwy.	Gordon Rd.	2	2		✓			6
17	Moulton Pkwy.	Mandeville Dr.	1	1					3
18	Moulton Pkwy.	Louisa St.	1	1					3
19	Moulton Pkwy.	Indian Hill	2	2					6

* Right Turn Only
✓ Warrant requirements satisfied.
(1) Greatest number of accidents occurring in a continuous 12 month period in a previous 3 year period.
(2) Broadside, left-turning, and vehicle/pedestrian/bicycle accidents.
(3) Traffic Volume component of accident warrant.

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Rating Item 4 – Special Conditions

This rating item considers area facilities, conditions and circumstances that are not addressed in other rating items that could benefit from an adjacent or nearby traffic signal installation. These include, for example, the presence of schools, churches, parks, and other public buildings. The identified facilities and conditions are shown on Table 9.

Table 9 – Rating Item 4
Special Conditions

Location	Major Street	Minor Street	Special Conditions							Points
			School	Church	Public Bldg/ Park	Curve	Hill	Sight Distance	Other	
1	Santa Vittoria	Ridge Route Dr.			X		X	X		7
2	Ridge Route Dr.	Mill Creek Dr.			X		X	X		7
3	St. Maria Ave.	San Remo Dr.	X			X	X	X		10
4	P.D. Valencia	*Calle Caballeros								N/A
5	P.D. Valencia	Hillary Ln.	X			X	X	X		10
6	P.D. Valencia	Velasquez Rd.	X			X	X	X		10
7	P.D. Valencia	Alisal Ave.				X	X	X		7
8	P.D. Valencia	Ericson Wy.				X	X	X		7
9	P.D. Valencia	Mackenzie St.	X			X	X	X		10
10	P.D. Valencia	Pine Nut Rd.	X			X	X	X		10
11	Oso Pkwy.	*Nottingham Ct.								N/A
12	La Paz Rd.	Alameda					X	X		5
13	La Paz Rd.	Appaloosa Pl.					X			2
14	La Paz Rd.	Gallup Dr.				X	X	X		7
15	Alicia Pkwy.	Via Lomas	X		X					6
16	Moulton Pkwy.	Gordon Rd.				X	X	X		7
17	Moulton Pkwy.	Mandeville Dr.			X	X	X	X		10
18	Moulton Pkwy.	Louisa St.				X	X	X		7
19	Moulton Pkwy.	Indian Hill				X	X	X		7

* Right Turn Only

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Rating Item 5 – Safety Index

This rating item uses accident totals and characteristics to develop a Benefit/Cost ratio. As there are always several costs associated with accidents depending upon their severity, and as the cost of traffic signals varies depending, in general, upon their configuration, a ratio and subsequent point allocation can be made by relating the accident and traffic signal cost factors. The resultant safety index is shown on Table 10.

Table 10 – Rating Item 5
Safety Index

Location	Major Street	Minor Street	Correctable Accidents (Consecutive 12 month Period)			
			Fatal	Injury	PDO	Points
1	Santa Vittoria	Ridge Route Dr.	0	0	1	0
2	Ridge Route Dr.	Mill Creek Dr.	0	0	0	0
3	St. Maria Ave.	San Remo Dr.	0	0	0	0
4	P.D. Valencia	Calle Caballeros	0	0	0	0
5	P.D. Valencia	Hillary Ln.	0	0	0	0
6	P.D. Valencia	Velasquez Rd.	0	1	0	7
7	P.D. Valencia	Alisal Ave.	0	0	0	0
8	P.D. Valencia	Ericson Wy.	0	1	0	7
9	P.D. Valencia	Mackenzie St.	0	0	0	0
10	P.D. Valencia	Pine Nut Rd.	0	0	1	0
11	Oso Pkwy.	Nottingham Ct.	0	1	0	7
12	La Paz Rd.	Alameda	0	0	0	0
13	La Paz Rd.	Appaloosa Pl.	0	0	0	0
14	La Paz Rd.	Gallup Dr.	0	0	0	0
15	Alicia Pkwy.	Via Lomas	0	1	1	7
16	Moulton Pkwy.	Gordon Rd.	0	0	1	0
17	Moulton Pkwy.	Mandeville Dr.	0	1	0	7
18	Moulton Pkwy.	Louisa St.	0	1	0	7
19	Moulton Pkwy.	Indian Hill	0	1	1	7

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Rating Item 6 – Environmental Conditions

This subjective evaluation considers the ramifications of a traffic signal installation on the adjacent environment. Such factors would include increased pollution generated by idling vehicles, impact on aesthetics, or loss of habitat. HCI's evaluation of potential environmental impact associated with traffic signal installation at the study intersections is shown on Table 11.

Table 11 – Rating Item 6
Environmental Impact Assessment

Loc.	Major Street	Minor Street	Environmental Impact			Points
			Minimal	Moderate	Substantial	
1	Santa Vittoria	Ridge Route Dr.	X			5
2	Ridge Route Dr.	Mill Creek Dr.	X			5
3	St. Maria Ave.	San Remo Dr.	X			5
4	P.D. Valencia	Calle Caballeros	N/A	Right	Turn Only	N/A
5	P.D. Valencia	Hillary Ln.	X			5
6	P.D. Valencia	Velasquez Rd.	X			5
7	P.D. Valencia	Alisal Ave.	X			5
8	P.D. Valencia	Ericson Wy.	X			5
9	P.D. Valencia	Mackenzie St.	X			5
10	P.D. Valencia	Pine Nut Rd.	X			5
11	Oso Pkwy.	Nottingham Ct.	N/A	Right	Turn Only	N/A
12	La Paz Rd.	Alameda		X		2
13	La Paz Rd.	Appaloosa Pl.	X			2
14	La Paz Rd.	Gallup Dr.	X			2
15	Alicia Pkwy.	Via Lomas	X			5
16	Moulton Pkwy.	Gordon Rd.	X			2
17	Moulton Pkwy.	Mandeville Dr.	X			2
18	Moulton Pkwy.	Louisa St.	X			2
19	Moulton Pkwy.	Indian Hill	X			2

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Rating Item 7 – Highway Geometry

Traditionally, streets are assigned classification and, subsequently, a number of through and turning lanes based on the traffic volumes that the street has or is expected to reach. The service area, land use, number of feeder streets and length of the street determine or produces the traffic volume on a given street. Typical classifications are Arterial, Collector, or Local with a function of single-lane Local streets distributing traffic to multilane Collector streets, and the Collector streets distributing traffic to multilane Arterial streets. Street geometry is the number of lanes a street has, and intersection geometry is the configuration of the intersecting streets (i.e., usually a 4-legged or T-configuration). Under normal circumstances, a traffic signal installation at an Arterial/Arterial intersection with its inherently greater traffic volumes and service area will have a greater Cost/Benefit than a traffic signal installed, for example, at a Collector/ Local intersection. The geometry based ranking of the candidate intersections is shown on Table 12.

Table 12 – Rating Item 7
Highway Geometry

Loc.	Inter. Type	Major Street		Minor Street		Points
		Name	Class.	Name	Class.	
1	4	Santa Vittoria	Arterial	Ridge Route Dr.	Collector	4
2	T	Ridge Route Dr.	Arterial	Mill Creek Dr.	Collector	3
3	T	St. Maria Ave.	Arterial	San Remo Dr.	Collector	3
4	T	P.D. Valencia	Arterial	Calle Caballeros	Collector	3
5	T	P.D. Valencia	Arterial	Hillary Ln.	Collector	3
6	T	P.D. Valencia	Arterial	Velasquez Rd.	Collector	3
7	T	P.D. Valencia	Arterial	Alisal Ave.	Collector	3
8	T	P.D. Valencia	Arterial	Ericson Wy.	Collector	3
9	T	P.D. Valencia	Arterial	Mackenzie St.	Collector	3
10	T	P.D. Valencia	Arterial	Pine Nut Rd.	Collector	3
11	T	Oso Pkwy.	Arterial	Nottingham Ct.	Collector	3
12	T	La Paz Rd.	Arterial	Alameda	Collector	3
13	T	La Paz Rd.	Arterial	Appaloosa Pl.	Collector	3
14	T	La Paz Rd.	Arterial	Gallup Dr.	Collector	3
15	T	Alicia Pkwy.	Arterial	Via Lomas	Collector	3
16	T	Moulton Pkwy.	Arterial	Gordon Rd.	Collector	3
17	T	Moulton Pkwy.	Arterial	Mandeville Dr.	Collector	3
18	T	Moulton Pkwy.	Arterial	Louisa St.	Collector	3
19	T	Moulton Pkwy.	Arterial	Indian Hill	Collector	3

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

Locations Satisfying Minimum Warrant Criteria and Priority Ranking

The findings of City of Laguna Hills' Traffic Signal Master Plan 2016 Update indicates that the following five (5) locations have satisfied the minimum CA MUTCD warrants for traffic signal installation:

7. Paseo de Valencia at Alisal Avenue
8. Paseo de Valencia at Ericson Way
13. La Paz Road at Appaloosa Place
15. Alicia Parkway at Via Lomas
16. Moulton Parkway at Gordon Road

Table 13 ranks the warranted locations based on the rating system employed in the Traffic Signal Master Plan Update.

Table 13

Priority Ranking of Study Intersections

Meeting Minimum Warrants for Traffic Signal Installation

Location	Major Street	Minor Street	Rating Item Number							
			1	2	3	4	5	6	7	Total
	Maximum Points		10	5	20	15	10	5	5	70
15	Alicia Pkwy.	Via Lomas	10	3	6	6	7	5	3	40
8	P.D. Valencia	Ericson Wy.	7	0	3	7	7	5	3	32
16	Moulton Pkwy.	Gordon Rd.	10	3	6	7	0	2	3	31
13	La Paz Rd.	Appaloosa Pl.	9	5	3	2	0	2	3	24
7	P.D. Valencia	Alisal Ave.	7	0	0	7	0	5	3	22

Recommendations

HCI recommends that this TSMP Update act as a guide for future traffic signal installation in the City of Laguna Hills. HCI also recommends that the TSMP be re-evaluated on a periodic basis to address changes in traffic volumes, accident history, and in the character and operational characteristics of the study intersections, as well as for inclusion of new locations as the need for potential traffic signalization occurs.

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

RATING ITEMS

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

RATING ITEM 1
Interruption of Continuous Traffic (10 Points Maximum)
(Warrant 1B)

Vehicles attempting to cross the major flow of traffic, or enter that flow, can cause the traffic on the Through street to be delayed or slow down unnecessarily. The installation of a signal at such locations may actually speed up the traffic flow on the Major street. Table A1 shows the percent of the maximum assigned points based on the Major street daily volume. For example, an intersection where the traffic volume on the Major street averages 11,000 vehicles per day would receive 70% of the maximum allowed. In this example, the intersection would receive 7 points for this rating area.

Table A1 – Percent of Maximum points – Interruption of Continuous Traffic

Major Street Volume Of at Least…	Percent of Maximum and Points Allowed
4,700	0% (0 points)
5,600	10% (1 points)
6,400	20% (2 points)
7,300	30% (3 points)
8,200	40% (4 points)
9,000	50% (5 points)
10,000	60% (6 points)
10,700	70% (7 points)
11,600	80% (8 points)
12,400	90% (9 points)
17,500	100% (10 points)

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

RATING ITEM 2
Coordinated Movement (5 Points Maximum)

When a traffic signal turns green and the waiting vehicles start down the roadway, they are in a relatively compact grouping referred to as a "platoon". As the group of vehicles progresses down the street, they become more and more disbursed due to differences in driving speeds. As a result, some of the cars in the original platoon are unable to pass through the next signal and are forced to stop. In certain cases, the installation of a signal between the original two intersections can keep this platoon intact and actually reduce the overall driving delay. This item depends on engineering judgment and should include present and future traffic demands of the area.

A signal may be justified when it forms a part of an interconnected or coordinated system and would serve the purpose of maintaining traffic volumes in relatively concentrated platoons of vehicles. Typically, the following question is asked: "Would a signal at this location cause the platoon approaching the next signal to be intact (5 points), spread (2 points), or disbursed (0 points)?"

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

RATING ITEM 3
Accident Hazards

An elevated intersection accident rate can be a sign of vehicles (and pedestrians) trying to enter the flow of traffic or cross the street when there are insufficient gaps in the Major street traffic. Only those accidents susceptible to correction by traffic signals should be considered when evaluating this item. And even then, only if less restrictive measures such as warning signs, proper lighting, painted markings, etc., have failed. Accidents which are susceptible to correction by a traffic signal are normally considered to be "broadside" or right-angle accidents, left-turn accidents, and those accidents involving vehicles/pedestrians. In this item, the maximum number of points is assigned to the intersection with the highest number of correctible accidents and 0 is assigned to the lowest. Table A2 illustrates the points that would be assigned if the highest intersection had six accidents and the lowest intersection had none.

Table A2 – Percent of Maximum Points – Accident Hazard

Correctible Accidents	Points
6 or more	20
5	16
4	13
3	10
2	6
1	3
0	0

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

RATING ITEM 4
Special Conditions (15 Points Maximum)

This item considers extenuating circumstances that are not covered in other items in the rating system. These may include the proximity of schools, churches, public buildings, and other traffic and pedestrian generation; an abrupt change from rural to an urban area; the need for police control during portions of the day; a steep hill; a horizontal curve; or restricted sight distance. This requires engineering judgment based on physical inspection of the site. Equal weights should be given to each of the items considered here. In Table A3, the percentages and points are based on how many of 6 conditions were located at an intersection.

Table A3 – Percent of Maximum Points – Special Conditions

Conditions Located	Points
6	100% (15 points)
5	83% (12 points)
4	67% (10 points)
3	50% (7 points)
2	33% (5 points)
1	17% (2 points)
0	0% (0 points)

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

RATING ITEM 5
Safety Index (15 Points Maximum)

A safety index is the Benefit/Cost ratio for a safety improvement expressed as a number. The costs and benefits are directly related to the number of accidents at a location which are susceptible to correction by a traffic signal. Points are assigned by setting the highest Benefit/Cost ratio to the maximum allowed points and the minimum Benefit/Cost ratio to zero. Ratings in between are allocated a proportion of the number to points between zero and the maximum. The accidents are grouped into categories, with costs, and weighted. The "benefit" portion of the ratio is actually the estimated cost of the severity categories as listed below.

Table A4 – "Costs" of Traffic Accidents

Category	Cost
Fatal Accidents	$4,800,000
Injury Accidents	$67,400
Property Damage Accidents	$10,200

Table A5 – Typical Signal Installation Costs in Southern California

Intersection Type	Cost
Four Legged Intersection	$400,000
T Intersection	$300,000

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

RATING ITEM 6
Environmental Conditions (5 Points Maximum)

This is the only rating item that can actually be assigned negative points. An evaluation of the environmental impacts associated with a traffic signal installation is performed, and a point value made for each location. A project that has minimum impacts receives the maximum 5 points while a project that could have a substantial adverse effect receives a negative 5 points. Gradations may be employed between the two limits.

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

RATING ITEM 7
Highway Geometry (5 Points Maximum)

In general, it is more cost effective and more productive to signalize a four-legged intersection than a T-intersection. Also, a traffic signal at an intersection of two arterial streets will better serve the community than will a traffic signal at an intersection of two local residential streets.

Higher Volume Street Is…	Lower Volume Street Is…	Maximum Points if…	
		Intersection is T	Intersection is 4 Legged
Local	Local	0	0
Collector	Local	0	1
	Collector	1	2
Arterial	Local	2	3
	Collector	3	4
	Arterial	4	5

Attachment: 2016 Traffic Signal Master Plan (3017 : Traffic Signal Master Plan Update and Construction of New Traffic Signals)

City of Laguna Hills
Traffic Commission
Staff Report

Date: March 19, 2025
To: Chair and Commission Members
From: Joe Ames, Public Works Director/City Engineer
Issue: Bicycle Master Plan Update

Recommendation: That the Traffic Commission recommend that the City Council direct City staff to update the bikeways portion of the Bikeways, Trails & Open Space Master Plan ("Bicycle Master Plan") and appropriate funding for this work.

Background:

At the September 13, 2022, City Council meeting, the City Council directed the Traffic Commission and City staff to research safety concerns over bicycles, electric bicycles, and motorized mobility devices and provide a report to City Council.

To this end, City staff prepared a comprehensive 279-page Bicycle, Electric Bicycle, and Motorized Mobility Device Safety "memorandum" (herein referred to as "The Report") on the issue examining education, enforcement, and facility enhancements as ways to address safety concerns and presented The Report to the Traffic Commission at the November 16, 2022 meeting.

Regarding future planned bikeway facilities, City staff included the District 5 Bikeways Strategy Report, dated March 2015, and the City's existing Bikeways, Trails, and Open Space Master Plan in The Report.

The Report outlined the following state of the City's bicycle lanes and bikeways:

"Existing Bicycle Routes"

In April 2011, the City Council approved the last update to the City's 2001 Bikeways, Trails & Open Space Master Plan (Master Plan). The City also adopted the Orange County Transportation Authority (OCTA) Commuter Bikeways Strategic Plan as the City's "Bicycle Transportation Plan" in December 2009. The OCTA Commuter Bikeways Strategic Plan identified proposed improvements to the City's bicycle transportation system (bike routes) in order to allow the City to meet eligibility requirements for State bicycle transportation funding. The 2011 Master Plan update included proposed improvements identified in the OCTA Commuter Bikeways Strategic Plan.

Subsequently, the Orange County Council of Governments (OCCOG) and OCTA commissioned the District 5 Bikeways Strategy Report. This report was completed in March 2015. This report focused on nine "bikeway corridors" in South Orange County and proposed improvements which could be made to finish the corridors.

The existing bicycle routes in the City are outlined in Table 1 of the 2011 Master Plan update shown below.

Table 1

Street	From	To	Class	Mileage
Alicia Pkwy (w/b)	Paseo de Valencia	Moulton Pkwy	I	0.76
Paseo de Valencia (sb)	Laguna Hills Dr	Alicia Pkwy	I	0.28
San Diego Fwy Path s/s	Alicia Pkwy.	North of Georgia Sue Dr.	I	0.33
J01 Bike trail (County of Orange)	I-5 fwy	w/o Moulton Pkwy	I	1.8
Laguna Hills Drive	Paseo de Valencia	Indian Hill lane	I	0.48
Oso Parkway (w/b)	Cabot Rd	Moulton Pkwy	I	1.71
Alicia Pkwy	Moulton Pkwy	Paseo de Valencia	II	0.76
Paseo de Valencia (nb)	Alicia Pkwy	El Toro Rd	II	1.50
Paseo de Valencia (sb)	El Toro Rd	Alicia Pkwy	II	1.50
Paseo de Valencia	Alicia Pkwy	La Paz Rd.	II	0.91
Alicia Pkwy	Paseo de Valencia	Hon Ave	II	0.83
Laguna Hills Dr (w/b)	Paseo de Valencia	Moulton Pkwy	II	0.70
Laguna Hills Dr (e/b)	Moulton Pkwy	Paseo de Valencia	II	0.70
Oso Pkwy (e/b)	Moulton Pkwy	Cabot Rd	II	1.71
Oso Pkwy (w/b)	Cabot Rd	Moulton Pkwy	II	1.71
Moulton Pkwy (n/b)	City bdry near Glenwood Dr.	La Paz Rd	II	1.72
Moulton Pkwy (s/b)	City bdry near Glenwood Dr.	City bdry near Nellie Gail Rd	II	2.18
Moulton Pkwy	Lake Forest Dr.	Ridge Route Dr.	II	0.56
Los Alisos Blvd (e/b)	Paseo de Valencia	San Diego Fwy (City bdry)	II	0.43
Los Alisos Blvd (w/b)	San Diego Fwy (City bdry)	Paseo de Valencia	II	0.43
Lake Forest Dr (e/b)	Del Lago Dr	Santa Vittoria	II	0.76
Lake Forest Dr (w/b)	Santa Vittoria Dr	Del Lago Dr.	II	0.76
La Paz Rd e/b	Cabot Rd	I-73	II	2.37
La Paz Rd w/b	I-73	Cabot Rd	II	2.37
Cabot Rd.	La Paz Rd.	s/o Oso Pkwy	III	1.18
			Total	**28.0**

Table 1 of the City's Bikeways, Trails & Open Space Master Plan, updated in 2011, identifying existing Class I, II, and III Bikeways

However, there are several gaps in the routes where bicyclists must share the road with motorists to traverse the City.

Insufficient connections exist between Mission Viejo and Laguna Hills, except via the Aliso Creek Bike Trail south of Los Alisos Boulevard. The Interstate 5 South County Improvement Project will provide a dedicated bike lane on La Paz Road within Laguna Hills and will provided a dedicated bike lane for the Los Alisos Boulevard bridge crossing over Interstate 5. However, the portion of La Paz Road within Mission Viejo immediately adjacent to Interstate 5 will not have a dedicated bike lane, and Oso Parkway and Alicia Parkway will still not have dedicated bike lanes to connect Laguna Hills with Mission Viejo.

Insufficient connections also exist between the central portion of Laguna Hills and north Laguna Hills. Some examples are below:

- There is insufficient right-of-way to provide a bicycle connection along Avenida de la Carlota from Ridge Route Drive to Los Alisos Boulevard.
- There are segments of Moulton Parkway with insufficient right-of-way in the City of Laguna Woods.
- There is no bike lane on El Toro Road.

However, there are several gaps in the routes where bicyclists must share the road with motorists to traverse the City."

"<u>New Infrastructure"</u>

There exist gaps in the roadway network to allow bicyclists and other mobilized device users to cross from area to area in the City. To this end, the Traffic Commission and City Council may consider authorizing funding to update the City's existing bicycle route master plan in order to prioritize work efforts and funding toward constructing new and improved bicycle routes.

An example of a gap in the bicycle route network exists on Paseo de Valencia between La Paz Road and Cabot Road connecting the Class II bike route on Paseo de Valencia north of La Paz Road with the Class III bike route on Cabot Road. At a future Traffic Commission meeting, the Public Works Director/City Engineer may

propose to place Paseo de Valencia on a “road diet” south of La Paz Road to reduce the number of through lanes in each direction from two (2) lanes to one (1) lane. This section of road is lightly travelled, and the City Engineer has determined the existing roadway configuration is not needed to accommodate the existing average daily traffic counts on this section of roadway. Theoretically, this road diet would allow for space for the construction of a new median, dedicated bike lane in each direction, and parkway landscaping without the need to purchase any right-of-way. This road diet should also allow for space on the north side of the roadway to construct dedicated refuge lane in front of Valencia Elementary school that would be separated from through traffic, which would address a verbal request made by Councilmember Pezold in October 2022 to investigate ways of providing a safer “drop off zone” on Paseo de Valencia in front of Valencia Elementary school. Currently, parents often park their vehicles on the shoulder of the roadway to drop off and pick up their children because the school’s existing parking lot does not have enough capacity for all the vehicles. This type of project should qualify for State funding under the Active Transportation Program because it would include bicycle and pedestrian mobility improvements. Potentially, Paseo de Valencia between La Paz Road and Alicia Parkway could also be placed on a road diet as part of this project to construct and continue the same improvements northerly to Alicia Parkway. Even if this project were approved by the Traffic Commission and the City Council, unfortunately, it would be a multi-year effort. This proposed project would first need to be approved by the Orange County Transportation Authority (OCTA) because Paseo de Valencia is part of the County’s Master Plan of Arterial Highways (MPAH). In order for the City to remain eligible for Measure M turnback funds, the City is required to certify annually that it has not reduced the number of travel lanes on any arterial highway. Therefore, an amendment to the MPAH would first need to be approved by OCTA prior to investigating any additional time and effort on this project.

(Editor’s Note: The above project has since been modified to connect the existing Aliso Creek Bikeway at Laguna Hills Drive and Paseo de Valencia to the future City of Mission Viejo El Paseo Bikeway project that will eventually connect Aliso Creek Bikeway users to the City of Laguna Niguel, City of San Juan Capistrano, and City of Dana Point bikeways that ultimately terminate at Doheny State Beach. Both the Laguna Hills and Mission Viejo projects were awarded grant funding, and the MPAH amendment has been approved by OCTA. Conceptual layouts attached.)

The 2011 City's Bikeways, Trails & Open Space Master Plan identifies Class II and Class III improvements to reduce the number of bicycle connectivity gaps in the City.

Table 2

Street/Path	From	To	Class	Mileage
Ridge Route Dr.	Mill Creek	Santa Vittoria	Class II	0.46
Ridge Route Dr	Mill Creek	Avenida de la Carlota	Class II	0.68
Aliso Hills Dr	Alicia Pkwy	La Paz Rd	Class II	0.9
Alicia Pkwy	Moulton Pkwy.	Ramona St.	Class II	0.22

Street/Path	From	To	Class	Mileage
*Moulton Pkwy	Ridge Route Dr.	Santa Maria Ave.	Class II	0.25
Moulton Pkwy (n/b)	Nellie Gail Rd	La Paz Rd	Class II	0.56
Paseo de Valencia	La Paz Rd.	Cabot Rd.	Class II	0.59
Avenida de la Carlota	Ridge Route Dr.	Los Alisos Blvd	Class III	1.44
Avenida de la Carlota	Ridge Route Dr.	Lake Forest Dr.	Class III	0.73
El Toro Rd (w/b)	City bdry near Ave Carlota	Paseo de Valencia	Class III	0.34
El Toro Rd (e/b)	Paseo de Valencia	City bdry near Ave Carlota	Class III	0.34
Santa Vittoria Dr	Santa Maria Ave	Lake Forest Dr	Class III	1.27
Lake Forest Dr (e/b)	Del Lago Dr.	City Bdry near I-5 fwy	Class III	0.37
Lake Forest Dr (w/b)	City Bdry near I-5 fwy	Del Lago Dr.	Class III	0.37
El Toro Road	Avenida de la Carlota	City Bdry near I-5 fwy	Class III	0.06
Alicia Pkwy	Hon Ave.	City Bdry near I-5 fwy	Class III	0.18
La Paz Rd.	Cabot Rd.	City Bdry near I-5 fwy	Class III	0.08
Oso Pkwy	Cabot Rd.	City Bdry near I-5 fwy	Class III	0.05
			Total	**8.89**

*Under Construction 2010/2011

Table 2 of the City's Bikeways, Trails & Open Space Master Plan, updated in 2011, identifying future Class II and Class III Bikeways.

Most of these locations will not be feasible under roadway widenings are implemented."

For reference, the following are the types of bike facility classifications:

Shared Roadways (No bikeway designation): Bikeways where bicyclists and cars operate within the same travel lane, either side by side or in single file depending on roadway configuration. In some instances, streets may be fully adequate and safe without bicycle specific signing and pavement markings.

Class I Bikeways (Bike Paths): These bikeways are facilities separated from roadways for use by bicyclists and pedestrians.

An example of a Class I Bikeway (Bike Path or Trail)

Class II Bikeways (Bike Lanes): These bikeways use signage and striping to delineate the right-of-way assigned to bicyclists and motorists. Bike lanes encourage predictable movements by both bicyclists and motorists.

An example of a Class II Bikeway (Bike Lanes)

Class III Bikeways (Bike Routes): Shared Roadways configured with pavement markings, signage and other treatments including directional signage, traffic diverters, chicanes, chokers and/or other traffic calming devices to reduce vehicle speeds or volumes. Such enhanced treatments often are associated with Bicycle Boulevards.

An example of a Class III Bikeway (Bike Route)

Class IV Bikeways (Cycle Tracks): These bikeways are exclusive bike facilities that combine the user experience of a separated path with the on-street infrastructure of conventional bike lanes.

Example of a Class IV Bikeway (Cycle Tracks)

One of City staff's recommendations included in the November 16, 2022 Traffic Commission agenda report included the recommendation to update the bikeways portion of the Bikeways, Trails & Open Space Master Plan. At that time, the Traffic Commission did not recommend that the bikeways portion of the Master Plan ("Bicycle Master Plan") be updated due to fiscal concerns and that the safety concern focus remain on monitoring and observing violations of State law and City codes related to motorized bicycles.

Recently, Traffic Commissioner Miller inquired with Public Works Director Ames about the process of constructing additional Class IV bikeways adjacent to City streets, including La Paz Road which currently has Class II bike lanes. Director Ames indicated that additional bikeways would likely be funded through grant opportunities and usually those grant opportunities rely on supporting, public engagement documentation including updated, adopted bikeway master plans.

Therefore, because the Bicycle Master Plan has not been updated in many years, City staff is recommending again that the Bicycle Master Plan be updated to prioritize funding and grant applications for future bikeway construction and enhancement efforts.

Fiscal Impact:

The estimated cost for updating the bikeways portion of the Bikeways, Trails & Open Space Master Plan is $50,000. This budgetary expenditure would need to be allocated in the FY 2025-2027 biennial budget as part of the upcoming City Council budget approval process.

Attachments:

1. District 5 Bikeways Strategy Report
2. City of Laguna Hills Bikeways, Trails & Open Space Master Plan

DISTRICT 5

BIKEWAYS STRATEGY REPORT

March 2015

OCCOG

OCTA

KOA Corporation
KTU+A

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I. EXECUTIVE SUMMARY

This report summarizes the results of a collaborative effort to identify and prioritize potential regional bikeways throughout south Orange County (Supervisorial District 5). Through extensive facilitation efforts, nine regional bikeway corridors were identified and ranked. The rankings serve as the basis for a subsequent feasibility study for the top three corridors. The remaining six corridors may by assessed at a later date, as agencies work toward obtaining funding for the completion of each corridor.

While the Orange County Council of Governments (OCCOG) and the Orange County Transportation Authority (OCTA) have commissioned this report, implementation of bikeway corridors will be led by the agency's that have jurisdiction. In some cases, roadways are managed by Caltrans, such as portions of Pacific Coast Highway (State Route 1) or at freeway interchanges. While OCCOG and OCTA will promote the implementation of corridors recommended in this report, final design, construction, and maintenance of the corridors will be coordinated and conducted by the respective jurisdictions. Additionally, the cities or the County may need to coordinate with various landowners such as utility companies, rail operators, and OCTA for right-of-way acquisition.

The District 5 Bikeways Strategy aims to enhance community interaction and expand travel choices for residents and bicyclists of all skill levels throughout south Orange County. The integrated planning effort establishes bikeways that cross jurisdictional boundaries and serve major destinations and employment centers. The coordinated efforts by OCTA and member agencies support improved road safety, reduced automobile trips, reduced fuel consumption and air emissions, and improved community health outcomes within District 5. The feasibility study will include an assessment of what is needed to complete or enhance the corridors, recommended designs, preliminary drawings, and cost estimates. These assessments and recommendations are intended to help advance local project implementation and provide the basis to apply for state and federal grants.

I.1 Background

The District 5 Bikeways Strategy was developed as part of OCTA's regional bikeways planning process, which involves OCTA, local jurisdictions, and public stakeholders. This process began in 2011 with a pilot effort for Supervisorial District 4 in northern Orange County, then for Supervisorial Districts 1 & 2 in central and western Orange County in 2012. It is funded by a federal grant received by OCCOG, with a 20% local match provided by OCTA. There are two phases of the regional bikeways planning process. Phase 1 is this bikeways strategy, which identifies the regional "backbone" bikeway corridors that connect to major activity centers. The regional bikeway corridors are identified based on community and agency input and ranked based on criteria consistent with regional transportation goals and objectives (see Table ES.1 and Chapter 3). In Phase 2, the top-ranking corridors are studied in more detail with the development of a feasibility study, which provide planning-level design recommendations to the local jurisdictions.

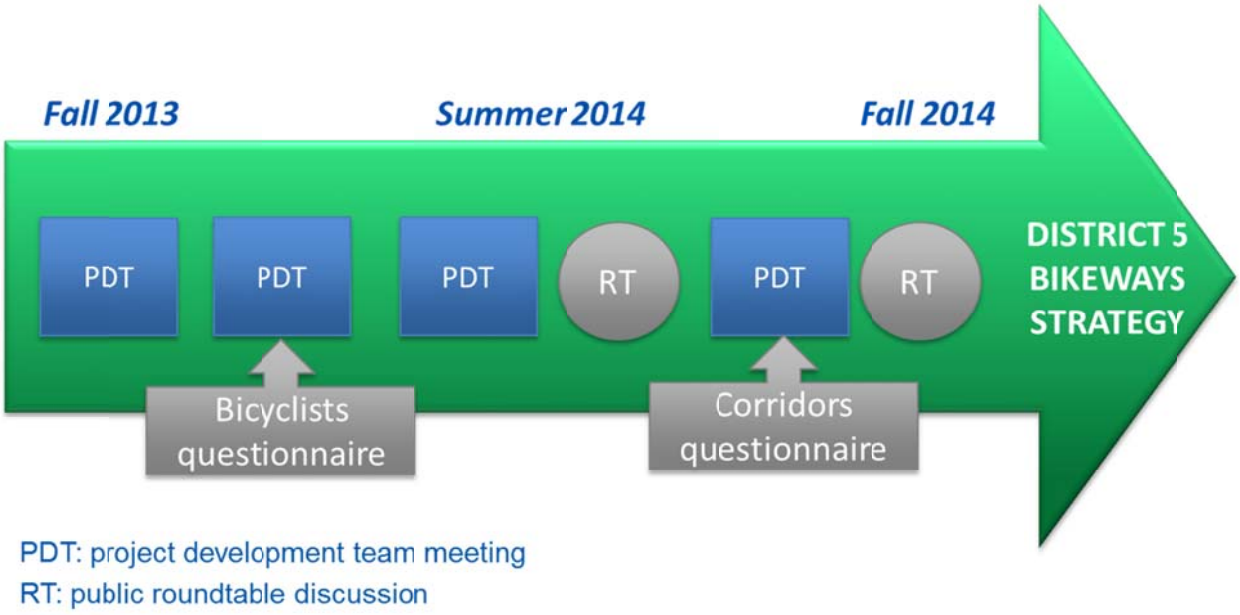
Regional bikeway planning supports the goals contained in existing countywide transportation plans, such as the Long Range Transportation Plan, OCTA Commuter Bikeways Strategic Plan (CBSP), and the Orange County Sustainable Communities Strategy. These goals are interrelated and include expanding travel choices, improving safety, and supporting the viability of bicycle transportation.

Building on these broad goals, a set of goals, objectives, and strategies were developed by the project team for District 5. These goals and objectives recognize the physical challenges facing District 5, which include high speed and high volume arterial roadways, large intersections, flood control channels, railroads, and freeways, and hilly terrains. There are four main goals established in accordance with the District 5 local context:

- Goal #1: Increase the use of bicycles as a viable alternative to the automobile
- Goal #2: Coordinate regional bikeways planning and construction among individual cities
- Goal #3: Build a bicycle transportation network by planning, designing, and maintaining transportation facilities that will meet the needs for all types of bicyclists
- Goal #4: Improve bicycling safety in the district

I.II Facilitation Efforts

Preparation of this report was a collaborative effort between OCTA, local agencies, bicycle advocates, and the general public. The process for facilitating discussions between the various stakeholders including the project development team and the bicycling community is detailed below:



The following summarizes the process for facilitating the regional bikeway discussion in preparing the Strategy:

- A project development team (PDT) was organized with planning and engineering representatives from each local jurisdiction (county and city) within Supervisorial District 5. These include the County of Orange and the cities of Aliso Viejo, Dana Point, Irvine, Laguna Beach, Laguna Hills, Laguna Niguel, Laguna Woods, Lake Forest, Mission Viejo, Rancho Santa Margarita, San Clemente, San Juan Capistrano, and Caltrans District 12. OCTA staff and the project consultant team participated on the PDT. The PDT met on multiple occasions to discuss project goals and objectives, opportunities and constraints, preliminary corridor alignments, and draft ranking criteria.

- Focus group meetings were conducted with smaller working groups of PDT representatives. During the focus group meetings, large-format boards were printed for brainstorming potential bikeways corridors. The boards presented information to help frame bikeways demand, needs, and opportunities. This included the identification of flood control channels and rail corridors, the transportation network, existing and proposed bikeways, major destinations, and other key features for consideration and collaborative brainstorming.

- Two community roundtable discussions were held to provide an opportunity for public input on the project. The first roundtable occurred in May 2014 during National Bike Month. A presentation on the draft regional bikeway corridors was made and public input was requested on corridor concepts, ranking evaluation criteria, and their top three desired corridors. Approximately 30 attendees included public stakeholders from the bicycle advocacy, health, safety, and social justice sectors, bicycle shop owners, as well as elected officials and community residents. Presentations describing the planning process and large-format boards displaying the proposed corridors were provided. The second roundtable occurred in September 2014 and was attended by approximately 50 people with boards showing the top three ranked regional bikeway corridors. A presentation described the nine corridors and key changes since the first roundtable with a focus on prioritizing the top three corridors. Attendees at the roundtable discussed the ranking analysis results and provided feedback on the recommended top three corridors. Promotion of the

roundtables was conducted by means of direct emails to over 1,000 stakeholders, advertisements on OCTA and city websites, OCTA's "On the Move" blog, and social media.

- A project webpage was created on OCTA's website (www.octa.net/Share-the-Ride/Bike/District-5-Bikeways-Roundtable). It included a project overview that was updated regularly with project materials, including meeting materials, meeting dates, and contact information.
- An online questionnaire was promoted online and distributed at the first public roundtable asking respondents to gauge attendees' level of bicycling comfort and gather input about their bicycling preferences and frequency. Almost 200 questionnaires were completed.
- A second questionnaire was distributed online and at the second roundtable to solicit feedback on the proposed corridors. It included a map of the proposed corridors. Participants were asked to rank the top three corridors. There were 150 questionnaires completed.

I.III Regional Corridors

As shown in Figure ES.1, a total of nine regional bikeway corridors are proposed to help improve the viability of bicycling and cross-jurisdictional bikeway connectivity throughout south Orange County. The proposed corridors provide connections to other regional bikeway corridors established in neighboring supervisorial districts and between major points of interest. These corridors are comprised of both existing bikeway facilities and new proposed segments. The exact corridor alignments may change upon more detailed analysis during the feasibility study phase. For example, corridors may be realigned to use parallel or adjacent streets that provide a more feasible route. The proposed corridors and corridor alignments evaluated in this Strategy are the following:

- **Corridor A – Pacific Coast Highway (PCH)** – This 20-mile north-south corridor runs south along PCH from the southern Newport Beach city boundary, along Del Prado to Golden Lantern Street, down to Dana Point Harbor Drive, along Park Lantern to Coast Highway, and finally along El Camino Real to the southern San Juan Capistrano city limit.

- **Corridor B – Laguna Canyon** – This 8.8-mile north-south corridor runs along Laguna Canyon Road from the Supervisorial District 5 boundary in Irvine at the I-405 Freeway and continues to PCH.

- **Corridor C – El Toro/Alicia/Laguna Canyon** – This 15.3-mile corridor extends along Alicia Parkway from Santa Margarita, onto Paseo de Valencia, to El Toro Road, then along Laguna Canyon Road (State Route 133) to Broadway Street, and ending at PCH in Laguna Beach.

- **Corridor D – Portola/Santa Margarita** – This 6.7-mile corridor extends along Portola Parkway from the Supervisorial District 5 boundary at the western city limit of Lake Forest, west of Paloma, and continues along Santa Margarita Parkway to Avenida Empresa, ending at Antonio Parkway.

- **Corridor E – Aliso Creek** – This 20.3-mile corridor runs along Santiago Canyon Road from the Supervisorial District 5 boundary in Modjeska Canyon at approximately Bolero Lookout Road, to El Toro Road at Ridgeline Road, continues along the Class I Aliso Creek bike path parallel to El Toro Road and ends at PCH.

- **Corridor F – Muirlands/Cabot/Camino Capistrano**– This 18-mile corridor runs along Muirlands Boulevard from the Supervisorial District 5 boundary east of Bake Parkway, then along the Aliso Creek Bike Path at Los Alisos Boulevard. It continues along the bike path parallel to Paseo de Valencia, then on Paseo de Valencia at Laguna Hills Drive, and onto Cabot Road and the Cabot-Forbes bike path at Rapid Falls Road. From there, it extends along Forbes Road to the Laguna Niguel Metrolink Station, crossing over to Camino Capistrano, continuing to La Zanja Street, then onto Avenida De La Vista. It picks up from there on the Trabuco Creek Trail, to the San Juan Creek Trail along Camino Capistrano to access San Juan Creek Road, then along a proposed bikeway currently in development that would connect to Avenida California, continue along Via California and Via Fortuna to Via Sacramento, then along Camino Capistrano to Palisades Drive and down to PCH.

- **Corridor G – Oso Parkway** – This 8.9-mile corridor runs along Pacific Park Drive from Woodfield and continues along Oso Parkway to its eastern end at Bend Road/Coto De Caza Drive.

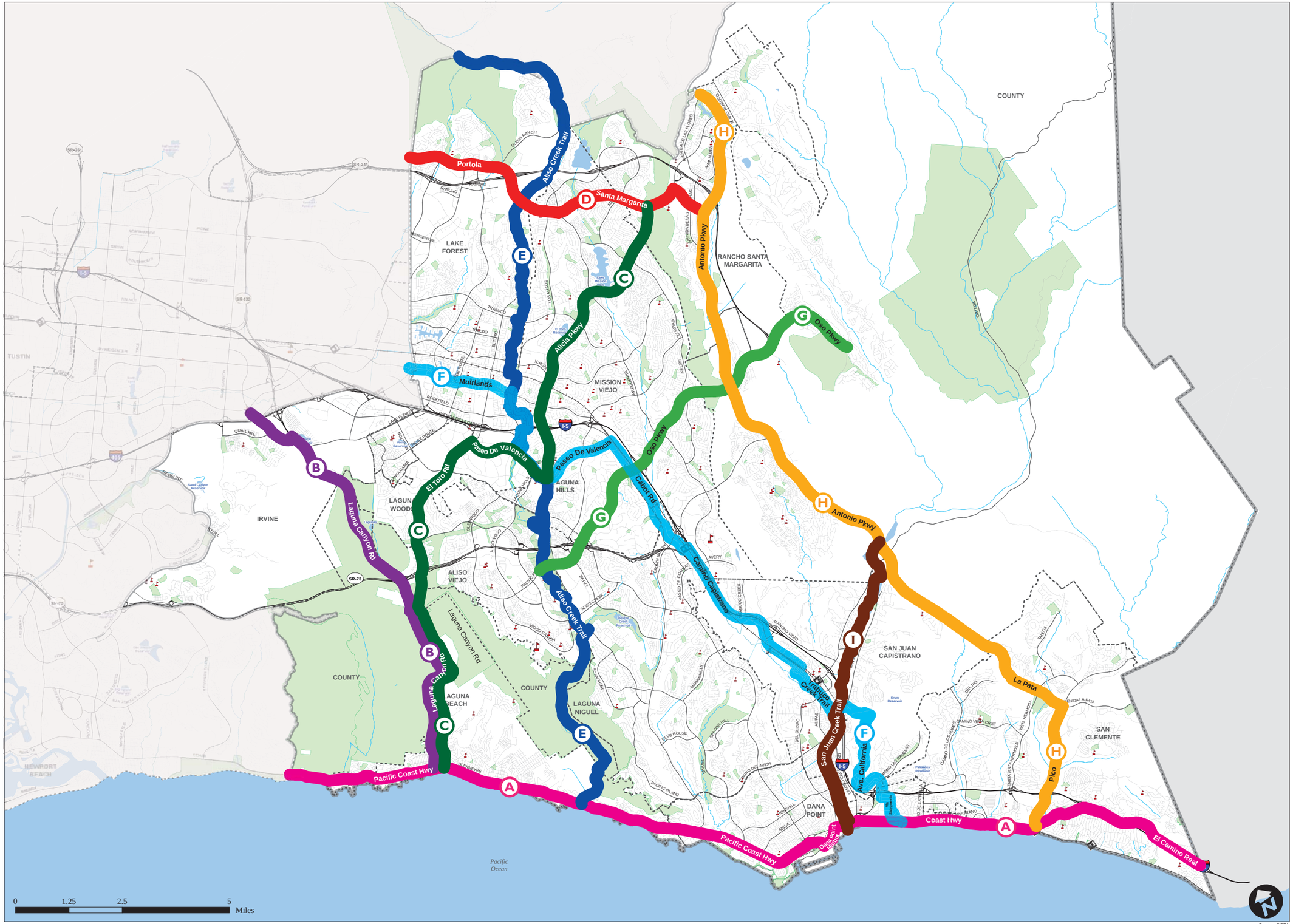
- **Corridor H – Antonio/La Pata/Pico** – This 18-mile corridor runs along Antonio Parkway from Avenida De Las Flores and continues along La Pata Avenue, then onto Avenida Pico down to El Camino Real.

- **Corridor I – San Juan Creek** – This 8.6-mile corridor extends along San Juan Creek Trail from Antonio Parkway down to PCH.

PROJECT CORRIDOR OVERVIEW

OCTA District 5 Bikeways Collaborative

KOA CORPORATION PLANNING & ENGINEERING



Source: OCTA

BIKEWAY CORRIDORS

- A — Pacific Coast Highway Corridor
- B — Laguna Canyon Corridor
- C — El Toro/Alicia Corridor
- D — Portola/Santa Margarita Corridor
- E — Aliso Creek Corridor
- F — Muirlands/Cabot Corridor/ Camino Capistrano
- G — Oso Parkway Corridor
- H — Antonio/La Pata/Pico Corridor
- I — San Juan Creek Corridor

LEGEND

- Transportation Center
- Rail
- Schools
- Colleges
- Parks / Open Space
- Waterbody
- City Boundary
- Supervisorial District 5

Figure ES-1

Each corridor was evaluated using criteria consistent with District 5 goals and objectives and building from criteria specified in OCTA's 2009 CBSP and District 1, 2 and 4 Bikeways Collaboratives. The criteria consider a range of opportunities, constraints, and other factors affecting demand and feasibility. The evaluation criteria include the following categories:

- Trip Demand
- Level of Traffic Stress (LTS)
- Reported Collisions
- Public Support
- Physical Constraints
- Completes the Corridor
- Completes the Network
- Economic Efficiency

Table ES.1 summarizes the ranking evaluation, with raw and weighted scores shown. Raw scores for each category were calculated using a methodology described in Chapter 3.2. The weighted scores account for normalizing between 0 and 100 and the weighting of each criterion.

The regional corridors were ranked to help guide implementing agencies in prioritizing bikeway improvements. The evaluation process determined which corridors would provide the greatest relative potential benefit to bicyclists in terms of regional connectivity, access to key destinations, and improved safety, while also possessing significant public support and limited physical constraints that could hinder implementation. The following top ranked corridors will be further studied for feasibility in the second phase of the District 5 Bikeways Strategy:

- **Corridor A:** Pacific Coast Highway
- **Corridor C:** El Toro/Alicia/Laguna Canyon
- **Corridor F:** Muirlands/Cabot/Camino Capistrano

Each of the District 5 cities, the County of Orange, and Caltrans have jurisdiction over portions of at least one of these three corridors. While feasibility review is not immediately being provided for all of the other six corridors, cities may advance the study of any corridor where there is interest in continuing the efforts of the Strategy.

Table ES.2 summarizes criteria ranking results for the nine proposed corridors within District 5 and shows the distance of each corridor and range of cost.

Table ES.1: Corridor Scoring

Criteria		Score	Level of Traffic Stress		Reported Collisions		Economic Efficiency		Trip Demand		Public Input		Completes the Network		Physical Constraints		Completes the Corridor	
Best Possible Score		Tot.	RS	WS	RS	WS	RS	WS	RS	WS	RS	WS	RS	WS	RS	WS	RS	WS
		100	4.0	20	3.0	20	6.4	15	343.6	15	96	10	1.7	5	3	10	0%	5
A	PCH Corridor	70	4	19	3	20	1	2	280	12	96	10	1	3	12	2	0	1
B	Laguna Canyon	54	4	20	1	9	0	1	209	9	62	6	1	2	29	1	0	5
C	El Toro/Alicia/ Laguna Canyon	65	4	20	2	16	2	4	289	13	21	2	1	4	20	1	0	5
D	Portola/Santa Margarita	59	4	20	1	7	1	1	317	14	19	2	2	5	6	5	0	5
E	Aliso Creek	50	1	6	0	1	5	11	261	11	58	6	1	4	3	10	0	1
F	Muirlands/Cabot / Camino Capistrano	60	2	12	1	8	6	15	344	15	47	5	1	3	21	1	0	1
G	Oso Parkway	48	4	19	0	3	1	2	277	12	13	1	1	4	16	2	0	5
H	Antonio/La Pata/Pico	44	3	17	1	7	1	1	245	11	23	2	1	2	20	1	0	2
I	San Juan Creek	38	1	3	0	0	5	12	313	14	22	2	1	3	11	2	0	1

Note: RS = Raw Score; WS = Weighted Score

Table ES.2: Corridor Ranking

Corridor ID	Corridor Name	Rank	Weighted Score	Length (miles)	Cost Range (millions)
A	PCH	1	70	19.0	$11.5 – $14.1
C	El Toro/Alicia/Laguna Canyon	2	65	15.3	$12.2 – $15.0
F	Muirlands/Cabot/Camino Capistrano	3	60	17.9	$7.4 – $9.0
D	Portola/Santa Margarita	4	59	6.7	$6.5 – $8.0
B	Laguna Canyon	5	54	8.8	$8.4 – $10.3
E	Aliso Creek	6	50	20.3	$8.2 – $10.0
G	Oso Parkway	7	48	8.9	$5.5 – $6.8
H	Antonio/La Pata/Pico	8	44	18.0	$11.1 – $13.5
I	San Juan Creek	9	38	8.6	$3.8 – $4.6
TOTAL				**123.5**	**$74.6 – $91.3**

I.IV Near-Term Action Plan

In an effort to build momentum to complete the regional bikeway network, the District 5 Bikeways Strategy recommends potential near-term projects. These potential near-term projects along the proposed corridors can be implemented requiring minimal construction costs, low right-of-way acquisition, and minimal environmental review as funds become available. Examples of near-term projects may include restriping a street to implement a Class II bike lane or providing signage along a street to designate it as a Class III bike route.

Each jurisdiction will lead funding and implementation efforts for projects in their respective areas. OCTA can provide support to these jurisdictions through efforts such as providing grant notifications, grant application guidance, and design solutions. Coordination between jurisdictions is highly encouraged to implement linkages simultaneously.

I.V Funding Strategies

Funding assistance can be provided through federal, state, and local government agency programs aimed at improving bicycle infrastructure. It is important that communities are made aware of funding sources and that the proper procedures are followed in applying for the grants. Because only a portion of public transportation funding is allocated toward bicycle policy development and infrastructure, there is strong competition between jurisdictions to successfully secure funding.

Most federal funding requires that funds be matched by state and/or local municipalities. State funding often requires similar funding matches from local agencies. To facilitate the acquisition and coordination of funding, a full-time bicycle coordinator with extensive knowledge of funding sources is often appointed. Bicycle coordinators should also have a strong capability to develop a competitive proposal, specifying the project details and jurisdictional needs and opportunities for bicycle improvements.

A summary table by source type has been provided with details regarding eligibility, use, and requirements associated with funding sources, to support agency efforts in finding outside funding sources to implement improvements along the proposed corridors (Chapter 6).

I.VI Programs

Non-infrastructure bicycle programs, such as education, encouragement (public outreach), enforcement, and evaluation (four of the "Five Es" of bicycle planning - with the fifth being engineering), work together through policy development and engineering implementation to enhance the bicycle network for all users. Based on community input and coordination with agency staff, programmatic recommendations are provided in this Strategy to complement the infrastructure recommendations associated with the proposed corridors.

1.0 INTRODUCTION

This document summarizes the recommendations and near-term action plan for the implementation of regional bikeways throughout south Orange County. The objective of the District 5 Bikeways Strategy ("the Strategy") is to coordinate planning and funding efforts between the various entities for implementing regionally-beneficial bikeways. The recommendations are the result of a collaborative effort between the local agencies and community stakeholders. The Strategy focuses on identifying potential regional bikeways that could best serve bicyclists of varying skill levels. A near-term action plan was established to outline potential next steps for completing the regional bikeway network.

1.1 Background

The District 5 Bikeways Strategy was developed as part of OCTA's regional bikeways planning process: involving OCTA, local jurisdictions, and public stakeholders. The County of Orange, Caltrans, and the cities of Aliso Viejo, Dana Point, Irvine, Laguna Beach, Laguna Hills, Laguna Niguel, Laguna Woods, Lake Forest, Mission Viejo, Rancho Santa Margarita, San Clemente, and San Juan Capistrano were involved. This process began in 2011 with a pilot effort for Supervisorial District 4 in northern Orange County, then for Supervisorial Districts 1 & 2 in west central Orange County in 2012. It is funded by a federal grant received by the Orange County Council of Governments (OCCOG), with a 20% local match provided by the Orange County Transportation Authority (OCTA). Figure 1.1 illustrates the Supervisorial District 5 boundaries.

Regional bikeway planning efforts support the goals contained in existing countywide transportation plans, such as the Long Range Transportation Plan and the Orange County Sustainable Communities Strategy. These goals include expanding travel choices, improving safety, and supporting sustainability. They also build on the 2009 Commuter Bikeways Strategic Plan (CBSP) which outlines OCTA's roles in bikeways planning, as follows:

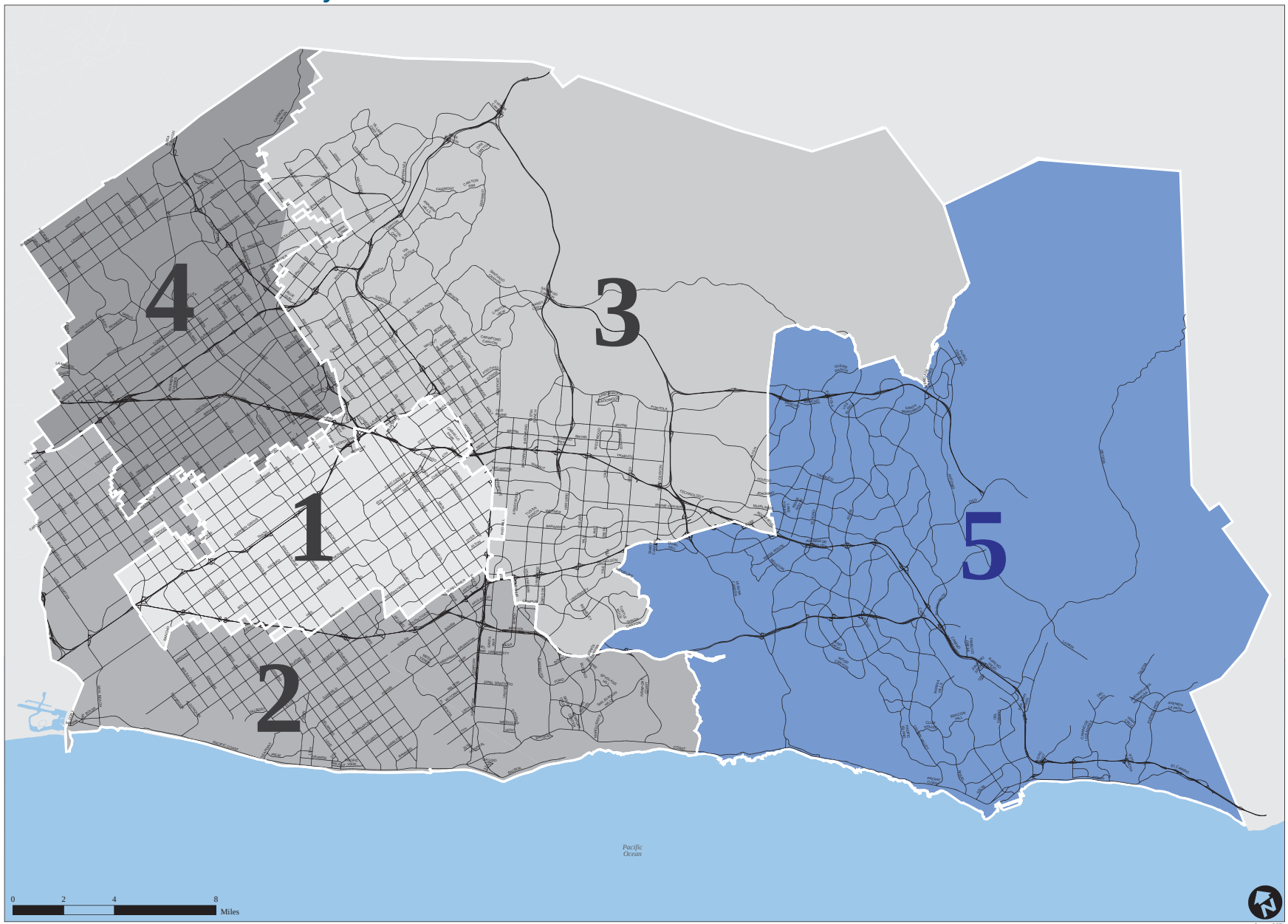
- Suggesting regional priorities for optimal use by local jurisdictions;
- Assisting in coordinating plans between jurisdictions;
- Providing planning and design guidelines; and
- Participating in outreach efforts to encourage bicycle commuting.

The CBSP outlines "regional priority locations", including colleges and universities, transportation centers, and major employment areas. These regional priorities served as the basis for developing the potential District 5 regional bikeway corridors. While this planning process has been initiated and coordinated by OCTA, local jurisdictions will bring projects from concept to construction, through coordination with Caltrans and OCTA as needed.

ORANGE COUNTY SUPERVISORIAL DISTRICTS

OCTA District 5 Bikeways Collaborative

KOA Corporation Planning & Engineering



DISTRICT INFORMATION

DISTRICT 1

Fountain Valley (Portions of)
Garden Grove
Santa Ana
Westminster

DISTRICT 2

Buena Park (Portions of)
Costa Mesa
Cypress
Fountain Valley (Portions of)
Huntington Beach
La Palma
Los Alamitos
Newport Beach
Seal Beach
Stanton

DISTRICT 3

Anaheim (Portions of)
Irvine (Portions of)
Orange
Tustin
Villa Park
Yorba Linda

DISTRICT 4

Anaheim (Portions of)
Brea
Buena Park (Portions of)
ullerton
La Habra
Placentia

DISTRICT 5

Aliso Viejo
Dana Point
Irvine (Portions of)
Laguna Beach
Laguna Hills
Laguna Niguel
Laguna Woods
Lake Forest
Mission Viejo
Rancho Santa Margarita
San Clemente
San Juan Capistrano

Figure 1-1

1.2 Strategy Overview

The Strategy identifies nine regional corridors to serve as the backbone bikeway network for cities and unincorporated areas within south Orange County. These corridors and the rationale for their alignments are described in Chapter 3. The report includes an overview of current conditions, highlights of attractions along the corridor, and the identification of opportunities (e.g. existing flood channel maintenance roads and available road right-of-way) and constraints (e.g. significant inclines/ declines and complex intersections).

The report describes each of the eight criteria used to assess and rank the regional corridors. These criteria are based on goals and objectives developed with input from the local agencies and the community. The top three corridors have been selected for a follow-up feasibility study that will include planning-level design recommendations for key sections of each corridor. The feasibility study will provide the information and data required for local jurisdictions to prepare grant applications for the design and construction of sections of each corridor.

In an effort to facilitate project implementation, a high-level near-term action plan for all nine of the corridors is outlined in this report. The plan recommends implementing items that are relatively low-cost and with few major constraints such as slope, environmental concerns, or lack of right-of-way. Local governmental agencies are already working on many of the items identified in the plan.

The Strategy also consists of a detailed discussion of the various types of bike facilities that could be used along these corridors in southern Orange County. Facilities covered in this section range from bike lanes and shared-use markings or "sharrows" to separated paths, cycle tracks, complex intersection treatments, signage, and street markings. Sections of the corridors where these facilities may be appropriate are identified.

The Strategy outlines educational approaches for bicyclists and motorists. Classes for children and adults as well as public outreach are reviewed.

Finally, the Strategy outlines funding strategies and points to a variety of public, as well as private, sources of funds for bike infrastructure and educational projects.

1.3 Bikeways Classifications

Throughout this report, reference is made to four classes or categories of bikeways. Until recently, the California Department of Transportation (Caltrans) used three categories for bikeways. However, a fourth category, separated bikeways or cycle tracks, has recently been added to the classification. California Streets and Highways Code (SHC) Section 890.4 defines the four bikeway. These bikeway classifications are illustrated in Figure 1.2 and summarized below:

- Class I – Off-Street Paved Bike Paths: facilities on a separate right-of-way from roadways, usually shared by bicyclists and pedestrians.
- Class II – On-Road Striped and Signed Bicycle Lanes: on-street facilities that use painted stripes and stencils to delineate the right-of-way assigned to bicyclists and motorists, and to provide for more predictable movements by each.
- Class III – On-Road Shared-Lane Signed Bicycle Routes: signed on-street facilities that accommodate vehicles and bicycles in the same travel lane. Bicycles are permitted on most roadways; however, for safety purposes, signed bicycle routes are often found on streets with lower speeds and traffic volumes.
- Class IV Bikeways - Separated Bikeways (Cycle Tracks): exclusive bike facilities that combine the user experience of a separated path with the on-street infrastructure of conventional bike lanes.

A more detailed description is in Chapter 5 (Bicycle Facility Toolkit).

1.4 Jurisdictional Governance

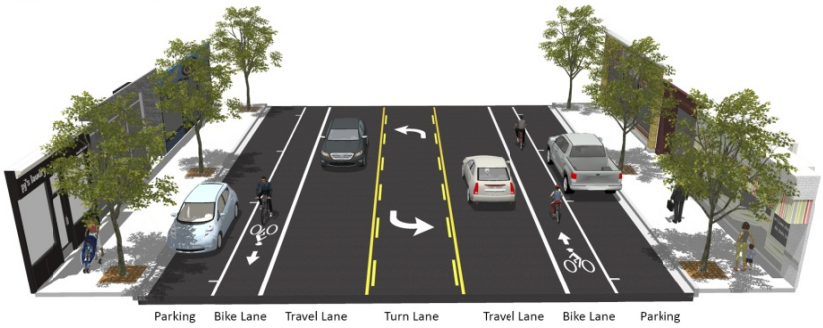
While OCCOG and OCTA commissioned this report, the implementation of bikeway corridors will be led by the cities or the County of Orange, whomever has jurisdiction. In some cases, roadways are managed by Caltrans, such as portions of Pacific Coast Highway (State Route 1), or at freeway interchanges.

While OCCOG and OCTA promote the implementation of corridors recommended in this report, final design, construction, and maintenance of the corridor would ultimately need to be accepted by the respective jurisdictions as outlined above. Additionally, the cities or the County of Orange may need to coordinate with various landowners such as utility companies, rail operators, and OCTA for right-of-way acquisition.

Figure 1.2: Caltrans Bikeway Classifications

Class I: Shared-Use Path/Trail

Class II: Bike Lane



Class III: Bike Route

Class IV: Cycle Track or Separated Lane

2.0 EXISTING CONDITIONS

2.1 Context

The 2009 OCTA CBSP notes that much of south Orange County was developed as planned communities over the last 30 years. The roadway networks are generally wider and more circuitous than in Central County. The advantage to these roads is that many of them were designed with bike lanes along the shoulders. However, these roads typically have higher speed limits, more elevation change, and alignments through low-density communities with housing separated from work and shopping centers. This layout often results in longer trips, and the lower densities consequently result in fewer job opportunities near the residential communities. The higher speed limits and wider roads result in more challenges for bicyclists desiring to share and cross the roadways. Nonetheless, many opportunities still exist, such as providing improved access and facilities at transit stations.

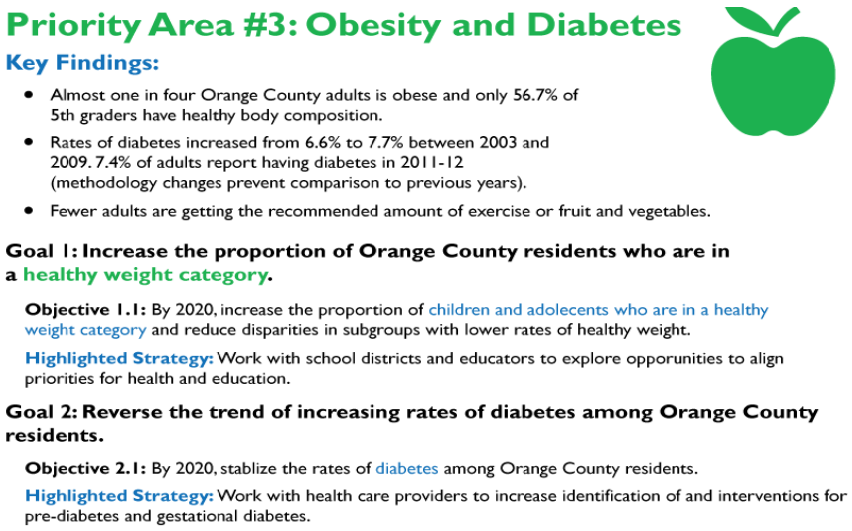
According to the 2013 American Community Survey (U.S. Census Bureau), less than 1 percent of Orange County's population commutes by bicycle. The vast majority of commuters commute to work by driving alone. This shows how automobile-dependent Orange County currently is and why many of the streets and freeways are at, or close to, maximum capacity. The Orange County Projections, produced by the Center for Demographic Research (out of California State University, Fullerton), estimates Orange County's 2013 population of 3.114 million to grow by nearly 600,000, more than 19 percent, by 2035, which will only put more demand on transportation infrastructure. See 2014 Long Range Transportation Plan (www.octa.net/LRTP/).

2.2 Rationale

Implementing bikeway facilities can result in decreased levels of traffic congestion, fuel consumption, and air pollutions, and improved air quality and health. Biking is a viable transportation option for short trips. It solves first mile/last mile issues for transit riders. A bicycle commuter who rides four miles to work, five days a week, avoids 2,000 miles of driving and (in the U.S.) about 2,000 pounds of carbon dioxide emissions each year, which is approximately 5% of the average American's carbon footprint (www.data.worldbank.org).

Serious obesity and diabetes issues exist in the US. Orange County is not immune. The overall obesity rate in the County is over 33%, with most cities in southern Orange County having rates in the low to mid 20's (www.publichealthadvocacy.org). As the graphic on the following page shows, over 7% of people in Orange County suffer from diabetes, with an increasing number of them being children (from the Orange County Health Care Agency, 2014-2016 OC Health Improvement Plan). Encouraging bicycling and other physical activities may help reduce diabetes. According to the Centers for Disease Control and Prevention, children 6 to 17 years of age should get one hour of exercise per day and adults about 30 minutes per day. Bicycling can provide much of this beneficial exercise.

However, to increase the number of people who bike on a regular basis, bicyclists need to feel safe on the roads and bikeways. According to pedbikeinfo.org, "Bicycle trips account for only 1% of trips in the United States. In 2012, there were 726 bicyclist fatalities and 49,000 bicyclist injuries. This data represents 2.2% of all traffic fatalities during the year. Sixty-nine percent of the bicyclist fatalities occurred in urban areas. In California, there were 124 bicyclist fatalities, representing 4.3% of the total 2,857 traffic fatalities in 2012". (National Highway Traffic Safety Administration Traffic Safety Facts 2012 Data, published in April 2014). Bike safety has become an increasing concern over the years.



Priority Area #3: Obesity and Diabetes

Key Findings:

- Almost one in four Orange County adults is obese and only 56.7% of 5th graders have healthy body composition.
- Rates of diabetes increased from 6.6% to 7.7% between 2003 and 2009. 7.4% of adults report having diabetes in 2011-12 (methodology changes prevent comparison to previous years).
- Fewer adults are getting the recommended amount of exercise or fruit and vegetables.

Goal 1: Increase the proportion of Orange County residents who are in a healthy weight category.

Objective 1.1: By 2020, increase the proportion of children and adolecents who are in a healthy weight category and reduce disparities in subgroups with lower rates of healthy weight.

Highlighted Strategy: Work with school districts and educators to explore opporunities to align priorities for health and education.

Goal 2: Reverse the trend of increasing rates of diabetes among Orange County residents.

Objective 2.1: By 2020, stablize the rates of diabetes among Orange County residents.

Highlighted Strategy: Work with health care providers to increase identification of and interventions for pre-diabetes and gestational diabetes.

Orange County Heath Care Agency,
2014-2016 OC Health Improvement Plan

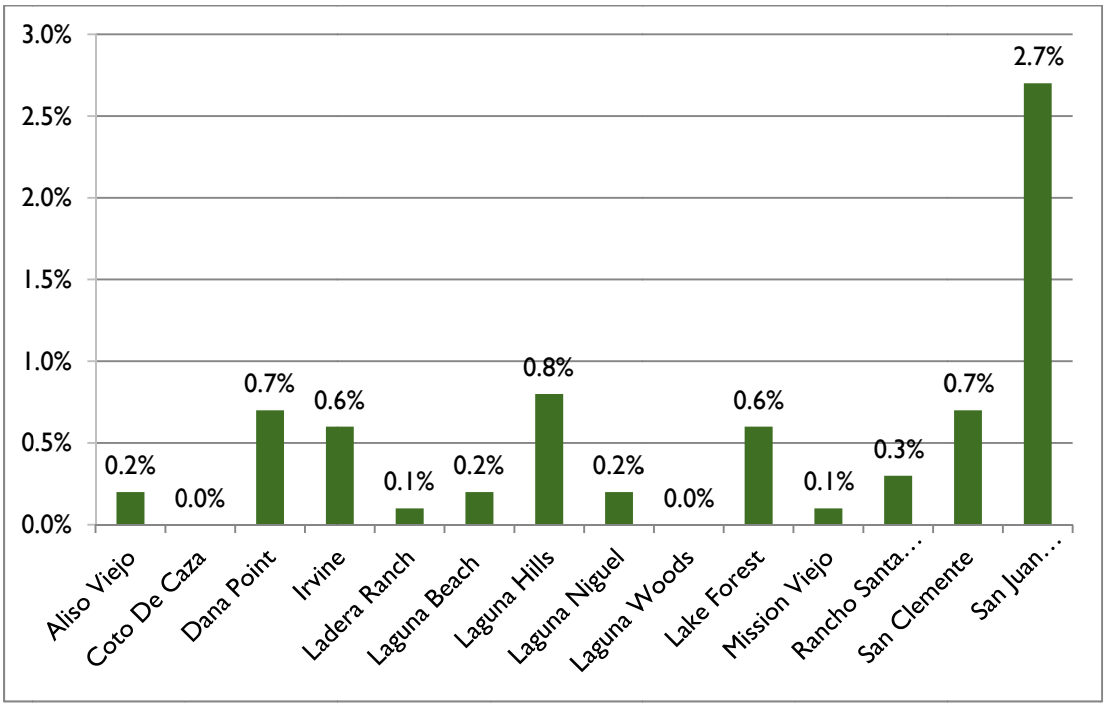
The Strategy identifies corridors that touch all portions of south Orange County's 5th District. They are intended to be designed for and used by bicyclists of all skill levels and help improve health, environmental, social, safety, and economic conditions. The corridors will connect neighboring cities and districts; within those boundaries, connect major points of interest, including employment and retail centers. This effort will require coordination among associated entities to implement.

2.3 Activity Levels and Collision Analysis

2.3.1 Bicycle Commute Mode Share by City

Bicycle commute mode share by city is determined using American Community Survey (ACS) data from the US Census Bureau. Figure 2.1 illustrates that the bicycle mode share for all work trips ranges between 0% and 2.7% within the District 5 cities. The state and county average is 1.0%, while the national average is 0.6%.

Figure 2.1: Bicycle Commute Mode Share by City[1]



1: US Census Bureau: 2009-2013 American Community Survey, 5-Year Estimates
Note: Only the tracts within Supervisorial District 5 of Irvine (mix of land uses)

2.3.2 Estimated Commuter and Utilitarian Bicyclists

In order to recognize the multiple benefits of these regional bikeway corridors, including improved health, less traffic congestion, and maintenance of ambient air quality levels, the number of bicyclists needs to be maximized. A better understanding of the number of existing bicycle trips is needed to achieve these goals of the Strategy. The U.S. Census' ACS provides useful data for understanding bicycling rates across different populations and geographies, as shown in Figure 2.1, but they only report the modes which residents use for commuting to and from work.

The following estimates include additional utilitarian trips, such as those trips made for daily activity by populations other than adults commuting to work. As shown in Table 2.1, there are about 25,000 daily trips by bicycle estimated in District 5. It is important to note that this is simply an order-of-magnitude estimate, based on available data and does not include recreational trips.

Table 2.1: Bicycle Trends in District 5

Variable	Value	Source
Existing Employed Population	290,934	2009-2013 ACS, B08101 5-Year Estimates
Existing Bike-to-Work Mode Share	0.8%	2009-2013 ACS, B08101 5-Year Estimates
Existing Number of Bike-to-Work Commuters	**1,460**	(Existing Employed Population) x (Existing Bike-to-Work Mode Share)
Existing Work-at-Home Mode Share	8.7%	2009-2013 ACS, B08101 5-Year Estimates
Existing Number of Work-at-Home Population	25,288	(Existing Employed Population) x (Existing Work-at-Home Mode Share)
Existing Number of Work-at-Home Bicyclists	**1,264**	Assumes 5% of population working at home makes at least one daily bicycle trip
Existing Transit-to-Work Mode Share	1.1%	2009-2013 ACS, B08101 5-Year Estimates
Existing Transit-to-Work Commuters	3,335	(Existing Employed Population) x (Existing Transit-to-Work Mode Share)
Existing Transit Bicycle Commuters	**67**	Assumes 2% of transit riders access transit by bicycle
Existing School Children, Ages 5-14 (Grades K-8)	41,405	2009-2013 ACS, B01001 5-Year Estimates
Existing School Children Bike Mode Share	2.0%	National Safe Routes to Schools surveys, 2010
Existing School Children Bike Commuters	828	(Existing School Children) x (Existing School Children Bicycling Mode Share)
Existing Number of College Students	35,137	2009-2013 ACS, B14001 5-Year Estimates
Existing College Bicycling Mode Share	25.0%	National Bicycling & Walking Study, FHWA, Case Study No. 1, 1995).
Existing College Bike Commuters	**8,784**	(Existing Number of College Students) x (Estimated College Bicycling Mode Share)
Existing Total Number of Bike Commuters	**12,403**	Total bike-to-work, school, college and utilitarian trips. Does not include recreation
Total Daily Bicycling Trips	***24,807***	Total bicycle commuters x 2 (for round trips)

2.3.3 Impact of E-Bike Technology

E-bikes are gaining popularity in the US with sales expected to double over the next 5 years. In hilly areas such as much of southern Orange County, e-bikes will make it easier for people to make short trips by bike versus car as well as use a bike for exercise and recreation.

A recent survey based study titled "Electric Bikes (E-Bikes) in the United States" by John MacArthur at Portland State University suggests that people who are likely to use e-bikes include those who (1) are older, (2) those commute over 5 miles, (3) live in hilly areas, (4) have physical limitations that makes bicycling difficult, (5) people who don't want to sweat or wear special clothes to commute, and (6) people who need to carry or haul items. http://ppms.otrec.us/media/project_files/E-bikes_in_North_America.pdf

> *"I live in a hilly town and would never commute to work on a standard bike –I wouldn't be able to make it up the hills. My electric assist bike makes commuting by bike possible."* –Survey Respondent

According to the survey the major reasons people bought e-bikes or converted a standard bike were (1) to replace some car trips, (2) health - to increase physical fitness, (3) live or work in a hilly area and (4) ride with less effort. The study also showed that the biggest uses for e-bikes were commuting to work/school and for local trips. The third largest use was for recreation.

The study shows that of the survey respondents 55% rode their standard bike weekly or daily prior to the e-bike purchase; this went to up to 93% after purchase.

The increased popularity of e-bikes will help drive the number of people who use bike facilities in Southern Orange County. As shown by the Portland State University Survey the e-bikes will likely be used largely for commuting and for short trips to local stores and restaurants. This will further increase the demand for bike facilities where all levels of bicyclists feel comfortable.

At the present time in the State of California anyone operating an electric bike is subject to all of the rules and regulations governing operation of a bicycle as outlined in California Vehicle Code Sections 21200-21212. In addition all users must be at least 16 years of age and wear a helmet (California Vehicle Code 24016). At the present time electric bikes cannot be operated on bicycle paths or trails, bikeways, equestrian trails, or hiking or recreational trails, unless it is within or adjacent to a roadway or unless the local authority or governing body of a public agency having jurisdiction over such paths or trails permits, by ordinance, such operation (California Vehicle Code section 21207.5). The laws governing the use of electric bikes are currently being reassessed. Therefore, review of the latest laws governing the use of electric bikes as outlined in the California Vehicle Code must be conducted.

2.3.4 Collision Analysis

Personal safety is a main concern for all new and existing bicyclists. A bikeway perceived as too dangerous or too close to heavy vehicular traffic will discourage the majority of cyclists from using that facility.

In Orange County, between June of 2013 and May of 2014, 17 bicyclists were struck and killed (California State Wide Integrated Traffic Records System). Part of this study is identifying potential improvements that will help prevent or minimize these collisions and resulting fatalities.

The Strategy has assessed the corridors for physical constraints, including freeways, channels, railroads, curb parking, slope, and roadway right-of-way to help identify the routes that would be most useful and enjoyable to the rider, while minimizing threats to their safety.

The analysis of bicyclist-involved crash data in District 5 from 2007-2011, obtained from the California Statewide Integrated Traffic Records System (SWITRS) shows there were 428 total crashes in the study area in the five-year period. Table 2.2 presents the total crashes in District 5 by violation category and party at fault. As shown in Figure 2.2, excluding "unknown causes", over two-thirds of the crashes were the result of four major causes listed below.

1. Right-of-way violation represents nearly one quarter of all crashes. A good example would be a car pulling out in front of a bicyclist.
2. Riding or driving on the wrong side of the road represents 18% of all crashes. Statewide, this is the number one cause of bicyclist-caused crashes and fatalities. This is an area where the education of bicyclists can make a major difference in their safety.
3. The third is improper turning, which accounts for 14% of all crashes. An example of this is when a motor vehicle driver or a bicyclist turns in front of the other.
4. The fourth is unsafe speed, accounting for 12% of all crashes.

Many people assume that running stop signs and stop lights is a cause of bike-related crashes. In District 5, this is the cause of less than 10% of all crashes. In this category motor vehicle drivers and bicyclists are almost equally at fault.

As shown in Figure 2.3, bicyclist-involved crashes per year ranged from 74 in 2007 to 100 in 2011, the most recent year for which complete data are available. As seen statewide, this upward trend in crashes coincides with an increase in the number of people riding bikes. Thus while the number of crashes is increasing, the overall rate of crashes may in fact be declining although at the present time those data are not available.

Table 2.2: Bicycle Collisions in District 5, 2007-2011

Violation Category	Bicycle	Vehicle	Pedestrian	Total	% Excluding unknown
Automobile ROW[1]	37	50		87	24%
Wrong Side of Road	33	32		65	18%
Unknown	34	21		58	
Improper Turning[2]	30	23		53	14%
Unsafe Speed	34	10		44	12%
Traffic Signals and Signs	17	14		31	8%
Other Improper Driving	15	10		25	7%
Other Hazardous Violation	6	12		18	5%
Other Than Driver	11	1		12	3%
Under the Influence	5	6		11	3%
Unsafe Lane Change[3]	4	3		7	2%
Unsafe Starting or Backing	2	2		4	1%
Improper Passing	3	1		4	1%
Pedestrian ROW	2			2	<1%
Lights	2			2	<1%
Pedestrian Violation			2	2	<1%
Following Too Closely	1			1	<1%
Impeding Traffic		1		1	<1%
Other Equipment	1			1	<1%
Total	240	186	2	428	

[1] http://www.nolo.com/legal-encyclopedia/free-books/beat-ticket-book/chapter7-5.html

[2] http://www.nolo.com/legal-encyclopedia/free-books/beat-ticket-book/chapter7-4.html

[3] http://www.nolo.com/legal-encyclopedia/free-books/beat-ticket-book/chapter7-8.html

Figure 2.2: Causes of Bicyclist-Involved Crashes by Year

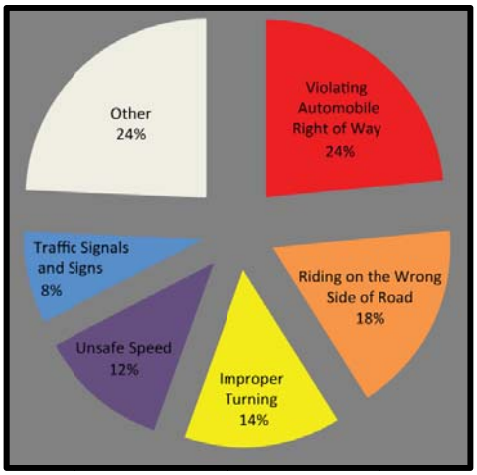
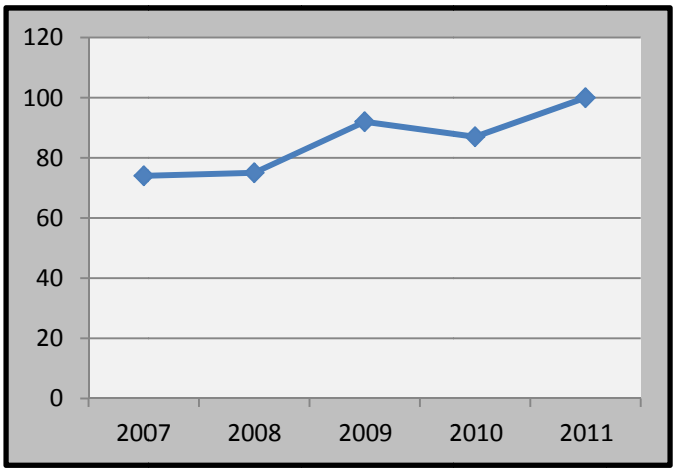


Figure 2.3: Bicyclist-Involved Crashes by Year



2.3.5 Recent Agency Efforts to Improve Bicycle Planning & Infrastructure

Within the 5th District, there are many planning and engineering efforts currently led by the cities to improve bicyclist safety, enhance infrastructure, and support increased bicycling within Orange County. The planning of bicycle infrastructure through general plan updates or bicycle master planning has occurred in San Clemente, Dana Point, Irvine, Laguna Beach, Rancho Santa Margarita, and the adjacent communities in Newport Beach. Many cities have applied for or obtained ATP Cycle 1 grant funds to implement new or improved bicycle facilities. Lower-cost bike facilities such as Class II bike lane striping have been implemented by many cities.

Major bike design and construction projects are currently in progress by cities such as San Clemente and Dana Point. For example, the City of San Clemente is currently in the design stages of improving the existing Class II bike lanes and constructing a Class I bike path along El Camino Real from Camino Capistrano to Avenida Estacion. In Dana Point, the city is in the planning stage to provide roadway and signal improvements, along with providing Class I and II facilities along Pacific Coast Highway, including Del Prado, from the northerly city limits to Camino Capistrano. The City of Laguna Beach has developed an assessment report for Laguna Canyon Road between El Toro Road to Canyon Acres Drive to improve mobility for all uses. The Rancho Mission Viejo development plan has adopted sustainable circulation to address bicycle and neighborhood electric vehicle components.

3.0 REGIONAL BIKEWAY CORRIDORS

As shown in Figure 3.1, the following nine regional bikeway corridors are proposed for District 5. The corridors connect to one another and to bike facilities to the north in OCTA Supervisorial Districts 2 and 3, as well as to the south in San Diego County. They provide key connections to popular attractions such as beaches, parks, schools, shopping, employment, and transit centers.

3.1 Regional Corridors

Regional corridors were developed through a series of focus group meetings and PDT meetings. At PDT Meeting #2, the team agreed to split the region into three focused areas: central cities, coastal cities, and northern area cities. Each focus group identified its own preferred corridors. OCTA and the consultant then consolidated the corridors identified by the three groups. At PDT Meeting #3, the draft regional corridors were presented and modified based on the collaborative input. In addition, the public input through online surveys or local events were obtained and the results and comments were presented at the PDT meetings.

The following provides a detailed discussion of each regional corridor within District 5. The corridors are labeled in no particular order. The ranking analysis of the nine corridors, using specific criteria, is presented in Section 3.2 for prioritization.

Efforts have been made to identify conceptual alignments of each corridor; however, refinements are expected as feasibility studies are conducted to provide an improved analysis and review of the constraints and opportunities of each corridor. Therefore, flexibility in the alignment of each corridor should be expected to help achieve regional connectivity and continuous linkage.

SOUTH OC REGIONAL BIKEWAY CORRIDORS

OCTA District 5 Bikeways Collaborative

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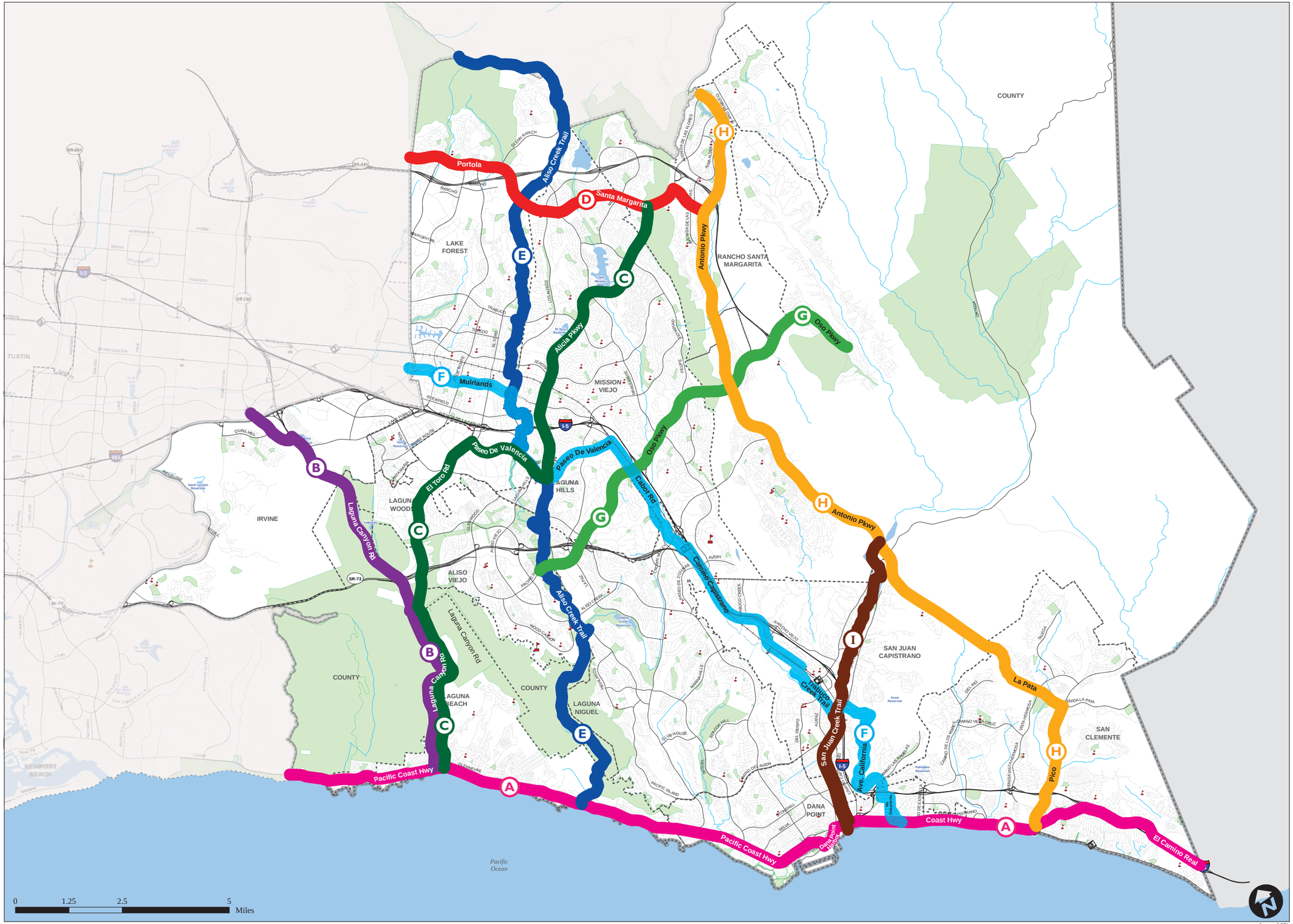

Source: OCTA

BIKEWAY CORRIDORS

- A — Pacific Coast Highway Corridor
- B — Laguna Canyon Corridor
- C — El Toro/Alicia Corridor
- D — Portola/Santa Margarita Corridor
- E — Aliso Creek Corridor
- F — Muirlands/Cabot Corridor/ Camino Capistrano
- G — Oso Parkway Corridor
- H — Antonio/La Pata/Pico Corridor
- I — San Juan Creek Corridor

LEGEND

- Transportation Center
- Rail
- Schools
- Colleges
- Parks / Open Space
- Waterbody
- City Boundary
- Supervisorial District 5

Figure 3-1

3.1.1 Corridor A: Pacific Coast Highway

Overview

The Pacific Coast Highway Corridor runs along Pacific Coast Highway through a combination of on- and off-street bike facilities. The corridor is approximately 19 miles[1] long, with 14.1 miles of existing bike facilities and 6.9 miles of proposed bike facilities.

Jurisdictions:	• County of Orange • Laguna Beach • Dana Point • San Clemente
Attractions:	• Beach cities • Museums, theaters, parks, shopping • Dana Cove • San Clemente Metrolink • Beach resorts
Cost:	$11.5-$14.1 million

The corridor directly connects to OCTA District 2 and passes through the following jurisdictions: County of Orange, Laguna Beach, Dana Point, and San Clemente. It also includes or intersects the following Caltrans facilities: Coast Highway 1, State Route 133, and Interstate 5 Freeway. The corridor has direct links to other regional bikeway corridors including Laguna Canyon, Aliso Creek, Muirlands/Cabot/Camino Capistrano, San Juan Creek, and Antonio/La Pata/Pico. Figure 3.2 illustrates Corridor A.

Length of Bikeway Facilities (Miles)		
Class I	**Existing**	1.6
	Proposed	0.8
Class II	**Existing**	4.6
	Proposed	5.7
Class III	**Existing**	7.9
	Proposed	0.4
Total Bikeway Miles		21.0
Corridor Length (miles)		***19.0***

Opportunities, Constraints, and Estimated Costs

The majority of the Pacific Coast Highway Corridor is located in coastal beach cities and attracts avid and social bicyclists of all levels of experience. With some notable exceptions, its relatively flat terrain makes the corridor easily accessible and ride-able. The corridor provides key regional connectivity, linking to five other regional bikeway corridors. At major junction points along the corridor, such as at the Interstate 5 Freeway, the bike facility is separated from automobile traffic.

A major challenge to completing the corridor involves installing Class II and III on-street bikeways, as the interaction between automobiles and bicyclists may deter novice cyclists from using the facility. The high number of street intersections and segments having limited right-of-way or on-street parking pose increased risks to cyclists using the corridor.

Estimated construction costs for the Pacific Coast Highway corridor including new and updated Class II bike lanes, a new Class I bike path along PCH in the City of Dana Point, one bridge crossing, and eight major intersection crossings, range from $11.5 to $14.1 million. Adjacent streets can be used, such as Cliff Drive and Glenneyre Street, as alternative routes to using PCH.

Major Regional Destinations

Aside from San Juan Creek, parks, and beaches along the corridor, the Pacific Coast Highway Corridor would also link to the Laguna Art Museum and South Coast Theatre, Dana Cove, San Clemente Metrolink Station, and beach resorts.

[1] *Corridor length and total miles of bikeway facilities along a corridor often differ as segments of the corridor may have more than one type of facility, such as both a class I off road facility and class II bike lanes. Total corridor length is measured in center line miles.*

CORRIDOR A: PACIFIC COAST HIGHWAY

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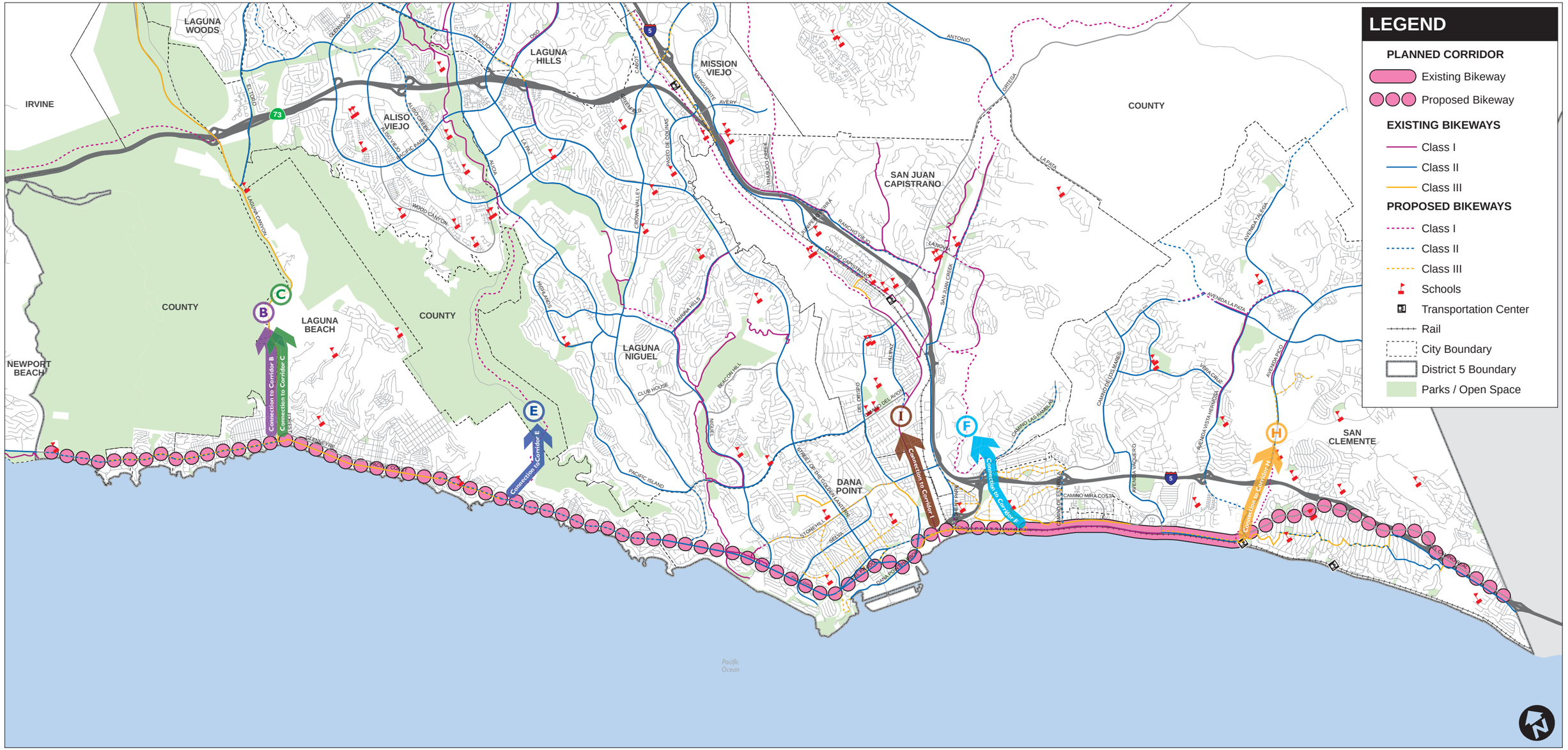

Source: OCTA

Corridor A
Bikeway Corridor Details

- 1.6 miles of existing Class I
- 4.6 miles of existing Class II
- 7.9 miles of existing Class III

9
Schools within 1/4-mile Served

35
Parks within 1/4-mile Served

53K
People within 1/4-mile Served (approx.)

19 miles
Of Total Corridor Length

$11.5-14.1 million
Estimated Project Cost

3.1.2 Corridor B: Laguna Canyon

Overview

Jurisdictions:	• Irvine • County of Orange • Laguna Beach
Attractions:	• Bommer and Shady Canyons Park • Laguna Coast Wilderness Park • Laguna College of Art and Design • Downtown Laguna Beach
Cost:	$8.4-$10.3 million

The Laguna Canyon Corridor runs north-south near the west boundary of District 5, with the majority of the corridor running along State Route 133 (Laguna Canyon Road). The corridor is approximately 8.8 miles long, comprised of mostly existing Class III bike facilities.

The corridor directly connects to OCTA District 3, and runs within the following jurisdictions: Irvine, County of Orange, and Laguna Beach. It also intersects the following Caltrans facilities: Interstate 405 Freeway, State Route 73, State Route 133, and Coast Highway 1. The corridor has direct links to other regional bikeway corridors including the El Toro/Alicia and Pacific Coast Highway corridors. Figure 3.3 illustrates Corridor B.

Length of Bikeway Facilities (Miles)		
Class I	**Existing**	0.0
	Proposed	0.0
Class II	**Existing**	1.0
	Proposed	6.8
Class III	**Existing**	7.8
	Proposed	0.0
Total Bikeway Miles		15.6
Corridor Length (miles)		***8.8***

Opportunities, Constraints, and Estimated Costs

The majority of the Laguna Canyon Corridor provides a scenic and largely uninterrupted riding experience for bicyclists wanting to travel long distances. The corridor has Class III bike facilities along its full length. To upgrade to a Class II bike facility would require major improvements such as roadway widening and construction of new sidewalks, curb, and gutter, and signing and striping. At major junction points, such as at State Route 73, there exists adequate right-of-way to provide bike lanes.

A challenge for the Laguna Canyon Corridor are short segments with grades greater than 5%, which are considered more difficult to bicycle or walk. Also, the majority of the corridor being located on State Route 133 and having a posted speed limit of 50 MPH may pose additional auto-related risks to bicyclists.

Most of the cost associated with the Laguna Canyon Corridor is associated with installing Class II bikeways on the segment between Hwy 73 and Canyon Acres Drive, which requires widening some segments of the roadway. Estimated construction costs for the Laguna Canyon corridor, including street widening, range from $8.4 to $10.3 million.

Major Regional Destinations

The Laguna Canyon Corridor would link to state parks including Bommer and Shady Canyons Park, Laguna Coast Wilderness Park, Crystal Cove State Park, and the Laguna College of Art and Design.

CORRIDOR B: LAGUNA CANYON

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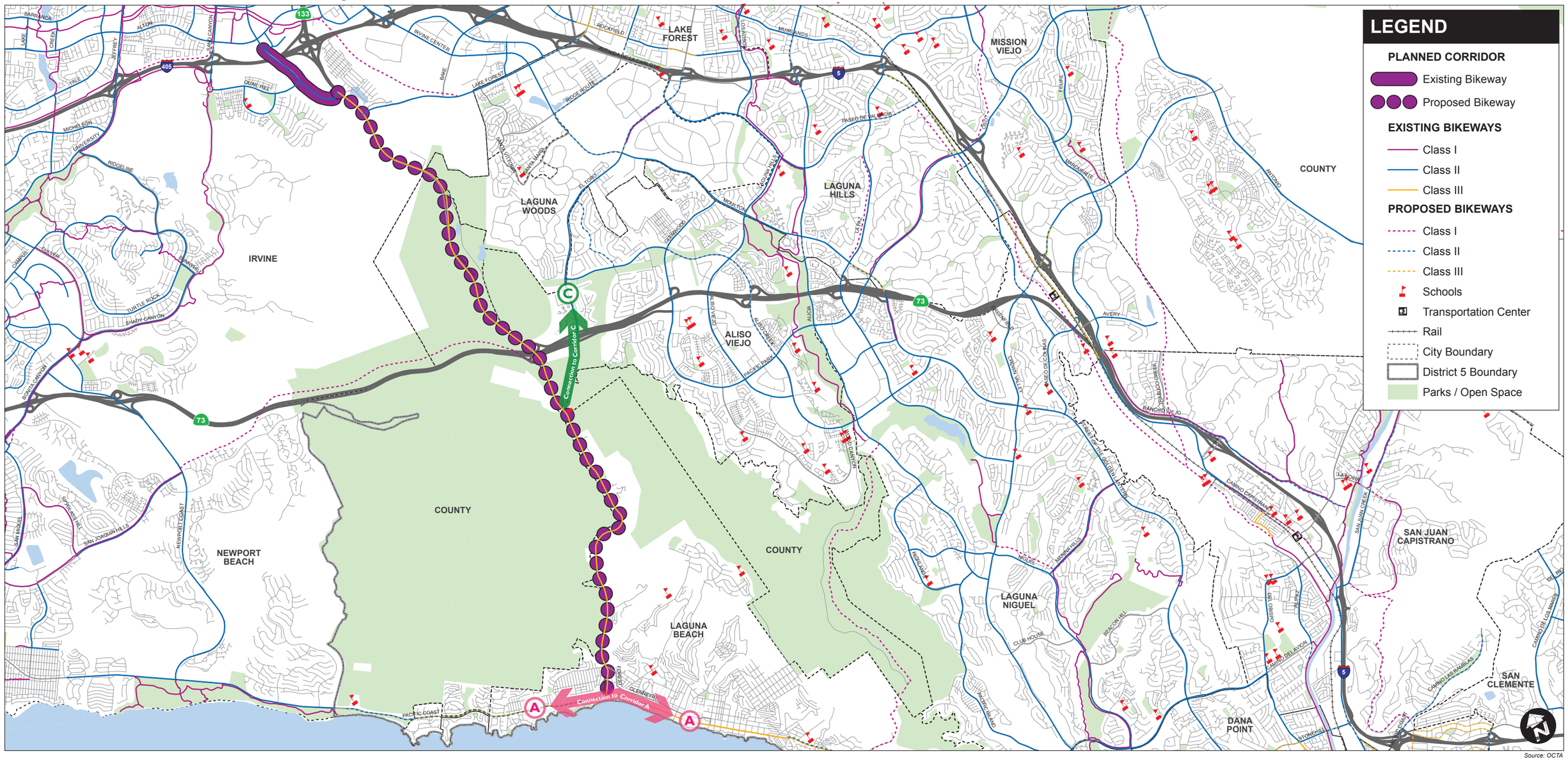

Source: OCTA

Corridor B
Bikeway Corridor Details

1 mile of existing Class II

7.8 miles of existing Class III

1
Schools within 1/4-mile Served

6
Parks within 1/4-mile Served

7.5K
People within 1/4-mile Served (approx.)

8.8 miles
Of Total Corridor Length

$8.4-10.3 million
Estimated Project Cost

Figure 3-3

3.1.3 Corridor C: El Toro/Alicia/Laguna Canyon

Overview

The El Toro/Alicia Corridor runs diagonally from near the north boundary of District 5 to Laguna Beach. The corridor is approximately 15.3 miles long, comprised of 0.5 miles of existing Class I, 10.5 miles of existing Class II bike facilities, and 4.3 miles of Class III. The corridor passes through the following jurisdictions: County of Orange, Mission Viejo, Laguna Hills, Laguna Woods, Aliso Viejo, and Laguna Beach. It also intersects the following Caltrans facilities: Interstate 5 and State Route 7, and part of the corridor is State Highway 133. The corridor has direct links to other regional bikeway corridors including the Portola/Santa Margarita, Aliso Creek, Muirlands/Cabot/Camino Capistrano, PCH, and Laguna Canyon. Figure 3.4 illustrates Corridor C.

Jurisdictions:	• County of Orange • Aliso Viejo • Laguna Beach • Laguna Woods • Laguna Hills • Mission Viejo • Rancho Santa Margarita
Attractions:	• Shopping centers • Saddleback Memorial Medical Center • Laguna Hills High School • Lake Mission Viejo • State and local parks and beaches
Cost:	$12.2-15.2 million

Length of Bikeway Facilities (Miles)		
Class I	**Existing**	0.5
	Proposed	0.0
Class II	**Existing**	10.5
	Proposed	1.4
Class III	**Existing**	4.3
	Proposed	0.0
Total Bikeway Miles		15.8
Corridor Length (miles)		*15.3*

Opportunities, Constraints, and Estimated Costs

The majority of the El Toro/Alicia/Laguna Canyon Corridor is located among residential and commercial uses that could appeal to avid and casual bicyclists. The majority of the corridor is already in place, making the corridor an established route that will only increase its ridership once improvements are made. The corridor intersects or overlaps with five other regional corridors, expanding its network.

The corridor crosses several major intersections; a large number of collisions have been recorded along the route. Due to this, enhanced bikeway features are recommended. The corridor crosses five major intersections and Interstate 5, and will require special treatments at these locations. The segment along Laguna Canyon is narrow with relatively high speed traffic. Currently improvements are planned for the northbound I-5 and eastbound Alicia Parkway on/off-ramp including widening the sidewalk from approximately four feet to eight feet and adding ADA curb ramps from the bridge to the adjacent Target driveway.

Estimated construction costs for the El Toro/Alicia/Laguna Canyon corridor including freeway and major intersection crossing improvements, range from $12.2 to $15.2 million.

Major Regional Destinations

The El Toro/Alicia/Laguna Canyon Corridor would link to state and local parks including Aliso Wood Canyons Wilderness Park, Lake Mission Viejo, and the Saddleback Memorial Medical Center, downtown Laguna Beach, and the adjacent beach areas.

CORRIDOR C: EL TORO / ALICIA / LAGUNA CANYON

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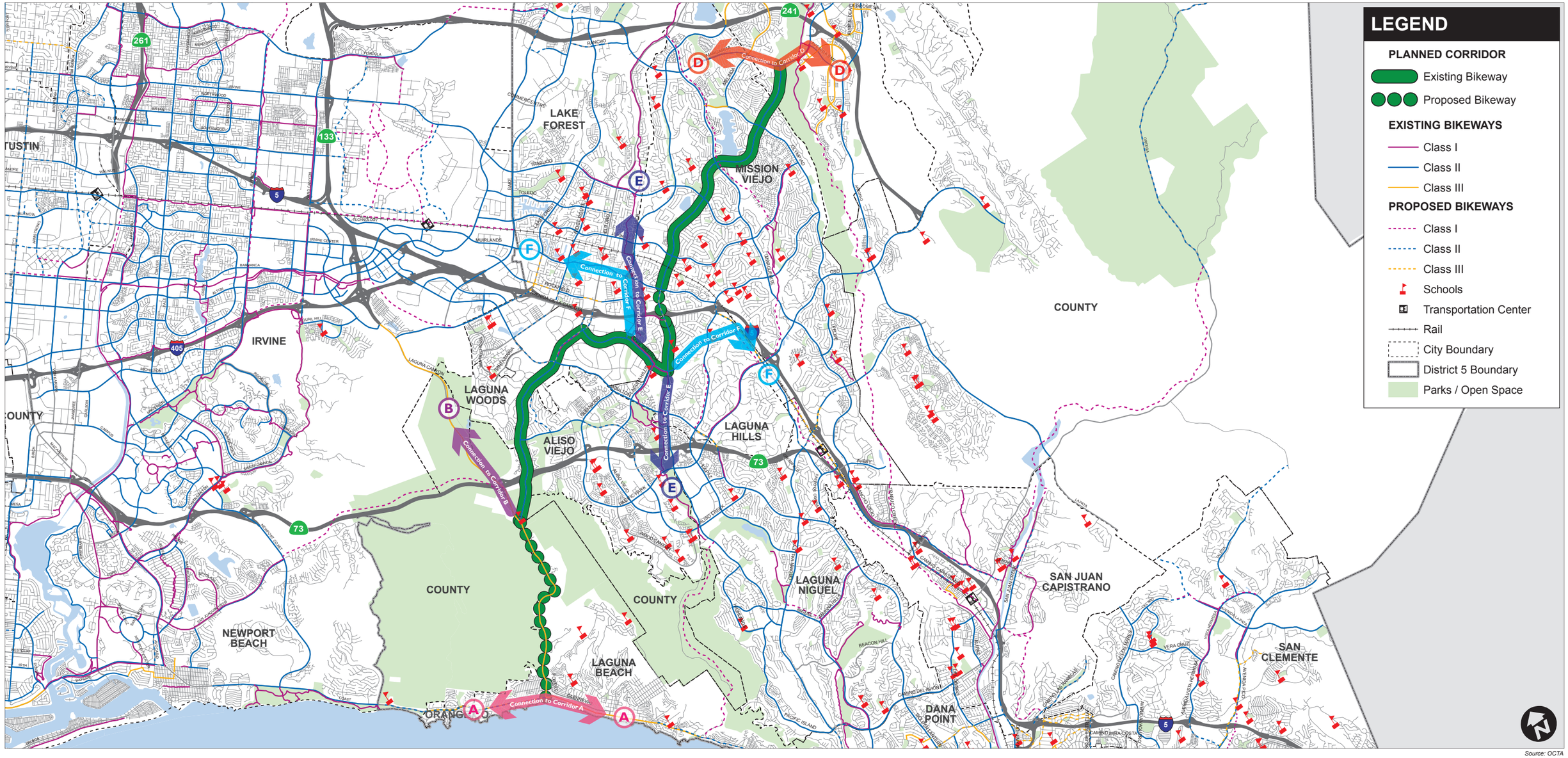


Source: OCTA

Corridor C
Bikeway Corridor Details

0.5 miles of existing Class I
10.5 miles of existing Class II
4.3 miles of existing Class III

6
Schools within 1/4-mile Served

24
Parks within 1/4-mile Served

50.4K
People within 1/4-mile Served (approx.)

15.3 miles
Of Total Corridor Length

$12.2-15.2 million
Estimated Project Cost

3.1.4 Corridor D: Portola/Santa Margarita

Overview

The Portola/Santa Margarita Corridor runs diagonal near the north boundary of District 5. The corridor is approximately 6.7 miles long, with 6.5 miles of existing Class II bike lanes and 0.6 miles of proposed Class I bike paths.

Jurisdictions:	• Lake Forest • Mission Viejo • Rancho Santa Margarita
Attractions:	• Shopping centers • Employment centers • Elementary and High Schools • State and local parks
Cost:	$6.5-$8.0 million

The corridor directly connects to Supervisorial District 3, Lake Forest, Mission Viejo, and Rancho Santa Margarita, and intersects State Route 241. The corridor has direct links to other regional bikeway corridors including the Aliso Creek, El Toro/Alicia/Laguna Canyon, and Antonio/La Pata/Pico corridors. Figure 3.5 illustrates Corridor D.

Length of Bikeway Facilities (Miles)		
Class I	**Existing**	0.0
	Proposed	0.6
Class II	**Existing**	6.5
	Proposed	0.0
Class III	**Existing**	0.0
	Proposed	0.0
Total Bikeway Miles		7.1
Corridor Length (miles)		*6.7*

Opportunities, Constraints, and Estimated Costs

Corridor D covers major residential and commercial areas in the northern portions of District 5. This is an appealing aspect of this corridor and could attract commuter and recreational riders. Class II bike lanes already exist along a majority of the corridor with connections to eleven intersections with existing or proposed bikeway facilities, providing many links for local cyclists. The corridor intersects or overlaps with three other regional corridors, expanding its network.

A majority of the street segments have high speed limits and Class II bike lanes, thus many bicyclists may not feel comfortable or safe riding next to high speed traffic. The corridor also crosses the State Route 241 freeway with Class II bike lanes provided; this may deter some riders and require special improvements.

Estimated construction costs for the Portola/Santa Margarita corridor including major intersection crossing improvements, range from $6.5 to $8.0 million.

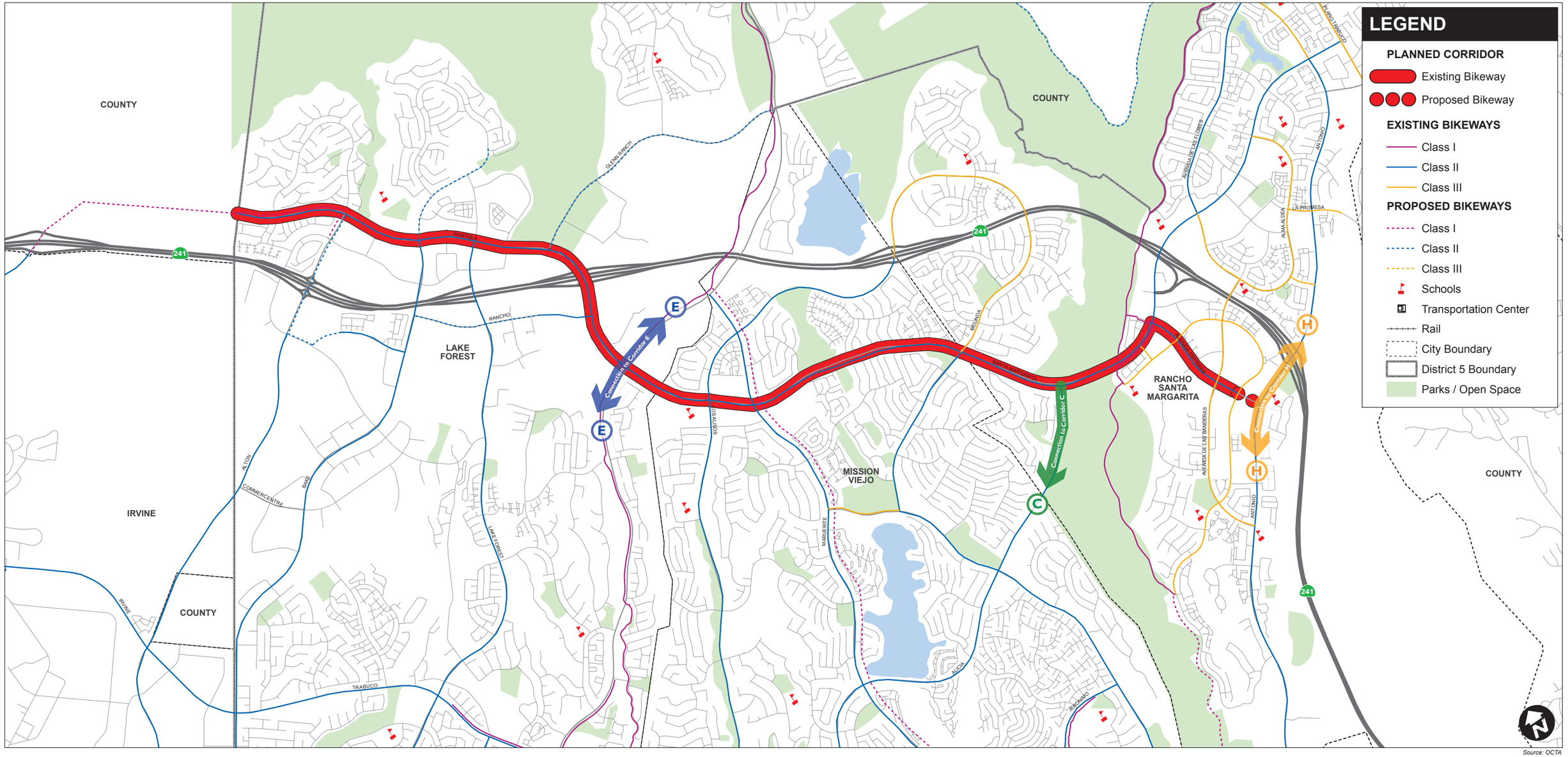
Major Regional Destinations

The Portola/Santa Margarita Corridor would link to state and local parks, Aliso Creek Trail, Serrano Creek Trail, Trabuco Hills High School, and Tijeras Creek Elementary School.

CORRIDOR D: PORTOLA / SANTA MARGARITA

OCTA District 5 Bikeways Collaborative

KOA CORPORATION PLANNING & ENGINEERING



Source: OCTA

Corridor D
Bikeway Corridor Details

6.5 miles of existing Class II

4
Schools within 1/4-mile Served

7
Parks within 1/4-mile Served

26.7K
People within 1/4-mile Served (approx.)

6.7 miles
Of Total Corridor Length

$6.5-8.0 million
Estimated Project Cost

3.1.5 Corridor E: Aliso Creek Corridor

Overview

The Aliso Creek Corridor runs north-south from the north boundary of District 5 to Pacific Coast Highway. The corridor is approximately 20.3 miles long, with 13.5 miles of existing Class I bike paths and 2.0 miles of existing Class II bike lanes.

The corridor directly connects to Supervisorial District 3 and runs within the following jurisdictions: County of Orange, Lake Forest, Mission Viejo, Laguna Woods, Laguna Hills, Aliso Viejo, Laguna Niguel, and Laguna Beach. It also intersects the following Caltrans facilities: State Route 133 and 241, Interstate 5, and State Route 1. The corridor has direct links to other regional bikeway corridors including the Portola/Santa Margarita, Muirlands/Cabot/Camino Capistrano, El Toro/Alicia, Oso Parkway, and Pacific Coast Highway corridors. Figure 3.6 illustrates Corridor E.

Jurisdictions:	• County of Orange • Lake Forest • Mission Viejo • Laguna Woods • Laguna Hills • Aliso Viejo • Laguna Niguel • Laguna Beach
Attractions:	• Shopping centers • Employment centers • Elementary and High Schools • State and local parks • Beach
Cost:	$8.2-$10.0million

Length of Bikeway Facilities (Miles)		
Class I	**Existing**	13.5
	Proposed	6.3
Class II	**Existing**	2.0
	Proposed	0.0
Class III	**Existing**	0.0
	Proposed	0.0
Total Bikeway Miles		21.8
Corridor Length (miles)		*20.3*

Opportunities, Constraints, and Estimated Costs

Corridor E covers major residential and commercial areas with access to schools and local and state parks. This corridor is largely comprised of existing Class I bike paths, which is an appealing aspect of the corridor and attracts numerous users every day. Class I bike paths exist along a majority of the corridor with connections to several intersections with existing or proposed bikeway facilities, providing additional links for local cyclists. The corridor intersects or overlaps with five other regional corridors, expanding its network and choice of routes. The corridor also crosses State Route 241 and 73 freeways, along with the Interstate 5 freeway, all providing Class I facilities traveling under the freeway.

As outlined in the Strategy, the corridor connects through Aliso and Wood Canyons Wilderness Park with a Class I connection to Aliso Beach County Park. However, at the present time the lower portion of Aliso Creek Canyon is privately owned by various landowners and hosts a nine-hole golf course and small hotel. Due to the narrowness of the canyon and property easement issue, a way to accommodate both the golf course and the bike corridor has not been resolved.

Estimated construction costs for the Aliso Creek corridor including grading/retaining walls and the construction of proposed Class I facilities, range from $8.2 to $10.0 million.

Major Regional Destinations

The Aliso Creek Corridor links to state and local parks, Laguna Hills Community Center and Sports Complex, Aliso Viejo Middle School, Aliso Niguel High School, and Wood Canyon Elementary School.

CORRIDOR E: ALISO CREEK

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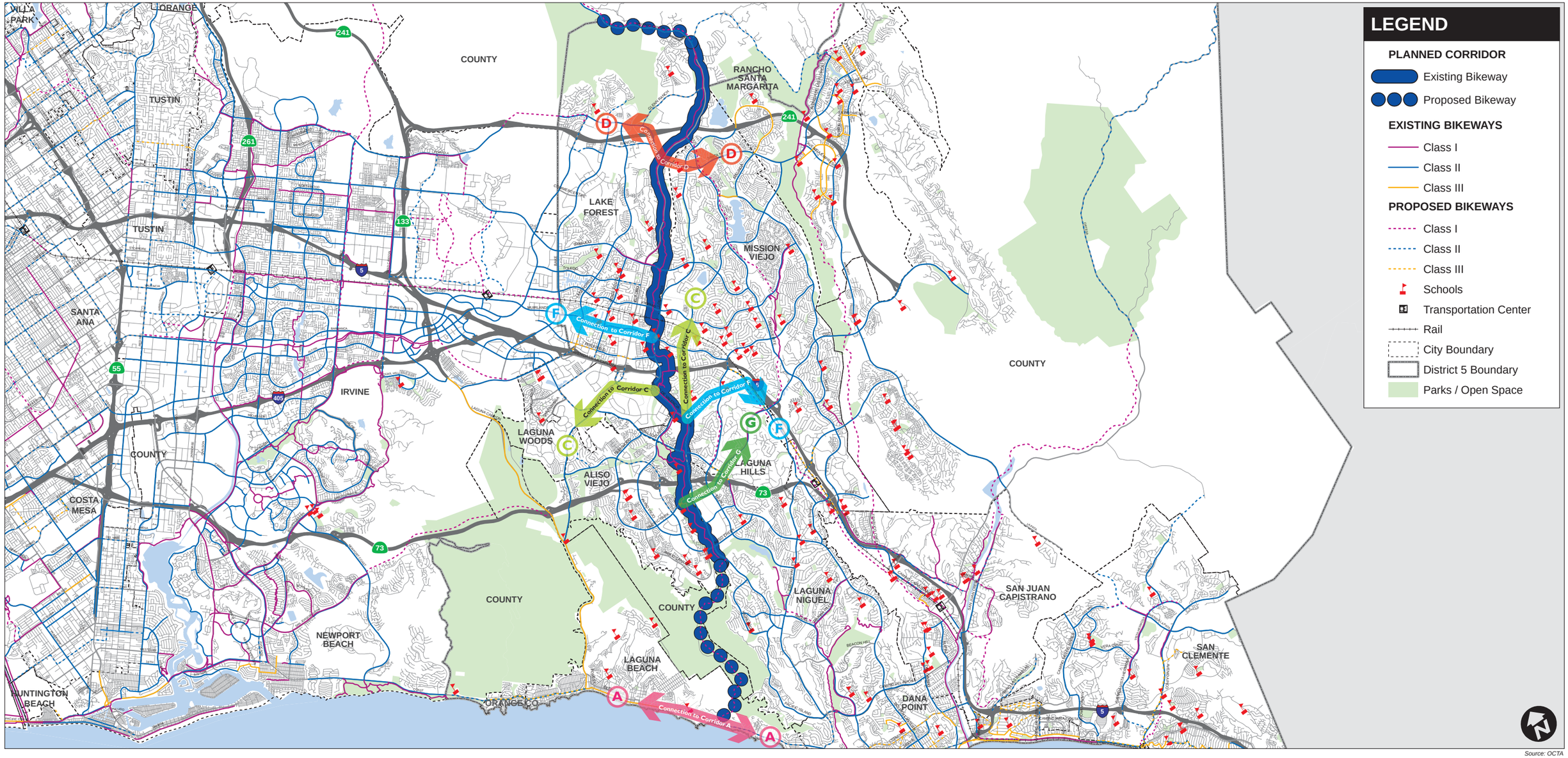

Source: OCTA

Corridor E
Bikeway Corridor Details

13.5 miles of existing Class I
2 miles of existing Class II

12
Schools within 1/4-mile Served

35
Parks within 1/4-mile Served

57.2K
People within 1/4-mile Served (approx.)

20.2 miles
Of Total Corridor Length

$8.2-10.0 million
Estimated Project Cost

3.1.6 Corridor F: Muirlands/Cabot/Camino Capistrano

Overview

The Muirlands/Cabot/Camino Capistrano Corridor runs diagonally north – south starting at the northern boundary of District 5 adjacent to Irvine and south to Pacific Coast Highway. The corridor is approximately 17.9 miles long, including 4.4 miles of existing Class I bike paths, 6.5 miles of existing Class II bike lanes, and 2.6 miles of proposed Class I bike paths. The corridor connects to Supervisorial District 3 on the north end, to Pacific Coast Highway on the south end, and crosses the I-5 Freeway at multiple locations. The corridor has direct links to other regional bikeway corridors including the Aliso Creek, El Toro/Alicia, Oso Parkway, San Juan Creek, and Pacific Coast Highway corridors. Figure 3.7 illustrates Corridor F.

Jurisdictions:	• Lake Forest • Mission Viejo • Laguna Woods • Laguna Hills • Laguna Niguel • San Juan Capistrano • Dana Point
Attractions:	• Shopping centers • Employment centers • Elementary and High Schools • State and local parks
Cost:	$7.4-$9.0 million

Length of Bikeway Facilities (Miles)		
Class I	**Existing**	4.4
	Proposed	2.6
Class II	**Existing**	6.5
	Proposed	1.5
Class III	**Existing**	1.6
	Proposed	2.0
Total Bikeway Miles		18.6
Corridor Length (miles)		*17.9*

Opportunities, Constraints, and Estimated Costs

Corridor F covers a major portion of District 5 and provides connections to some of the densest residential and commercial areas in south Orange County. It parallels the Metrolink rail corridor with access to two Metrolink stations. A large portion of the corridor is already in place, providing Class I bike paths and Class II bike lanes along the majority of the corridor. It provides many connections to several intersections with existing or proposed bikeway facilities. The corridor intersects or overlaps with five other regional corridors, expanding its network. The corridor crosses the Interstate 5 freeway at three locations along the entire corridor. There are many significant constraints for this corridor: (1) crossing the I-5 at La Paz Road, (2) using the LOSSAN railroad right-of-way along Camino Capistrano, south of the Mission Viejo Metrolink station, and (3) connection from San Juan Creek to the Coast Highway, and others.

At La Paz Road, Muirlands Boulevard (on the north side of I-5) and Cabot Road (on the south side of I-5) are separated by only a few hundred yards. However, the connection currently requires navigating the I-5 undercrossing of La Paz Road, which has very high traffic volumes. To avoid this difficult crossing an alternate route has been proposed that would go south on Los Alisos Boulevard, connect to the Aliso Creek Bikeway to cross under the I-5, with a connection to Paseo De Valencia, then back to Cabot Road. This more circuitous route adds about 1.5 miles and several hills to the corridor. During the feasibility phase other alternatives will be examined including (1) improvements to LaPaz at the freeway on/off ramps and (2) adding a Class I facility adjacent to the railroad right-of-way between Muirlands Boulevard and Cabot Road at La Paz Road. Right-of-way issues on Camino Capistrano will be reviewed during the feasibility study phase. Estimated construction costs for the Muirlands/Cabot/Camino Capistrano corridor, including major intersection crossing improvements, new Class I bike path facilities, and improvements to Class II bikeways, range from $7.4 to $9.0 million.

Major Regional Destinations

The Muirlands/Cabot/Camino Capistrano corridor would link state and local parks, Aliso Creek Trail, Los Alisos Intermediate School, Ralph A. Gates Elementary School, Laguna Hills Community Center and Sports Complex, Valencia Elementary School, Laguna Niguel/Mission Viejo Metrolink Station, San Juan Capistrano Metrolink Station, San Juan Hills Golf Club, and Palisades Elementary School.

CORRIDOR F: MUIRLANDS / CABOT / CAMINO CAPISTRANO

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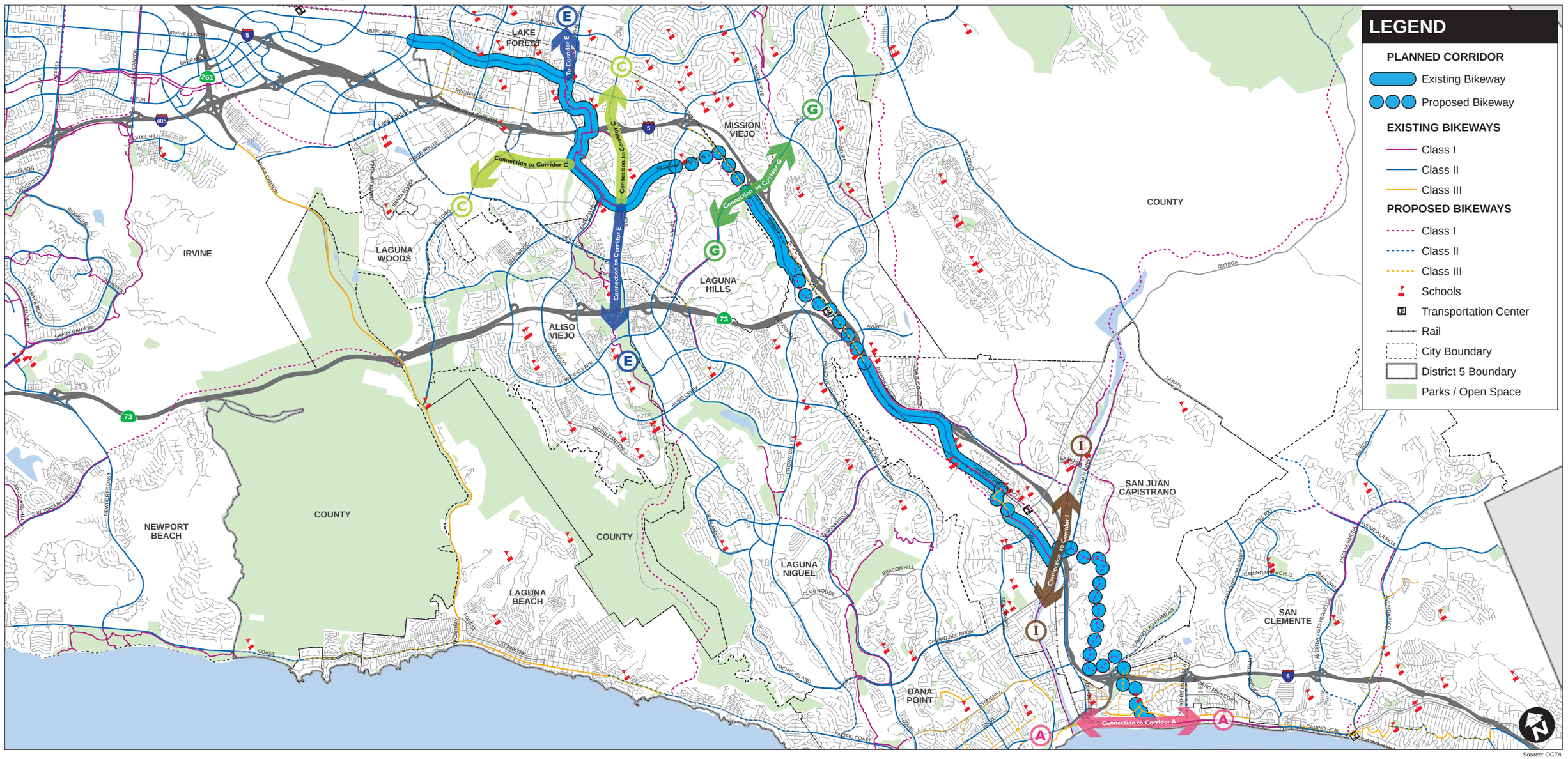

Source: OCTA

Corridor F
Bikeway Corridor Details

4.4 miles of existing Class I
6.5 miles of existing Class II
1.6 miles of existing Class III

19
Schools within 1/4-mile Served

27
Parks within 1/4-mile Served

62.6K
People within 1/4-mile Served (approx.)

17.9 miles
Of Total Corridor Length

$7.4-9.0 million
Estimated Project Cost

3.1.7 Corridor G: Oso Parkway

Jurisdictions:	• Aliso Viejo • Laguna Niguel • Laguna Hills • Mission Viejo • Rancho Santa Margarita • County of Orange
Attractions:	• Shopping centers • Middle and High Schools • State and local parks
Cost:	$5.5-$6.8 million

Overview

The Oso Parkway Corridor runs east-west from east of Aliso Creek Road to South Bend Road/Coto De Caza Drive. The corridor is approximately 8.9 miles long, with 1.7 miles of existing Class I bike paths and 8.8 miles of existing Class II bike lanes. The corridor directly connects to Aliso Viejo, Laguna Niguel, Laguna Hills, Mission Viejo, Rancho Santa Margarita, County of Orange, and intersects State Route 73 and the Interstate 5 freeway. The corridor has direct links to other regional bikeway corridors including the Aliso Creek, Muirlands/Cabot, and Antonio/La Pata/Pico corridors. Figure 3.8 illustrates Corridor G.

Length of Bikeway Facilities (Miles)		
Class I	**Existing**	1.7
	Proposed	0.0
Class II	**Existing**	8.8
	Proposed	0.0
Class III	**Existing**	0.0
	Proposed	0.0
Total Bikeway Miles		10.5
Corridor Length (miles)		*8.9*

Opportunities, Constraints, and Estimated Costs

Corridor G covers major residential areas in the central portion of District 5. The entire corridor is already in place providing Class II bike lanes along a majority of the corridor with connections to approximately seven intersections with existing or proposed bikeway facilities, providing many links for local cyclists. The corridor intersects or overlaps with three other regional corridors, expanding its network. Because the corridor has some segments with an average slope greater than 5%, some cyclists may not feel comfortable or willing to ride along portions of this corridor. The corridor also crosses the State Route 73 and 241 freeways along with the Interstate 5 freeway with Class II bike lanes provided; this may deter some riders and special improvements are needed.

Estimated construction costs for the Oso Parkway corridor including upgrading Class II bike lanes to separated bikeway facilities, range from $5.5 to $6.8 million.

Major Regional Destinations

The Oso Parkway corridor connects state and local parks, Aliso Creek Trail, Mission Viejo Golf Course, Serrano Creek Trail, Las Flores Middle School, Tesoro High School, and Wagon Wheel Sports Park.

CORRIDOR G: OSO PARKWAY

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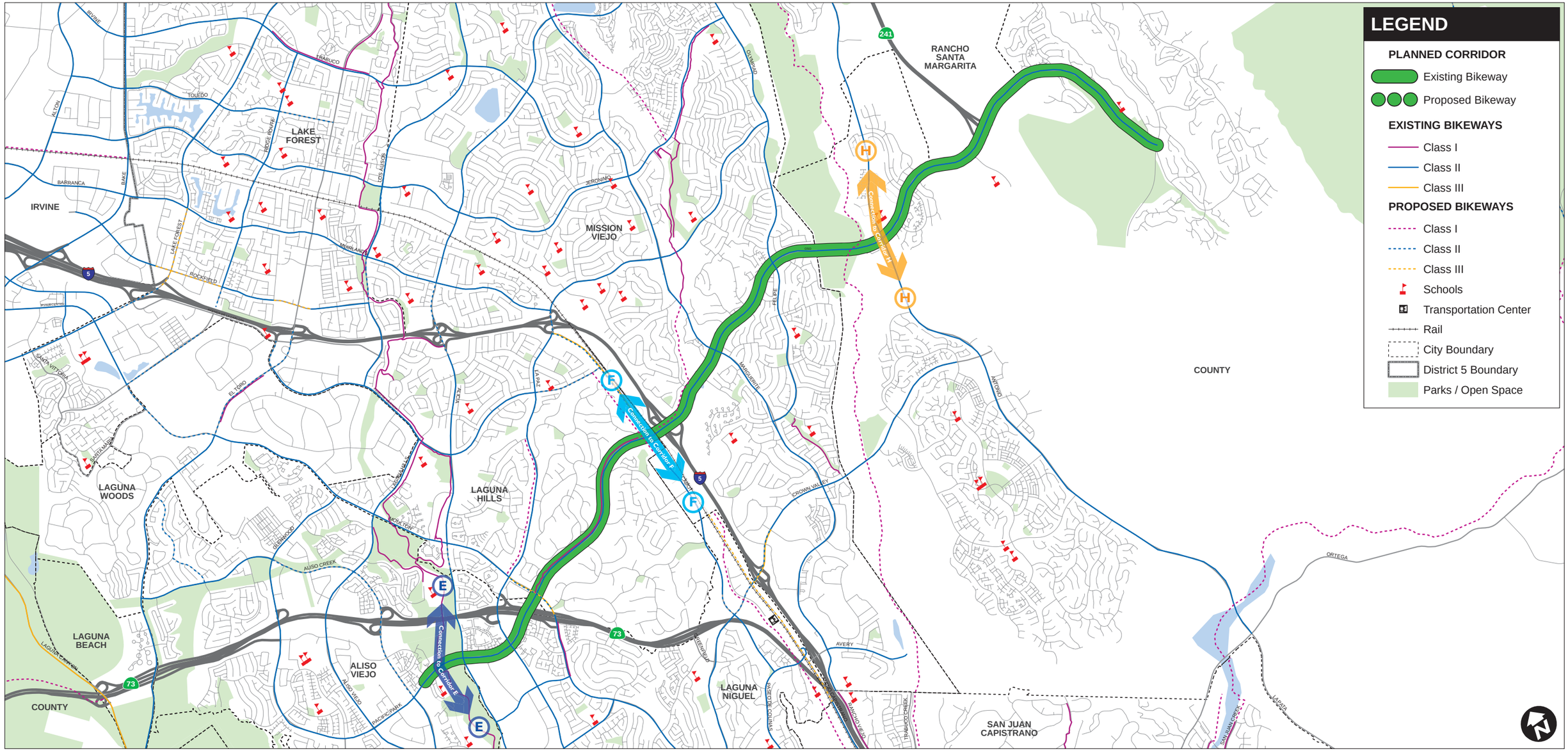

Source: OCTA

LEGEND

PLANNED CORRIDOR

- Existing Bikeway
- Proposed Bikeway

EXISTING BIKEWAYS

- Class I
- Class II
- Class III

PROPOSED BIKEWAYS

- Class I
- Class II
- Class III
- Schools
- Transportation Center
- Rail
- City Boundary
- District 5 Boundary
- Parks / Open Space

Corridor G
Bikeway Corridor Details

1.7 miles of existing Class I
8.8 miles of existing Class II

5
Schools within 1/4-mile Served

8
Parks within 1/4-mile Served

22.4K
People within 1/4-mile Served (approx.)

8.9 miles
Of Total Corridor Length

$5.5-6.8 million
Estimated Project Cost

3.1.8 Corridor H: Antonio/La Pata/Pico

Overview

Jurisdictions:	• Rancho Santa Margarita • County of Orange • San Juan Capistrano • San Clemente
Attractions:	• Shopping centers • Employment centers • Elementary, Middle and High Schools • State and local parks
Cost:	$11.1-$13.5 million

The Antonio/La Pata/Pico Corridor runs diagonally from near the north boundary of District 5 to Pacific Coast Highway. The corridor is approximately 18 miles long, with 13 miles of existing Class II bike lanes and 1 mile of existing Class I bike paths. The corridor directly connects to Rancho Santa Margarita, County of Orange, San Juan Capistrano, and San Clemente, and intersects State Route 241. The corridor has direct links to other regional bikeway corridors including the Portola/Santa Margarita, Oso Parkway, San Juan Creek, and Pacific Coast Highway corridors. Figure 3.9 illustrates Corridor H.

Length of Bikeway Facilities (Miles)		
Class I	**Existing**	1.0
	Proposed	0.2
Class II	**Existing**	13.0
	Proposed	3.5
Class III	**Existing**	0.5
	Proposed	0.0
Total Bikeway Miles		18.2
Corridor Length (miles)		*18.0*

Opportunities, Constraints, and Estimated Costs

Corridor H covers major residential and commercial areas in the eastern portions of District 5. A major portion of the corridor is already in place providing Class II bike lanes with connections to approximately ten intersections with existing or proposed bikeway facilities, providing many links for local bicyclists. The corridor also intersects or overlaps with three other regional corridors, expanding its network. Avenida Pico has limited curb to curb width with high traffic demand. An opportunity to utilize the flood channel parallel to Avenida Pico to create a Class I bike lane has been explored.

The corridor is relatively flat with only two segments having an average slope of 5% or higher. A segment of the corridor is missing and needs infrastructure to complete the corridor. The corridor also crosses the State Route 241 freeway with Class II bike lanes provided. The other challenge for Corridor H is the high speed and high volume arterial roadway.

Estimated construction costs for the Antonio/La Pata/Pico corridor including major intersection crossing improvements, improving the existing Class II bike lanes, and the new Class I bike paths, range from $11.1 to $13.5 million.

Major Regional Destinations

The Antonio/La Pata/Pico corridor provides connection to state and local parks, Trabuco Mesa Elementary School, Santa Margarita Catholic High School, Rancho Santa Margarita Intermediate School, Tijeras Creek Elementary School, Las Flores Middle School, Rancho Mission Viejo Horse Park, San Juan Hills High School, Vista Hermosa Sports Park, San Clemente High School, and the San Clemente Metrolink Station.

CORRIDOR H: ANTONIO / LA PATA / PICO

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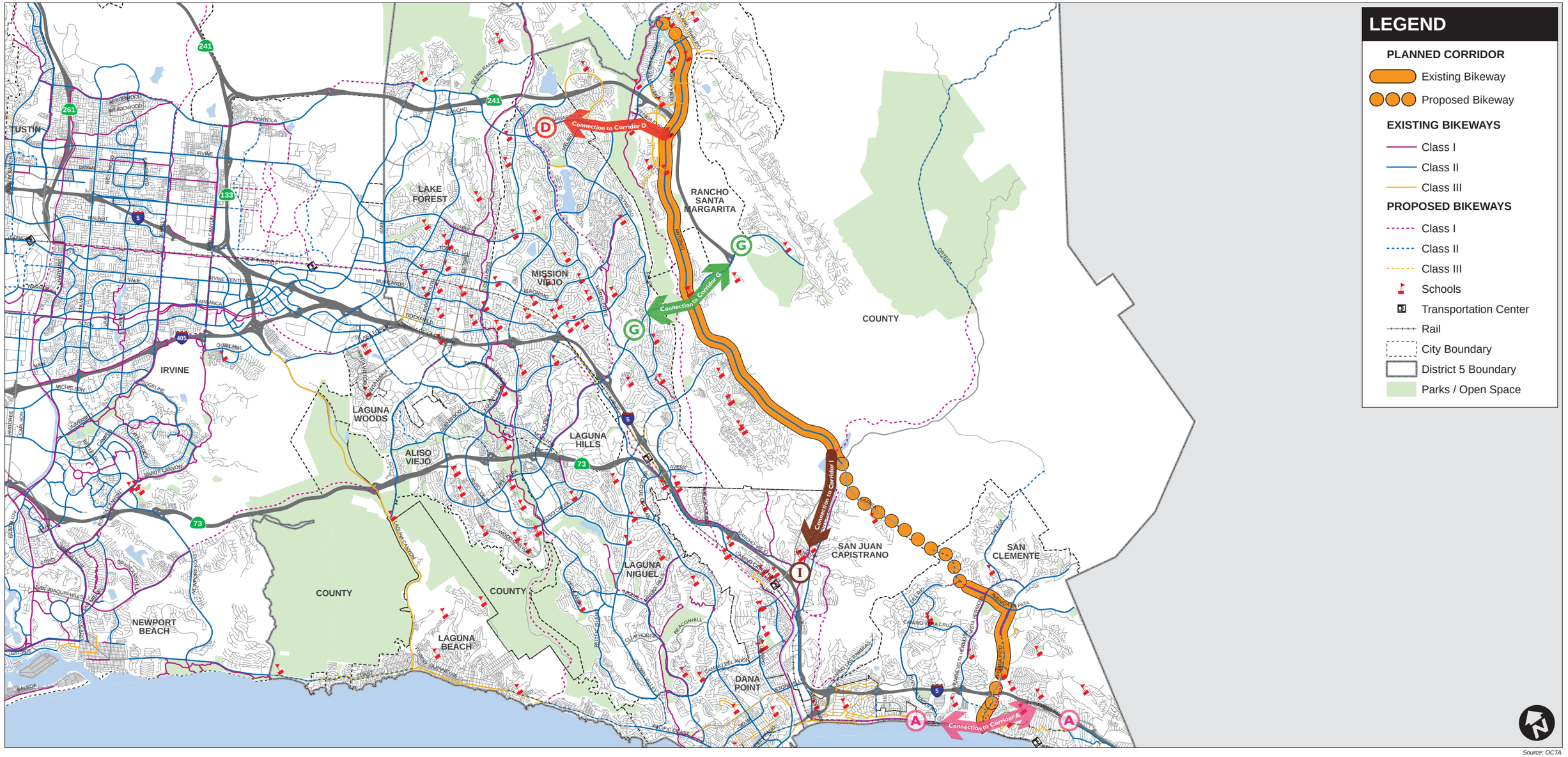

Source: OCTA

Corridor H
Bikeway Corridor Details

1 mile of existing Class I
13 miles of existing Class II
0.5 miles of existing Class III

12
Schools within 1/4-mile Served

15
Parks within 1/4-mile Served

40.8K
People within 1/4-mile Served (approx.)

18 miles
Of Total Corridor Length

$11.1-13.5 million
Estimated Project Cost

3.1.9 Corridor I: San Juan Creek

Overview

Jurisdictions:	• Lake Forest • Mission Viejo • Rancho Santa Margarita
Attractions:	• Shopping centers • Employment centers • Elementary and High Schools • State and local parks
Cost:	$3.8-$4.6 million

The San Juan Creek Corridor runs diagonally from Antonio Parkway just north of San Juan Capistrano to Doheny State beach in Dana Point. The corridor is approximately 8.6 miles long, comprised of 5.8 miles of existing Class I bike paths and 2.8 miles of proposed Class I bike paths. The corridor connects to the County of Orange, San Juan Capistrano, Dana Point, and intersects the Interstate 5 freeway. The corridor also has direct links to other regional bikeway corridors including the Antonio/La Pata/Pico, Muirlands/Cabot, and Pacific Coast Highway corridors. Figure 3.10 illustrates Corridor I.

Length of Bikeway Facilities (Miles)		
Class I	**Existing**	5.8
	Proposed	2.8
Class II	**Existing**	0.0
	Proposed	0.0
Class III	**Existing**	0.0
	Proposed	0.0
Total Bikeway Miles		8.6
Corridor Length (miles)		*8.6*

Opportunities, Constraints, and Estimated Costs

Corridor I provides connections to residential, commercial, and recreational areas in the southern portions of District 5. This corridor consists of Class I bike paths along the majority of the corridor, which is an appealing aspect of this corridor and attracts numerous users every day. The majority of the corridor is already in place, providing Class I bike lanes along a majority of the corridor with connections to four streets with existing or proposed bikeway facilities, providing access to local and regional bicyclists. The corridor intersects or overlaps with three other regional corridors, expanding its network. Because the corridor is completely off-street without intersection crossings or travel alongside vehicles, many bicyclists will feel more comfortable or safe riding along this corridor. The corridor also crosses under the Interstate 5 Freeway. There is an opportunity to pave the south/east bank of the trail and connect to the new development area of the City of San Juan Capistrano.

Estimated construction costs for the San Juan Creek corridor including major intersection crossing improvements, new Class I bike paths, and a new pedestrian/bicycle bridge where San Juan Creek and Trabuco Creek meet, providing access to the east side of the San Juan Creek, range from $3.8 to $4.6 million.

Major Regional Destinations

The San Juan Creek Corridor would provide connections and access to state and local parks, Saint Margaret's Episcopal School, City of San Juan Capistrano City Hall, and Doheny State Beach in Dana Point.

CORRIDOR I: SAN JUAN CREEK

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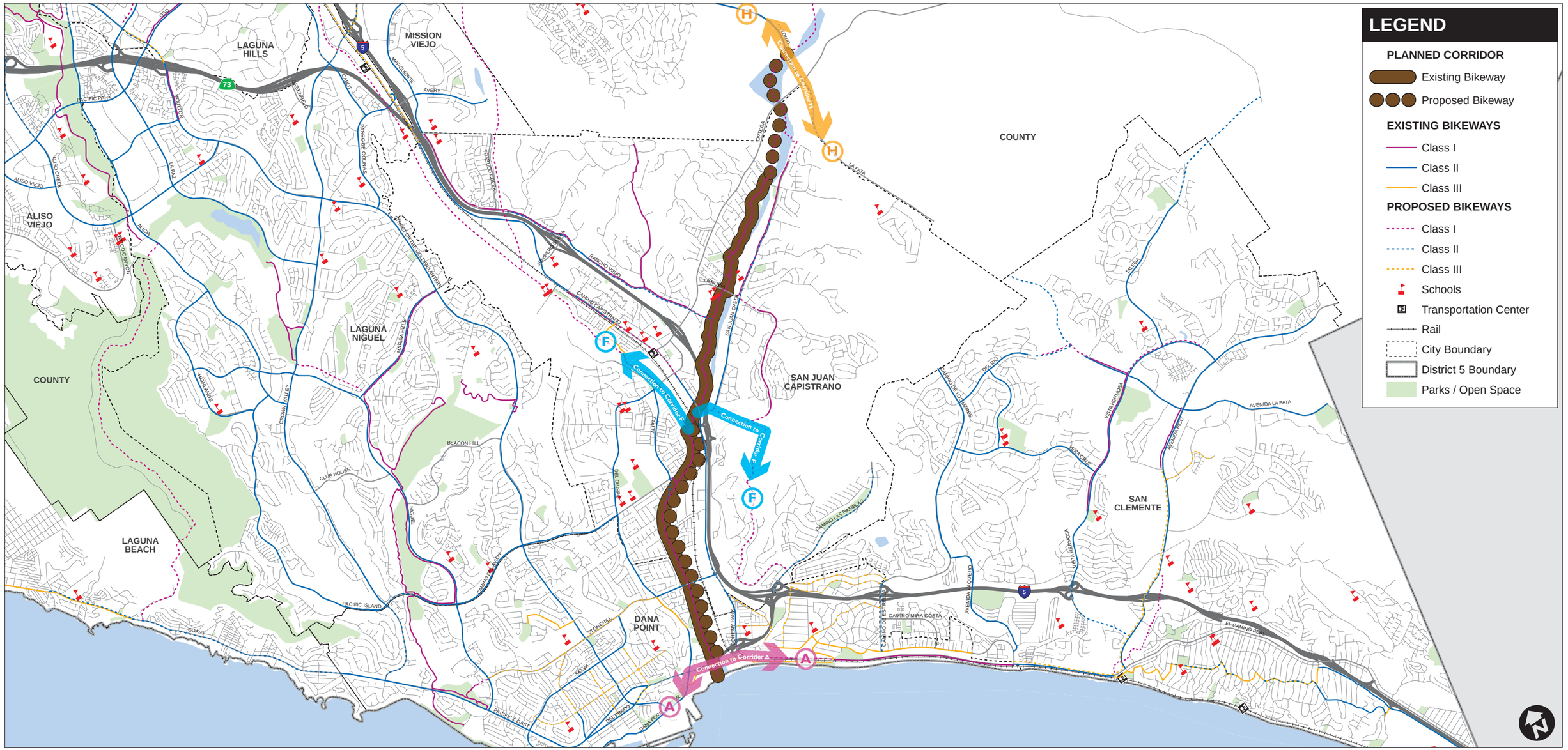


Source: OCTA

Corridor I
Bikeway Corridor Details

5.8 miles of existing Class I

9
Schools within 1/4-mile Served

5
Parks within 1/4-mile Served

18.2K
People within 1/4-mile Served (approx.)

8.6 miles
Of Total Corridor Length

$3.8-4.6 million
Estimated Project Cost

Figure 3-10

3.2 Evaluation and Ranking

3.2.1 Criteria and Weighting

Each of the proposed regional bikeway corridors were evaluated based on criteria consistent with District 5 goals and objectives. Using the District 1 and 2 criteria as a baseline, the criteria were refined through discussions with PDT members, and through public feedback received during Roundtable #1. The criteria and weighting factors for District 5 have been altered based on the input from Roundtable #1 and the PDT meetings. The criteria below were used to account for a range of opportunities, constraints, and other factors that could influence the usage and implementation of each corridor.

The criteria were developed and presented to the PDT members during the PDT Meeting #3. The criteria were refined based on the feedback from the PDT members and then used to evaluate and rank the regional corridors. During the Roundtable #1 meeting, the regional corridor evaluation analysis results were presented to the PDT members and the public. The evaluation criteria was then refined and several weighting factors were adjusted based on the feedback from the PDT members and the public during the Roundtable #1 meeting. For example, through Roundtable #1, most stakeholders agreed that the safety factor (reported collisions) needed to have a higher weighting factor due to the high speed and high volume roadway characteristic of District 5.

Table 3.1: Criteria Weighting Factor Adjustments

Criteria	Initial Weight Factor	Adjusted Weight Factor
Level of Traffic Stress	1.0	1.0
Reported Collisions	**0.5**	**1.0**
Economic Efficiency	**1.0**	**0.75**
Trip Demand	**1.0**	**0.75**
Public Support	0.5	0.5
Physical Constraints	0.5	0.5
Completes the Network	**0.5**	**0.25**
Completes the Corridor	**0.5**	**0.25**

Refinements to the criteria and weighting factors included the refinement of the criteria description and analysis methodology. Weighting factors were adjusted to allocate a higher weight on some criteria more than others, based on the feedback from the PDT members and the public. The criteria weighting factors were adjusted as shown in Table 3.1.

The regional corridors were evaluated and ranked using these criteria to help guide the implementing cities in prioritizing bikeway improvements in order to complete and/or improve the corridor bikeway facilities. The evaluation process determined which corridors would provide the greatest relative potential benefit to bicyclists in terms of regional connectivity, access to key destinations, and improved safety, while also having significant public support and limited physical constraints that could impede implementation. The top ranked proposed corridors will be further studied for feasibility in the second phase of the District 5 Bikeways Collaborative. Cities may individually advance the study of a corridor where there is interest and desire to continue the efforts of the strategy.

Table 3.2 below summarizes the criteria and weighting utilized in the ranking analysis and in determining the top ranked corridors to be further studied for feasibility. Please refer to Appendix D for additional details regarding the criteria.

Table 3.2: Criteria Description and Weighting Summary

CRITERIA	DESCRIPTION	WEIGHT
Level of Traffic Stress	Addresses perceive safety related to existing bikeway type and posted speed limits. There are four levels of traffic stress. Corridors with higher level of traffic stress are scored higher and represent a higher priority for treatment.	1.0
Reported Collisions	Addresses safety through five years of reported crash data, normalized by crashes per mile. Unlike motor vehicle crash data, the lower volume of bike crashes and lack of robust, long term exposure data (i.e. number of bicyclists using each corridor) means that this dataset is not as statistically sound. However, it is still commonly reported and easily understood. Corridors with higher collisions per mile are scored higher.	1.0
Economic Efficiency	Measures the financial benefits associated with the corridor, normalized by the number of anticipated users (which is in turn a product of the facility type, population density along the corridor and length), and divided by planning level construction costs estimates.	0.75
Trip Demand	Based on the Bicycle Priority Index (BPI). The BPI, which was developed by OCTA and accounts for various factors that influence bicycle usage including population and employment density, land use, local schools and transit.	0.75
Public Support	Incorporates public priorities through a Public Demand Index. The public input was acquired through the Roundtable #1 and online surveys.	0.5
Physical Constraints	A tally of physical constraints such as right-of-way, on-street parking, freeway ramps, and other "chokepoints". Fewer constraints result in a higher score as the corridor will be easier to implement.	0.5
Completes the Network	Regional corridors which connect to other regional and local bikeways to help complete the bikeways network. Measured by the number of intersections with other existing and proposed bikeways. Existing bikeway would be weighted more heavily. Proximity to the bikeway network is also included in the BPI.	0.25
Completes the Corridor	Proportion of the corridor that is already built to at least minimum Caltrans standards for the bikeway type that is being proposed. This helps to prioritize corridors which are already partially built. This factor is also part of the LTS Index.	0.25

3.2.2 Cost Estimate Assumptions

Planning level cost estimates were prepared for each corridor for use in the economic efficiency criterion. The costs utilized in the ranking analysis include high-level estimates based on cost averages of similar facilities. Estimates include costs for sign installations at intersections, major intersection improvements, grading and retaining walls, and other anticipated construction costs including bridges, but do not include environmental clearance, design, utility impacts, or maintenance costs. Refer to Appendix D for detailed cost estimate assumptions for each corridor.

The following are key assumptions utilized during the preparation of the cost estimates by facility type:

Class I (off-street bike path):	
Existing Facilities	Upgrade way-finding signs on existing routes, including additional bike lane signage
Proposed Facilities	• Construction of new Class I bike path with 10-foot-wide pavement and 2-foot-wide shoulders on each side, per Caltrans standards. While Caltrans allows 8-foot-wide Class I bike facilities, input from cities during the project indicated that the additional width allows for better accommodation of maintenance vehicles and provides enhanced space allocation for heavily utilized corridors. It also more readily accommodates both bicycle and pedestrian usage, which public input has suggested is an important factor. • Signage for bike path and way-finding • Street crossings were assumed to be at-grade either using nearby existing signalized intersections or a new crosswalk (enhanced crosswalks assumed in limited locations); no new traffic signals assumed. • Bridges over flood control channels were assumed, where appropriate

Class II (on-street bike lanes):	
Existing Facilities	• Upgrade way-finding along existing routes, including additional bike lane signage (particularly at intersections). • Upgrade Class II striping to include a buffer between vehicle travel lanes and the bike lane on existing facilities where feasible.
Proposed Facilities	• Stripe new Class II on-street bike lane with standard white stripe at locations where curbside travel lane is greater than 16 feet wide; buffer or colored lanes also assumed. • Widening of street by 4 feet to accommodate new Class II on-street bike lane with standard white stripe at locations where curbside travel lane is less than 16 feet wide; with cost represented on per linear foot basis assuming general costs for widening and right-of-way acquisition. • Signage for bike lane and for way-finding • Where on-street parking exists, initial cost assumes removal of on-street parking instead of street widening. The feasibility of removing parking will be more a component of the next phase of corridor analysis.

Class III (on-street bike routes):	
Existing Facilities	• Upgrade way-finding along existing routes, including additional bike lane signage, sharrows, and signage for regional corridor.
Proposed Facilities	• Implementation of sharrows, bike route signage, and way-finding signage. • Enhanced bike boulevard treatments such as traffic circles, roundabouts, and bikeway channels were not included in cost estimates pending more detailed feasibility review.

Class IV (cycle tracks)	
Existing Facilities	• N/A
Proposed Facilities	• Installation of raised islands serving as buffers between a curbside bike lane and vehicular travel lanes • Narrowing of vehicular lanes by restriping

Table 3.4 summarizes the results of the criteria ranking for the nine proposed corridors within District 5 with length and range of costs shown.

Table 3.3: Corridor Cost Estimates

Corridor ID	Corridor Name	Length (miles)	Cost Range (millions)
A	PCH	19.0	$11.5 – $14.1
B	Laguna Canyon	8.8	$8.4 – $10.3
C	El Toro/Alicia/Laguna Canyon	15.3	$12.2 – $15.0
D	Portola/Santa Margarita	6.7	$6.5 – $8.0
E	Aliso Creek	20.3	$8.2 – $10.0
F	Muirlands/Cabot/Camino Capistrano	17.9	$7.4 – $9.0
G	Oso Parkway	8.9	$5.5 – $6.8
H	Antonio/La Pata/Pico	18.0	$11.1 – $13.5
I	San Juan Creek	8.6	$3.8 – $4.6
TOTAL		**123.5**	**$74.6 – $91.3**

Note: The costs shown above are high-level estimates based on averages of similar facilities. Costs include costs for sign installations at intersections, major intersection improvements, grading and retaining walls, and other anticipated construction costs including bridges, but do not include environmental clearance, design, utility impacts, or maintenance costs.

3.2.3 Results of Criteria Ranking

Table 3.3 summarizes the detailed ranking evaluation, with raw and weighted scores shown. The weighted scores account for normalizing between 0 and 100, and weighting of each criterion.

Table 3.4: Corridor Scoring

Criteria		Rank	Score	Level of Traffic Stress		Reported Collisions		Economic Efficiency		Trip Demand		Public Input		Completes the Network		Physical Constraints		Completes the Corridor	
Best Possible Score			Tot.	RS	WS	RS	WS	RS	WS	RS	WS	RS	WS	RS	WS	RS	WS	RS	WS
			100	4.0	20	3.0	20	6.4	15	343.6	15	96	10	1.7	5	3	10	0%	5
A	PCH Corridor	1	70	3.8	19	2.9	20	0.9	2	280.1	12	96	10	0.8	3	12	2	0.0	1
C	El Toro/Alicia/ Laguna Canyon	2	65	3.9	20	2.4	16	1.5	4	288.8	13	21	2	1.0	4	20	1	0.0	5
F	Muirlands/Cabot / Camino Capistrano	3	60	2.3	12	1.1	8	6.4	15	343.6	15	47	5	0.9	3	21	1	0.3	1
D	Portola/Santa Margarita	4	59	3.9	20	1.1	7	0.6	1	317.1	14	19	2	1.7	5	6	5	0.0	5
B	Laguna Canyon	5	54	4.0	20	1.4	9	0.3	1	209.2	9	62	6	0.6	2	29	1	0.0	5
E	Aliso Creek	6	50	1.1	6	0.1	1	4.5	11	260.8	11	58	6	1.0	4	3	10	0.3	1
G	Oso Parkway	7	48	3.7	19	0.4	3	1.0	2	277.3	12	13	1	1.0	4	16	2	0.0	5
H	Antonio/La Pata/Pico	8	44	3.4	17	0.9	7	0.6	1	245.1	11	23	2	0.5	2	20	1	0.2	2
I	San Juan Creek	9	38	0.7	3	0.0	0	5.2	12	312.6	14	22	2	0.9	3	11	2	0.3	1

Note: RS = Raw Score; WS = Weighted Score

The corridor evaluation process determined that corridors A, C, and F would provide the greatest relative potential benefit to bicyclists in terms of regional connectivity, access to key destinations, and improved safety, while also possessing significant public support and limited physical constraints that could impede implementation.

The following section describes the performance of corridors for each criterion.

Criteria			Reported Collisions	
			RS	WS
Best Possible Score			3.0	20
Corridor	C	El Toro/Alicia	3.0	20
	A	PCH Corridor	2.9	19
	B	Laguna Canyon	1.4	9
	F	Muirlands/Cabot	1.1	7
	D	Portola/Santa Margarita	1.1	7
	H	Antonio/La Pata/Pico	0.9	6
	G	Oso Parkway	0.4	3
	E	Aliso Creek	0.1	1
	I	San Juan Creek	0.0	0

RS = Raw Score, WS = Weighted Score

Safety:

Corridor C received the highest score with regard to the safety criterion. This indicates that this corridor exhibited a relatively higher number of collisions per mile, and priority for treatment.

Criteria			Level of Traffic Stress	
			RS	WS
Best Possible Score			4.0	20
Corridor	B	Laguna Canyon	4.0	20
	C	El Toro/Alicia	3.9	20
	D	Portola/Santa Margarita	3.9	20
	A	PCH Corridor	3.8	19
	G	Oso Parkway	3.7	19
	H	Antonio/La Pata/Pico	3.4	17
	F	Muirlands/Cabot	2.3	12
	E	Aliso Creek	1.1	6
	I	San Juan Creek	0.7	3

RS = Raw Score, WS = Weighted Score

Level of Traffic Stress

Corridor B received the highest score with regard to Level of Traffic Stress. This indicates that the corridor had relatively higher posted speeds and lack of designated bicycle facilities.

Criteria			Trip Demand	
			RS	WS
Best Possible Score			343.6	15
Corridor	F	Muirlands/Cabot	343.6	15
	D	Portola/Santa Margarita	317.1	14
	I	San Juan Creek	312.6	14
	C	El Toro/Alicia	288.8	13
	A	PCH Corridor	280.1	12
	G	Oso Parkway	277.3	12
	E	Aliso Creek	260.8	11
	H	Antonio/La Pata/Pico	245.1	11
	B	Laguna Canyon	209.2	9

RS = Raw Score, WS = Weighted Score

Trip Demand: Bicycle Priority Index (BPI)

Corridor F received the highest BPI score indicating the most potential demand for bicycle demand. Some of the most densely populated and major employment centers in south Orange County are in close proximity to Corridor F.

Criteria			Economic Efficiency	
			RS	WS
Best Possible Score			6.4	15
Corridor	F	Muirlands/Cabot	6.4	15
	I	San Juan Creek	5.2	12
	E	Aliso Creek	4.5	11
	C	El Toro/Alicia	1.5	4
	A	PCH Corridor	1.1	3
	G	Oso Parkway	1.0	2
	D	Portola/Santa Margarita	0.6	1
	H	Antonio/La Pata/Pico	0.6	1
	B	Laguna Canyon	0.3	1

RS = Raw Score, WS = Weighted Score

Economic Efficiency

Corridor F received the highest score for economic efficiency and exhibited the most benefit for the cost to complete/enhance the corridor. The majority of Corridor F is already in place and would require relatively minimal work to complete, but serve the most potential demand.

Criteria			Public Input	
			RS	WS
Best Possible Score			96	10
Corridor	A	PCH Corridor	96	10
	B	Laguna Canyon	62	6
	E	Aliso Creek	58	6
	F	Muirlands/Cabot	47	5
	H	Antonio/La Pata/Pico	23	2
	I	San Juan Creek	22	2
	C	El Toro/Alicia	21	2
	D	Portola/Santa Margarita	19	2
	G	Oso Parkway	13	1

RS = Raw Score, WS = Weighted Score

Public Support

Corridor A received the highest score for public support. Pacific Coast Highway is one of the most iconic bicycling routes in California and is recognized throughout Orange County as a popular and scenic bicycling destination.

Criteria			Physical Constraints	
			RS	WS
Best Possible Score			3	10
Corridor	E	Aliso Creek	3	10
	D	Portola/Santa Margarita	6	5
	I	San Juan Creek	11	2
	A	PCH Corridor	12	2
	G	Oso Parkway	16	2
	C	El Toro/Alicia	20	1
	H	Antonio/La Pata/Pico	20	1
	F	Muirlands/Cabot	21	1
	B	Laguna Canyon	29	1

RS = Raw Score, WS = Weighted Score

Constraints

Corridor E received the highest score for having the least amount of constraints. The Aliso Creek corridor is entirely off-street and has minimal at-grade crossings. It is also aligned along a natural water body with minimal slope.

Criteria			Completes the Corridor	
			RS	WS
Best Possible Score			0.0	5
Corridor	B	Laguna Canyon	0.0	5
	G	Oso Parkway	0.0	5
	D	Portola/Santa Margarita	0.0	5
	C	El Toro/Alicia	0.0	5
	H	Antonio/La Pata/Pico	0.2	2
	E	Aliso Creek	0.3	1
	I	San Juan Creek	0.3	1
	F	Muirlands/Cabot	0.3	1
	A	PCH Corridor	0.3	1

RS = Raw Score, WS = Weighted Score

Complete the Corridor

Corridor's B, G, D, and C received the highest score with regard to completing the corridor. This indicates that these corridors are relatively the most complete and already in place and would require only gap closures to complete.

Criteria			Completes the Network	
			RS	WS
Best Possible Score			1.7	5
Corridor	D	Portola/Santa Margarita	1.7	5
	C	El Toro/Alicia	1.0	4
	E	Aliso Creek	1.0	4
	G	Oso Parkway	1.0	4
	A	PCH Corridor	0.8	3
	F	Muirlands/Cabot	0.9	3
	I	San Juan Creek	0.9	3
	B	Laguna Canyon	0.6	2
	H	Antonio/La Pata/Pico	0.5	2

RS = Raw Score, WS = Weighted Score

Complete the Network

Corridor D received the highest score exhibiting the most connections to other bike facilities. This indicates that Corridor D serves as a key connection point in the overall bike network.

3.2.4 Top Ranked Corridors

As shown in Table 3.3 the three top ranked corridors are:

- **Corridor A:** Pacific Coast Highway;
- **Corridor C:** El Toro/Alicia/Laguna Canyon;
- **Corridor F:** Muirlands/Cabot/Camino Capistrano

Each of the District 5 cities, the County of Orange, and Caltrans have jurisdiction over portions of these three corridors.

The Pacific Coast Highway Corridor, which extends from the north side of Laguna Beach to San Clemente received the highest score. This score was driven by the level of traffic stress (19 out of a possible 20 points), reported collisions (20 out of 20 possible points), trip demand (12 out of 15) and strong public input (10 out of 10).

El Toro/Alicia/Laguna Canyon Corridor, which extends from the base of the Santa Ana Mountains in Mission Viejo to the beach in Laguna Beach, received the second highest score. This score was driven by the level of traffic stress (20 out of a possible 20 points), reported collisions (16 out of 20 possible points), and trip demand (13 out of 15).

Muirlands/Cabot/Camino Capistrano Corridor, which extends from just north of the I-5 in Lake Forest SE to San Juan Capistrano and the Dana Point/San Clemente Border, was the third highest ranking corridor. This score was driven by economic efficiency (15 out of a possible 15 points), trip demand (15 out of 15 possible points), trip demand (12 out of 15) and to a lesser extent level of traffic stress (12 out of 20 possible points).

These three corridors will be further studied for feasibility in the second phase of the District 5 Bikeways Collaborative. The feasibility analyses may determine that segments of certain corridors should be shifted to parallel roadways, depending upon circumstances and/or constraints. Therefore, the nine corridors identified in this report are only conceptual and their exact alignments may change in subsequent stages of planning and design. This design flexibility will ensure that the best possible routes are included in transportation plans and applications for construction funds.

4.0 ACTION PLAN

4.1 Potential Near-Term Efforts

This section identifies potential near-term projects that can be implemented by each of the cities within District 5 to begin implementation of the proposed corridors. Potential near-term projects are those that are expected to have a low construction cost and can be implemented in a relatively short period of time as funds become available. Implementation and funding of these projects would be the responsibility of each jurisdiction. OCTA would assist local jurisdictions in obtaining funding for these projects by providing letters of support, grant notifications and guidance, and design solutions. Coordination between jurisdictions is highly encouraged to implement bikeway connections simultaneously.

Each of the nine regional bikeway corridors has been reviewed at a conceptual level to identify "potential near-term" projects expected to require minimum capital investment, little or no right-of-way acquisition, and may require minimal environmental review. These types of projects may include restriping a street to implement a Class II bikeway, signing a street to designate it as a Class III bikeway, or signing and striping an existing paved off-street path or maintenance road of sufficient width to serve as a Class I off-street bikeway. For existing Class II bike lanes, if there is enough roadway width, enhancing the existing Class II bike lane to a buffered bike lane can be easily implemented.

Table 4.1 summarizes the proposed near-term improvements along with estimated costs and jurisdictional responsibilities. Figure 4.1 shows the locations of the proposed near-term improvements.

Table 4.1: Proposed Near-Term Improvements

Corridor	Location	Owner/ Operator	Proposed Improvement	Length (feet)	Cost Estimate
A: Pacific Coast Highway	PCH (west city limit to Cliff Dr)	Laguna Beach/Caltrans	New Class II (on-street, striping)	5,970	$65,670
	PCH (Nyes Place to Eastline Drive)	Laguna Beach/Caltrans	New Class II (on-street, striping)	14,230	$156,530
	El Camino Real (Camino Capistrano to Avenida Estacion)	San Clemente	New Class IV	10,000	$524,000
B: Laguna Canyon	Laguna Canyon Road at SR-73	County of Orange / Caltrans	Stripe bike lanes through freeway interchange	3,000	$33,000

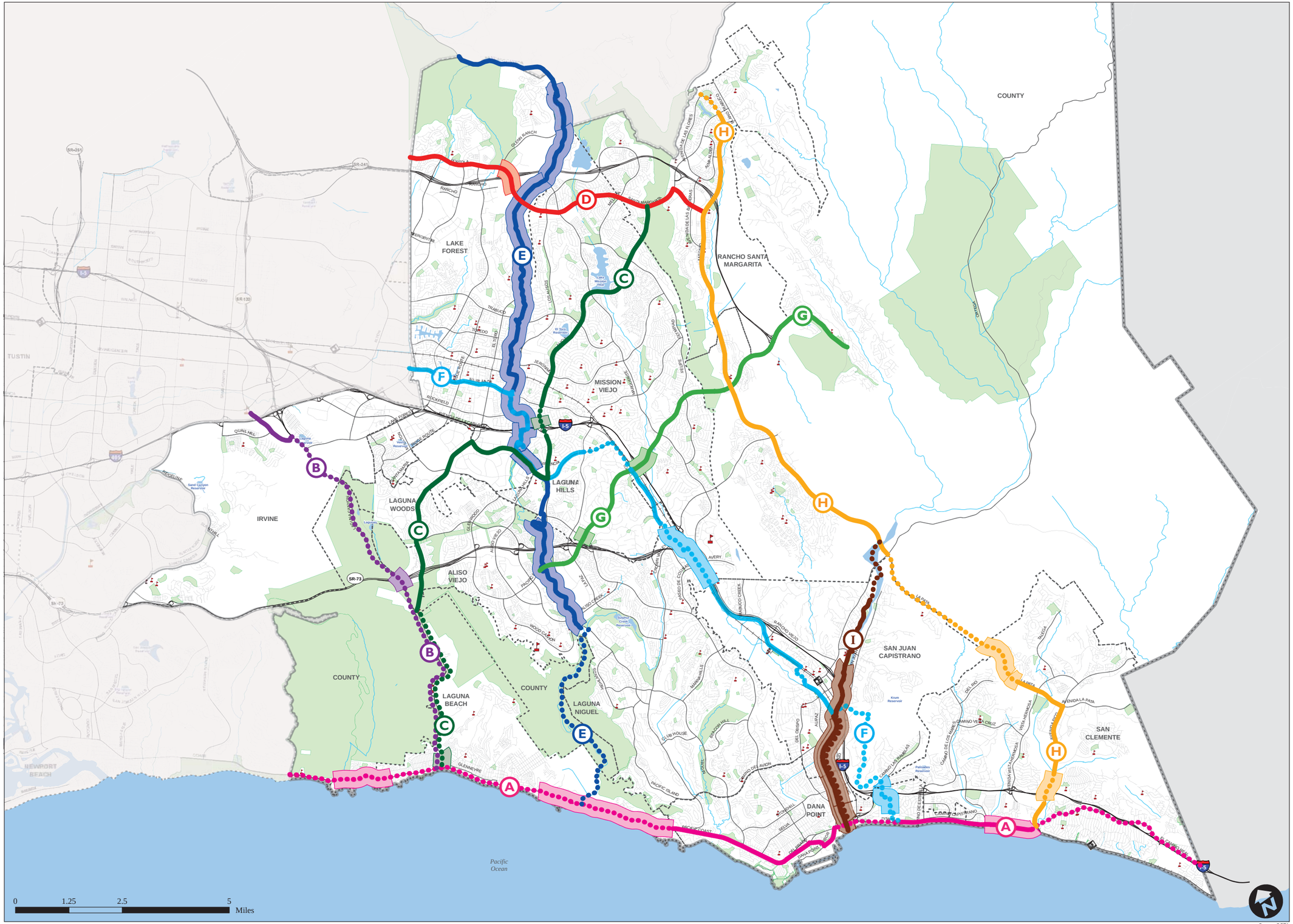
Corridor	Location	Owner/ Operator	Proposed Improvement	Length (feet)	Cost Estimate
C: El Toro / Alicia / Laguna Canyon	Broadway Street (Laguna Canyon Road to PCH)	Laguna Beach	Upgrade Existing Facility (signage and other)	1,510	$453
D: Portola / Santa Margarita	SR-241 and Portola Parkway	County of Orange / Caltrans	Class II buffered bikeway striped through interchange	3,000	$33,000
E: Aliso Creek	Aliso Creek Trail	County of Orange,	Upgrade existing Class I by adding way-finding signage	4,670	$1,401
		Mission Viejo		5,930	$1,779
		Lake Forest		30,050	$9,015
		Laguna Woods		2,870	$861
		Laguna Hills		3,410	$1,023
		Aliso Viejo		14,550	$4,365
F: Muirlands/ Cabot/Camino Capistrano	Camino Capistrano (Metrolink Station to south city limit)	Laguna Niguel	New Class III (on-street, signage)	3,710	$9,275
	Via California (Camino Las Ramblas to Calle Beinvenido)	San Clemente	New Class III (on-street, signage)	510	$1,275
	Via California (Via Velez to Via Lopez)	Dana Point	New Class II (on-street, striping)	540	$5,940
	Via Fortuna (Via California to Via Sacramento)	Dana Point	New Class III (on-street, signage)	840	$2,100
	Via Sacramento (Via Fortuna to Camino Capistrano) & Via California (via Lopez to Via Fortuna)	Dana Point	New Class III (on-street, signage)	1,950	$4,875
G: Oso Parkway	Oso Parkway at I-5 Freeway	OCTA and Caltrans	Add buffered class II striping through intersection (with green paint)	5,500	$75,000
	Oso Parkway at Moulton Parkway	Aliso Viejo	Add Class II striping to the intersection	900	$10,000
H: Antonio / La Pata / Pico	La Pata - west city limits to Del Rio	San Clemente	New Class II (on-street striping)	870	$9,570
	La Pata - Del Rio to Calle Saluda	San Clemente	New Class I (off-street paving)	1,200	$180,000
	Avenida Pico (Calle Frontera/Avenida Presidio to Calle De Industrias/Via Pico Plaza)	San Clemente	New Class II (on-street striping)	3,000	$33,000

Corridor	Location	Owner/ Operator	Proposed Improvement	Length (feet)	Cost Estimate
I: San Juan Creek	Avenida Siega/Calle Arroyo to Calle Jardin	San Juan Capistrano	Upgrade Existing Facility (Signage and Other)	19,700	$5,931
	Calle Jardin to Doheny State Beach	Dana Point	Upgrade Existing Facility (Signage and Other)	6,240	$1,872
	East side of San Juan Creek (Trabuco Creek Trail to Stonehill Dr)	San Juan Capistrano	New Class I - off street paving	7,620	$1,143,000
	East side of San Juan Creek (Stonehill Dr to PCH)	Dana Point	New Class I - off street paving	3,810	$571,500

NEAR TERM CORRIDOR IMPROVEMENTS

OCTA District 5 Bikeways Collaborative

KOA CORPORATION PLANNING & ENGINEERING



Source: OCTA

BIKEWAY CORRIDORS

Existing Facility	Proposed Facility	Near Term Project	
			A: Pacific Coast Highway
			B: Laguna Canyon
			C: El Toro/Alicia
			D: Portola/Santa Margarita
			E: Aliso Creek
			F: Muirlands/Cabot/Camino Capistrano
			G: Oso Parkway
			H: Antonio/La Pata/Pico
			I: San Juan Creek

LEGEND

- Transportation Center
- Rail
- Schools
- Colleges
- Parks / Open Space
- Waterbody
- City Boundary
- Supervisorial District 5

Figure 4-1

4.2 Programmatic Recommendations

Of the five E's of bicycle planning, four are related to programs; encouragement, education, enforcement and evaluation. Programs should complement engineering improvements such as bike paths, lanes, and routes by providing the education and encouragement to ensure that the facilities get maximum utilization.

4.2.1 Encouragement

Safe Routes to School Program

The Safe Routes to School (SRTS) Program (www.saferoutesinfo.org) focuses on both education and infrastructure development with the goal of increasing the number of children who walk and bike to school on a regular basis.

The program offers promotional and educational materials to help communities develop effective safe routes to schools programs. The statewide Active Transportation Program (ATP) for funding bike and pedestrian programs includes a specific category for SRTS programs. These grants can be used for either infrastructure or educational programs that promote children walking and biking to school. One of the advantages of SRTS grants is that they require no local match. For more on funding opportunities, see Chapter 6.

Bike month is a nationwide event held in May of each year. The intent of the month long campaign is to increase awareness of bicycling, its benefits and impact, as well as encourage bicycling across all segments of the population. OCTA has an active campaign each May that includes not only a bike-to-work day, but a number of events held throughout the month. In addition, many of the cities in District 5 hold their own bike-related events.

For more information on National Bike Month, go to the League of American Bicyclists www.bikeleague.org/bikemonth. For a list of events in Orange County, see www.octa.net/Share-the-Ride/Bike/Bike-Month

Employer-Based Encouragement Programs

Many companies, OCTA, and participating cities work with or provide information to employees about commuting by bicycle. A useful resource is an article published in Inc Magazine in 2010 titled "How to encourage your employees to bike to work." It has a checklist showing what companies (and government agencies) can do to encourage their employees to bike to work.

Launch Party for New Bikeways

When a new bikeway is built, some residents will become aware of it and use it, while others may not realize that they have improved bikeway options available.

Conducting opening events where you invite local dignitaries, school groups, bike clubs, and local businesses to participate is a great way to help raise early awareness and use of new facilities.

Elected and school officials are often eager to be involved in these types of events, as they can be used to highlight programs they have encouraged and championed in the community.

Open Streets Events

Open streets events have many names: Sunday Parkways, Ciclovias, Summer Streets, and Sunday Streets. These events have become increasingly popular across the County. In Southern California, these events have been hosted from Los Angeles to Santa Ana, Garden Grove, and San Diego. Los Angeles's events routinely attract over 100,000 participants and have encouraged large numbers of people who do not regularly ride a bike to come out and enjoy car-free city streets.

One of the many benefits of these events is highlighting the businesses along the route and showing people how easy it is to dine and shop by bike. A recent study from UCLA, titled "Economic impacts of CicLAvia: Study Finds Gain To Local Businesses" discusses the significant economic impact of these events.

For a guide to conducting an open streets event, go to the Alliance for Biking and Walking website: www.bikewalkalliance.org/resources/reports/open-streets-guide.

Bicycle Friendly Community

The League of American Bicyclists recognizes communities that are good, friendly, safe places to ride your bike; cities that welcome and encourage bicyclists and bicycling. According to the league's website, "A BFC welcomes bicyclists by providing safe accommodations for bicycling and encouraging people to bike for transportation and recreation. Making bicycling safe and convenient are keys to improving public health, reducing traffic congestion, improving air quality and improving quality of life."

Being recognized as a bike friendly community is becoming more and more important in attracting and retaining new residents as well as businesses. People of all ages ranging from school age, to newly working adults to aging baby boomers are looking for cities that offer an active lifestyle and provide an opportunity to choose to get out of their vehicle and use alternative forms of transportation including bicycling. Businesses are looking to locate and grow in cities that offer a lifestyle that will attract new employees and customers; one of their important criteria has become having a bike (and pedestrian) friendly culture.

In Orange County, the cities of Irvine and Huntington Beach, along with the County, have achieved recognition as Bike Friendly Communities. Nationwide, over 300 communities are recognized as being bike friendly.

For information on the advantages of being recognized as a bike friendly community and on obtaining bike friendly status see the League of American Bicyclists website www.bikeleague.org/bfa.

4.2.2 Education

Bicycle Resource Website

Educating both bicycles and motorists is an important aspect of being bike friendly. Bicyclists need to understand safe bicycling behavior and the basics of bicycle maintenance. They need to understand how to deal with traffic as well as pedestrians and other bicyclists. Motorists need to understand that bicyclists have the same rights that vehicle drivers have. Now motorists need to understand safety rules, such as the 3-foot law.

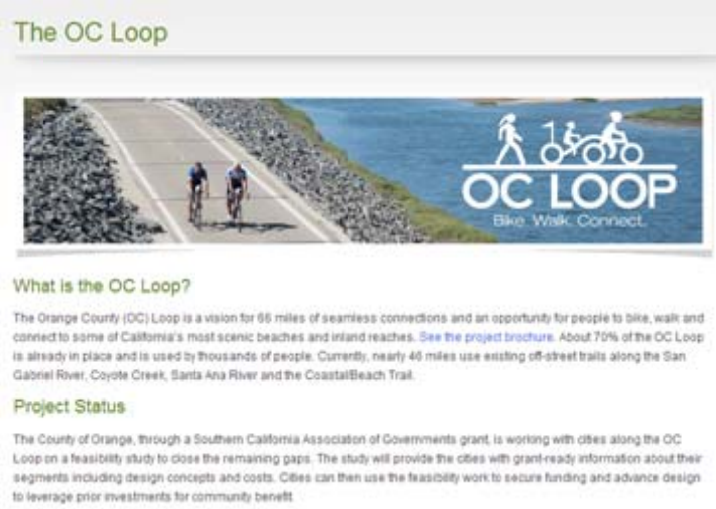
OCTA hosts several pages dedicated to bicycling and bicycle safety: http://www.octa.net/Share-the-Ride/Bike/Riding-in-Orange-County/OC-Bikeways-Map/

Bicycle resource websites may also include:

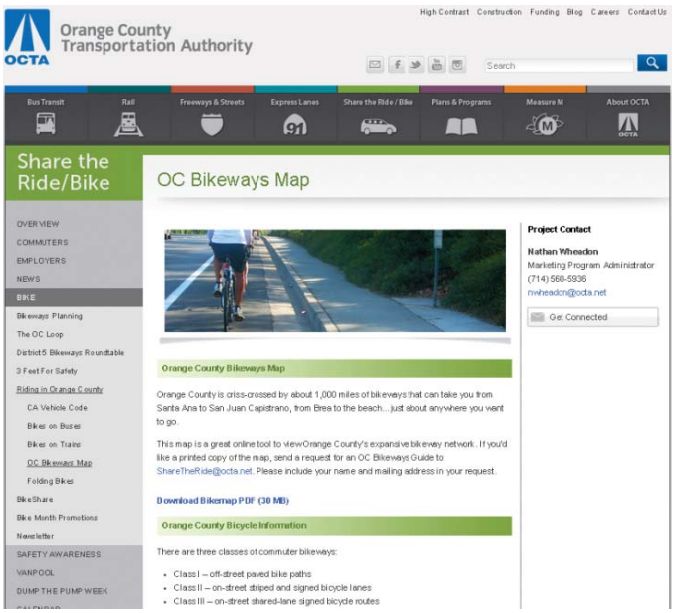
- Advertisements for all bikeways after implementation
- Bicycling tips including information on how to:
  - Carry items using baskets and panniers
  - Properly lock a bike
  - Ride in the rain with help from fenders and rain gear
  - Tips can also include information on the importance of bicycle lights and reflectors.
- Bikeway maintenance and repair phone numbers
- Bicycle events calendar
- Bicycle traffic skills classes information
- multilingual versions

Marketing Concurrent with New Facilities

Education about new facilities can help notify and educate both cyclists and motorists about newly installed facilities. OCTA has a history of effective marketing using local events to highlight new facilities. These include special events associated with opening segments of facilities, such as ribbon cutting ceremonies and bike rides where local private and governmental entities are invited to participate, along with local school and youth groups.



Social media and the web are also important tools for marketing new facilities. A recent example of a marketing campaign associated with the OC Loop, a 66-mile largely off-street bike and pedestrian facility that connects northern inland OC with the beach communities can be found at www.octa.net/OCLOOP



A marketing campaign that highlights bicyclists and pedestrian safety is an important part of creating public awareness.

OCTA has a strong history of creating community outreach programs, using social media, and creating public service messages including items such as banner ads, in particular those placed on OCTA busses.

OCTA's yearly Bike Month Campaign has been very effective at conveying a safety message for both motorists and bicyclists.

Funding sources for similar campaigns that can be conducted at the city level are discussed in Chapter 6.

Adult Bicycling Traffic Skills Classes

Most adult bicyclists have not received any formal training on safe bicycling practices, the rules of the road, and bicycle handling skills. If they received any bike education at all, it was most likely as a child. Now, many of the adults who are being encouraged to return to bicycling feel uncomfortable, in many cases, even riding in their neighborhood.

Adult classes offered by League of American Bicyclist certified instructors are available by contacting www.bikeleague.org. These courses combine some short lectures about riding skills and simple bike maintenance. More importantly they offer the bicyclist the opportunity to learn new skills or refresh old skills in a safe environment, accompanied by a certified instructor.

Route 004 : Silver Lake to Downtown

Meet Thursdays at 8:00am at Caffe Vita on Sunset near Hillhurst and the Vista Theater. This route uses bike lanes on Sunset Boulevard, Rampart Boulevard and 7th Street to take us from Los Feliz/Silverlake past beautiful MacArthur Park to Downtown Los Angeles, ending at 7th and Grand where you can refuel at Bottega Louie if the ride leaves you with a sweet tooth. Majority of the route is on bike lanes, but we will share the road with automobiles for brief sections. We'll keep it low-stress and low-sweat; this is more of a trolley than high-speed rail. Even still, we'll make the trip in about 30 minutes!

A recent innovation in LA has been the creation of "bike trains" for adults. Just as a train, a bike train runs on a given schedule over a given route. Bike trains have been used for several years to aid children going to and from school. More recently, a similar concept has been implemented for adults in LA. There are currently eight routes in LA. For each of these routes a group will meet one or two days per week. Each ride has a conductor who guides the group along the route as well as provides any assistance that is necessary. For more information on Bike Trains for Adults see http://labiketrains.com/

Youth Bicycle Skills Classes

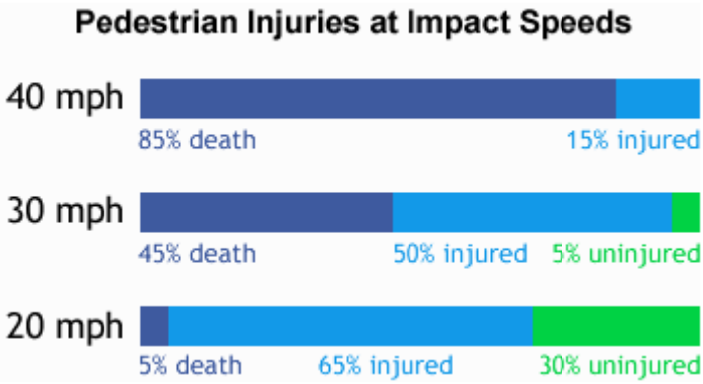
School-based bicycle education programs educate students about the rules of the road and safe bicycling skills. Safe routes to schools (SRTS) educational grants are available for these programs, which are typically offered for upper elementary and middle school age children. Funding strategies for these programs is discussed in Chapter 6.

Bike trains and walking school buses, where parents or staff guide students to and from school over a set route at a set time, are being added in more and more schools across Southern California. In some cases these are formal programs that are sponsored by the school. In other cases the programs are organized and coordinated informally by parents who want the children to have the opportunity to walk and/or bike to school. These programs allow children with different skill levels to interact and provide an alternative to the class-room or school-yard based training.

4.2.3 Enforcement

Bicycle Patrol

Police bicycle patrols not only increase the mobility of officers in dense areas but also offer the opportunity for officers to interact with bicyclists in a non-confrontational, low key manor. Bicycle patrol officers know both the law as well as the challenges faced by bicyclists on a day-to-day basis. These officers can demonstrate and explain safe riding techniques as well as provide enforcement if appropriate.



Speed Feedback Signs and Rest in Red Signals

Vehicle speeds greatly affect the severity of the crash for the bicyclist or pedestrian. The adjacent figure, from the Safe Routes to School (SRTS) guide to slowing down traffic, shows that at a speed of 20 MPH, the percentage of pedestrians being killed in a crash is under 5% but at a speed of 40 mph, the percentage is 85%.

Speed feedback signs have been shown to be an effective means of making the driver more aware of their speed and encouraging them to reduce their speed.

A relatively new traffic engineering tool involves setting traffic lights for when vehicles approach a signal over the legal speed limit, the light turns red. Once the vehicle slows to below the limit, it will turn green, allowing the vehicle to proceed. The City of Long Beach has recently installed these with success at two locations. A video showing how this works can be seen at www.youtube.com/watch?v=x5zhziy7TIA

Targeted Enforcement

Targeted enforcement uses the focused efforts of police officers at known locations where compliance is low. According to the Federal Highway Traffic Administration (FHWA) these programs are most effective when crash, citation or other sources of information suggests that the site is unusually hazardous due to illegal driving practices.

According to the FHWA, "The advantage of targeted enforcement is that it can be implemented in a very short period of time and identified problems can be addressed almost immediately. The disadvantage is that the effectiveness is usually measured in terms of days and perhaps weeks, rather than months or years." For more information on targeted enforcement see: safety.fhwa.dot.gov/intersection/resources/intsafestratbro/ug1.cfm

Adult Bicycle Education Diversion Program

A few cities in the State of California have adopted adult bicycle diversion programs. In these programs, when bicyclists are given a traffic ticket they are provided the opportunity to take a bike education program rather than paying the full price of the ticket. At the present time Huntington Beach has a program for teens; Marin County has an adult program. Due to potential conflicts with state regulations these programs have not been widely adopted across the state.

4.2.4 Evaluation

Evaluation programs measure and evaluate the impact of projects, policies and programs.

Surveys

Surveys are useful for eliciting infrastructural deficiency and attitudinal information. These may be intercept surveys conducted in the field during events or in locations such as bike shops. They may also be conducted online. For this report both online and face-to-face surveys were used to collect both behavioral information as well as indications of preferred routes and to determine corridor rankings.

Counts

Bike counts are an important part of any bike program. As the National Bicycle and Pedestrian Documentation Project says, "One of the greatest challenges facing the bicycle and pedestrian field is the lack of documentation on usage and demand. Without accurate and consistent demand figures, it is difficult to measure the impacts of investments in these modes."

Standard forms and instructions for bike counts can be downloaded from the National Bicycle and Pedestrian Documentation Project website (www.bikepeddocumentation.org).

In addition to yearly counts, counts can be done on a before and after basis to show the impact of a specific project. Most projects that are funded by government grants routinely incorporate these counts into the project plans.

Recently, several cities have started to use automated counters that are useful in collecting long term counts, establishing daily, weekly, or monthly variations, and almost always requiring fewer person hours (National Bicycle and Pedestrian Documentation project: Automatic count technologies).

The photo on the previous page shows one form of counter that has recently been installed in on the Santa River Trail.

Several other cities including Portland, OR, Minneapolis, MN and Arlington, VA, are installing counters such as the one shown on the left. These counters not only keep track of the number of bicyclists, but visibly display the results on a real time basis. (Photo by Eco-Counter)

Automated counters are an important element in helping determine the effectiveness of bike programs. With their effectiveness and efficiency in data collection and their reasonable costs ($2,000-$3,000 or less per installation), they can be incorporated in most future projects.

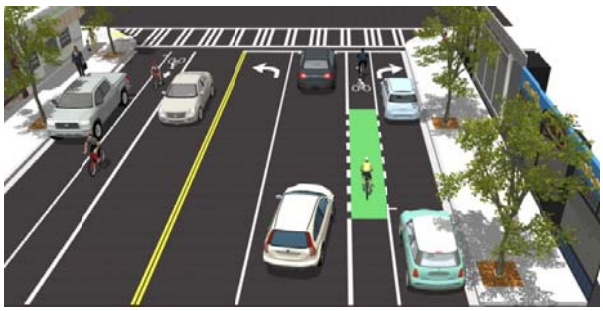
A recent project sponsored jointly by SCAG and the Los Angeles County MTA is designed to help compile, organize, make accessible and create a standard for bike count data in Southern California. As a result of the project, a clearinghouse for bike count data has been created and is being maintained by UCLA. The project includes information on best practices and forms for bike counts, a literature review, and a white paper on bike counts, travel demand modeling, and benefits estimation. For more information on the Bike Count Clearinghouse see www.bikecounts.luskin.ucla.edu.

5.0 BICYCLE FACILITY TOOLKIT

5.1 Introduction

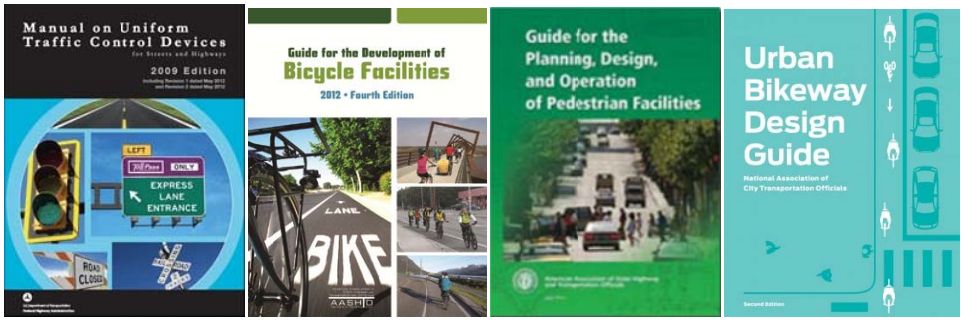
This chapter is intended to assist the Orange County Transportation Authority and local jurisdictions within the District 5 study area in the selection and design of bicycle facilities. District 5 is unique from the other Districts in Orange County in which corridors are on major arterials due to the topography of District 5. Many of these corridors have existing bike lanes; however an extensive shared-use path network also exists throughout District 5.

The following pages pull together best practices by facility type from public agencies and municipalities nationwide. Within the design section, treatments are covered within a single-sheet tabular format relaying important design information and discussion, example photos, schematics (if applicable), and existing summary guidance from current or upcoming draft standards. Existing standards are referenced throughout and should be the first source of information when seeking to implement any of the treatments featured here.



5.1.1 National Standards

Several agencies and organizations provide design standards for bike facilities in the US. The most commonly used manuals that outline these standards are listed below.



The Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD) defines the standards used by traffic engineers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public traffic. The FHWA MUTCD forms the basis of the California MUTCD, which is the standard used by most cities in California.

To further clarify the MUTCD, the FHWA created a table of contemporary bicycle facilities that lists various bicycle related signs, markings, signals, and other treatments and identifies their official status (e.g., can be implemented, currently experimental). See Bicycle Facilities in the Manual on Uniform Traffic Control Devices.

There are some newer bikeway treatments that may not be explicitly covered by the MUTCD that are often subject to experiments, interpretations and official rulings by the FHWA. The MUTCD Official Rulings is a resource that allows website visitors to obtain information about these supplementary materials. Copies of various documents (such as incoming request letters, response letters from the FHWA, progress reports, and final reports) are available on this website.

American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, updated in June 2012 provides guidance on dimensions, use, and layout of specific bicycle facilities. The standards and guidelines presented by AASHTO provide basic information, such as minimum sidewalk widths, bicycle lane dimensions, detailed striping requirements and recommended signage and pavement markings.

The National Association of City Transportation Officials' (NACTO) 2014 Urban Bikeway Design Guide is the newest publication of nationally recognized bikeway design standards, and offers guidance on the current state of the practice designs. The intent of the guide is to offer substantive guidance for cities seeking to improve bicycle transportation in places where competing demands for the use of the right of way present unique challenges. All of the NACTO Urban Bikeway Design Guide treatments are in use internationally and in many cities around the US.

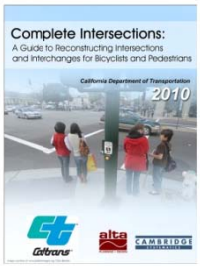
Meeting the requirements of the Americans with Disabilities Act (ADA) is an important part of any bicycle and pedestrian facility project. The United States Access Board's proposed Public Rights-of-Way Accessibility Guidelines (PROWAG) and the 2010 ADA Standards for Accessible Design (2010 Standards) contain guidance and standards, respectively, for the construction of accessible facilities. This includes requirements for sidewalk curb ramps, slope requirements, and pedestrian railings along stairs.

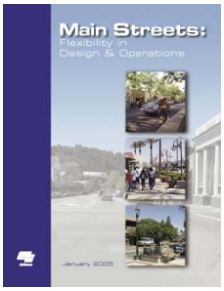
Some of these treatments are not directly referenced in the current versions of the AASHTO Guide or the MUTCD, although many of the elements of these treatments are found within these documents. In all cases, engineering judgment is recommended to ensure that the application makes sense for the context of each treatment, given the many complexities of urban streets.

Below is a list of the websites associated with these standards and guides and their associated manuals.

1. FHWA. Bicycle Facilities and the Manual on Uniform Traffic Control Devices. 2011. http://www.fhwa.dot.gov/environment/bikeped/mutcd_bike.htm
2. MUTCD Official Rulings. FHWA. http://mutcd.fhwa.dot.gov/orsearch.asp
3. http://nacto.org/cities-for-cycling/design-guide/
4. http://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way
5. www.ada.gov/2010ADAstandards_index.htm

5.1.2 State Standards and Guidelines





California Highway Design Manual (HDM) (2012)

This manual establishes uniform policies and procedures to carry out highway design functions for the California Department of Transportation. The 2012 edition incorporated Complete Streets focused revisions to address the Department Directive 64 R-1.

Under existing California law, all local agencies responsible for the development or operation of bikeways or roadways where bicycle travel is permitted must utilize Caltrans adopted design criteria and specifications as contained in the HDM and MUTCD. For bikeways that do not meet these standards, cities and counties can apply for a design exception from Caltrans. However, according to the Legislative Analyst's review during passage of Assembly Bill 1193 in 2014, "local governments complain that the process is cumbersome and time-consuming. In contrast, cities and counties may, but are not required to, utilize the HDM when designing local streets and roads." AB 1193 allows local governments to adopt alternative national criteria, such as AASHTO's or NACTO's.

Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians (2010)

This California Department of Transportation reference guide presents information and concepts related to improving conditions for bicyclists and pedestrians at major intersections and interchanges. The guide can be used to inform minor signage and striping changes to intersections, as well as major changes and designs for new intersections.

Main Streets: Flexibility in Design & Operations (2013)
This Caltrans booklet is an informational guide that reflects many of the recent updates to the Caltrans manuals and policies that improve multimodal access, livability and sustainability within the transportation system. The document will help users locate information about standards and procedures descried in the Caltrans Highway Design Manual (HDM), the California Manual on Uniform Traffic Control Devices (California MUTCD) and the Project Development Procedures Manual (PDPM) www.dot.ca.gov/hq/LandArch/mainstreet/main_street_3rd_edition.pdf

NCHRP Legal Digest 53: Liability Aspects of Bikeways (2010)
This digest is a useful resource for city staff considering innovative engineering solutions to localized issues. The document addresses the liability of public entities for bicycle collisions on bikeways as well as on streets and highways. The report will be useful to attorneys, transportation officials, planners, maintenance engineers and all persons interested in the relative rights and responsibilities of motorists and bicyclists on shared roadways.

New Legislation Allowing Safety Standards Other Than Caltrans' HDM: AB 1193
AB 1193, signed into law on September 22, 2014, allows local agencies to adopt, by resolution, safety standards for bikeways other than Caltrans' Highway Design Manual. According to the Legislative Analyst, AB 1193 "allows local governments to deviate from state criteria when designing bikeways, but does not give them complete control. Cities and counties that elect to use design criteria not contained within the HDM would have to ensure that the alternative criteria have been reviewed and approved by a qualified engineer, are adopted by resolution at a public meeting, and adhere to guidelines established by a national association of public agency transportation officials, such as the National Association of City Transportation Officials." The bill also expands the definition of bikeways to include cycle tracks or separated bikeways, also referred to as "Class IV bikeways," which promote active transportation and provide a right-of-way designated exclusively for bicycle travel adjacent to a roadway and which are protected from vehicular traffic. Types of separation include, but are not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

5.1.3 Bicycle Facility Standards Compliance

Some of these bicycle facilities covered by these guidelines are not directly referenced in the current versions of the California Highway Design Manual or the California MUTCD, although many of the elements of these treatments are found within these documents. An "X" marking in Table 5.1 below identifies the inclusion of a particular treatment within the national and state design guides. A "-" marking indicates a treatment may not be specifically mentioned, but is compliant assuming MUTCD compliant signs and markings are used.

In all cases, engineering judgment is recommended to ensure that the application makes sense for the context of each treatment, given the many complexities of urban streets.

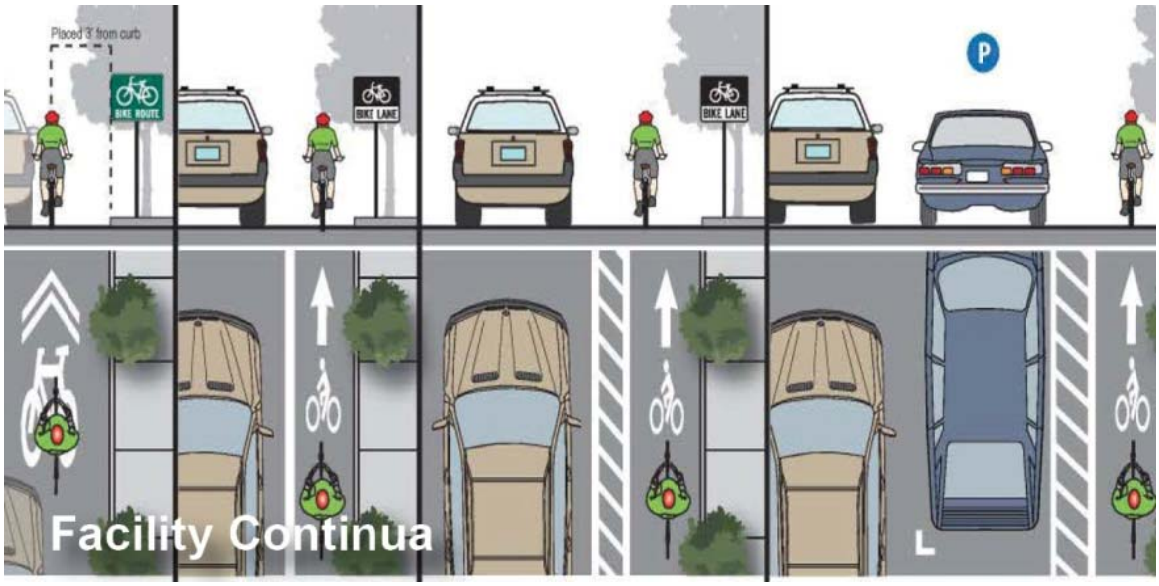
Table 5.1: National and State Design Guides

	Caltrans	Caltrans	NACTO
	CA MUTCD (2014)	Highway Design Manual (2014)	Urban Bikeway Design Guide (2014)
Signed Shared Roadway	X		
Marked Shared Roadway	X		X
Bicycle Boulevard	-		X
Bicycle Lane	X	X	X
Buffered Bicycle Lane	X	-	X
Cycle Tracks		Same as Class I	X
Bike Box	Experimental		X
Bike Lanes to the left of Right Turn Only Lanes	X		X
Green-Colored Bike Lanes in Conflict Areas	FHWA Interim Approval (IA-14)		X
Combined Bike Lane/Turn Lane	Disallowed		X
Two-Stage Turn Queue Boxes	At T-intersections		X
Intersection Crossing Markings	X		X
Wayfinding Sign Types & Placement	X		X
Wayfinding Sign Placement	X		X
Bicycle Signal Heads	X		X
Active Warning Beacons	X		X
Pedestrian Hybrid Beacons	X		X

5.2 Bicycle Facility Selection

There are no 'hard and fast' rules for determining the most appropriate type of bicycle facility for a particular location – roadway speeds, volumes, right-of-way width, presence of parking, adjacent land uses, and expected bicycle user types are all critical elements of this decision. Studies find that the most significant factors influencing bicycle use are motor vehicle traffic volumes and speeds. Additionally, most bicyclists prefer facilities separated from motor vehicle traffic or located on local roads with low motor vehicle traffic speeds and volumes. Because off-street pathways are physically separated from the roadway, they are perceived as safe and attractive routes for bicyclists who prefer to avoid motor vehicle traffic. Consistent use of treatments and application of bikeway facilities allow users to anticipate whether they would feel comfortable riding on a particular facility, and plan their trips accordingly. This section provides guidance on various factors that affect the type of facilities that should be provided.

Facility Classification


Placed 3' from curb
BIKE ROUTE
BIKE LANE
BIKE LANE
P
Facility Continua

5.2.1 Facility Classification

Description

Consistent with bicycle facility classifications throughout the nation, these Bicycle Facility Design Guidelines identify the following classes of facilities by degree of separation from motor vehicle traffic.

Shared Roadways (No bikeway designation) are bikeways where bicyclists and cars operate within the same travel lane, either side by side or in single file depending on roadway configuration. In some instances, streets may be fully adequate and safe without bicycle specific signing and pavement markings.

Class III Bikeways (Bike Routes) are Shared Roadways configured with pavement markings, signage and other treatments including directional signage, traffic diverters, chicanes, chokers and /or other traffic calming devices to reduce vehicle speeds or volumes. Such enhanced treatments often are associated with Bicycle Boulevards.

Class II Bikeways (Bike Lanes) use signage and striping to delineate the right-of-way assigned to bicyclists and motorists. Bike lanes encourage predictable movements by both bicyclists and motorists.

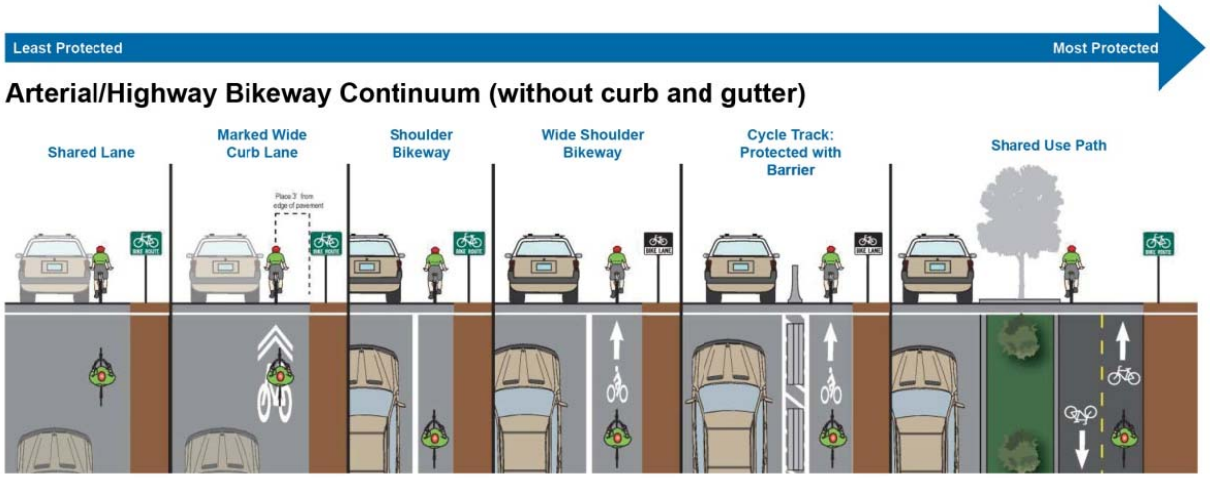
Class IV Bikeways (Cycle Tracks) are exclusive bike facilities that combine the user experience of a separated path with the on-street infrastructure of conventional bike lanes.

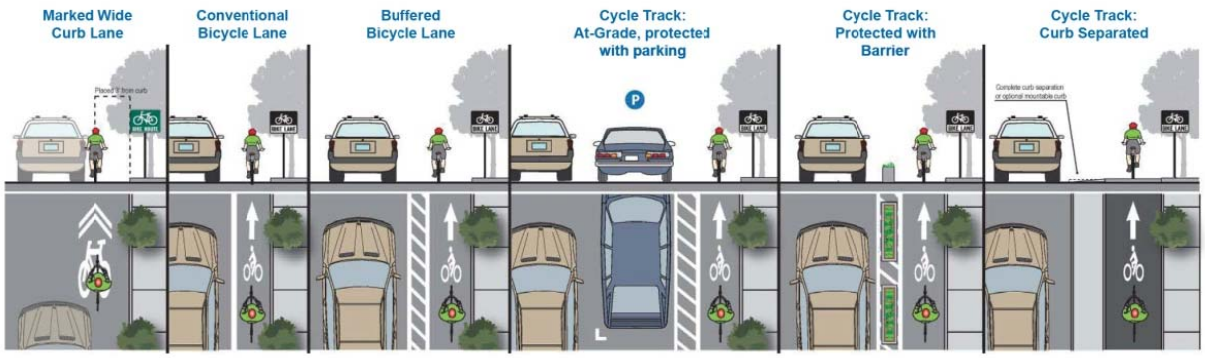
Class I Bikeways (Bike Paths) are facilities separated from roadways for use by bicyclists and pedestrians.

5.2.2 Facility Continua

The following continua illustrate the range of bicycle facilities applicable to various roadway environments, based on the roadway type and desired degree of separation. Engineering judgment, traffic studies, previous municipal planning efforts, community input and local context should be used to refine criteria when developing bicycle facility recommendations for a particular street. In some

corridors, it may be desirable to construct facilities to a higher level of treatment than those recommended in relevant planning documents in order to enhance user safety and comfort. In other cases, existing and/or future motor vehicle speeds and volumes may not justify the recommended level of separation, and a less intensive treatment may be acceptable.





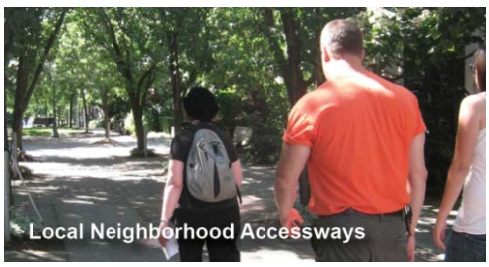
5.3 Shared-use Paths

A shared-use path allows for two-way, off-street use for pedestrians, skaters, wheelchair users, joggers and other non-motorized users, as well as for bicyclists. These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles. Path facilities can also include amenities such as lighting, signage, and fencing (where appropriate).

Throughout the United States outside of California, the terms "shared-use path" and "Class I bike path" are used interchangeably. However, California law requires all bikeways, i.e., "all facilities that provide primarily for, and promote, bicycle travel", to conform to the Caltrans Highway Design Manual, even bikeways that are not under Caltrans' jurisdiction. For this reason, paths that fall short of the HDM's requirements for Class I pavement widths, shoulders, vertical clearance, and separation from the edge of travel way of a parallel street are often labeled "shared-use paths", removing the implication that the path is primarily for bicyclists.

Key features of shared-use paths include:

- Frequent access points from the local road network.
- Directional signs to direct users to and from the path.
- A limited number of at-grade crossings with streets or driveways.
- Terminating the path where it is easily accessible to and from the street system.
- Separate treads for pedestrians and bicyclists when heavy use is expected.



5.3.1 General Design Practices

Description

Shared-use paths can provide a desirable facility, particularly for recreation, and users of all skill levels preferring separation from traffic. Bicycle paths should generally provide directional travel opportunities not provided by existing roadways.

Guidance

Width

- 9 feet is the minimum allowed by the HDM for a one-way Class I bicycle path consisting of a 5-foot paved width with 2-foot shoulders on each side.
- 12 feet is the minimum allowed by the HDM for a two-way Class I bicycle path consisting of two 4-foot lanes and 2-foot shoulders on each side. On structures, the clear width of a Class I path between railings shall be not less than 10 feet.

Lateral Clearance

- The minimum separation between the edge of pavement of a one-way or a two-way bicycle path and the edge of travel way of a parallel road or street shall be 5 feet plus the standard shoulder width. Prior to 2012, the Highway Design Manual allowed narrower separation if a physical barrier is included. Since 2012, however, a physical barrier would not result in a reduced separation.

Overhead Clearance

- The minimum vertical clearance allowed by the HDM to obstructions across the width of a bike path is 8 feet, and 7 feet over shoulder.

Striping

- When striping is required, use a 4-inch dashed yellow centerline stripe with 4-inch solid white edge lines.
- Solid centerlines can be provided on tight or blind corners, and on the approaches to roadway crossings.

Materials and Maintenance
Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term.

Existing Locations

- Avenida Pico, San Clemente (see photo on previous page)
- Avenida Vista Hermosa in San Clemente
- Aliso Creek Bike Path in Laguna Hills

Potential Locations

- Trabuco Creek in Rancho Santa Margarita
- Service road in Aliso and Wood Canyons Wilderness Park, Orange County
- Avenida California in San Juan Capistrano

5.3.2 Paths in River and Utility Corridors

Description
Utility and waterway corridors often offer excellent shared-use path development and bikeway gap closure opportunities. Utility corridors typically include power line and sewer corridors, while waterway corridors include canals, drainage ditches, rivers, and beaches. These corridors offer excellent transportation and recreation opportunities for bicyclists of all ages and skills.

Guidance
Shared-use paths in utility corridors should meet or exceed general design practices, and must conform to the Caltrans Highway Design Manual if designated as a Class I bike path.

Access Points
Any access point to the path should be well-defined with appropriate signage designating the pathway as a shared-use path or bicycle facility and prohibiting motor vehicles.

Path Closure
Public access to the path may be prohibited during the following events:

- Canal/flood control channel or other utility maintenance activities
- Inclement weather or the prediction of storm conditions

5.3.3 Paths in Abandoned Rail Corridors

Description

Commonly referred to as Rails-to-Trails or Rail-Trails, these projects convert vacated rail corridors into off-street paths. Rail corridors offer several advantages, including relatively direct routes between major destinations and generally flat terrain.

Guidance

Shared-use paths in abandoned rail corridors should meet or exceed general design practices. If additional width allows, wider paths and landscaping are desirable.

In full conversions of abandoned rail corridors, the sub-base, superstructure, drainage, bridges, and crossings are already established. Design becomes a matter of working with the existing infrastructure to meet the needs of a rail-trail.

Discussion

It is often impractical and costly to add material to existing railroad bed fill slopes. This results in trails that meet minimum path widths, but often lack preferred shoulder and lateral clearance widths.

Additional References and Guidelines

- *AASHTO. Guide for the Development of Bicycle Facilities. 2012.*
- *California MUTCD. 2014.*
- *Flink, C. Greenways. 1993.*

Materials and Maintenance

For paths that are susceptible to flooding or ponding, permeable pavement is an option to reduce water collection.

Existing Locations

- San Juan Creek Trail, San Juan Capistrano (see photo on previous page)

Potential Locations

- TBD

5.3.4 Paths in Active Rail Corridors

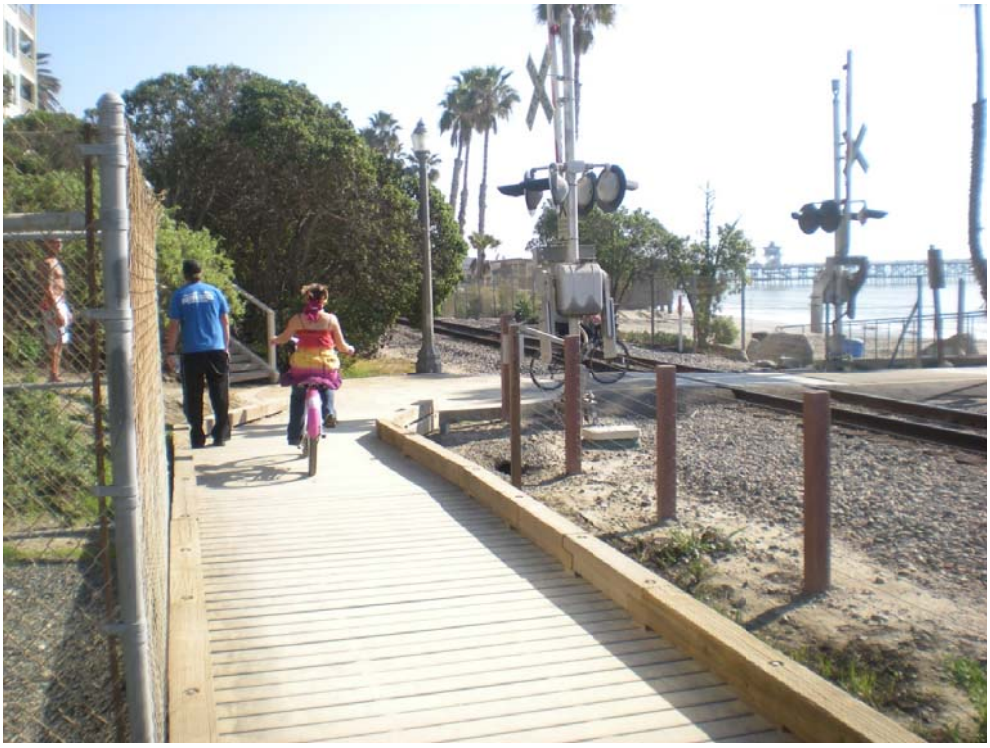
Description

Rails-with-Trails projects typically consist of paths adjacent to active railroads. It should be noted that some constraints could impact the feasibility of rail-with-trail projects. In some cases, space needs to be preserved for future planned freight, transit or commuter rail service. In other cases, limited right-of-way width, inadequate setbacks, concerns about safety and trespassing, and numerous mid-block crossings may affect a project's feasibility.

Guidance

If required, fencing should be a minimum of 5 feet in height with higher fencing than usual next to sensitive areas such as switching yards. Setbacks from the active rail line will vary depending on the speed and frequency of trains, and available right-of-way. Furthermore, the railroad operators have their own design criteria regarding separation from bikeways.

Metrolink's SCRRA Rail-with-Trail Design Guidelines provide recommended minimum setbacks from the centerline of the nearest track. For example, the setback should be 40 feet where the main line railroad speed is between 90 mph and 79 mph. Where these setbacks cannot be met, "additional barriers, vertical separation or other methods shall be employed."



Discussion

Railroads typically require fencing with all rail-with-trail projects. Concerns with trespassing and security can vary with the amount of train traffic on the adjacent rail line and the setting of the bicycle path, i.e. whether the section of track is in an urban or rural setting.

Additional References and Guidelines

- *AASHTO. Guide for the Development of Bicycle Facilities. 2012.*
- *California MUTCD. 2014.*
- *FHWA. Rails-with-Trails: Lessons Learned. 2002.*
- *Metrolink SCRRA Rails-with-Trails Design Guidelines, 2010*

Materials and Maintenance

For paths that are susceptible to flooding or ponding, permeable pavement is an option to reduce water collection.

Existing Locations

- San Clemente Beach Trail (see photo above)
- Aliso Creek Bike Path, Lake Forest

Potential Locations

- LOSSAN Corridor in Mission Viejo, Laguna Niguel, and Lake Forest

5.3.5 Local Neighborhood Accessways

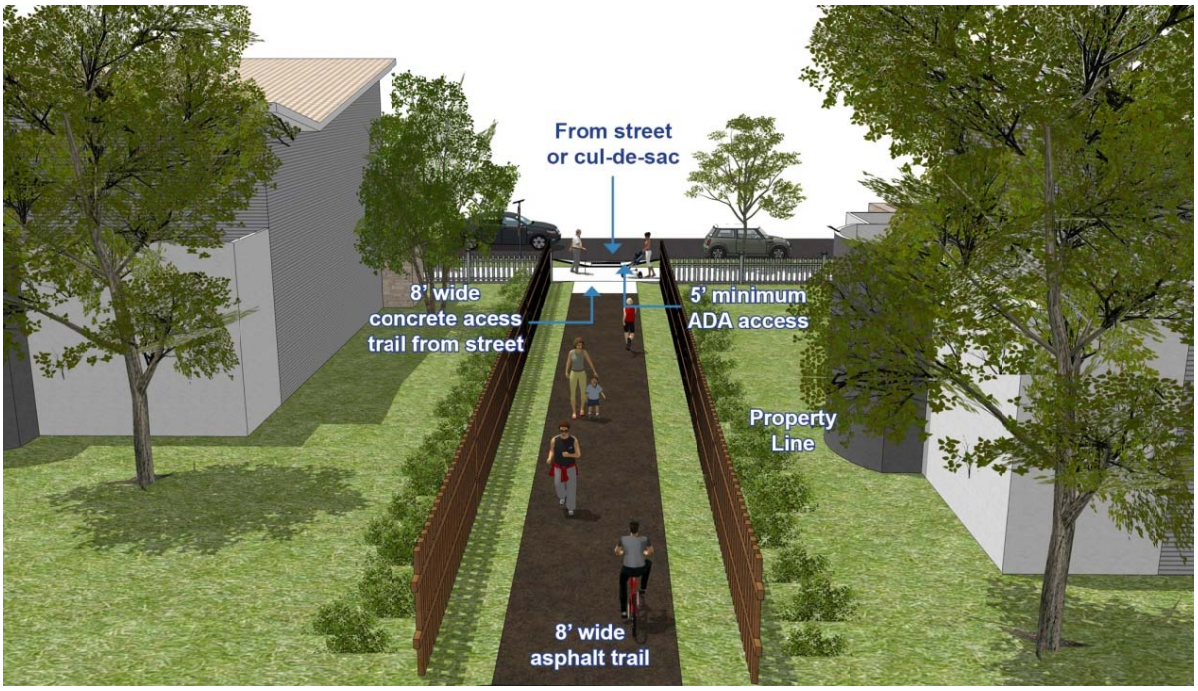
Description

Neighborhood accessways provide residential areas with direct bicycle and pedestrian access to parks, trails, green spaces, and other recreational areas. They most often serve as small trail connections to and from the larger trail network, typically having their own rights-of-way and easements.

Additionally, these smaller trails can be used to provide bicycle and pedestrian connections between dead-end streets, cul-de-sacs, and access to nearby destinations not provided by the street network.

Guidance

- Neighborhood access should remain open to the public
- Trail pavement shall be at least 8 feet wide to accommodate emergency and maintenance vehicles, meet ADA requirements and be considered suitable for multi-use
- Trail widths should be designed to be less than 8 feet wide only when necessary to protect large mature native trees over 18 inches in caliper, wetlands or other ecologically sensitive areas.
- Access trails should slightly meander whenever possible



Discussion

Neighborhood access should be designed into new subdivisions at every opportunity and should be required by City/County subdivision regulations.

Additional References and Guidelines

- *AASHTO. Guide for the Development of Bicycle Facilities. 2012.*

Materials and Maintenance

For paths that are susceptible to flooding or ponding, permeable pavement is an option to reduce water collection.

Existing Locations

- Horno Creek Road to Marbella Vista Road, San Juan Capistrano (see photo above)
- Aliso Creek Bike Path at Clarington Dr., Laguna Hills

Potential Locations

- Cul-de-sac connections
- Neighborhood easements

5.4 Path/Roadway Crossing

At-grade roadway crossings can create potential conflicts between path users and motorists; however, well-designed crossings can mitigate many operational issues and provide a higher degree of safety and comfort for path users. This is evidenced by the thousands of successful facilities around the United States with at-grade crossings. In most cases, at-grade path crossings can be properly designed to provide a reasonable degree of safety and can meet existing traffic and safety standards. Path facilities that cater to bicyclists can require additional considerations due to the higher travel speed of bicyclists versus pedestrians.

Marked/Unsignalized Crossings

Signalized Crossings

Overcrossings

5.4.1 Marked/Unsignalized Crossings

Description

A marked/unsignalized crossing typically consists of a marked crossing area, signage, and other markings to slow or stop traffic. The approach to designing crossings at mid-block locations depends on an evaluation of vehicular traffic, line of sight, pathway traffic, use patterns, vehicle speed, road type, road width, and other safety issues such as proximity to major attractions.

When space is available, using a median refuge island can improve user safety by providing pedestrians and bicyclists space to perform the safe crossing of one side of the street at a time.

Guidance

Maximum traffic volumes

- < 9,000-12,000 Average Daily Traffic (ADT) volume
- Up to 15,000 ADT on two-lane roads, preferably with a median
- Up to 12,000 ADT on four-lane roads with median

Maximum travel speed: 35 MPH

Minimum line of sight

- 25 MPH zone: 155 feet
- 35 MPH zone: 250 feet
- 45 MPH zone: 360 feet

Discussion

Unsignalized crossings of multi-lane arterials over 15,000 ADT may be possible with features such as sufficient crossing gaps (more than 60 per hour), median refuges, and/or active warning devices like rectangular rapid flash beacons.

Additional References and Guidelines

- *AASHTO. Guide for the Development of Bicycle Facilities. 2012*
- *California MUTCD. 2014*

Existing Location for Potential Improvement

- Shady Canyon Drive, Irvine (see photo above)
- Aliso Creek Bike Path at Los Alisos Blvd, Lake Forest
- Pacific Coast Highway Connector at Coast Hwy, Dana Point

5.4.2 Signalized Crossings

Description

Path crossings within approximately 400 feet of an existing signalized intersection with pedestrian crosswalks are typically diverted to the signalized intersection to avoid traffic operation problems when located so close to an existing signal. For this restriction to be effective, barriers and signing may be needed to direct path users to the signalized crossing. If no pedestrian crossing exists at the signal, modifications should be made.

Guidance

Path crossings should not be provided within approximately 400 feet of an existing signalized intersection. If possible, route path directly to the signal.

Discussion

In the US, the minimum distance a marked crossing can be from an existing signalized intersection varies from approximately 250 to 660 feet. Engineering judgment and the context of the location should be taken into account when choosing the appropriate allowable setback.

Additional References and Guidelines

- *AASHTO. Guide for the Development of Bicycle Facilities. 2012*
- *AASHTO. Guide for the Planning, Design, and Operation of Pedestrian Facilities. 2004*

Materials and Maintenance

If a sidewalk is used for crossing access, it should meet ADA guidelines.

Existing Locations

- Laguna Hills Drive at Paseo de Valencia, Laguna Hills (see photo above)
- Aliso Creek Bike Path at Alicia Pkwy, Laguna Hills
- Trabuco Side Path at Trabuco Rd and El Toro Rd, Lake Forest

Potential Locations

- Avenida Empresa at Santa Margarita Pkwy, Rancho Santa Margarita
- Salt Creek Bike Path at Ritz Carlton Dr. and Pacific Coast Hwy, Dana Point

5.4.3 Overcrossings

Description

Bicycle/pedestrian overcrossings provide critical non-motorized system links by joining areas separated by barriers such as deep canyons, waterways or major transportation corridors. In most cases, these structures are built in response to user demand for safe crossings where they previously did not exist. Grade-separated crossings may be needed where existing bicycle/pedestrian crossings do not exist, where ADT exceeds 25,000 vehicles, and where 85th percentile speeds exceed 45 miles per hour.

Guidance

- 10-foot minimum width between railings, 14 feet preferred. If overcrossing has any scenic vistas additional width should be provided to allow for stopping. A separate 5-foot pedestrian area may be provided for facilities with high bicycle and pedestrian use.
- 10-foot headroom on overcrossing
- Vertical clearance below will vary depending on feature being crossed:
  - ✓ Roadway: 17 feet
  - ✓ Freeway: 18.5 feet
  - ✓ Heavy Rail Line: 23 feet

Discussion

Overcrossings for bicycles and pedestrians typically fall under the Americans with Disabilities Act (ADA), which strictly limits ramp slopes of 8.33% (1:12) with 5-foot landings every 30 feet. Title 24 of the California Code of Regulations requires gradients up to 5% (1:20) to have 5-foot landings at 400-foot intervals.

Additional References and Guidelines

- *AASHTO. Guide for the Development of Bicycle Facilities. 2012.*
- *AASHTO. Guide for the Planning, Design, and Operation of Pedestrian Facilities. 2004.*

Materials and Maintenance

Potential issues with vandalism

Existing Locations

San Juan Creek Bicycle-Pedestrian Bridge, San Juan Capistrano (see photo on previous page)
Bicycle-Pedestrian Bridge over I-5, San Clemente (see photo above)
Pedestrian Overpass at Paseo De Cristobal and Esplanade, San Clemente

Possible Locations

San Juan Creek near Trabuco Creek confluence in San Juan Capistrano

5.5 Separated Bikeways

Designated exclusively for bicycle travel, separated bikeways are segregated from vehicle travel lanes by striping (Class II), or physical measures such as parking, bollards, raised islands, or curbs (Class IV Cycle Tracks). Separated bikeways are most appropriate on arterial and collector streets where higher traffic volumes and speeds warrant greater separation.

5.5.1 Bicycle Lane

Description

This facility provides an exclusive lane for one-way bicycle travel on a street or highway, installed along streets in corridors where there is significant bicycle demand, and where there are distinct needs that can be served by them. On streets with on-street parking, bicycle lanes are located between the parking area and the traffic lanes and used in the same direction as motor vehicle traffic.

Bicycle Lane

Bicycle Lanes and Diagonal Parking

Many bicyclists, particularly less experienced riders, are more comfortable riding on a busy street if it has a striped and signed bikeway than if they are expected to share a lane with vehicles.

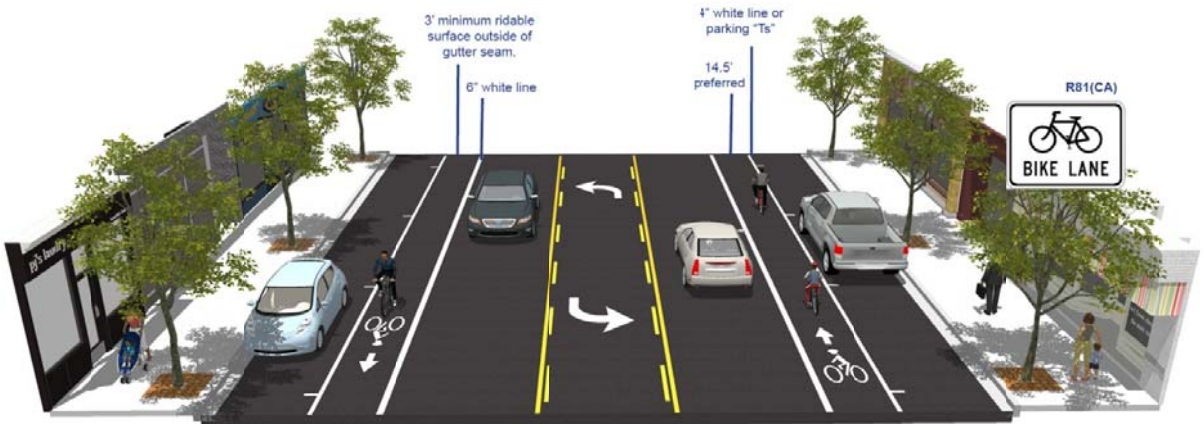
Guidance

Provide 5-foot minimum width for bicycle lanes located between parking and traffic lanes. Six feet is desired.

Buffered Bicycle Lanes

- Provide 4-foot minimum width if no gutter exists. With a normal 2-foot gutter, minimum bicycle lane width is five feet.
- 14.5-foot preferred from curb face to edge of bike lane. (12-foot minimum).
- 7-foot maximum width for use adjacent to arterials with high travel speeds. Greater widths may encourage motor vehicle use of bike lane.
- When approaching an intersection with right turn only lanes, the bike lane should be transitioned to a through bike lane to the left of the right turn only lane.

Cycle Tracks



Discussion

Wider bicycle lanes are desirable in certain situations such as on higher speed arterials (45 mph+) where use of a wider bicycle lane would increase separation between passing vehicles and bicyclists. Consider Buffered Bicycle Lanes when further separation is desired.

Additional References and Guidelines

- AASHTO Guide for the Development of Bicycle Facilities, 2012
- California MUTCD, 2014
- NACTO Urban Bikeway Design Guide, 2012
- Caltrans California HDM, 2012

Materials and Maintenance

Paint can wear more quickly in high traffic areas.

Existing Locations

- Oso Pkwy, Aliso Viejo
- Niguel Rd, Laguna Niguel

Potential Locations

- Golden Lantern Street, Dana Point (see photo above)
- Crown Valley Pkwy, Dana Point

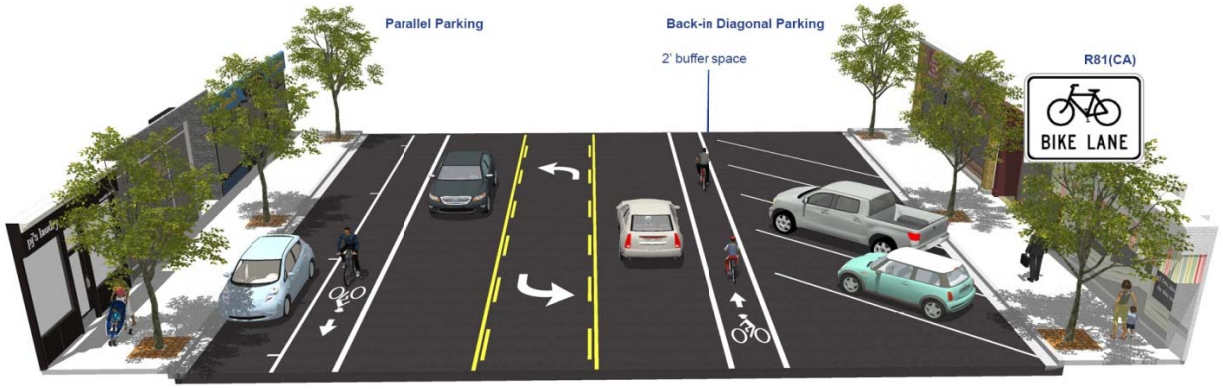
5.5.2 Bicycle Lanes and Diagonal Parking

Description

The back-in/head-out parking is considered safer than conventional head-in/back-out parking due to better visibility when leaving. This is particularly important on busy streets or where vehicle drivers may find their views blocked by large vehicles or tinted windows in adjacent vehicles. The presence of raised median islands helps prevent motorists from using a back-in stall for head-in parking

Guidance

Based on existing dimensions from test sites and permanent facilities, provide 16 feet from curb edge to inner bicycle lane stripe and a five foot bicycle lane.



Discussion

Test the facility on streets with existing head-in angled parking and moderate to high bicycle traffic. Additional signs to direct vehicle driver in how the back-in angled parking works is recommended.

Additional References and Guidelines

- City of Los Angeles Bicycle Plan Update, City of Los Angeles

Existing Locations

- None

Potential Locations

- TBD

5.5.3 Buffered Bicycle Lane

Description

Buffered Bike Lanes as defined in the Urban Bikeway Design Guide are "conventional bike lanes paired with a buffered space separating the bike lane from the adjacent motor vehicle travel lane and/or parking lane." Buffered bike lanes are allowed as per California 2014 MUTCD guidelines for buffered preferential lanes (section 3D-01).

Conventional bike lanes typically provide a 5 to 6-foot wide space between the curb and travel lane. However, many bicyclists are uncomfortable riding this close to moving traffic particularly on higher speed and/or higher volume roadways. A recent study from Portland State titled "Evaluation of innovative bicycle facilities," shows that bicyclists feel a lower risk of being "doored" in a buffered bike lane and nearly nine in ten bicyclists prefer buffered lanes to standard lanes. Seven in ten bicyclists indicated they would go out of their way to ride on a buffered bike lane over a standard lane.

The NACTO Urban Bikeway Design guides list several advantages of buffered lanes including:

- Providing a "shy" distance between motor vehicles and bicyclists.
- Providing space for bicyclists to pass another bicyclist without encroaching into the adjacent motor vehicle travel lane.
- Encouraging bicyclists to ride outside of the door zone when buffer is between parked cars and the bike lane.
- Providing a greater space for bicycling without making the bike lane appear so wide that it might be mistake for a travel lane or a parking lane.
- Appealing to a wider cross-section of bicyclist users.
- And encouraging bicycling by contributing to the perception of safety among users of the bicycle network.

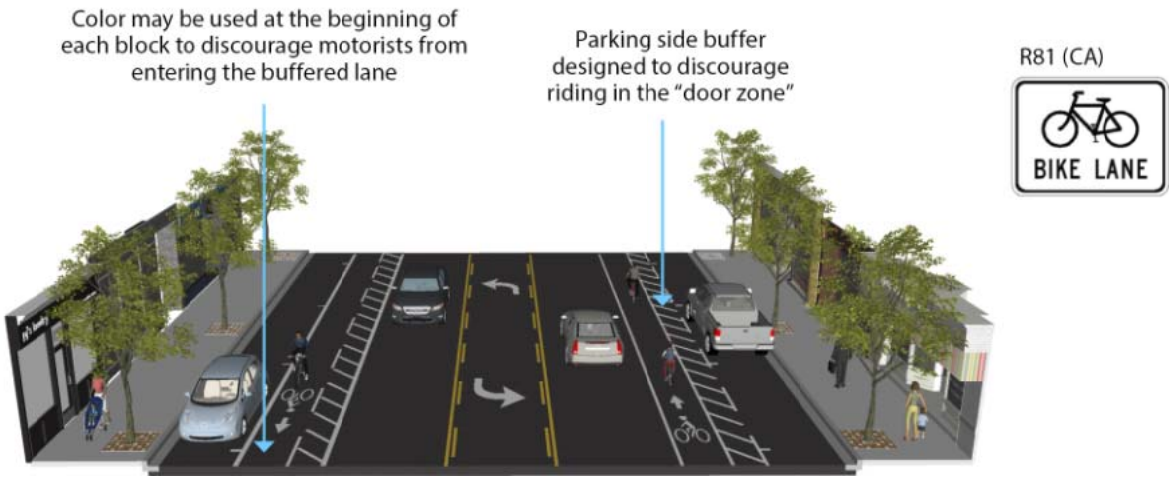
There are three types of buffers:

1. Parking side or curb buffer
2. Travel lane side buffer
3. Combined side or double buffer

Parking side or curb buffer:

Parking or curb side buffers provide space between the bicyclist and parked cars or the gutter pan. This (1) reduces the potential for a bicyclist to strike a car door being opened by a driver, (2) eliminates use of the gutter pan as part of the bike lane, and (3) moves the bicyclist out of the blind spots of motorists approaching on side streets or driveways.

The limitation to the parking side or curb side buffer is that they do not provide the "shy space" that makes bicyclists feel more comfortable, but they do reduce the risk of dooring and the use of the gutter pan as part of the bike lane.



Travel side (left) and parking side (right) buffers

Travel side buffer:

Travel side buffers provide space between the bicyclist and motor vehicles in the travel lane. High speed, high volume roadways make many bicyclists uncomfortable. Recent studies from the Portland State have shown that a simple buffer substantially increases the level of comfort for most bicyclists. The example below shows side travel side buffer on PCH in Dana Point.

Combined side or double sided buffer:

The combined side or double sided buffer offers advantage of guiding the bicyclists away from the door zone while providing a perceived safer distance between the bicyclist and motor vehicles.

Guidance

According to California MUTCD 2014 - Section 3D Buffered bike lanes are considered "allowable" treatments. Signage and dimensional guidelines are the same as for Class 2 bicycle lanes. Additional guidance is included in the NACTO Urban Bikeway Design Guide.

- Bike lane word and/or symbol shall be used (MUTCD Figure 9C-3).
- The buffer shall have interior diagonal cross hatching or chevron markings if it is 3 feet in with or wider.
- The buffer shall be marked with 2 white lines. The California MUTCD 2104 standards (Section 3D.01) are such that for a bicyclist to be allowed to cross a double white line it must be dashed (these are the same standards applied to buffered HOV Lanes). Thus it is recommended that that the inside line be dashed instead of solid.
- Buffers should be at least 24inches wide.

Discussion

- Add diagonal striping on the outer buffer adjacent to the traffic lanes.
- On-street parking remains adjacent to the curb.
- A travel lane may need to be eliminated or narrowed to accommodate buffers.

Additional References and Guidelines

- NACTO Urban Bikeway Design Guide, 2014
- Portland State University, Center for Transportation Studies (2011) Evaluation of innovative bicycle facilities.
- California MUTCD 2014 Edition

Materials and Maintenance

Paint can wear more quickly in high traffic areas.

Existing Locations

- Pacific Coast Highway, Dana Point

Potential Locations

- Pacific Coast Hwy, Laguna Beach (see photo on previous page)
- Antonio Parkway, Ladera Ranch & Rancho Santa Margarita

5.5.4 Cycle Track or Class IV Bike Facilities

Description

Cycle tracks, which were recently designated as Class IV facilities in California, are an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk. These differ from buffered lanes in that the bicyclist is separated from the travel lanes by a physical barrier.

Class IV: Cycle Track

Cycle tracks have different forms but all share common elements they provide space that is intended to be exclusively or primarily used by bicycles, and are separated from motor vehicle travel lanes, parking lanes, and sidewalks. Raised cycle tracks may be at the level of the adjacent sidewalk or set at an intermediate level between the roadway and sidewalk to separate the cycle track from the pedestrian area.

Over the past five years more than 100 new separated bike facilities have been added in the US. This relatively new type of facility has been shown to be effective in increasing the number of bicyclists using the street, increasing safety for bicyclists, pedestrians and motorists and increasing access to local businesses (Lessons from the Green Lanes: Evaluating Protected Bike Lanes in the US, National Institute for Transportation and Communities, 2014).

Separated bikeways can increase safety and promote proper riding by:

- Defining road space for bicyclists and motorists, reducing the possibility that motorists will stray into the bicyclists' path.
- Discouraging bicyclists from riding on the sidewalk.

Guidance

Cycle tracks should ideally be placed along streets with long blocks and few driveways or mid-block access points for motor vehicles.

One-Way Cycle Tracks

- NACTO Guidelines recommend a 7-foot minimum to allow passing. 5-foot minimum width in constrained locations. Note: In accordance with AB 1193, signed in 2014, the local agency

must pass a resolution to adopt NACTO Guidelines in lieu of the Caltrans Highway Design Manual if the one-way cycle track width is less than 9 feet.

- One way cycle tracks can be either conventional flow (i.e., go the same direction as the adjacent traffic) or contra-flow (opposite direction of adjacent traffic flow, such as to the left side of traffic on a one-way street).

Two-Way Cycle Tracks

- Cycle tracks located on one-way streets have fewer potential conflict areas than those on two-way streets.
- 12-foot recommended minimum for two-way facility. 8-foot minimum in constrained locations. Note: In accordance with AB 1193, signed in 2014, the local agency must pass a resolution to adopt NACTO Guidelines in lieu of the Caltrans Highway Design Manual if the two-way cycle track width is less than 12 feet.

Discussion

Special consideration should be given at transit stops to manage bicycle and pedestrian interactions. Driveways and minor street crossings are unique challenges to cycle track design. Parking should be prohibited within 30 feet of the intersection to improve visibility.

Additional References and Guidelines

- NACTO. Urban Bikeway Design Guide. 2014.
- Lessons from the Green Lanes: Evaluating Protected Bike Lanes in the US, National Institute for Transportation and Communities, 2014

Materials and Maintenance

Depending upon the width, barrier-separated and raised cycle tracks may require smaller equipment for sweeping.

Existing Locations

- PCH in Dana Point just north of San Clemente

Potential Locations

- El Camino Real, San Clemente

Bike Lanes and Right Turn Only Lanes

Colored Bike Lanes in Conflict Areas

Combined Bike Lane/Turn Lane

Intersection Crossing Markings

Bike Lanes at High Speed Interchanges

Bike Boxes

5.6 Separated Bikeways at Intersections

Designs for intersections with bicycle facilities should reduce conflict between bicyclists (and other vulnerable road users) and vehicles by heightening the level of visibility, denoting clear right-of-way, and facilitating eye contact and awareness with other modes.

Intersection treatments can improve both queuing and merging maneuvers for bicyclists, and are often coordinated with timed or specialized signals. The configuration of a safe intersection for bicyclists may include elements such as color, signage, medians, signal detection, and pavement markings. Intersection design should take into consideration existing and anticipated bicyclist, pedestrian, and motorist movements. The degree of mixing or separation between bicyclists and other modes is intended to reduce the risk of crashes and increase bicyclist comfort. The level of treatment required for bicyclists at an intersection will depend on the bicycle facility type used, whether bicycle facilities are intersecting, and the adjacent street function and land use.

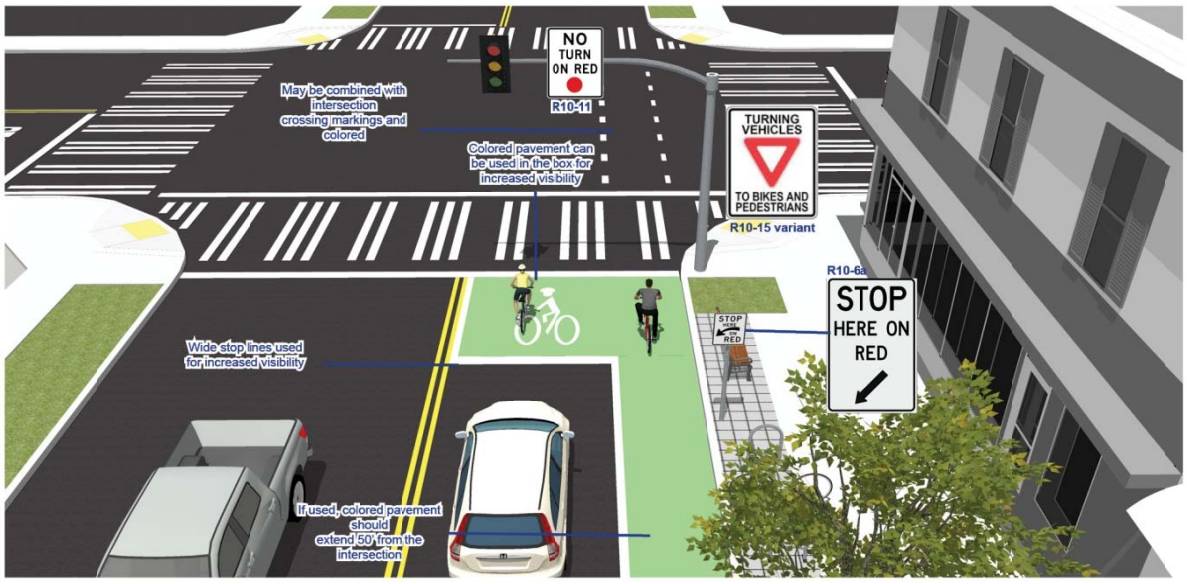
5.6.1 Bike Box

Description

A bike box is a designated area located at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe and visible space to get in front of queuing motorized traffic during the red signal phase. Motor vehicles must queue behind the white stop line at the rear of the bike box.

Guidance

- 14' minimum depth
- A "No Turn on Red" (MUTCD R10-11) sign shall be installed to prevent vehicles from entering the Bike Box.
- A "Stop Here on Red" sign should be post mounted at the stop line to reinforce observance of the stop line.
- A "Yield to Bikes" sign should be post-mounted in advance of and in conjunction with an egress lane to reinforce that bicyclists have the right-of-way going through the intersection.
- An ingress lane should be used to provide access to the box.
- A supplemental "Wait Here" legend can be provided in advance of the stop bar to increase clarity to motorists.
- Requires permission to experiment from the Federal Highways Administration.



Discussion

Bike boxes should be placed only at signalized intersections. Bike boxes should be used in locations that have a large volume of bicyclists and are best utilized in central areas where traffic is usually moving more slowly.

Additional References and Guidelines

- NACTO. Urban Bikeway Design Guide. 2014
- FHWA. Interim Approval (IA-14). 2011

Materials and Maintenance

Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.

Existing Locations

- None

Potential Locations

- TBD

5.6.2 Bike Lanes at Right Turn Only Lanes

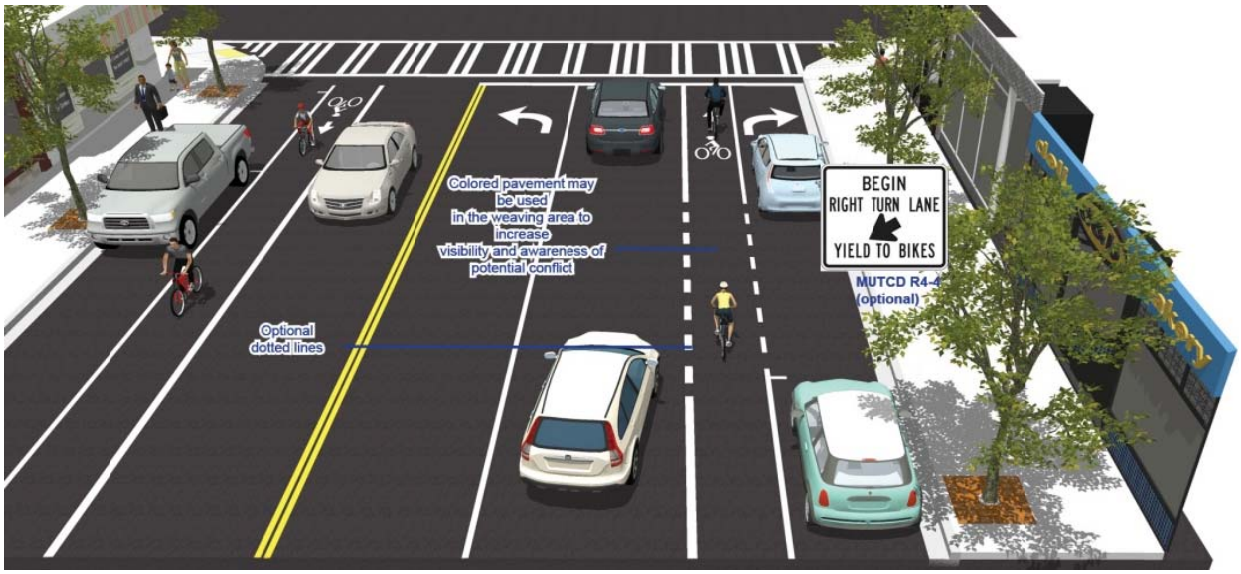
Description

Class II bike lanes may be placed between the right-turn lane and the right-most through lane. Bicyclists would access the bike lane pocket through a weave zone, with signage or pavement markings indicating that motorists should yield to bicyclists through the conflict area.

Guidance

At right turn only lanes:

- Continue existing bike lane width; standard width of 5 feet or 4 feet in constrained locations.
- Use signage to indicate that motorists should yield to bicyclists through the conflict area.
- Consider using colored conflict areas to promote visibility of the mixing zone.



Additional References and Guidelines

- AASHTO. Guide for the Development of Bicycle Facilities. 2012.
- California MUTCD. 2014.
- NACTO. Urban Bikeway Design Guide. 2014.
- Caltrans. California HDM. 2012.
- Caltrans. Complete Intersections. 2010.

Materials and Maintenance

Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.

Existing Locations

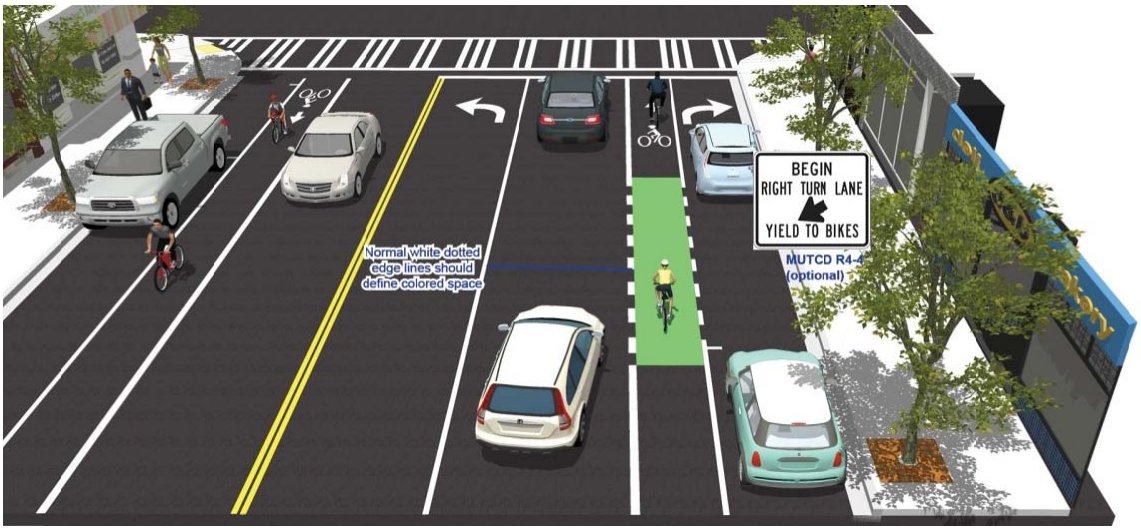
- Pacific Coast Highway at Camino Capistrano, San Clemente (see photo on previous page)
- Pacific Coast Hwy at Crown Valley Pkwy, Dana Point

5.6.3 Colored Bike Lanes in Conflict Areas

Description

The Federal Highway Administration (FHWA) has granted the State of California approval for optional use of green colored pavement in marked bicycle lanes and in extensions of bicycle lanes through intersections and other traffic conflict areas. It should be noted that the green colored pavement as

described under this approval is used for two different situations: first, to denote a lane that is exclusively used for bicyclists and second, to advise motorists and bicyclists that they are sharing the same patch of pavement and should beware of each other's presence. Local agencies have adopted different philosophies on the usage of green colored pavement. Some agencies use green colored pavement only for Class II lanes where bicyclists have exclusive use, and leave the conflict zones uncolored. Other agencies use the green colored pavement only in conflict zones, such as the weave zone shown in the figure below.



Discussion

The best practices for green colored pavement are still evolving. As of this date, more agencies use green colored pavement for conflict zones than for exclusive bicyclist lanes. The amount of green paint used by such agencies varies dramatically. Some agencies fill the entire conflict zones with solid green paint, while others use a pattern of green stripes. Some agencies use green colored pavement across every driveway, alley, and cross streets, while others reserve the use of green colored pavement for conflict zones that merit special attention. The precise design of green colored pavement remains at the discretion of the local agencies.

It should be noted that the combination of a shared lane marking ("sharrow") within green colored pavement, as is used on Second Street in the Belmont Shores community of Long Beach, is no longer approved for new experimentation by the FHWA. However, the FHWA may accept for experimentation the use of green colored pavement as a "background conspicuity enhancement".

Additional References and Guidelines

- AASHTO. Guide for the Development of Bicycle Facilities. 2012.
- California MUTCD. 2014.
- NACTO. Urban Bikeway Design Guide. 2014.
- Caltrans. California HDM. 2012.
- Caltrans. Complete Intersections. 2010.

Existing Locations

- None

Potential Locations

- Pacific Coast Hwy at Crown Valley Pkwy, Dana Point
- Lake Forest Dr. at Jeronimo Rd., Lake Forest

5.6.4 Combined Bike Lane / Turn Lane

Description

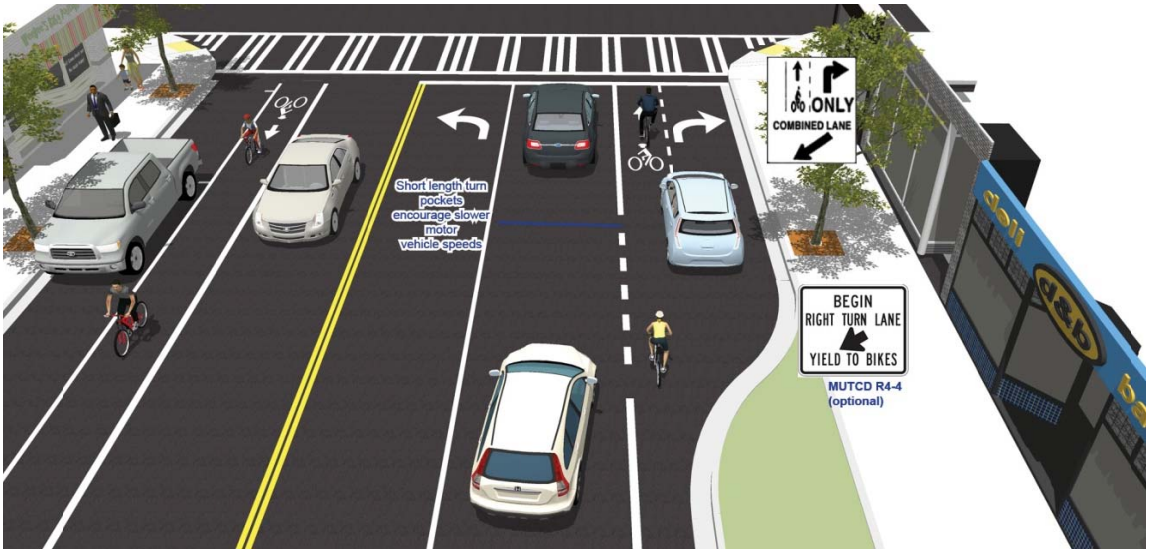
The combined bicycle/right turn lane places a standard-width bike lane on the left side of a dedicated right turn lane. A dotted line delineates the space for bicyclists and motorists within the shared lane. This treatment includes signage advising motorists and bicyclists of proper positioning within the lane. This treatment has been used at intersections lacking sufficient space to accommodate both a standard through bike lane and right turn lane.

Guidance

The FHWA has disallowed the experimental use of combined bike lane/turn lane markings. Previously, typical installations were as follows:

Maximum shared turn lane width is 13 feet; narrower is preferable.

- Bike Lane pocket should have a minimum width of 4 feet with 5 feet preferred.
- A dotted 4 inch line and bicycle lane marking should be used to clarify bicyclist positioning within the combined lane, without excluding cars from the suggested bicycle area.
- A "Right Turn Only" sign with an "Except Bicycles" plaque may be needed to make it legal for through bicyclists to use a right turn lane.



Discussion

Unless the FHWA resumes granting permission to experiment with a combined bike lane/turn lane, this treatment will not be recommended.

Additional References and Guidelines

- NACTO. Urban Bikeway Design Guide. 2014.
- AASHTO. Guide for the Development of Bicycle Facilities. 2012.

Existing Locations

- None

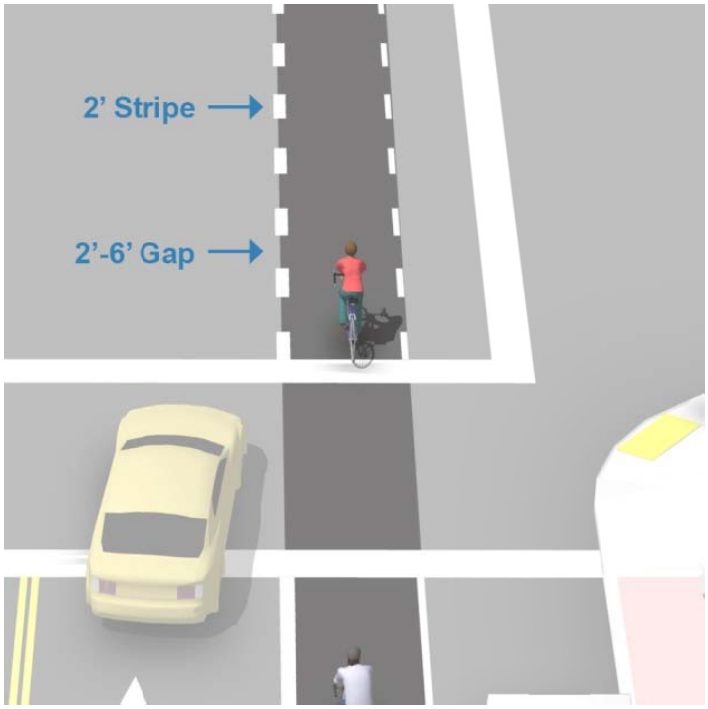
5.6.5 Intersection Crossing Markings

Description

Bicycle pavement markings through intersections indicate the intended path of bicyclists through an intersection or across a driveway or ramp. They guide bicyclists on a safe and direct path through the intersection and provide a clear boundary between the paths of through bicyclists and either through or crossing motor vehicles in the adjacent lane.

Guidance

- See MUTCD Section 3B.08: "dotted line extensions"



Additional References and Guidelines

- AASHTO. Guide for the Development of Bicycle Facilities. 2012.
- California MUTCD. 2014.
- NACTO. Urban Bikeway Design Guide. 2014.

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority.

Existing Locations

- None

Potential Locations

- Pacific Coast Hwy, Dana Point and Laguna Beach

5.6.6 Two-Stage Turn Box

Description

A two-stage turn box provides bicyclists a way to make left turns at multi-lane signalized intersections from a right side cycle track or bike lane. Bicyclists are often reluctant to weave into traffic to turn left. A two-stage left turn box allows bicyclists to continue straight while the traffic signal displays green for the original direction of travel, during one stage of a traffic signal, and then wait for the second stage when the cross street receives a green light to complete the move.

Guidance

- A two-stage turn box to facilitate a jughandle turn at a T-intersection is presently allowed in the Federal and California MUTCD's.
- A two-stage turn box for use other than for a jughandle turn at a T-intersection is experimental. Required design elements include a bicycle symbol pavement marking, a pavement marking turn or through arrow, full-time turn on red prohibition for the cross street, and passive detection of bicycles if the signal phase that permits bicyclists to enter the intersection during the second stage of their turn is actuated.
- Green colored pavement is optional.

Discussion

While two-stage turns may increase bicyclist comfort in many locations, this configuration typically results in higher average signal delay for bicyclists versus a vehicular style left turn maneuver.

Additional References and Guidelines

- NACTO. Urban Bikeway Design Guide. 2014.

Materials and Maintenance

Paint can wear more quickly in high traffic areas.

Existing Locations

- None

Potential Locations

- Antonio Pkwy at Santa Margarita Pkwy, Rancho Santa Margarita
- Marguerite Pkwy at Oso Pkwy, Mission Viejo

5.6.7 Bike Lanes at Diverging Ramp Lanes

Description

Some arterials may contain high speed freeway-style designs such as merge lanes and exit ramps, which can create difficulties for bicyclists. The entrance and exit lanes typically have intrinsic visibility problems because of low approach angles and feature high speed differentials between bicyclists and motor vehicles. Strategies to improve safety focus on increasing sight distances, creating formal crossings, and minimizing crossing distances.

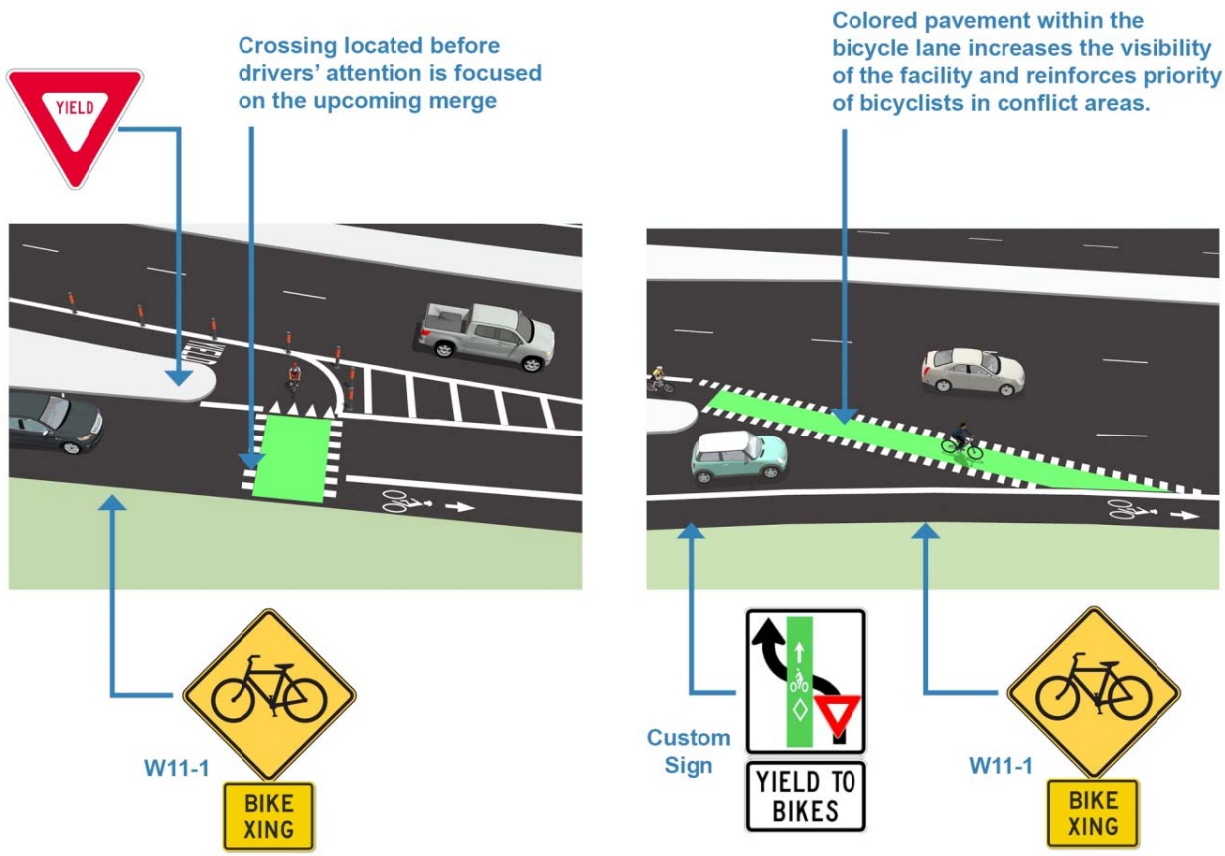
Guidance

Entrance Ramps:

- Angle the bike lane to increase the approach angle with entering traffic. Position crossing before drivers' attention is focused on the upcoming merge.

Exit Ramps:

- Use a jug handle turn to bring bicyclists to increase the approach angle with exiting traffic, and add yield striping and signage to the bicycle approach.



Discussion

Green colored pavement is optional.

Additional References and Guidelines

- AASHTO. Guide for the Development of Bicycle Facilities. 2012.
- California MUTCD. 2014.
- Caltrans. Complete Intersections. 2010.

Materials and Maintenance

Locate crossing markings out of wheel tread when possible to minimize wear and maintenance costs.

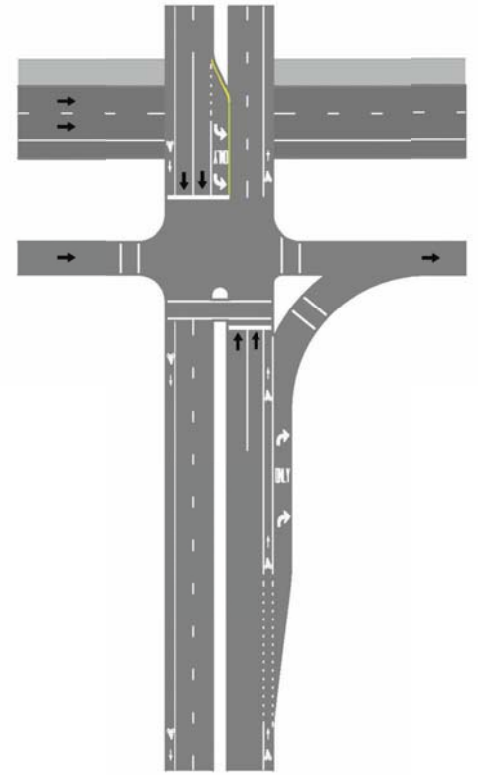
Existing Location with Proposed Improvement

- San Juan Creek Rd at Valle Rd, San Juan Capistrano
- Research Dr. at Irvine Center Dr., Irvine

5.6.8 Freeway Interchange Design

Description

Freeway Interchanges can be significant obstacles to bicycling if they are poorly designed. Travel through some interchange designs may be particularly challenging for young bicyclists. Key design features at conflict areas through interchanges should be included to improve the experience for bicyclists.



Guidance

Entrance Ramps:

- A right-turn lane should be configured with a taper as an "add-lane" for motorists turning right onto the freeway entrance ramp.
- A bike lane should be provided along the left side of the right turn lane. Dotted through bike lane striping provides clear priority for bicyclists at right turn 'add lane' on-ramps.

Exit Ramps:

- Motorists existing the freeway and turning onto the crossroad should be controlled by a stop sign, signal, or yield sign, rather than allowing a free flowing movement.

Discussion

The on-ramps should be configured as a right-turn-only "add lane" to assert through bicyclist priority. Designs that are functional for bicycle passage typically encourage slowing or require motor vehicle traffic to slow or stop. Designs that encourage high-speed traffic movements are difficult for bicyclists to negotiate.

Additional References and Guidelines

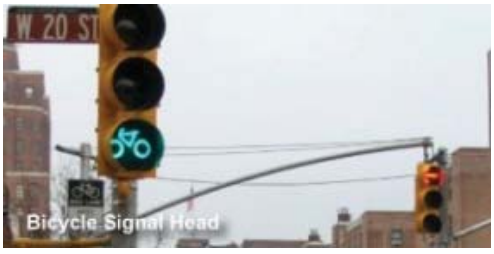
- AASHTO. Guide for the Development of Bicycle Facilities. 2012.
- California MUTCD. 2014.
- Caltrans. Complete Intersections. 2010.

Materials and Maintenance

Locate crossing markings out of wheel tread when possible to minimize wear and maintenance costs.

5.7 Signalization

Determining which type of signal or beacon to use for a particular intersection depends on a variety of factors. These include speed limits, traffic volumes, anticipated bicycle crossing traffic, and the configuration of planned or existing bicycle facilities. Signals may be necessary as part of the construction of a protected bicycle facility such as a cycle track with potential turning conflicts, or to decrease vehicle or pedestrian conflicts at major crossings. An intersection with bicycle signals may reduce stress and delays for a crossing bicyclist, and discourage illegal and unsafe crossing maneuvers.



5.7.1 Bicycle Detection and Actuation

Loop or Video Detectors

For signalized intersection movements that do not normally receive a green light unless actuated by a car or pedestrian, the California Vehicle Code requires installation of detectors capable of detecting bicyclists at the limit line. This is most commonly handled with either inductive loop detectors or with video detection. Traffic actuated signals should be sensitive to bicycles, should be located in the bicyclist's expected path, and stenciling should direct the bicyclist to the point where the bicycle will be detected. This allows the bicyclist to stay within the lane of travel without having to maneuver to the side of the road to trigger a push button.

Push Button Actuation

A bicyclist pushbutton may be used to supplement the required limit line detectors. These buttons should be mounted in a location that permits their activation by a bicyclist without having to dismount.

Discussion

Proper bicycle detection should meet two primary criteria: 1) accurately detects bicyclists and 2) provides clear guidance to bicyclists on how to actuate detection (e.g., what button to push, where to stand). The requirement for bicycle detection at all new and modified approaches to traffic signals is included in the CA MUTCD 2014.

Additional References and Guidelines

- AASHTO. Guide for the Development of Bicycle Facilities. 2012.
- NACTO. Urban Bikeway Design Guide. 2014.
- California MUTCD. 2014.
- Caltrans. Policy Directive 09-06. 2009.
- Caltrans. Complete Intersections. 2010.

Materials and Maintenance

Signal detection and actuation for bicyclists should be maintained with other traffic signal detection and roadway pavement markings.

5.7.2 Bicycle Signal Heads

Description

The California MUTCD authorizes the use of bicycle signal heads only at locations that meet Caltrans Bicycle Signal Warrants. FHWA's Interim Approval IA-16, dated December 24, 2013, specifies a more detailed application of bicycle signal indications. Bicycle signal heads may be used for a movement that is not in conflict with any simultaneous motor vehicle movements at a signalized intersection, including right or left turns on red. The bicycle movement may not be modified by lane-use signs, turn prohibition signs, pavement markings, separate turn signal indications, or other traffic control devices.

The size of signal lenses may be 4 inches, 8 inches, or 12 inches in diameter, with the 4-inch lens size reserved only for supplemental near side mountings.

Additional References and Guidelines

- California MUTCD. 2014.
- FHWA Interim Approval IA-16, 2013.

Materials and Maintenance

Bicycle signal heads require the same maintenance as standard traffic signal heads, such as replacing bulbs and responding to power outages.

5.7.3 Active Warning Beacons

Description

Active warning beacons are user-actuated illuminated devices designed to increase motor vehicle yielding compliance at crossings of multi-lane or high volume roadways. Types of active warning beacons include conventional circular yellow flashing beacons, in-roadway warning lights, or Rectangular Rapid Flash Beacons (RRFB). RRFBs have blanket approval in California per FHWA MUTCD IA11.

Guidance

Warning beacons shall not be used at crosswalks controlled by YIELD signs, STOP signs, or traffic signals.

- Warning beacons shall initiate operation based on pedestrian or bicyclist actuation and shall cease operation at a predetermined time after actuation or, with passive detection, after the pedestrian or bicyclist clears the crosswalk.

Additional References and Guidelines

- NACTO. Urban Bikeway Design Guide. 2014.
- California MUTCD. 2014.
- FHWA. Interim Approval (IA-11). 2008.
- Caltrans. Complete Intersections. 2010.

Materials and Maintenance

Depending on power supply, maintenance can be minimal. If solar power is used, RRFBs can run for years without issue.

Existing Locations

- Shady Canyon Trail at Shady Canyon Rd, Irvine

Potential Locations

- Aliso Creek Bike Path at Los Alisos Blvd, Lake Forest

5.7.4 Pedestrian Hybrid Beacons

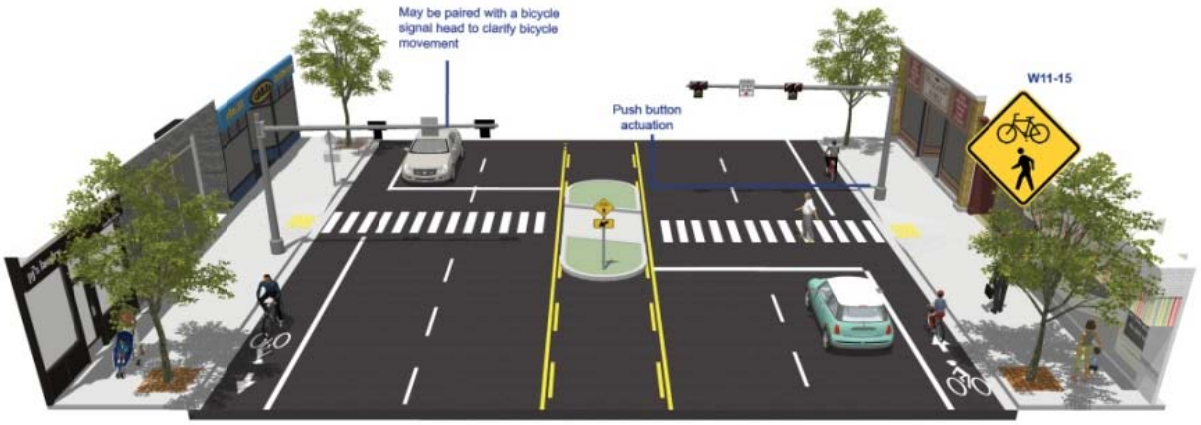
Description

A pedestrian hybrid beacon, also known as a High-intensity Activated CrossWalK (HAWK), consists of a signal-head with two red lenses over a single yellow lens on the major street, and pedestrian and/or bicycle signal heads for the minor street. The signal normally displays dark indications to motor vehicle traffic. When actuated by a pedestrian, the signal displays a yellow light, followed by an interval where both red lights are displayed steadily during the pedestrian walk interval, followed by alternating flashing red indications during the pedestrian clearance interval. As used in other states, pedestrian hybrid beacons are used to improve non-motorized crossings of major streets in locations where side-street volumes do not support installation of a conventional traffic signal or where there are concerns that a conventional signal will encourage additional motor vehicle traffic on the minor street. However, due to California law that prohibits the installation of STOP signs on approaches to signalized intersections, hybrid beacons may only be used at mid-block crossing locations.

Guidance

Pedestrian hybrid beacons may be installed without meeting traffic signal control warrants if roadway speed and volumes are excessive for comfortable user crossing.

- If installed within a signal system, signal engineers should evaluate the need for the pedestrian hybrid beacon to be coordinated with other signals.
- Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk



Discussion

An alternative to a pedestrian hybrid beacon is a standard signal face that displays a flashing red indication during the pedestrian clearance phase. The advantage of a standard signal face is that it displays no dark indications that could be interpreted by a motorist to be a symptom of a power outage that requires coming to a stop.

Additional References and Guidelines

- California MUTCD. 2014.

Materials and Maintenance

Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

Existing Locations for Potential Improvement

- Laguna Niguel Family YMCA Bike Path at Crown Valley Pkwy, Laguna Niguel
- Creekside Access Rd at Aliso Viejo Pkwy and Briar Glenn, Aliso Viejo

5.8 Shared Roadways

On shared roadways, bicyclists and motor vehicles use the same roadway space. These facilities are typically used on roads with low speeds and traffic volumes; however they can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided. Shared roadways employ a large variety of treatments from simple signage and shared lane markings to more complex treatments including directional signage, traffic diverters, chicanes, chokers, and/or other traffic calming devices to reduce vehicle speeds or volumes.

5.8.1 Signed Shared Roadway

Description

Signed shared roadways are Class III facilities generally located on roadways with lower speeds and lower traffic volumes. Class III facilities are designated as roadways with no striped bicycle lanes, but include signage to indicate the roadway is a bicycle route. Shared roadways can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.

Guidance

"BIKE ROUTE" - This sign (D11-1) is intended for use where no unique designation of routes is desired. Directional changes should be signed with appropriate arrow sub-plaques (D1-1b) or directional signage

"Bicycles May Use Full Lane"- This sign (R4-11) sign may be used:

- On roadways where there are no bicycle lanes or adjacent shoulders usable by cyclists and where travel lanes are too narrow for cyclists and motor vehicles to safely operate side-by-side.

- In locations where it is important to inform all road users that cyclists may occupy the travel lane.

Discussion

A Bicycle May Use Full Lane sign (R4-11) may be used on a lane that is too narrow for a bicycle and an automobile to share the road side by side within the same lane).

Additional References and Guidelines

- AASHTO. Guide for the Development of Bicycle Facilities. 2012.
- California MUTCD. 2014.

Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs, and will need periodic replacement due to wear.

Existing Locations

- South Ola Vista, San Clemente (see photo above)
- Pacific Coast Hwy, Laguna Beach

Potential Locations

- Calle Amanecar, San Clemente
- Via California, San Juan Capistrano

5.8.2 Marked Shared Roadway

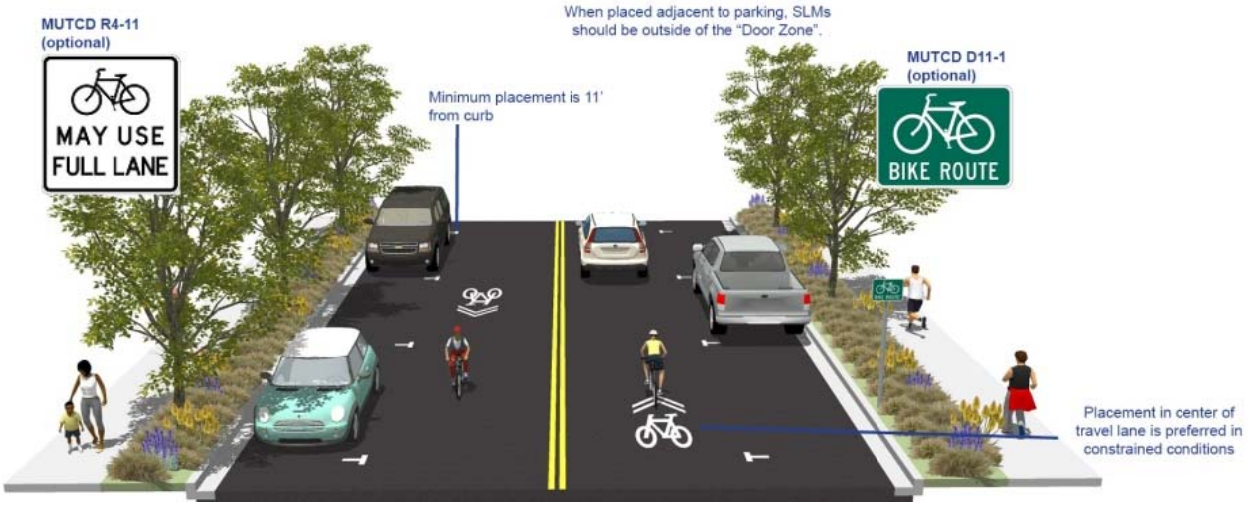
Description

The shared lane marking (SLM) or "sharrow" is commonly used where parking is allowed adjacent to the travel lane. The center of the marking should be located where bicyclists would be clear of the open doors of parked cars. This often results in the bicyclists being near the center of the right-most travel lane.

Guidance

Shared lane markings may be considered in the following situations:

- On constrained roadways too narrow to stripe with bicycle lanes
- To delineate space within a wide outside lane where cyclists can be expected to ride
- On roadways where it is important to increase vehicle driver awareness of cyclists
- On roadways where cyclists tend to ride too close to parked vehicles



Discussion

Class II bike lanes should be considered on roadways with outside travel lanes wider than 15 feet, or where other lane narrowing or removal strategies may provide adequate road space. Sharrows shall not be used on shoulders, on designated Bike Lanes, or to designate Bicycle Detection at signalized intersections. (MUTCD 9C.07)

Additional References and Guidelines

- Caltrans HDM Chapter 300
- California MUTCD 2014
- NACTO Urban Bikeway Design Guide, 2012
- Model Design Manual of Living Streets, 2011

Existing Locations

- Gleneyre St, Laguna Beach (see photo above)
- South Ola Vista, San Clemente

Potential Locations

- Blue Lantern St, Dana Point
- Low volume, low speed streets

5.8.3 Bicycle Boulevard

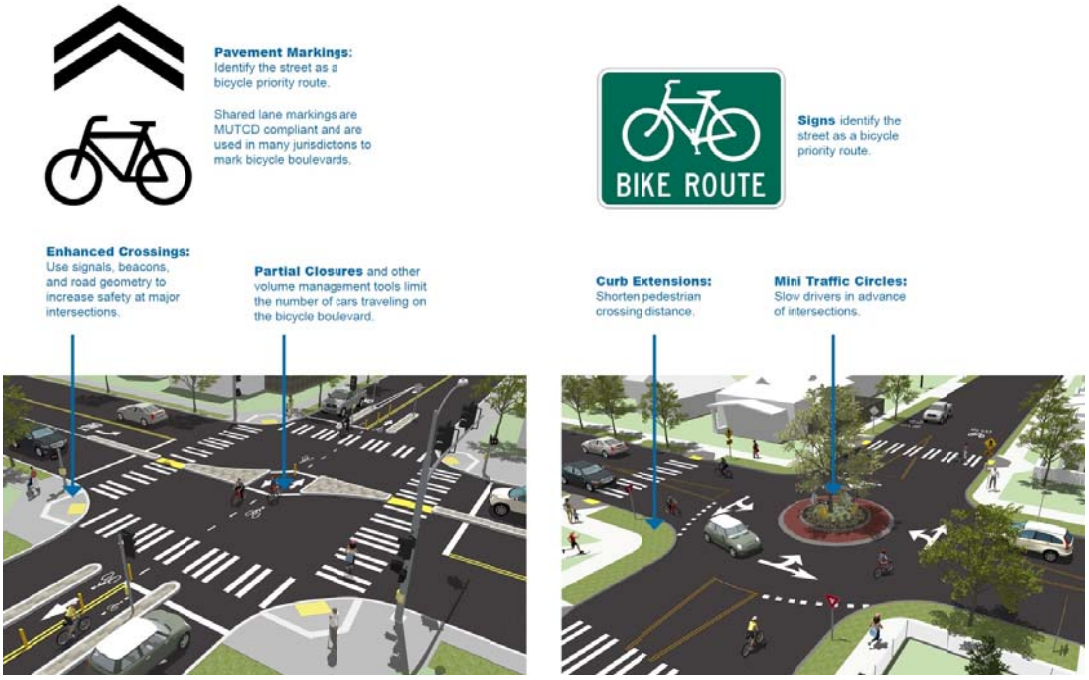
Description

Bicycle boulevards are low-volume, low-speed streets modified to enhance bicyclist comfort by using treatments such as signage, pavement markings, traffic calming and/or traffic reduction, and intersection modifications. These treatments may allow through movements of bicyclists while discouraging similar through-trips by non-local motorized traffic.

Guidance

Signs and pavement markings are the minimum treatments necessary to designate a street as a bicycle boulevard.

- Bicycle boulevards should have a maximum posted speed of 25 mph. Use traffic calming to maintain an 85th percentile speed below 22 mph.
- Implement volume control treatments such as traffic diverters based on the context of the bicycle boulevard and using engineering judgment. Target motor vehicle volumes range from 1,000 to 3,000 vehicles per day.
- Intersection crossings should be designed to slow motor vehicles, enhance safety for bicyclists and pedestrians and minimize delay for bicyclists.



Discussion

The term "bicycle boulevard" implies a facility that encourages bicycle usage while reducing motor vehicle volumes and/or speeds to a greater extent than on a typical Class III route. Some of the treatments used to encourage cycling may include preferential treatment by means of exclusions from turn restrictions, contra-flow access through a one-way street, exclusive traffic signal phases, or the re-orientation of stop sign control to favor the bicycle boulevard. Traffic calming techniques may include bulbouts, chokers, traffic circles, roundabouts, speed humps, turn restrictions, or barricades.

Additional References and Guidelines

- Caltrans HDM Chapter 300
- California MUTCD 2012
- NACTO Urban Bikeway Design Guide, 2012
- AASHTO. Guide for the Development of Bicycle Facilities. 2012.
- FHWA Mini-Roundabouts. 2010

Existing Locations

- Traffic circle at Calle Colima, San Clemente (see photo above)

Potential Locations

- TBD

5.9 Bikeway Signing

The ability to navigate through a city is informed by landmarks, natural features and other visual cues.
Signs throughout the city may indicate to bicyclists:

- Direction of travel
- Location of destinations
- Travel time/distance to those destinations

Wayfinding Signage

These signs will increase users' comfort and accessibility to the bicycle systems. Signage can serve both wayfinding and safety purposes including:

Wayfinding Sign Placement

- Helping to familiarize users with the bicycle network
- Helping users identify the best routes to destinations
- Helping to address misperceptions about time and distance
- Helping overcome a "barrier to entry" for people who are not frequent bicyclists (e.g., "interested but concerned" bicyclists)

A community-wide bicycle wayfinding signage plan would identify:

- Sign locations
- Sign type – what information should be included and design features
- Destinations to be highlighted on each sign – key destinations for bicyclists
- May include approximate distance and travel time to each destination Bicycle wayfinding signs also visually cue motorists that they are driving along a bicycle route and should use caution. Signs are typically placed at key locations leading to and along bicycle routes, including the intersection of multiple routes. Too many road signs tend to clutter the right-of-way, and it is recommended that these signs be posted at a level most visible to bicyclists rather than per vehicle signage standards.

5.9.1 Wayfinding Sign Types

Description

A bicycle wayfinding system consists of comprehensive signing and/or pavement markings to guide bicyclists to their destinations along preferred bicycle routes. There are three general types of wayfinding signs:

Confirmation Signs

- Indicate to bicyclists that they are on a designated bikeway. Make motorists aware of the bicycle route.
- May include destinations and distance/time. Do not include arrows.

Turn Signs

- Indicate where a bikeway turns from one street onto another street. Can be used with pavement markings.
- Include destinations and arrows.

Decisions Signs

- Mark the junction of two or more bikeways.
- Inform bicyclists of the designated bike route to access key destinations.
- Destinations and arrows are required, distances are optional but recommended.
- The inclusion of bicycle travel time is nonstandard, but is recommended.

Discussion

There is no standard color for bicycle wayfinding signage. Section 1A.12 of the MUTCD establishes the general meaning for signage colors. Green is the color used for directional guidance and is the most common color of bicycle wayfinding signage in the US, including those in the MUTCD.

Additional References and Guidelines

- AASHTO. Guide for the Development of Bicycle Facilities. 2012.
- California MUTCD. 2014.
- NACTO. Urban Bikeway Design Guide. 2014.

Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs and will need periodic replacement due to wear.

5.9.2 Wayfinding Sign Placement

Guidance

Signs are typically placed at decision points along bicycle routes – typically at the intersection of two or more bikeways and at other key locations leading to and along bicycle routes.

Decisions Signs

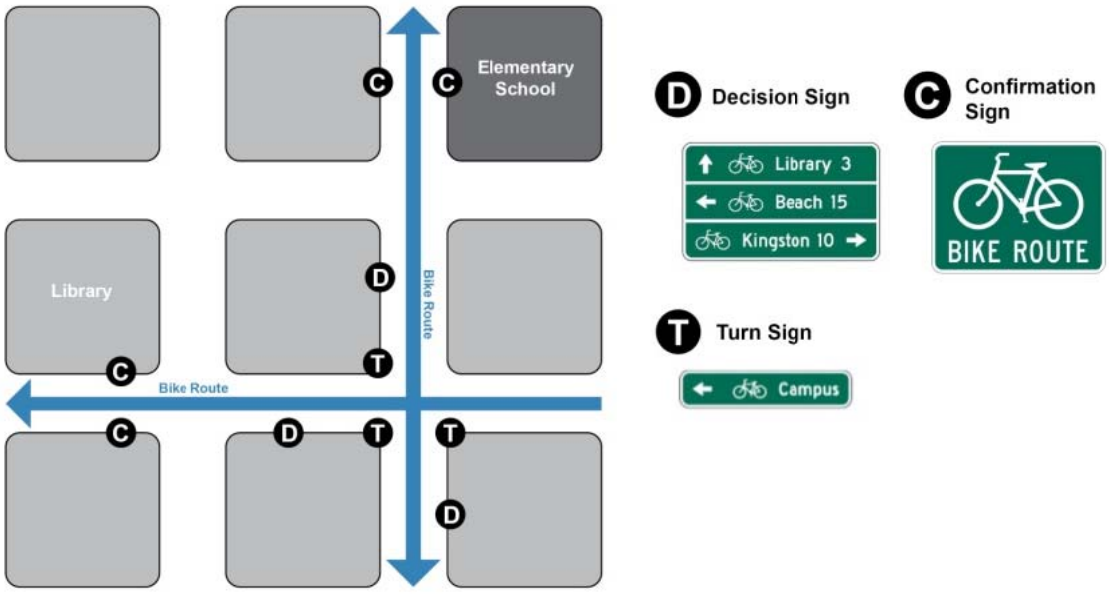
- Near-side of intersections in advance of a junction with another bicycle route.
- Along a route to indicate a nearby destination.

Confirmation Signs

- Every one-quarter to one-mile interval on off-street facilities and every 2 to 3 blocks along on-street bicycle facilities, unless another type of sign is used (e.g., within 150 feet of a turn or decision sign). It should be placed soon after turns to confirm destination(s). Pavement markings can also act as confirmation that a bicyclist is on a preferred route.

Turn Signs

- Near-side of intersections where bike routes turn (e.g., where the street ceases to be a bicycle route or does not go through). Pavement markings can also indicate the need to turn to the bicyclist.



Discussion

It can be useful to classify a list of destinations for inclusion on the signs based on their relative importance to users throughout the area. A particular destination's ranking in the hierarchy can be used to determine the physical distance from which the locations are signed.

Additional References and Guidelines

- AASHTO. Guide for the Development of Bicycle Facilities. 2012.
- California MUTCD. 2014.
- NACTO. Urban Bikeway Design Guide. 2012.

Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs and will need periodic replacement due to wear.

5.10 Retrofitting Existing Streets to Add Bikeways

Most major streets are characterized by conditions (e.g., high vehicle speeds and/or volumes) for which dedicated bike lanes are the most appropriate facility to accommodate safe and comfortable riding. Although opportunities to add bike lanes through roadway widening may exist in some locations, many major streets have physical and other constraints that would require street retrofit measures within existing curb-to-curb widths. As a result, much of the guidance provided in this section focuses on effectively reallocating existing street width through striping modifications to accommodate dedicated bike lanes.

Although largely intended for major streets, these measures may be appropriate for any roadway where bike lanes would be the best accommodation for bicyclists.

5.10.1 Lane Narrowing

Description

Lane narrowing utilizes roadway space that exceeds minimum standards to provide the needed space for bike lanes. Many roadways have existing travel lanes that are wider than those prescribed in local and national roadway design standards, or which are not marked. Most standards allow for the use of 11 feet and sometimes 10 feet wide travel lanes to create space for bike lanes.

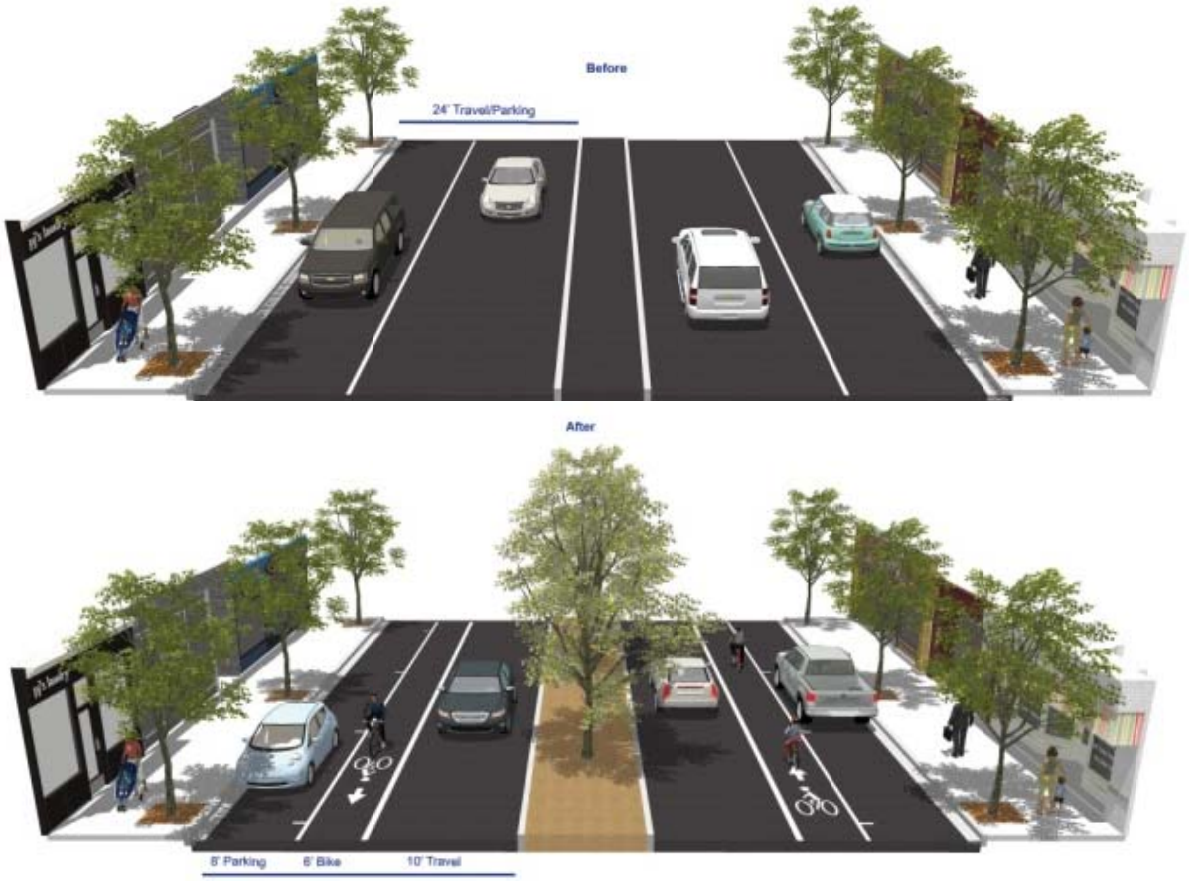
Guidance

Vehicle lane width:

- Before: 10 to 15 feet
- After: 10 to 11 feet

Bicycle lane width:

- Guidance on Bicycle Lanes applies to this treatment



Discussion

Special consideration should be given to the amount of heavy vehicle traffic and horizontal curvature before the decision is made to narrow travel lanes. Center turn lanes can also be narrowed in certain situations to provide space for bike lanes.

Additional References and Guidelines

- AASHTO. Guide for the Development of Bicycle Facilities. 2012.
- AASHTO. A Policy on Geometric Design of Highways and Streets. 2004.
- Caltrans. California HDM. 2012.
- Caltrans. Main Streets. 2005.

Materials and Maintenance

Repair rough or uneven pavement surface.

5.10.2 Lane Reconfiguration

Description

The removal of a single travel lane will generally provide sufficient space for two bike lanes on each side of a street. Streets with excess vehicle capacity provide opportunities for bike lane retrofit projects.

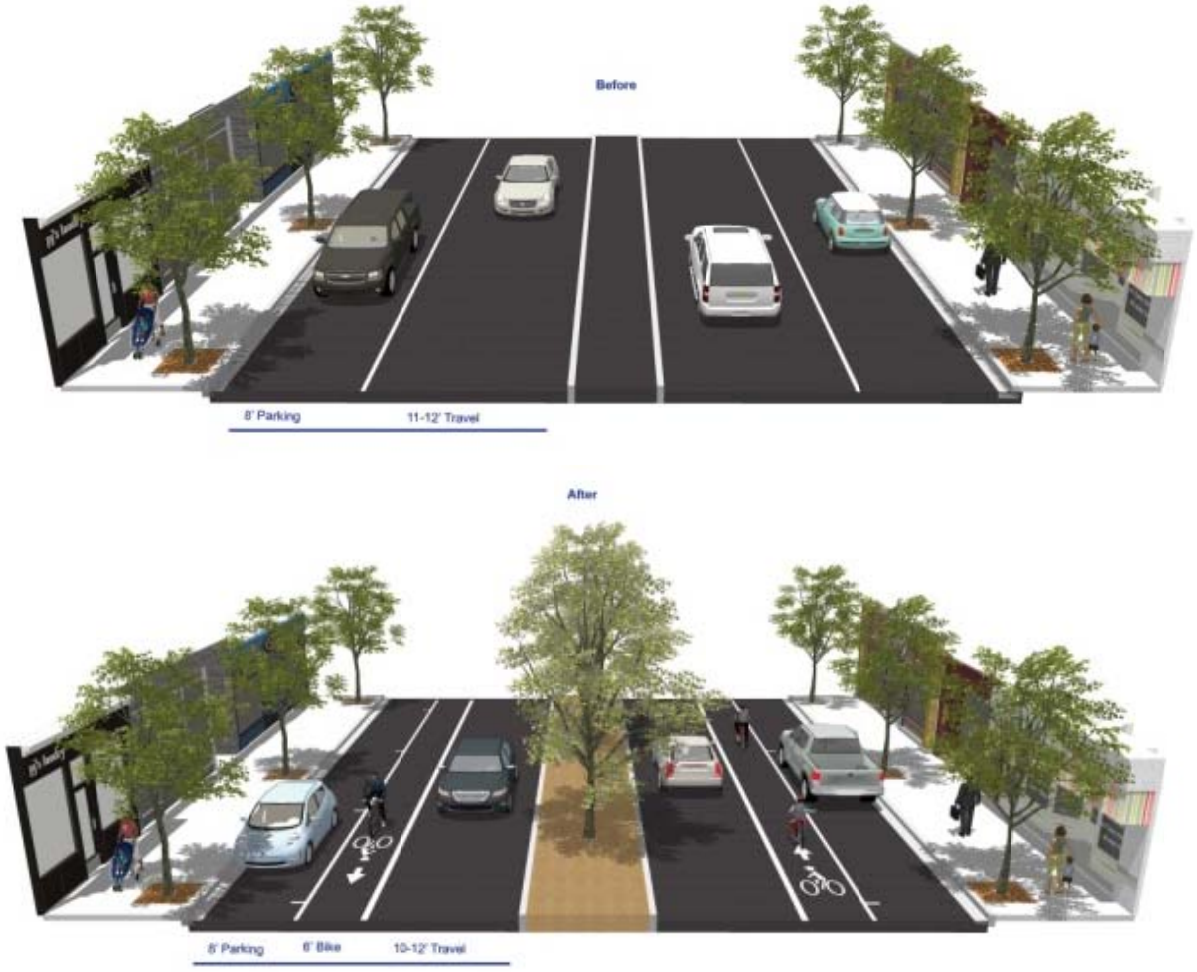
Guidance

Vehicle lane width:

- Width depends on project. No narrowing may be needed if a lane is removed.

Bicycle lane width:

- Guidance on Bicycle Lanes applies to this treatment.



Discussion

Depending on a street's existing configuration, traffic operations, user needs and safety concerns, various lane reduction configurations may apply. For instance, a four-lane street (with two travel lanes in each direction) could be modified to provide one travel lane in each direction, a center turn lane, and bike lanes.

Additional References and Guidelines

- AASHTO. Guide for the Development of Bicycle Facilities. 2012.
- FHWA. Evaluation of Lane Reduction "Road Diet" Measures on
- Crashes. 2010.
- Caltrans. Main Streets. 2005.

Materials and Maintenance

Repair rough or uneven pavement surface.

5.11Bicycle Support Facilities

Facilities

Bicycle Parking

Bicyclists expect a safe, convenient place to secure their bicycle when they reach their destination. This may be short-term parking of two hours or less, or long-term parking for employees, students, residents, and commuters.

Access to Transit

Safe and easy access to bicycle parking facilities is necessary to encourage commuters to access transit via bicycle. Providing bicycle access to transit and space for bicycles on buses and rail vehicles can increase the feasibility of transit in lower-density areas, where transit stops are beyond walking distance of many residences. People are often willing to walk only a quarter- to half-mile to a bus stop, while they might bike as much as two or more miles to reach a transit station.

Bicycle Parking

On-Street Bicycle Corral

Bicycle Lockers

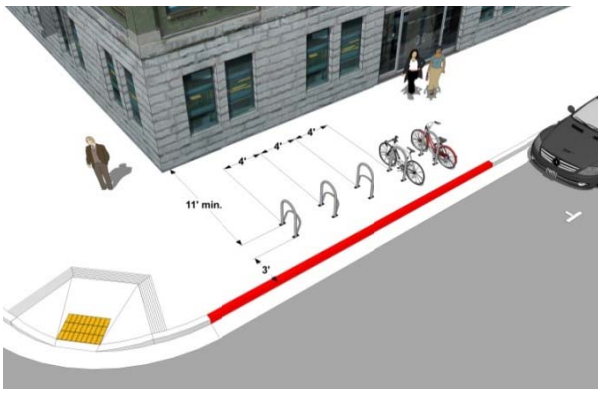
Secure Parking Areas (SPA)

Bicycle Access to Transit

5.11.1Bicycle Racks

Description

Secure bicycle parking at likely destinations is an integral part of a bikeway network. Adequate bicycle parking should be incorporated into any new development or redevelopment project. Bicycle parking should be given a balanced level of importance when considering car parking improvements or development. In commercial areas where bicycle traffic is more prevalent, as well as parks and shopping centers, increased bicycle parking is recommended.

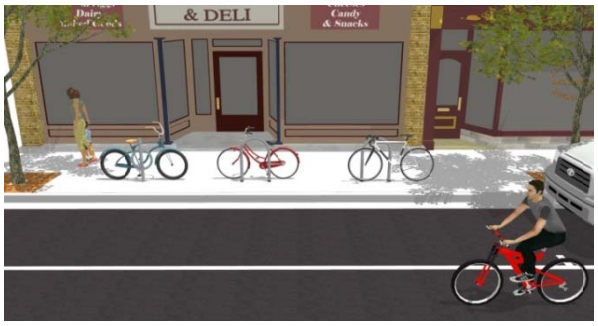


Bicycle rack type plays a major role in the utilization of the bicycle racks. Only racks that support the bicycle at two points and allow convenient locking should be used. The Association for Pedestrian and Bicycle Professionals (APBP) recommends selecting a bicycle rack that:

- Supports the bicycle in at least two places, preventing it from falling over
- Allows locking of the frame and one or both wheels with a U-lock
- Is securely anchored to ground
- Resists cutting, rusting and bending or deformation

Guidance

- Does not bend wheels or damage other bicycle parts
- Accommodates high security U-shaped bicycle locks
- Accommodates securing the frame and wheels
- Does not trip pedestrians
- Are easily accessed yet protected from motor vehicles
- Are covered if users will leave their bicycles for long periods
- Located in areas that cyclists are most likely to travel



Additional References and Guidelines

- AASHTO. Guide for the Development of Bicycle Facilities. 2012.
- APBP. Bicycle Parking Guide 2nd Edition. 2010.

Materials and Maintenance

Use of proper anchors will prevent vandalism and theft.

5.11.2 On-Street Bicycle Corral

Description

Bicycle corrals are generally former vehicle parking stalls converted to bicycle parking. Most have been on-street conversions, but they are now being incorporated into shopping center parking lots as well. Corrals can accommodate up to 20 bicycles per former vehicle parking space. On-street bicycle corrals provide many benefits where bicycle use is high and/ or growing:

Businesses - Corrals provide a much higher customer to parking space ratio and advertise "bicycle friendliness." They also allow more outdoor seating for restaurants by moving the bicycle parking off the sidewalk. Some cities have instituted programs that allow local businesses to sponsor or adopt a bicycle corral to improve bicycle parking in front of their business.

Pedestrians - Corrals clear the sidewalks and those installed at corners also serve as curb extensions
Cyclists - Corrals increase the visibility of cycling and greatly expand bicycle parking options

Vehicle drivers - Corrals improve visibility at intersections by preventing large vehicles from parking at street corners and blocking sight lines

Guidance

See guidelines for sidewalk Bicycle Rack placement.

- Can be used with parallel or angled parking
- Parking stalls adjacent to curb extensions are good candidates for bicycle corrals since the concrete extension serves as delimitation on one side
- Can be customized and have been designed and fabricated to complement specific locations

Discussion

In many communities, the installation of bicycle corrals is driven by requests from adjacent businesses, and is not a city-driven initiative. In other areas, the city provides the facility and business associations take responsibility for the maintenance of the facility.

Additional References and Guidelines

- *APBP. Bicycle Parking Guide 2nd Edition. 2010.*

Materials and Maintenance

Physical barriers may obstruct drainage and collect debris. Establish a maintenance agreement with neighboring businesses.

5.11.3 Bicycle Lockers

Description

Bicycle parking facilities intended for long-term parking must protect against theft of the entire bicycle and its components and accessories.

Three common ways of providing secure long-term bicycle parking are:

- Fully enclosed lockers accessible only by the user, either coin-operated, or by electronic, on-demand locks operated by "smartcards" equipped with touch-sensitive imbedded RFID chips.
- A continuously monitored facility that provides at least medium-term type bicycle parking facilities generally available at no charge
- Restricted access facilities in which short-term type bicycle racks are provided and access is restricted only to the owners of the bicycles stored there

Perhaps the easiest retrofit is the bicycle locker. Generally, they are as strong as the locks on their doors and can secure individual bicycles with their panniers, computers, lights, etc., left in place. Some bicycle locker designs can be stacked to double the parking density.

Lockers with coin-operated locks can be a target of theft and may attract various unintended uses. This can be mitigated by installing lockers with mesh sides to allow periodic inspection.

Guidance

Minimum dimensions: width (opening) 2.5 feet; height 4 feet; depth 6 feet.

- Four-foot side clearance and 6-foot end clearance.
- Seven-foot minimum distance between facing lockers.
- Locker designs that allow visibility and inspection of contents are recommended for security.
- Access is controlled by a key or access code.

Discussion

Long-term parking facilities are more expensive to provide than short-term facilities, but are also significantly more secure. Although many bicycle commuters would be willing to pay a nominal fee to guarantee the safety of their bicycle, long-term bicycle parking should be free wherever automobile parking is free.

Additional References and Guidelines

- *AASHTO. Guide for the Development of Bicycle Facilities. 2012.*
- *APBP. Bicycle Parking Guide 2nd Edition. 2010.*

Materials and Maintenance

Regularly inspect the functioning of moving parts and enclosures. Change keys and access codes periodically to prevent access to unapproved users.

5.11.4 Secure Parking Areas (SPA)

Description

A Secure Parking Area for bicycles, also known as a Bike SPA or Bike & Ride (when located at transit stations), is a semi-enclosed space that offers a higher level of security than ordinary bike racks. Accessible via key-card, combination locks, or keys, Bike SPAs provide high-capacity parking for 10 to 100 or more bicycles. Increased security measures create an additional transportation option for those whose biggest concern is theft and vulnerability.

Guidance

Key features may include:

- Closed-circuit television monitoring
- Double high racks & cargo bike spaces
- Bike repair station with bench
- Bike tube and maintenance item vending machine
- Bike lock "hitching post" – allows people to leave bike locks
- Secure access for users

Discussion

Long-term parking facilities are more expensive to provide than short-term facilities, but are also significantly more secure. Although many bicycle commuters would be willing to pay a nominal fee to guarantee the safety of their bicycle, long-term bicycle parking should be free wherever automobile parking is free.

Additional References and Guidelines

- AASHTO. Guide for the Development of Bicycle Facilities. 2012
- APBP. Bicycle Parking Guide 2nd Edition. 2010

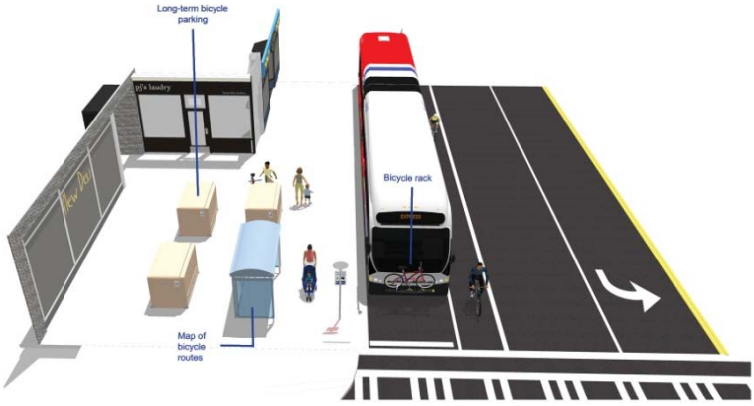
Materials and Maintenance

Regularly inspect the functioning of moving parts and enclosures. Change keys and access codes periodically to prevent access to unapproved users.

5.11.5 Bicycle Access to Transit

Description

Safe and easy access to transit stations and secure bicycle parking facilities is necessary to encourage commuters to access transit via bicycle. Bicycling to transit reduces the need to provide expensive and space consuming car parking spaces. Many people who ride to a transit stop will want to bring their bicycle with them on the transit portion of their trip, so buses and other transit vehicles should be equipped accordingly.



For staircases at bus or rail transit stations, bicycle access could be facilitated with bicycle staircase side ramps. These consist of narrow channels just wide enough to accommodate bicycle tires, installed below the hand rails of stair cases. Cyclists could place their bicycles onto the side ramps and walk them up or down the stairs, with the bicycles rolling within the channels. Examples of bicycle staircase side ramps can be found at the El Monte Bus Station and at BART's 16th Street Station.

Guidance

- Provide direct and convenient access to transit stations and stops from the bicycle and pedestrian networks.
- Provide maps, wayfinding signage and pavement markings from the bicycle network to transit stations.

Bicycle Parking

- The route from bicycle parking locations to station/stop platforms should be well-lit and visible.
- Signing should note the location of bicycle parking, rules for use, and instructions as needed.
- Provide safe and secure long-term parking such as bicycle lockers at transit hubs. Parking should be easy to use and well maintained.

Discussion

Providing bicycle routes to transit helps combine the long-distance coverage of bus and rail travel with the door-to-door service of bicycle riding. Transit use can overcome large obstacles to bicycling, including distance, hills, riding on busy streets, night riding, inclement weather, and breakdowns.

Additional References and Guidelines

- APBP. Bicycle Parking Guide 2nd Edition. 2010.
- FHWA. University Course on Bicycle and Pedestrian Transportation.
- Lesson 18: Bicycle and Pedestrian Connections to Transit. 2006.

Materials and Maintenance

Regularly inspect the functioning of long-term parking moving parts and enclosures.

5.12 Bikeway Facility Maintenance

Regular bicycle facility maintenance includes sweeping, maintaining a smooth roadway, ensuring that the gutter-to-pavement transition remains relatively flat, and installing bicycle-friendly drainage grates. Pavement overlays are a good opportunity to improve bicycle facilities. The following recommendations provide a menu of options to consider enhancing a maintenance regimen.

Sweeping

Gutter to Pavement Transition

Roadway Surface

Drainage Grates

5.12.1 Sweeping

Description

Bicyclists often avoid shoulders and bike lanes filled with gravel, broken glass and other debris; they will ride in the roadway to avoid these hazards, potentially causing conflicts with motorists. Debris from the roadway should not be swept onto sidewalks (pedestrians need a clean walking surface), nor should debris be swept from the sidewalk onto the roadway. A regularly scheduled inspection and maintenance program helps ensure that roadway debris is regularly picked up or swept.

Guidance

Establish a seasonal sweeping schedule that prioritizes roadways with major bicycle routes.

- Sweep walkways and bikeways whenever there is an accumulation of debris on the facility.
- In curbed sections, sweepers should pick up debris; on open shoulders, debris can be swept onto gravel shoulders.
- Pave gravel driveway approaches to minimize loose gravel on paved roadway shoulders.
- Perform additional sweeping in the fall in areas where leaves accumulate.

Note - some separated bike facilities (cycle tracks) that employ curbs or other physical barriers for separation may be too narrow for a standard street sweeper, which requires a 10-foot wide clearance. If this is the case, arrangements need to be made for smaller equipment to be used on a regular basis to keep the facility clean.

5.12.2 Gutter-to-Pavement Transition and handling standing water

Description

On streets with concrete curbs and gutters, 1 to 2 feet of the curbside area is typically devoted to the gutter pan, where water collects and drains into catch basins. On many streets, the bikeway is situated near the transition between the gutter pan and the pavement edge. This transition can be susceptible to erosion, creating potholes, and a rough surface for travel. These areas can also be prone to retaining standing water during and after rains.

Guidance

Ensure that gutter-to-pavement transitions have no more than a ¼" vertical transition.

- Examine pavement transitions during every roadway project for new construction, maintenance activities, and construction project activities that occur in streets.
- Inspect the pavement two to four months after trenching construction activities are completed to ensure that excessive settlement has not occurred.
- Provide at least three feet of pavement outside of the gutter seam and four feet is preferred.
- When adding new bike facilities such as separated lanes, roundabouts, and traffic circles, check for potential drainage issues. Installing bioswales to capture runoff and avoid standing water in bike lanes is becoming a standard part of building bike facilities in bike-friendly communities such as Portland and Long Beach.

5.12.3 Roadway Surface

Description

Bicycles are much more sensitive to subtle changes in roadway surface than are motor vehicles. Various materials are used to pave roadways, and some are smoother than others. Compaction is also an important issue after trenches and other construction holes are filled. Uneven settlement after trenching can affect the roadway surface nearest the curb where bicycles travel. Sometimes compaction is not achieved to a satisfactory level, and an uneven pavement surface can result due to settling over the course of days or weeks. When resurfacing streets, use the smallest chip size and ensure that the surface is as smooth as possible to improve safety and comfort for bicyclists.

Guidance

Maintain a smooth pothole-free surface.

- Ensure that on new roadway construction, the finished surface on bikeways does not vary more than ¼".

- Maintain pavement so ridge buildup does not occur at the gutter-to-pavement transition or adjacent to railway crossings.
- Inspect the pavement two to four months after trenching construction activities are completed to ensure that excessive settlement has not occurred.
- If chip sealing is to be performed, use the smallest possible chip on bike lanes and shoulders. Sweep loose chips regularly following application.
- During chip seal maintenance projects, if the pavement condition of the bike lane is satisfactory, it may be appropriate to chip seal the travel lanes only. However, use caution when doing this so as not to create an unacceptable ridge between the bike lane and travel lane.

5.12.4 Drainage Grates

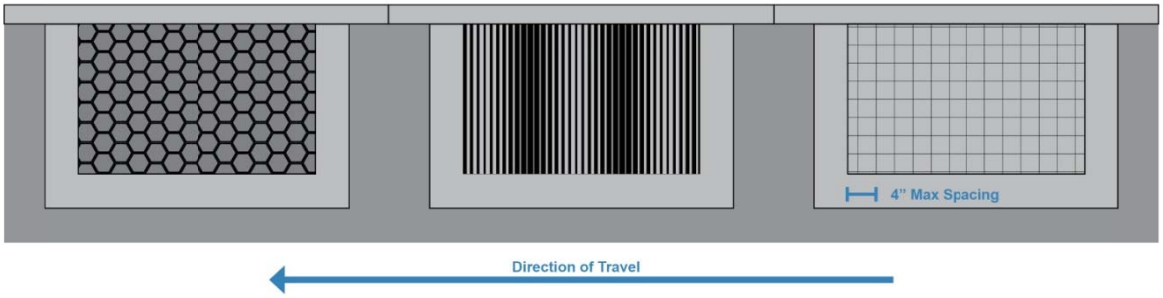
Description

Drainage grates are typically located in the gutter area near the curb of a roadway. Drainage grates typically have slots through which water drains into the municipal storm sewer system. Many older grates were designed with linear parallel bars spread wide enough for a tire to become caught so that if a bicyclist were to ride on them, the front tire could become caught in the slot. This would cause the bicyclist to tumble over the handlebars and sustain potentially serious injuries.

Guidance

Require all new drainage grates be bicycle-friendly, including grates that have horizontal slats on them so that bicycle tires and assistive devices do not fall through the vertical slats.

- Create a program to inventory all existing drainage grates, and replace hazardous grates as necessary – temporary modifications such as installing rebar horizontally across the grate should not be an acceptable alternative to replacement.



5.12.5 Bikeway Maintenance and Operations

Description

Motor vehicle traffic tends to "sweep" debris like litter and broken glass toward the roadway edges where it can accumulate in bicycle lanes. Maneuvering to avoid such hazards can cause a cyclist to fall. In this way, proper maintenance directly affects safety and street sweeping must be a priority on roadways

with bicycle facilities, especially in curb lanes and along the curbs themselves. Law enforcement can assist by requiring towing companies to fully clean up crash sites to prevent glass and debris from being left in place or simply swept to the curb or shoulder after collisions.

When any roadwork repairs are done by the City or other agencies, the roadway must be restored to satisfactory quality with particular attention to surface smoothness suitable for cycling. Striping must be restored to the prior markings, or new markings if called for in a project. Bicycles facilities also sometimes seem to "disappear" after roadway construction occurs. This can happen incrementally as paving repairs are made over time and are not promptly followed by proper re-striping. When combined with poor surface reconstruction following long periods out of service due to road work, bikeway facilities can be "lost," which can discourage cycling in general. Construction projects that require the demolition and rebuilding of adjacent roadways can cause problems maintaining and restoring bikeway function.

Construction activities controlled through permits, such as driveway, drainage and utility work can have an important effect on roadway surface quality where cyclists operate in the form of mismatched pavement heights, rough surfaces or longitudinal gaps in adjoining pavements, or other pavement irregularities. Permit conditions should ensure that pavement foundation and surface treatments are restored to their pre-construction conditions, that no vertical irregularities will result and that no longitudinal cracks will develop. Strict specifications, standards and inspections designed to prevent these problems should be developed. A five year bond should be held to assure correction of any deterioration that might occur as a result of faulty reconstruction of the roadway surface.

Bicycle facilities should be swept regularly, at least twice a month, and preferably more often for heavily traveled routes. Also, adjacent shrubs and trees should be kept trimmed back to prevent encroachment into the pathway or obstructing cyclists' views.

Guidance

Colored Pavement Materials:

- Waterborne Paints
    - Over the past 10 years, transportation agencies in the United States have gradually replaced conventional solvent paints with waterborne paints that have low Volatile Organic Compounds (VOC) and other newer pavement marking materials. Waterborne traffic paints are the most widely used and least expensive pavement marking material available. Glass beads are either pre-mixed into the paint or dropped onto the waterborne paint to provide retro-reflectivity.
    - Waterborne paints generally provide equal performance on asphalt and concrete pavements but have the shortest service life of all pavement marking materials. This paint type tends to wear off rapidly and lose retro-reflectivity quickly after being exposed to factors such as high traffic volumes. Although still a widely used material,

waterborne paint is also used as an interim marking material until they can apply something more durable.

- Regular Solvent Paint
  - This type of paint can be used universally for just about any pavement needing paint and is the least expensive. Sometimes additives such as reflective glass beads for reflectivity and sand for skid resistance are widely used to mark road surfaces. This is typically considered a non-durable pavement marking and is easily worn by vehicle tires and often requires annual re-application.
- Durable Liquid Pavement Markings
  - Durable Liquid Pavement Markings (DLPM) include epoxy and Methyl Methacrylate (MMA). Epoxy paint has traditionally been viewed as a marking material that provides exceptional adhesion to both asphalt and concrete pavements when the pavement surface is properly cleaned before application. The strong bond that forms between epoxy paints and both asphalt and concrete pavement surfaces results in the material being highly durable when applied on both pavement surfaces. These markings are highly durable and can be sprayed or extruded but generally require long no-track times.
- Thermoplastics
  - Thermoplastics are a durable pavement marking material composed of glass beads, pigments, binders (plastics and resins) and fillers. There are two types of thermoplastics: hydrocarbon and alkyd. Hydrocarbon thermoplastics are made from petroleum-derived resins; and alkyd thermoplastics are made from wood-derived resins. One of the added advantages of using thermoplastic is that the material can be re-applied over older thermoplastic markings, thereby refurbishing the older marking as well as saving on the costs of removing old pavement markings. Although thermoplastic materials usually perform very well on all types of asphalt surfaces, there have been mixed results when they have been applied on concrete pavements.

Paint Type Estimated Product Life Advantage Disadvantages:

- Waterborne
  - Paints 9-36 months * Inexpensive * Quick-drying * Longer life on low-volume roads * Easy clean-up and disposal * Short life on high-volume roads * Subject to damage from sands/abrasives * Pavement must be warm or it will not adhere.
- Regular
  - Solvent Paint 9-36 months* * Inexpensive * Quick-drying * Longer life on low-volume roads * Short life on high-volume roads * Subject to damage from sands/abrasives * Easy clean-up and disposal * Pavement must be warm or it will not adhere.

Durable Liquids for Pavement Markings:

- Epoxy
  - 4 Years* * Longer life on low-volume roads * More retro-reflective * Slow drying * Requires coning and/or flagging during application * Heavy bead application- may need to be cleaned off of roadway * High initial cost * Subject to damage from sands/abrasives
- Thermoplastic
  - 3-6 Years* * Long life on low-volume roads * Retro-reflective * No beads needed * Any temperature for application * Recommended use for symbols and spot treatments * Subject to damage from sands/abrasives * Cost prohibited if used for large scale applications * Shown to wear quickly in conflict areas * Life of pavement marking will depend on traffic volume, road condition and application time of year

Source:
NACTO. Urban Bikeway Design Guide. 2014.
FHWA. Durability and Retro-Reflectivity of Pavement Markings (Synthesis Study). 2008

Use of Green Paint:
One significant change is the FHWA's interim approval for the use of green colored pavement within bicycle lanes in mixing or transition zones, such as at intersections and in other potential conflict zones where motor vehicles may cross a bicycle lane. They are intended to warn drivers to watch for and to yield to cyclists when they encounter them within the painted area. FHWA studies have also shown that green bicycle lanes improve cyclist positioning as they travel across intersections and other conflict areas.

Jurisdictions within the State must notify Caltrans before proceeding with green bicycle lane projects because the agency is required to maintain an inventory, but since Caltrans has requested to participate in this interim approval, the process has been streamlined because FHWA experimental treatment protocol is no longer required.

Source:
NACTO. Urban Bikeway Design Guide. 2014.
http://mutcd.fhwa.dot.gov/resources/interim_approval/ia14/index.htm

6.0 FUNDING STRATEGIES

The federal and state government, along with regional and local governmental agencies, spend billions of dollars each year to fund transportation programs. These programs range from major highway and bridge projects to local street repair. Only a small percentage of these dollars is used for planning, developing, and constructing bike-related projects and programs. However, even though the percentage is small, tens of millions of dollars are made available on a yearly basis for funding active transportation projects for both biking and walking. While the competition for these funds is fierce, a well-crafted application to fund needed infrastructure and educational programs stands a good chance of being funded.

A major source of funding for bike and pedestrian projects is the Federally funded Moving Ahead for Progress in the 21st Century (MAP-2)1 Program. The Act was signed into law on July 6, 2012. The bill, which was reauthorized for FY 2014-2015, provides $25.2 billion dollars nationwide of which just under $2.4 billion is allocated to California. Eligible activities include:

- Transportation alternatives
- Recreational trails program
- Safe Routes to School Program
- Planning, designing, or constructing roadways with the right-of-way of former interstate routes for other divided highways.

Many federal and state grants require some level of matching funds. As a result most programs rely on more than one source of money. Developing a strategy to put together all of the required funds is important, as grants will not be awarded without specifying the sources of matching funds. The strategy may include matching a state grant with a federal grant, or the use of local or regional funds.
Many cities have hired a bike coordinator to not only help develop and oversee an effective bike program, but also to coordinate their funding efforts. These positions, which now often use the term active transportation to include both bike and walking, can help cities leverage their existing investments in street repair and maintenance as well as local returns from gas tax and developer fees. Cities such as Long Beach have brought in over $20 million dollars in bike and pedestrian-related funds over the past 10 years. Recently Orange County cities were awarded over $14 million dollars to fund bike and pedestrian projects between and FY 2015-2016. An active transportation coordinator can help your city obtain a portion of these active transportation funds.

For additional information, SCAG, OCTA and Safe Routes to Schools all have resources that can be used to help determine the most effective strategy to obtain federal, state and regional funds for active transportation projects.

To help agencies determine funding sources for projects along the proposed corridors, a summary by source type is provided with details regarding types of eligible projects, match requirements, and use.

6.1 Federal Programs

6.1.1 Partnership for Sustainable Communities

Partnership for Sustainable Communities is an interagency partnership between HUD, DOT and the EPA.

- HUD offers funding opportunities to help communities realize their own visions for building more livable, walkable, and environmentally sustainable regions.
- DOT offers funding opportunities to support more livable walkable communities.
- EPA offers grants to support activities that improve the quality of development and protect human health and the environment.

Grants are offered periodically and can be found at www.sustainablecommunities.gov/partnership-resources.

6.1.2 Department of the Interior – Land and Water Conservation Fund (LWCF)

The LWCF state assistance program provides matching grants to help states and local communities protect parks and recreation resources. This 50:50 matching program is the primary federal investment tool to ensure that families have easy access to parks and open space, hiking and riding trails, and neighborhood recreation facilities.

The program is administered through the National Parks Service. Grants are allocated on an as-requested basis. The state prioritizes and selects eligible projects for LWCF assistance. For more info, visit http://www.nps.gov/ncrc/programs/lwcf/manual/lwcf.pdf.

6.1.3 Rivers, Trails, and Conservation Assistance Program (RTCA)

This program, funded through the National Park service, provides technical assistance in the form of visioning, program planning, goal setting, and community outreach. In the past, these grants have been used to establish high-level plans for the Santa River Trail and the LA River. Project proposals are due August 1st of each year. For more information on these grants, see www.nps.gov/orgs/rtca/apply.htm

6.1.4 Community Transformation Grants

The Center for Disease Control (CDC), through their Community Transformation Grant (CTG) program, offers grants designed to "create healthier communities by making healthy living easier and more affordable where people work, live, learn and play." Active living is one focus of the grant program. An example project is promoting improvements in sidewalks and street lighting to make it safe and easy for people to walk and ride bikes. Class I and Class IV bike facilities are types of bike infrastructure that may be supported by the CTG program. For more information on these grants see www.cdc.gov/nccdphp/dch/programs/ communitytransformation/funds/index.htm

6.2 State Programs

6.2.1 Active Transportation Program (ATP)

California's Active Transportation Program was created in 2013 to encourage increased use of active modes of transportation, such as biking and walking. According to the California Transportation Commission (www.catc.ca.gov/programs/ATP.htm):

> *The ATP consolidates various transportation programs, including the federal Transportation Alternatives Program, state Bicycle Transportation Account, and federal and state Safe Routes to School programs into a single program to:*
>
> - *Increase the proportion of biking and walking trips,*
> - *Increase safety for non-motorized users,*
> - *Increase mobility for non-motorized users,*
> - *Advance the efforts of regional agencies to achieve greenhouse gas reduction goals,*
> - *Enhance public health, including the reduction of childhood obesity through the use of projects eligible for Safe Routes to Schools Program funding,*
> - *Ensure disadvantaged communities fully share in program benefits (25% of program), and*
> - *Provide a broad spectrum of projects to benefit many types of active transportation users.*
>
> *Program funding is segregated into three components and is distributed as follows:*
>
> - *50% to the state for a statewide competitive program,*
> - *10% to small urban and rural regions with populations of 200,000 or less for the small urban and rural area competitive program, and*
> - *40% to Metropolitan Planning Organizations (MPO) in urban areas with populations greater than 200,000 for the large urbanized area competitive program.*

For the Orange County area, the ATP is overseen by the Southern California Association of Governments (SCAG). For Fiscal Years 2014-15 and 2015-16, the area of Southern California governed by SCAG received a total of $74.3 million for funding bike and pedestrian projects of which about 25% ($18 million) was allocated to disadvantaged communities[2]. Of the total funding available in the SCAG region, 17 projects were funded in Orange County for a total of $13 million. The grants ranged from a low of $126,000 to a maximum of $2.6 million with a median of $475,000. Fifteen of the grants in Orange County were for infrastructure development and two were for planning.

[2] ATP guidelines prescribe that no less than 25% of overall program funds benefit disadvantaged communities, which are defined as having a median household income less than 80% of the statewide median, or among the most disadvantaged 10% in the state (according to the latest version of the CA Communities Environmental Health Screening Tool), or at least 75% of the public school students in the project area are eligible to receive free or reduced meals under the National School Lunch Program.

For ATP Cycle I matching funds of a least 11.47% were required for all projects except for projects predominantly benefiting a disadvantaged community, stand-alone non-infrastructure projects (for example community safety and bike education programs) and safe routes to school projects. The source of the matching funds was any combination of local, private, state or federal funds. Matching funds were required to be expended in the same project phase (permits and environmental studies; plans, specifications, and estimates; right-of-way capital outlay; support for right-of-way acquisition; construction capital outlay; and construction engineering) as the Active Transportation Program funding. The matching requirements for ATP Cycle II are subject to change pending finalization of the program's guidelines.

For fiscal year 2016-17 and 2017-18, the funding available for the SCAG region should be similar. The next round of grant submittals will be due in March 2015. The most current information on the ATP program can be found at www.catc.ca.gov/programs/ATP.htm

6.2.2 AB2766

Since 1991 local governments have received AB 2766 funds to implement programs that reduce air pollution from motor vehicles. AB 2766 specifies that a Motor Vehicle Registration fee surcharge of $6 per vehicle be collected by the Department of Motor Vehicles and given to the South Coast Air Quality Management District (SCAQMD) for disbursement. Of this fee, 40% goes to local governments. The local funds are designed to help cities meet requirements of the federal and state Clean Air Act.

The AB 2766 guidelines indicate that the design, development, and installation of bicycle routes, bikeways/bike paths and bike trail improvements are eligible for AB 2766 funding. The guidelines go on to specify:

> *Bike lanes, paths or routes are most effective when they reduce commute and non-recreational auto travel by encouraging and increasing the use of bicycles. A bike path must eliminate and/or decrease single commuter vehicle trips and miles traveled, while improving safety and accessibility. Bike paths strictly used for recreational activities will not qualify as an eligible project because there are no motor vehicle emission reductions or vehicular commuter trips reduced or eliminated.*

Other bike facilities that promote and facilitate the increased use of non-motorized transit are also eligible. This would include bike racks, lockers, signals, and bus racks; and the installation of bike storage units with park and ride facilities or at the end of bicycle trails. In addition, the purchase of electric or standard bicycles in lieu of gas powered vehicles for police officers, community service personnel, and community residents is eligible. For more on AB 2766 funding see www.aqmd.gov/docs/default-source/transportation/ab2766-motor-vehicle-subvention-fund-program/ab2766-resource-guide.pdf?sfvrsn=2

6.2.3 Climate Ready Grant Program – California State Coastal Conservancy

The purpose of the Climate Ready grant program is to help advance the planning and implementation of on-the-ground actions that will lessen the impacts of climate change on California's coastal resources. The Coastal Conservancy fund may include trails and other public access to and along the coast.

The stages of a project generally funded by the Coastal Conservancy include pre-project feasibility studies, property acquisition, planning (for large areas or specific sites) and design, environmental review, construction, monitoring, and, in limited circumstances, maintenance. For more information see www.scc.ca.gov/category/grants/

6.2.4 Greenhouse Gas Reduction Fund: Affordable Housing and Sustainable Communities program

The auction proceeds from the State's Cap and Trade Program are appropriated in the Greenhouse Gas Reduction Fund. A minimum of 50% of the funds must be used for affordable housing.

A portion of these funds will be made available for bicycle-related projects on a competitive basis through the Strategic Growth Council's Affordable Housing and Sustainable Communities program (AHSC). Eligible projects will include those that result in a reduction of greenhouse gas emissions by increasing accessibility of housing, employment centers, and key destinations via low-carbon transportation options (walking, biking and transit), resulting in fewer vehicle miles traveled (commonly known as transit-oriented development). At least 50% of these funds will be targeted at disadvantaged communities. For updates on the program see http://sgc.ca.gov/index.php

6.3 Regional & Local Programs

6.3.1 OCTA Bicycle Corridor Improvement Projects (BCIP)

In 2012, the OCTA Board of Directors authorized 10% of Federal Congestion Mitigation and Air Quality (CMAQ) funds that are currently authorized under MAP-21 to be set aside for bicycle and pedestrian projects that are "ready to go" as determined through competitive calls for projects.

Eligible applicants include the 35 local government agencies in Orange County. Eligible agencies must be able to receive federal funding through OCTA or must be able to provide authorizing resolutions and cooperative agreements from their controlling bodies or through Caltrans as a direct recipient of Federal Highway Administration (FHWA) funds.

In the 2014 funding cycle, $4.3 million dollars were allocated for bike and pedestrian projects with a minimum grant size of $100,000 and a $1 million maximum. However, projects that required more than $1 million could be segmented into smaller phases and submitted as individual projects. Projects that were prioritized as part of a multi-jurisdictional active transportation planning effort (such as this district

5 Bikeways Strategy) received up to 10 additional points for coordination. A minimum local match of 12% was required for each grant application.

The 2016 BCIP plan is currently under review by OCTA staff with announcements regarding the plan by early 2016. For more information about the BCIP see http://www.octa.net/BCIPcall.aspx

6.3.1 Developer Impact Fees

Under California law, developers can be charged a one-time fee to offset impacts of their project. Traffic mitigation fees, infrastructure improvement fees, and fees for improving sewer and water systems to accommodate new development are common examples of development impact fees. "Exaction" is a broader term for impact fees, dedications of land, and in-lieu fees that are imposed to fund public improvements necessitated by the proposed development. School facility fees, park land dedication requirements, and road dedications and improvements are all examples of exactions.

In order for these impact fees to be imposed, the responsible agency must:

1. Identify the purpose to which the fee is put;
2. Demonstrate a reasonable relationship between the fee and purpose for which it is charged;
3. Identify all sources and amounts of funding anticipated to be used to finance the incomplete improvements; and
4. Designate the approximate dates on which the above funding is expected to be deposited into the appropriate account or fund.

For more on the Developer Impact Fee program see the California Natural Resources Agency website www.ceres.ca.gov/planning/financing/chap4.html

San Francisco has used this fee to fund transportation projects ranging from buses and street cars to bike facilities. As of 2012 the development fee had generated over $100 million dollars to support transit-related projects. To find out more about the San Francisco program see http://www.metroplanning.org/news/newsletters/173

6.4 Private Programs

There are a variety of private sources that may be tapped for funding bike-related programs. Some of the more prominent sources are discussed below.

6.4.1 People For Bikes Grant Program

Formerly known as the Bikes Belong Program, PeopleforBikes (www.peopleforbikes.org) is a bike industry-sponsored non-profit that provides community grants as well as support for advocacy.

The PeopleforBikes Community Grant Program provides funding for important and influential projects that leverage federal funding and build momentum for bicycling in communities across the U.S. These projects include bike paths and rail trails, as well as mountain bike trails, bike parks, BMX facilities, and large-scale bicycle advocacy initiatives.

Since 1999, the program has awarded 272 grants to non-profit organizations and local governments in 49 states and the District of Columbia. Their investments total nearly $2.5 million and have leveraged $650 million in public and private funding. For more information on the grant program see www.peopleforbikes.org/pages/community-grants

People-for-Bikes also sponsors the Green Lane Project, which is aimed at helping cities build better bike lanes to create low-stress streets. The program focuses on protected bike lanes, which are on-street lanes separated from traffic by curbs, planters, parked cars, or posts.

The Green Lane Project hosts hands-on workshops and study tours for city leaders, provides technical and strategic assistance, and delivers targeted grants designed to get protected bike lanes on the ground.

For more information on the Green Lane Project including an excellent video on protected bike lanes see http://www.peopleforbikes.org/green-lane-project.

6.4.4 Kaiser Permanente Healthy Eating Active Living (HEAL) Program

For over 60 years Kaiser Permanente has offered grants to charitable and community based organizations.

According to the Kaiser Permanente website:

> *Our Community Health Initiatives take a prevention-driven approach to health, supporting policies and environmental changes that promote healthy eating and active living (often referred to as HEAL) in neighborhoods, schools and workplaces. Our work also addresses community economic development, environmental sustainability and neighborhood safety—key factors in promoting healthy communities. We work with community-based organizations and residents to translate their vision for healthy communities into visible, concrete changes—and ultimately healthier neighborhoods.*

Cities such as Long Beach have used HEAL grants as part of their bike program neighborhood outreach and education effort. The Long Beach grants were obtained through their Public Health Department. For more on Kaiser Permanente grants see http://share.kaiserpermanente.org/article/grants-overview.

7.0 APPENDICES

A. Sample Letter of Support

The following is an example of a letter of support that would be prepared by an individual city and submitted as part of a grant funding application.

Date
Funding Agency
Address
City, State, Zip

Subject: Letter of Support for Funding Grant Application for (insert Project name)

To Whom it May Concern:

The City of (insert name) is submitting this letter in support of the funding grant application submitted by (insert lead agency) for the (insert project name). This proposed bikeway project represents an important piece of the regional bikeway network in south Orange County. We recognize the benefits that the project will provide not only to (insert city name), but all cities within this section of the county.

This proposed project was identified as a focus corridor as part of the District 5 Bikeways Collaborative, a joint effort involving our city, the project applicant, the Orange County Transportation Authority (OCTA), and other neighboring local agencies. Our city was an active participant in the District 5 Bikeways Collaborative. This collaborative effort focused on regional bikeway planning and the identification of bikeway projects and improvements that would provide benefits throughout Orange County's Supervisorial District 5. The collaborative was one of many projects undertaken by OCTA to improve regional bikeways planning throughout Orange County.

Improving bikeway facilities within District 5 is a key priority for our city. Bikeway facilities help to provide our residents and commuters with alternatives to automobile travel and provide safe and convenient bikeways to encourage people to travel by bicycle. We enthusiastically support the consideration of the (insert project name) for funding through this program.

Sincerely,

City Contact
Title

B. Facilitation Efforts

Preparation of this report was a collaborative effort, with facilitation by OCTA of input from public stakeholders, agency staff, and elected officials. Preparation of the strategy included the following efforts.

Project Development Team (PDT) Summary

A project development team (PDT) was convened with planning and engineering representatives from each member agency within District 5, as well as OCTA, OCCOG, and project consultant team staff. The PDT met on multiple occasions to discuss project goals and objectives, opportunities and constraints, preliminary corridor alignments, and draft ranking criteria. Meetings were held at Laguna Hills Community Center (October 2013 & May 2014), Lake Forest City Hall (December 2013), San Juan Capistrano Council Chambers (April 2014), Laguna Beach City Hall (July 2014), and San Juan Capistrano Community Center (September 2014). Attendance at the PDT meetings ranged between 20-30 attendees. The PDT membership included the following representatives:

- City of Aliso Viejo – Shaun Pelletier
- City of Dana Point – Brad Fowler
- City of Irvine – David Law
- City of Laguna Beach – Scott Drapkin
- City of Laguna Hills – Ken Rosenfield, Humza Javed, and Katie Crockett
- City of Laguna Niguel – Edgar Abrenica
- City of Laguna Woods – Douglas C. Reilly
- City of Lake Forest – Carrie Tai
- City of Mission Viejo – Philip Nitollama and Greg Stones
- City of Rancho Santa Margarita – Anthony Viera and Nate Farnsworth
- City of San Clemente – Tom Frank
- City of San Juan Capistrano – Joe Mankawich and George Alvarez
- County of Orange – Khalid Bazmi, Joe Sarmiento, Sam Ahi, and Hany Ahmed
- Caltrans – Romeo Estrella and Marlon Regisford
- Transportation Corridor Agencies (TCA) – Valarie McFall
- OCTA – Charlie Larwood, Gary Hewitt, Carolyn Mamaradlo, Marlon Perry, Paul Martin, Nathan Wheadon

Focus Group Meetings

Focus group meetings were organized with PDT representatives to create smaller working groups consisting of groups of cities. During the focus group meetings, large-format boards were printed for brainstorming potential bikeway corridors. The printed materials included the identification of water and rail corridors, the transportation network, existing and proposed bikeways, major destinations, and other key features for consideration and collaborative brainstorming.

Focus group meeting #1 occurred on January 13, 2014 at the City of Mission Viejo with representatives from Mission Viejo, Lake Forest, Laguna Woods, Laguna Hills, Rancho Santa Margarita, County of Orange, and Caltrans. Focus group meeting #2 occurred on January 27, 2014 at the City of Dana Point with representatives from Dana Point, Laguna Beach, San Clemente, County of Orange, and Caltrans. Focus group meeting #3 occurred on January 30, 2014 at the City of Laguna Niguel with representatives from Laguna Niguel, Aliso Viejo, and County of Orange.

From the three focus group meetings, the "Potential Bikeway Corridors" inventory map was developed to identify potential corridors which agencies would like to develop in the future. From these potential corridors, the nine regional bikeway corridors were developed. Figure B-1 illustrates the potential bikeway corridors initially identified by the PDT members. While not all of these connections were ultimately designated on the recommended regional network, they may still be considered in localized planning and implementation efforts by the respective cities and County agencies.

These potential bikeway corridors can be identified and serve as local spur connections from the nine regional bikeway corridors and other bikeway facilities throughout District 5. These local spur connections will help build a larger bikeway network with additional connectivity to regional and local bikeway corridors as well as regional and local destinations and attractions.

C. Outreach

Media

Information regarding the District 5 regional bikeways was provided at www.octa.net/Share-the-Ride/Bike/Bikeways-Planning/Regional-Bikeways-Planning. The webpage includes a project overview, background, schedule, and a map illustrating the existing bikeways network in the project area along with the potential bikeway corridors in District 5. The webpage was updated regularly with project materials including meeting materials, meeting dates, and contact information. Additionally, outreach events schedules within the community were posted to the webpage to provide notification to the community. The project website includes a marketing contact from OCTA in the frame on the right with phone and email contact information provided.

PDT IDENTIFIED POTENTIAL BIKEWAY CORRIDORS

OCTA District 5 Bikeways Collaborative

KOA CORPORATION PLANNING & ENGINEERING

Source: OCTA

BIKEWAY CORRIDORS

- Potential Bikeway Corridors

LEGEND

- Transportation Center
- Rail
- Schools
- Colleges
- Parks / Open Space
- Waterbody
- City Boundary
- Supervisorial District 5

Questionnaires

Questionnaire #1

An initial online questionnaire was distributed to gather input that would be useful for developing the regional bikeway corridor alignments and in consideration of the types of connections to serve. The results of this questionnaire were provided to the PDT and considered in developing the draft corridors. There were a total of 167 respondents through the OCTA webpage. Below are the results of the questionnaire:

1. How often do you ride your bicycle?		
Answer Options	**Response Percent**	**Response Count**
4-7 days a week	41.3%	69
2-3 days a week	31.1%	52
Once a week	13.2%	22
Less than once a week	14.4%	24
	answered questions	167
	skipped questions	0

2. Why do you ride your bicycle (check one that applies most often)?		
Answer Options	**Response Percent**	**Response Count**
To go to work/school	31.7%	52
To go shopping/run errands; For entertainment; To socialize	12.8%	21
To exercise; For recreation	55.5%	91
Other (please specify)		16
	answered questions	164
	skipped questions	3

3. How far do you usually ride your bike?		
Answer Options	**Response Percent**	**Response Count**
0-3 miles	14.5%	24
4-6 miles	18.7%	31
7-9 miles	12.7%	21
10 miles or greater	54.2%	90
	answered questions	166
	skipped questions	1

4. Which of the following do you use to ride your bicycle (check all that apply)?		
Answer Options	**Response Percent**	**Response Count**
Off street paths (e.g. sidewalks, trails, etc.)	80.2%	134
Residential streets or streets with a speed limit below 35 MPH	79.0%	132
Streets with a speed limit over 35 MPH and with a bike lane	70.7%	118
Streets with a speed limit over 35 MPH and no bike lane	46.1%	77
Other (please specify)		12
answered questions		167
skipped questions		0

5. What is the biggest challenge to bicycling in your neighborhood?		
Answer Options	**Response Percent**	**Response Count**
Steep hills	14.5%	22
High-speed traffic	32.9%	50
Long distances	0.7%	1
Lack of bicycle facilities (e.g. bike lanes, bike parking, etc.)	52.0%	79
Other (please specify)		30
answered questions		152
skipped questions		15

6. Have you ever been in an accident on or with a bike?		
Answer Options	**Response Percent**	**Response Count**
Yes	38.8%	64
No	61.2%	101
If yes, please describe (optional).		54
answered questions		165
skipped questions		2

If yes, please describe (optional).	
Number	**Response Text**
1	Hit & run in Laguna Beach. The driver sideswiped me then took off.
2	I have had 3 minor collisions with cars while on my bike and had one major solo crash. All within the last 9 yrs.
3	I was run off the road by an automobile, separated shoulder
4	Another cyclist riding the wrong way hit me head-on.
5	Mechanical failure

If yes, please describe (optional).	
6	A block of wood fell off a truck. I was biking on the road and I couldn't get out of the way. So I fell on the street and I feared getting hit from the cars behind me.
7	It was my own fault. Did not involve a car.
8	Twice years ago between J Serra and Avery (minor scrapes). Too many close calls to count.
9	Hit by a car twice. Once was my fault the second time I was in a painted bicycle lane in downtown Anaheim and I was cut off by a car.
10	Never a car/bike collision, because I ride like a driver. And I have been spared the bad fortune of being in the trajectory of an impaired motorist.
11	Driver ran a stop sign on T intersection.
12	Almost. The SE corner of Campus and Culver is an accident waiting to happen. Cars turning east to Campus tend to go without stopping or looking.
13	Too many close calls and aggressive or unaware drivers who drive to close to a bicyclist or sound their horns as they pass.
14	Hit by a truck (vehicle failed to yield). Hit a pedestrian who jaywalked (she was cited). Skidded on oil while turning.
15	A driver made an illegal maneuver coming from a stop and hit me on the side, while I was crossing the intersection with a green light.
16	I've been run down 2 times both knee , operations , uninsured , hit and run
17	I have not been hit by a car, but have had plenty of close calls with cars driving into the Class II bike lane and almost hitting me.
18	I have been grazed, (not too serious), by a car, on two separate occasions.
19	Since I'm 60, and have been riding most of my life, I've been in several serious ones. Fortunately none were life threatening.
20	children on the bike path stopping abruptly.
21	With another rider, cutoff, cracked helmet in half. No hand signals used by the offending rider.
22	Many times it is people in some type of motorized vehicle who is driving much too fast or turning carelessly with little to no regard of a bicyclists right of way
23	Slipping on wet roads and falling on mountain trails.
24	About 30 years ago I hit a sidewalk adjacent, raised planter (OK, I used to ride on sidewalks as a kid) and broke my ankle.
25	sideswiped on Hamilton bridge, followed and driven into curb on w16th in Costa mesa
26	DO YOU MEAN BIKE CRASHES? (THEY ARE USUALLY AVOIDABLE AND ARE NOT ACCIDENTS.) DURING 70 YEARS OF BICYCLING: - SEVERAL WITH STATIONARY OBJECTS. - MAYBE 4 WITH OTHER CYCLISTS - NEVER WITH A MOTOR VEHICLE.

If yes, please describe (optional).	
27	I rear-ended a truck that cut me off.
28	Hit by a car who turned in front of me without notification. No bike lane.
29	slipped on wet surface, fell, bruised hand
30	Hit by a car in South Carolina. Other crashes by myself or in races.
31	Car turning right did not look right and hit me and took off
32	Ran off the road by a car on Jamboree Blvd.
33	Motorist made a sudden right turn in front of me on Crown Valley Parkway and I collided with the vehicle.
34	I slipped on wet pavement and had skin abrasions in 2004
35	Car swerved into bike lane on Lambert Road in North Orange County and struck me. The car kept driving without stopping.
36	Car wanted to make a right hand turn and parked me into the curb. Car made an oncoming left hand turn trying to out run me in the intersection.
37	I have been hit by a truck, and thrown over the handlebars of my bicycle, among other accidents. I ALWAYS wear a helmet!
38	Was wearing a high visibility 3m scotchlite sweater and was hit by a car turning. He never even looked in my direction when pulling into the street. Pulled out right in front of me.
39	about 14 years ago, someone turning right against a red light as I was in the crosswalk, struck me, destroying my bike. Luckily, I rolled over the hood and landed on my feet. Driver took me to emergency care then to Jax Bicycle Center to buy me a new bike.
40	I have been twice struck by cars that were turning into shopping centers. In one of these hit-and-run accidents, I was thrown onto my knee, which resulted in hemorrhagic bursitis ligament strain, and a chondral fracture of the patella. As a result, I now have arthritis in that knee and underwent arthroscopic debridement 2 1/2 weeks ago. My life has been forever altered by a vehicle that came up from behind and suddenly cut across my path without warning.
41	on sidewalk, something jammed in my spokes
42	Many years ago (and not in California) I was riding in a designated bike lane when a car in the oncoming lanes turned left in front of me. I collided with the passenger-side of the car, went over the hood, and was saved from significant trauma by my helmet.
43	stopped too fast and fell off, trying to avoid turning vehicle in the right lane where I was going straight (thankfully, didn't collide with another vehicle or bike)
44	Hit from the rear while making a left hand turn on my bike.
45	Several. Only one involving a driver, in Corona Del Mar on PCH. Inattentive driver turned right suddenly in front of me and another biker after having just passed us seconds before.
46	Another cyclist hit me. Also a car almost hit me in the bike lane.

If yes, please describe (optional).	
47	the car driver was not looking and backed out of there drive way and hit me
48	I fell from my bike while transitioning from the street (bike lane) to an off street bike trail. The road surface, gutter, and curb created a situation in which caused my front tire to track in the gutter and not to the path smoothly causing me to lose control and fall.
49	I was hit by a car in an intersection and bumped into a car in a crosswalk. I almost get hit by a car every time I ride my bike!
50	was riding on sidewalk and car cut in front of me
51	I was riding in a fairly low-speed limit medium density residential area with shops and a car coming from a 25 mph residential area ran through a stop sign speeding. In order to avoid the car, which I judged was going over 30 mph, I knew I had to fall into the street and off my bike. So I got off my bike and hit the road and my bike rolled on top of me, but I avoided the car. I wasn't wearing a helmet. I managed to get by with a few scrapes and a bruised elbow. Since then, I am overly cautious and will bike slower and stop more frequently to avoid dangerous cars.
52	Hit by a car as it was turning on to PCH in Laguna Beach.
53	Fell off braking for a bunny crossing the path :-)
54	Taking a corner too quickly, touching wheels, and hit a street reflector

Other Comments	
Number	Response Text
1	I am interested in the Citizens Advisory Committee
2	Off street bike paths are needed desperately.
3	More dedicated trails for bikes and safe connections to Metrolink and more bus runs for bike racks
4	Why can't we place K rails on bike routes that parallel major roads
5	Vehicle speed limits are too high on most streets making for a dangerous combination when bicycles are put into the mix. There should be more traffic control police to slow things down!
6	We need more bike paths/lanes along the major streets. Sidewalks are cluttered with electrical boxes, street light boxes, power poles, etc.; sidewalks don't allow enough space for bike traffic.
7	great information and survey
8	I've heard talk of a bike/ pedestrian bridge being added to the west side of the existing train bridge over San Juan Creek behind SJC City Hall. The "Trail" on the east side of San Juan Creek from Doheny currently dead ends at the San Juan Creek/ Trabuco Creek terminus. Most people who ride that trail just carry their bikes over the train tracks (it's illegal, but MUCH safer than riding northbound Camino Capistrano into San Juan from the beach). If the trail was extended over San Juan Creek by a bridge it would alleviate the need to travel northbound on Camino Capistrano altogether. Thanks for your time.
9	Please keep working hard to improve cycling in north Orange County. Your hard work isn't going unnoticed.
10	Thanks for the great work. Orange County Cycle Paths could always be better and the obvious gaps and disconnects are frustrating ... but despite that they are a great amenity, and we should be grateful for what you do! Thank You
11	Creating safe and well-lit bike lanes to major centers such as CSUF, Fullerton College, Fullerton Transportation Center, Brea Mall, Honda Center, Angel Stadium etc., will encourage bicycle usage and relieve congestion and pollution and allow persons to consider this viable year-round option for commuting and travel. I am grateful for what has been done so far and would encourage more active work in this undertaking. Please make it safe and convenient for us to ride our bikes.

Other Comments	
Number	**Response Text**
12	Cycling for recreation or commuting is safe and FUN in Orange County! Spread the word about Safe Cycling by encouraging people to take the TS101 classes. Slow down and enjoy the ride!!!
13	Please install more Class I bikeways!!!
14	Thank you for supporting transportation by bicycle!
15	It's important to build bikeways now. My friends are dying on the road. Drivers don't like bike riders. We need a circular bike only path that actually circles Orange County and allows riders to enter the path and be safe from cars. We should work to do this now. We need to use the old railroad tracks.
16	Please start including bicycle facilities on all transportation projects. This is a zero emission transportation mode and needs to get priority funding.
17	We need more areas specifically for cyclists that are off road and safe, painted lines in the street do nothing to impede motorists from running over or into cyclists as most motorists do not even regard the bike lane as its own part of road.
18	Preserve and improve trail along east side of San Juan Creek from Camino Cap to Doheny Beach.
19	I would use my bicycle much more often for shopping if there were ways to get to even a few destinations, like Irvine spectrum, without competing with car traffic, especially at night.
20	Please consider a bikeway connection on Irvine Blvd between Tustin Ranch Road and Newport Blvd. Thank you!
21	I need A TUNE UP WITH NEW TIRES & TUBES.
22	By far the biggest hazard is highway overpasses with no bike path. Getting across highways safely on a bike is very difficult, and there are many of them in OC.
23	Santa Ana is one of the most unfriendliest bike cities I've ever known!
24	We need to get the word out to the community that riding is safe and fun. The best way to do that is have a ciclavia event in orange county. Close the streets somewhere on a Sunday and have a festival type event like in LA. How about downtown Santa Ana? Families, food trucks, music, art, bikes, corporate sponsors, etc. I am willing to help, but don't know who to contact or how to get started! Eric
25	Great Job OCTA!!!!
26	Need to study Amsterdam as that MAJOR EU city has more bikes than cars. And car traffic mixed with bike traffic.
27	none of this survey seems to be about South County, which is the worst place for bike riding at present. Few trails and almost none link to one another.
28	Please install a class 1 bike lane on the unused Pacific Electric Right of Way, which cuts through OC and bisects Garden Grove.
29	I drive and I ride. I share the road.
30	Give buses the capacity for more than two bicycles.
31	Consider reaching out to OC bike clubs to get more bike rider input.
32	I would ride to work if there was a safe trail or bike lane.
33	As long as people on bikes run stop signs & red lights; ride against traffic in the street; unpredictably ride on and off of the sidewalks... motorists are going to continue to disrespect and dislike us. Better public education and enforcement of the vehicle code for both bikes and cars is much needed.
34	Bikes and high speed cars just don't mix well. More truly dedicated bike trails, like the River Trail would be great.
35	There needs to be designated parking areas for landscapers and maintenance vehicles that do not impede bike traffic using designated bike lanes or paths. A turnout area for maintenance purposes needs to be created in greenbelt (similar to bus stops) that provides for the safety of the bicyclist and the maintenance crews working in the street.
36	I would like to help bring attention to drivers of bicyclists rights to share the road and navigate intersections with our safety as a number one priority. Secondly I could useful in helping develop bike trails and lanes to encourage pedestrian and bicycle routes for pedestrians also.
37	Like the fact that you are doing surveys to making biking safer.... too many cyclists are being killed.

Other Comments	
Number	**Response Text**
38	Long somewhat flat trails away from traffic are the best. A neurologist I know made me promise him that he would never, ever find me riding in traffic. I think the biggest problem riding in bike lanes is that cyclists tend to think that all the traffic is watching out for them. Not so true.
39	I live in Westminster and just to get out of the city is a huge hassle, McFadden and bolsa are TERRIBLE for bikes
40	We need more bike lanes in South Orange County, especially Mission Viejo, Laguna Niguel and Aliso Viejo. Thanks!
41	The City Council of Aliso Viejo is doing a lot to make Aliso Viejo very bike friendly, but Pacific Park, from the 73 to Wood Canyon Drive is not safe for bicyclists, in my opinion. The speed limit is 50, but most of the time there is little traffic and some drivers thunder through at 60 and even 70 mph. Furthermore, this stretch of Pacific Park is now a 4 lane street, but, in my opinion, it can be reduced to a 2 lane street; the bike lanes can be expanded and separated from traffic with a row of trees or shrubbery. With the beautiful views, this area can become great for bicyclists. For example, people can ride their bikes from their homes to the shopping mall on Aliso Creek, to the Aliso Viejo library, and to the different park areas.
42	Orange County's level of bike (un-?)safety is so severe I am too afraid to use city streets. It's just not worth it and there is such a large system of trails I don't really see the point. But this seriously limits the metropolitan area's ability to encourage alternative uses for transportation.
43	I don't live in the 5th District. It is the place to ride, when will you have a survey for the other districts? I want to ride my work from Tustin to Santa Ana. It's far too dangerous even though it's a straight shot via streets. Help!
44	Wahoo!

Questionnaire #2

A second questionnaire that asked respondents to identify corridors they would be most likely to utilize was distributed online, during outreach events, and at the second Roundtable event. The survey included a graphic showing the preliminary regional bikeway corridors for the respondents to select the top three regional corridors they would like to see studied further. A sticker survey was conducted during the Roundtable #1 meeting for the participants to select the top three corridors they would like to see studied further. The table below shows the results of the online and sticker survey.

Corridor	Online Questionnaire	Roundtable #1 Sticker Survey	Total Survey Score
PCH Corridor	82	14	96
Laguna Canyon Corridor	59	3	62
Aliso Creek Corridor	54	4	58
Muirlands/Cabot Corridor	35	12	47
Antonio/La Pata Corridor	18	5	23
San Juan Creek Corridor	18	4	22
El Toro/Alicia Corridor	20	1	21
Portola/Santa Margarita Corridor	17	2	19
Oso Parkway Corridor	9	4	13

Bikeways Roundtables

Two roundtables provided the opportunity for public input on the project. The first roundtable provided project information and a presentation was made on the potential corridors and the proposed ranking criteria. Public input was requested and a group discussion was facilitated. Large-format boards were provided describing each of the draft corridors. The second roundtable included a presentation focused on key changes since the first roundtable and the ranking of the nine regional bikeway corridors. Attendees included public stakeholders from bicycle advocacy groups as well as elected officials and community residents. Attendees at the roundtables were provided various opportunities to provide feedback including participating in the group discussion, provide comments on the boards directly, and through comment sheets.

Bikeways Roundtable 1: Laguna Hills Community Center

The first bikeways roundtable was conducted in Laguna Hills on Wednesday, May 28, 2014, at the Community Center to provide detailed information to members of the public and solicit input on the draft corridors and ranking criteria. Approximately 30 people attended. A presentation was given, discussing the regional context and background, with an overview of each draft corridor. Large-format boards were also provided to illustrate the alignments and characteristics of each draft corridor. The ranking criteria were summarized in the PowerPoint presentation. Input from stakeholders and the public helped refine and prioritize the corridors as well as identify non-engineering ideas for improving bicycling within District 5. Roundtable materials were provided at the workshop and on the OCTA website, which included the presentation given in PDF format, a project factsheet, the Draft Regional Bikeways Corridors Map, and the draft evaluation criteria.

Bikeways Roundtable 2: San Juan Capistrano Community Center

The second bikeways roundtable was conducted in San Juan Capistrano on Wednesday, September 17, 2014, at the Community Center to provide a quick summary of the refined corridors and ranking analysis and to discuss the next steps for the feasibility studies. Large-format boards were provided to illustrate the proposed bikeway corridors and the top three ranked corridors. A presentation was given, discussing the proposed corridors with changes identified as a result of the first bikeways roundtable. Roundtable materials were provided at the roundtable and on the OCTA website, which included the presentation given in PDF format, the Regional Bikeways Corridors Map, and the corridor ranking results.

D. Corridor Ranking Criteria

Corridor Ranking Criteria Definitions and Scoring

Since raw measures are in different units, they have been normalized to provide a "weighted score" in order to combine scores across the different scales. For example, the number of collisions per mile for a given corridor is transformed into a normalized score between 0 and 100 using the formula given below. To maintain consistency (100 is best), the maximum and minimum terms have been reversed if the scoring is done on a measure where lower values are more desirable.

$$\text{Normalized Value} = 100 \times \frac{\text{Actual value}}{\text{Maximum value in range}}$$

Below is a discussion of the criteria and weighting utilized in the ranking analysis.

1. **Level of Traffic Stress (LTS):** addresses perceived safety related to traffic volume, traffic speed and existing bikeway type. The foundation for the traffic stress analysis is based on The Mineta Transportation Institutes' Low-Stress Bicycle and Network Connectivity model. High-stress routes are prioritized for treatment. Weight: 1.0

    - Stress increases with the number of traffic lanes, traffic speed, and lack of existing bikeway facilities. LTS scores can range from 1 (low stress) to 4 (high stress).

STRESS CATEGORY	STRESS INDICATOR
LTS 1	Suitable for almost all cyclists, including children trained to safely cross intersections.
LTS 2	Suitable to most adult cyclists but demanding more attention than might be expected from children.
LTS 3	Suitable to many adults currently riding bikes in American cities.
LTS 4	Suitable to very few people, the "strong & fearless" cyclists who will ride in nearly any setting.

- The criteria for level of traffic stress (LTS) used on the District 5 Regional Bikeway Corridors were the following:

FACTORS	LTS 1		LTS 2		LTS 3			LTS 4			
Bike Facility	Class I	Class II	Class II	None or Class III	None or Class III	None or Class III	Class II	None or Class III	None or Class III	None or Class III	Class II
Number of Lanes	No effect	2	No effect	2-3	2-3	4-5	4 or more	2-3	4-5	6 or more	No effect
Speed (mph)	No effect	Up to 25	30	Up to 25	30	Up to 25	35	35 or more	30 or more	No effect	40 or more

(No effect) = Factor does not trigger an increase on this level of traffic stress.

- The LTS analysis scoring calculations of each corridor were derived by first identifying the LTS score of each street segment within a corridor. The distance of all street segments with the same LTS score (1-4) within a corridor were calculated in miles.
    - The magnitude of each LTS score (1-4) was calculated using the total distance of each LTS among the corridor (in miles), as shown in the formula below:
        - (LTS Score) x (Total Distance of LTS Among Corridor (miles))
    - The raw score for each corridor was calculated by adding the magnitude of each LTS score category and dividing that by the length of the corridor (in miles) as show in the formula below:
        - (Magnitude of all LTS score categories) / (Length of Corridor (miles))

2. **Reported Collisions:** addresses safety through five years of reported data, normalized by crashes per mile. Unlike automobile crashes, the lower volume of bike crashes and lack of robust, long term exposure data (i.e. number of bicyclists using each corridor) means that this dataset is less statistically sound than others. However, it is still commonly reported and easily understood. Weight: 1.0

   Crash data were obtained from the California State Wide Integrated Traffic Records System (SWITRS), which provides a statewide compilation of all vehicle, pedestrian and bicycle related crashes on public streets and highways.

- For each corridor, a 100-foot buffer was defined. All reported collisions for the five year period (2007-2011) were counted. The total reported collisions were divided by corridor length in miles. Corridors with higher collisions per mile are prioritized for treatment.

3. **Economic Efficiency:** measures the financial benefits associated with the corridor, normalized by the number of anticipated users, and divided by planning level construction cost estimates. Weight: 0.75

- Using National Cooperative Highway Research Program (NCHRP) Report 552 methods, ¼, ½, and 1 mile buffers are drawn around each corridor to obtain population and journey-to-work mode share data. The bike commute share rate is factored up to estimate the rate of all existing adult bicyclists (both commute and non-commute). This rate is applied to the population around the corridor to provide an estimated number of existing bicyclists. To estimate the number of new bicyclists induced by new bikeways, a multiplier is applied to the number of existing bicyclists. Based on these ridership levels, the cumulative financial value for annual mobility, health, recreation, and reduced auto use benefits is calculated.

- The assumptions in the NCHRP method are modified to more conservative values (for example, rather than assuming that a new corridor facility would result in usage by new riders 365 days per year, usage was estimated for only 12 days per year). Also, all benefit figures are calculated using the original dollar values rather than updated to 2015 values. These simplifications and conservative assumptions are considered appropriate given the high-level comparative nature of the assessment. The economic evaluation assumes a 30-year analysis period, 0.57% annual population growth rate and a 5% discount rate. The net present value (NPV) of benefits is divided by cost.

- The calculation methodology is comprised of the following categories of data and calculations to determine the benefit-cost ratio (BCR).

    - ***American Community Survey (ACS) Data*** – contains data used to determine the following information based on the ACS data and the NCHRP Report 552 methodology.
        - Total Population
        - Adult Population
        - Workers 16+
        - Bike Commuters (Bicycle Only)
        - Bicycle Mode Share (mean percentage within buffer)
        - Adult Population (not cumulative)
        - Commuters (Workers 16+)

    - ***Calculated Rates*** – contains the adult bicycling rates calculated using the ACS bicycle commute mode share (C) and the formula below provided in the NCHRP Report 552 methodology.

$$T_{\text{moderate}} = 0.4 + 1.2C$$

The table below summarizes the Benefit-Cost Analysis for the nine study corridors.

	Calculated Rates	EXISTING		NEW		Annual Mobility Benefits	Annual Health Benefits	Annual recreation Benefits	Annual Reduced Auto Use	Annual Combined Benefits	Project Life Combined Benefits (30 yrs)	Cost	Benefit-Cost Ratio
		Bike Commuters	Adult Bicyclists	Bike commuters	Adult Bicyclists	Bike commuters existing + new	New adults	New adults - new bike commuters	New bike commuters			Maintenance not included	
Corridor													
Aliso Creek Trail		578	1879	769	2044	$1,964,491	$261,586	$152,990	$109,369	$2,488,436	$37,757,162	$9,107,852	**4.5**
Quarter-Mile	1.9%	266	611	514	1,179								
Half-Mile	1.7%	184	515	205	571								
One Mile	1.3%	127	754	50	294								
Antonio/La Pata/Pico		131	528	139	527	$318,057	$67,416	$46,518	$19,781	$451,773	$6,153,177	$12,284,675	**0.6**
Quarter-Mile	0.8%	43	146	83	282								
Half-Mile	0.8%	30	133	34	148								
One Mile	0.7%	58	248	22	97								
Laguna Cyn Rd/El Toro/ Alicia		460	1194	356	1065	$948,965	$133,868	$83,219	$50,130	$1,216,183	$17,983,490	$11,170,302	**1.8**
Quarter-Mile	1.0%	64	253	124	488								
Half-Mile	1.2%	109	291	121	323								
One Mile	1.4%	287	650	112	254								
Laguna Canyon		50	160	45	134	$109,251	$17,197	$10,775	$6,339	$143,562	$2,060,800	$13,271,851	**0.2**
Quarter-Mile	0.9%	11	29	21	56								
Half-Mile	0.9%	12	38	13	42								
One Mile	0.9%	27	93	11	36								
Muirlands/Cabot/Camino Capistrano		865	2604	1055	2785	$2,460,708	$356,483	$207,626	$150,070	$3,174,886	$48,703,636	$8,182,863	**6.4**
Quarter-Mile	3.0%	352	821	680	1,584								
Half-Mile	2.6%	243	702	269	779								
One Mile	2.0%	270	1,082	105	422								
Oso Parkway		118	446	104	385	$268,429	$49,330	$33,728	$14,841	$366,329	$5,062,515	$6,148,519	**1.0**
Quarter-Mile	0.8%	25	89	47	172								
Half-Mile	0.8%	29	104	32	115								
One Mile	0.7%	65	253	25	99								
Pacific Coast Highway		216	631	226	693	$528,474	$88,729	$56,004	$32,224	$705,432	$10,110,333	$5,345,509	**2.2**
Quarter-Mile	0.9%	63	206	122	397								
Half-Mile	1.0%	62	181	69	201								
One Mile	1.0%	91	244	35	95								
Portola Santa Margarita		76	316	84	318	$189,685	$40,721	$28,080	$11,970	$270,456	$3,669,629	$7,239,154	**0.6**
Quarter-Mile	0.8%	25	86	48	165								
Half-Mile	0.8%	22	87	25	97								
One Mile	0.7%	29	143	11	56								
San Juan Creek Trail		323	898	407	975	$1,087,270	$124,793	$68,127	$57,936	$1,338,125	$20,878,928	$4,183,833	**5.2**
Quarter-Mile	3.8%	135	288	260	555								
Half-Mile	3.5%	102	252	114	280								
One Mile	2.7%	86	358	34	140								
TOTAL		**2814**	**8637**	**3182**	**8907**	**$7,875,330**	**$1,140,123**	**$687,067**	**$452,660**	**$10,155,182**	**$152,379,670**	**$76,934,558**	**2.2**

Note: Calculations above are based on the methodology described in the National Cooperative Highway Research Program Report 552

- ***Existing Adult Bicyclists*** – applies the calculated adult bicycling rates to the adult population to estimate the number of existing adult bicyclists.

- ***New Adult Bicyclists*** – applies multipliers for each buffer (1/4, 1/2, and 1-mile), provided in the NCHRP Report 552, to the calculated existing adult bicyclists values to calculate the number of new bicyclists.

- ***Annual Mobility Benefits*** – assumes monetary value for time people are willing to add to trips in order to use designated biking facilities ($4.08 for Class I and $3.60 for Class II). Annual commuter trips are calculated based on the number of existing and new bicyclists multiplied by 364.8 commute trips per year. This is more conservative (48wks/4days/1.9trips) than what is recommended in the NCHRP Report 552 (50x5x2). Then, the percentage of Class I vs. II trips are determined based on the percentage of existing conditions along the corridor.

- ***Annual Health Benefits*** – uses the annual per-capita cost savings from physical activity of $128 to calculate the annual health benefits of new adult bicyclists.
- ***Annual Recreation Benefits*** – uses the calculated new adult bicyclists, the calculated new bike commuters, the days per year of bike recreational use, and the "typical" day which is valued at $10, to calculate the Annual Recreation Benefit.

- ***Annual Reduced Auto Use*** – uses the calculated new bike commuters, the savings per mile, each way trip distance value, and the calculated commute trips per year to calculate the annual reduced auto use benefit for new bike commuters. Savings per mile and each-way-trip distance values were provided in the NCHRP Report 552 methodology.

- ***Combined Benefits*** – is the sum of annual mobility, health, recreation, and reduced auto use benefits.

- ***NPV Combined Benefit***s – uses a 30 year analysis period, an annual population growth rate of 0.57%, and a discount rate of 5% (values provided in the NCHRP Report 552 methodology) to calculate the NPV combined benefits.

- ***Cost*** – is the value calculated from the planning-level construction cost estimates calculated for each corridor, which do not include right-of-way, utility impacts, and maintenance costs.

- ***Benefit Cost Ratio (BCR)*** – uses the NPV combined benefits and the construction cost estimates to calculate the BCR.

4. **Trip Demand:** Based on the Bicycle Priority Index (BPI), a measure of population and employment density, land use, local schools, and transit that influences usage. Weight: 0.75

   - OCTA Bicycle Priority Index GIS output: score per acre. Higher numbers represent a higher estimated potential demand and therefore a higher priority for treatment. The BPI calculations use the origins and destination calculated values within a 1/4 mile buffer for each corridor.
   - The following data are used in the BPI calculations:

ORIGINS

FACTOR	MAX VALUE
Population Density (Base)	10
Population Growth (2035)	8
Population Density less than 18 years old (US CENSUS ACS)	8
Land-Use Mix	8
Bicycle to Work (US CENSUS ACS)	8
Bicycle Network Proximity (Existing)	8

DESTINATIONS

FACTOR	MAX VALUE
Employment Density (Base)	8
Employment Growth (2035)	8
Universities/Colleges (Enrollment)	8
Metrolink Rail Stations (AM Alightings)	8
Schools (Elementary, Middle, High School)	8
Parks, Local Retail/Public Services	4
Bus Stops (PM Trips)	6

   - The BPI is determined using the following formula for each corridor:
     - (Sum of Origin Values + Sum of Destination Values) / (Quarter-Mile Service Area (in acres))

5. **Public Support:** incorporates public priorities through a Public Demand Index. The public input was acquired through Roundtable #1 and online surveys. Combination of online survey questions regarding the selection of the top three desired corridors and the roundtable "sticker survey" votes. Weight: 0.5

6. **Physical Constraints:** A subjective assessment of freeway crossings, on-street parking impacts, channel crossings, railroad crossings, slope, the number of unsignalized street crossings, the need for roadway infrastructure/bridge or bridge crossings, and the need for roadway widening. Fewer constraints result in a higher score, as the corridor will be easier to implement. Weight: 0.5

- The scoring of each individual category was weighted differently by how significant the constraint would be. A total raw score and weighted score was then determined based on the sum of all individual category scores.
    - ***Freeway Crossings*** – measured by the number of freeway crossings that occur along the entire corridor.
    - ***On-street Parking*** – measured by the length (miles) of on-street parking along the entire corridor divided by the corridor length (miles).
    - ***Channel Crossings*** – measured by the number of channel crossings that occur along the entire corridor divided by the corridor length (miles).
    - ***Railroad Crossings*** – measured by the number of railroad crossings that occur along the entire corridor.
    - ***Slope*** – measured by the length (miles) of a roadway or bikeway facility having a slope of greater than 5% divided by the corridor length (miles).
    - ***Unsignalized Street Crossings*** – measured by the number of unsignalized crossings along the entire corridor divided by the corridor length (miles).
    - ***Need for Roadway Infrastructure/Bridge or Bridge Crossings*** – measured by the number of locations where roadway infrastructure or a new bicycle/pedestrian bridge or improved bridge crossings were needed throughout the corridor.
    - ***Need for Roadway Widening (for proposed facilities)*** – measured by the length (miles) of roadway widening needed for proposed facilities divided by the corridor length (miles).
    - ***Existing vs. Proposed Bikeways*** – measured by the ratio of existing versus proposed bikeway facilities of the entire corridor.

7. **Completes the Network:** This is measured by the number of intersections with other existing and proposed bikeways. Although partly captured in the BPI method, the number of links/crossings with existing or proposed bikeways (from CBSP and this project) is recalculated here as the BPI does not include the proposed corridors. Connections to Class 3 bikeways were not considered. Note that this is largely a function of length; therefore the number of connections has been divided by miles. Weight: 0.25
8. **Completes the Corridor:** the portion of the corridor that is already built to at least minimum Caltrans standards for the bikeway type that is proposed. A high ratio (near 100%) means that the corridor has no existing bikeways to build on. This helps to prioritize corridors which are already partially built. This factor is also part of the LTS Index. Weight: 0.25.

E. Corridor Cost Estimates – Detailed Summary

Cost estimates were prepared for each corridor to determine planning-level estimates and were used in the economic efficiency criteria. The costs utilized in the ranking analysis include new bicycle/pedestrian bridges, freeway interchange improvements, and construction costs, but do not include environmental clearance, design, utility impacts, right-of-way, or maintenance costs. The table below summarizes the planning-level cost estimates for each corridor.

The basis for the cost estimates are shown in the following table.

Item	Unit	Rate	Comment
Upgrade Existing Facility	Linear Foot	$0.30	Signs and other upgrades
Upgrade Class II to Separate Bikeway	Linear Foot	$100	Based on Long Beach Costs for upgrading to a Class I separated bikeway. Applied to corridors with high volumes.
New Class 1 Facility	Linear Foot	$150	Installation of new Class 1 Facility where no existing path exists. 10' path construction, striping, and amenities
New Class 2 Facility	Linear Foot	$11	Based on signing and striping of Class II facility where no existing facility exists.
New Class 2 Facility w/ Widening	Linear Foot	$300	Based on signing and striping, curb/sidewalk removals, new sidewalks and pavement for 4' widening in each direction where no existing facility exists.
New Class 3 Facility	Linear Foot	$2.50	Based on striping, bike pavements symbols, and wayfinding signs approximately every 800 ft
Intersection Signs	Each	$780	Bike Sign and Directional Arrow/Route Label
Major Intersection	Each	$50,000	Assumed Average Cost of Intersection Treatment
Grading/Retraining Wall	Linear Foot	$500	Assumes Grading and Approx. 6-8ft Retaining Wall in areas where Class 1 is being proposed in areas of steep existing grades.
Bridge Crossing	Square Foot	$80	Assuming 80 per SF for Bridge with a 12' Wide Bridge
New Bridge	Square Foot	$100	Assuming 100 per SF for construction of new Bridge
Roundabout	Each	$200,000	Based on Long Beach
Fwy Interchange Treatment	Each	$2,000,000	Rough cost for proposed treatment at interchange, which may involve ped/bike crossing signals at ramps, street and or bridge widening, etc.

The table below shows the cost breakdown for each of the nine corridors.

Corridor	Facility Improvements	Mileage	Cost
A: Pacific Coast Highway (PCH)	Class I (new/grading/retaining wall)	5.6	$6,967,000
	Class II (upgrade/new)	9.7	$1,901,190
	Class III (upgrade/new)	6.5	$19,696
	Intersection Signing		$12,480
	Major Intersection Improvements		$400,000
	Bridge Crossing		$590,400
	30% Contingency		$2,967,230
	Total	**21.8**	**$12,857,996**
B: Laguna Canyon	Class II (upgrade/widen)	7.8	$7,163,631
	Class III (upgrade)	1.0	$1,586
	Intersection Signing		$3,900
	30% Contingency		$2,150,735
	Total	**8.8**	**$9,319,852**
C: El Toro/Alicia/Laguna Canyon	Class I (upgrade)	0.5	$840
	Class II (upgrade/new/widen)	13.0	$8,175,112
	Class III (upgrade)	1.9	$3,051
	Intersection Signing		$11,700
	Major Intersection Improvements		$250,000
	Freeway Interchange Improvements		$2,000,000
	30% Contingency		$3,132,211
	Total	**15.4**	**$13,572,914**
D: Portola/Santa Margarita	Class I (new/grading/retaining wall)	0.6	2,080,000
	Class II (upgrade)	6.5	3,430,000
	Intersection Signing		8,580
	Major Intersection Improvements		50,000
	30% Contingency		1,670,574
	Total	**7.1**	**7,239,154**
E: Aliso Creek	Class I (upgrade/new/grading/retaining wall)	19.8	$6,986,420
	Class II (upgrade)	2.0	$3,240
	Intersection Signing		$16,380
	30% Contingency		$2,101,812
	Total	**21.8**	**$9,107,852**
F: Muirlands/Cabot/Camino Capistrano	Class I (upgrade/new)	7.0	$2,061,990
	Class II (upgrade/new)	8.0	$3,525,800
	Class III (upgrade/new)	3.6	$28,960
	Intersection Signing		$9,360
	Major Intersection Improvements		$150,000
	Bridge Crossing		$518,400
	30% Contingency		$1,888,353
	Total	**18.6**	**$8,182,863**

Corridor	Facility Improvements	Mileage	Cost
G: Oso Parkway	Class I (upgrade)	1.6	$2,610
	Class II (upgrade)	8.8	$4,670,000
	Intersection Signing		$7,020
	Major Intersection Improvements		$50,000
	30% Contingency		$1,418,889
	Total	**10.5**	**$6,148,519**
H: Antonio/La Pata/Pico	Class I (upgrade/new)	1.2	$181,530
	Class II (upgrade/new)	14.7	$6,985,700
	Class III (new)	1.9	$25,500
	Intersection Signing		$7,020
	Major Intersection Improvements		$250,000
	Freeway Interchange Improvements		$2,000,000
	30% Contingency		$2,834,925
	Total	**17.8**	**$12,284,675**
I: San Juan Creek	Class I (upgrade/new)	8.5	$2,162,093
	Intersection Signing		$6,240
	Major Intersection Improvements		$50,000
	Bicycle/Pedestrian Bridge		$1,000,000
	30% Contingency		$965,500
	Total	**8.5**	**$4,183,833**

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City of Laguna Hills

Bikeways, Trails & Open Space Master Plan

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November 10, 2001

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Introduction

Regional Location

The project is located within the City of Laguna Hills in south Orange County, California. Laguna Hills is a high quality community consisting of residential neighborhoods, parks and supporting retail businesses in an attractive setting.

Regionally, the City is located approximately 50 miles south of downtown Los Angeles and 65 miles north of San Diego. Regional access to the City is easily available via the Interstate 5 (I-5) freeway that traverses the entire State of California from north to south. Additional regional access is available via the San Joaquin Hills Transportation Corridor (SR-73), a toll road.

Project Description

Laguna Hills is typical of Orange County suburban communities, however, s it also has the following unique features.

- The addition of a new community center adds a central recreation component to the City. Utilizing the existing trail and bikeway systems as the backbone of an expanded system would allow residents of the City, particularly children, to access the Community Center without an automobile.

- Another desirable amenity is the proximity of the city to two large wilderness parks, Aliso and Wood Canyons Wilderness Park and Laguna Coast Wilderness Park. Trails and bikeways connect residents of the City of Laguna Hills to the wilderness parks as well as to other corridors leading to the beaches and the mountains.

- Of particular note is the Nellie Gail community in the southeastern portion of the city. This is an up-scale community of large homes on large equestrian-zoned parcels. The homes are connected by a network of trails that were built and are maintained by a homeowners association.

- The north Laguna Hills area is isolated from the main portion of the City by intervening communities. A narrow stretch of Laguna Hills along the I-5 Freeway Corridor including Avenida de la Carlota connects the two parts of the City but is not wide enough for a bicycle or trail corridor. Currently no bicycle link exists within north Laguna Hills. The area has little existing public natural open space areas, but the presence of two privately owned lakes with riparian habitat presents opportunities for providing amenities.

Goals, Objectives and Policies

Goals

- To upgrade the existing trails and bikeways system, reflecting the wishes of the citizens in Laguna Hills
- To enhance and protect the existing habitat in the City of Laguna Hills

Objectives

- To create a safe system of trails and bikeways that links the residential neighborhoods to the centrally located Community Center.
- To address safety and maintenance issues that will increase the quality and safety of the trail, bikeway and open space systems. To provide trails and bikeway links internal to the City.
- To provide additional bikeway and trails amenities in north Laguna Hills. To provide a common wayfinding and information signage system for the open space, trails and bikeway system.

- To provide external links to regional trails and to large open space parks in adjacent communities.
- To enhance existing natural habitats located in the City and eradicate non-native species from these habitats.

Policies

- The overriding concern in the establishment of bicycle and pedestrian pathways will be the safety of the user
- Wherever possible, trail alignments should use existing paths and/or unimproved roads (i.e., maintenance roads, flood control berms, unused access roads, etc.)
- Trails and bikeways should have a relationship to identifiable destination points of interest to users, in particular the Community Center, schools and parks
- Trail and bikeway alignments should be compatible with existing and future land uses
- The City of Laguna Hills shall support an on-going public education program on bicycle safety and encourage bicycle safety programs for cyclists and motorists.
- Federal and state funding for construction and maintenance of bicycle facilities shall be actively pursued.
- Coordination with County of Orange Master Plan of Trails and Bikeway Routes should be generally consistent with City Standards in both intent and design
- Amenities for bicyclists, equestrians and pedestrians shall be considered in any future development or reconstruction when facilities for vehicular travel or parking are provided.

Executive Summary

Open Space

Prior to its incorporation, the City of Laguna Hills was primarily developed as a series of small residential communities. Due in part to the moderate to steep terrain in the community and the desire to maximize development, most of the community was developed into residential communities with adjacent commercial malls. Nearly all of the undeveloped open space consists of steep slopes captured between the outside perimeter walls of residential developments and sidewalks, separated from major arterials by median strips. As a result two remaining large buildable open space parcels exist in Laguna Hills including:

- The Edison easements extending from La Paz Road west, past the Community Center through Sheep Hills Park to the City Limit.

and

- The open space along the northwest side of La Paz Road from Moulton Parkway to Aliso Hills Drive, which, while choked with Pampas Grass, provides a long contiguous strip with mild to moderate grades.

The addition of bikeways and trails to these spaces would provide excellent internal spokes leading from residential neighborhoods to the Community Center. In particular a safe link from the Edison easement trails and bikeways to the Community Center is an important component of a safe plan. The Edison Easement from Las Paz Road to the Community Center is very steep and would require considerable grading and retaining walls, at great expense, in order to accommodate a bikeway. A less costly solution would entail upgrading the existing maintenance road to accommodate a pedestrian and equestrian trail. Careful review of the options resulted in a decision to make a pedestrian and equestrian trail from La Paz Road to Alicia Parkway and Priority I. Because of the considerable expense and the uncertainty as to how much additional traffic would result as a result of the new Community Center, adding a bicycle trail was deferred to Priority III. Also, deferred is an overpass linking the proposed Edison Easement property to the Community Center. In addition to the expense, questions exist regarding the aesthetics of putting an overpass in this location.

The portion of the Edison easement from the Community Center westbound is more conducive to building a bike trail and would provide access to the Community Center from neighborhoods to the west. It has been designated as a priority I project

The pampas grass removal and construction of a multi-use trail along La Paz Road from Moulton Parkway to Aliso Hills Drive would provide an important connection as well as a scenic trailway. The pampas grass would be replaced with native vegetation, and interpretive signage would help showcase the interesting habitat in the area. It too has been designated a Priority I project. A possible source of funds of this project would be a transportation grant.

Trail plazas along the bikeways and trails would introduce an element of good quality "natural" open space in the heart of the City where citizens could appreciate plant and animal species indigenous to the area.

Habitat

Native habitat is limited in the City, however, there are some good examples of riparian, and a few examples of coastal sage scrub at locations throughout the City. Most of the City's habitat is riparian habitat due to the flammable nature of coastal sage scrub, however, there are some areas of coastal sage scrub revegetation along Alicia Parkway and Cabot Road. Adding native oaks to the Edison Easement could increase the variety of habitat in the City, as well as providing attractive, shade giving trees to this open spaces.

Some of the best habitat in the City is located in North Laguna Hills along the Lakes. The parcels along the lakes are in private ownership and the shore of the Lakes is steeply sloped and is unlikely to be developed by the current owners. A trail along the west shore of the Lakes, midway up the slope, would be an excellent use of this land, providing a good overview of the Lakes and great bird watching, with minimal disruption of the habitat or the office complex at the top of the slope.

Trails and Class I Bikeways

While adequate parkland was dedicated and developed, a comprehensive trail and bikeway system, linked throughout the community, was only partially completed by the County of Orange prior to the incorporation of the City of Laguna Hills.

Since its incorporation, the City of Laguna Hills has formally adopted a bikeway along the north side of Oso Parkway and informally adopted a trail along the south side.

Two existing County corridors include:

- The Aliso Creek Multi-Use Corridor passing beneath the I-5 Corridor to the north. This trail detours along surface streets around Laguna Woods and passes into Aliso and Wood Canyons Park to the southwest.

and

- The Oso Creek Trail along the east side of Cabot Road. The County's existing plan includes a link north through the Nellie Gail community, however, the easements are not in place to complete the entire trail and completion would require an agreement with the homeowner's association.

The Orange County Master Plan of Trails and Bikeways includes a proposed northbound trail through the Nellie Gail Community.

The Nellie Gail Homeowners Association has a system of well-maintained trails throughout their complex, and while they do not enforce it, the trails are signed for the exclusive use of Nellie Gail residents and their guests. Although the system is comprehensive, one important link in their trail system, located at the top of the slope along the San Joaquin Hills

The trail along the northern perimeter of the Transportation Corridor from Moulton Parkway to Greenfield Drive, is currently interrupted by a CalTrans access road and chain link fence.

There is adequate room to move the fence to the freeway side of the existing bench providing room for a trail and a joint approach by the County, the City and the Homeowners Association would be the most effective way to work out a solution with Cal Trans. The County has expressed interest in this as a possible county trail route, and exploring the possibility of the County exchanging right of way with the Nellie Gail Association should be explored to complete this important link in the County's trail system.

Class II and III Bikeways

There are many opportunities to add Class II and III Bikeways to the existing arterials, providing better internal links. This is especially true in North Laguna Hills, which is lacking in internal bicycle circulation.

The potential to provide external connections to communities to the north, east and west is limited to Crown Valley Parkway and Los Alisos due to the lack of bike lanes in adjacent communities. Links to the City of Laguna Niguel on major south and southwest bound arterials are both feasible and desirable.

Trail and Bikeway Signage

Wayfinding and informational signage along the trails and bikeways in Laguna Hills is essentially lacking. The addition of a consistent and comprehensive signage and plaza system would provide a significant upgrade to the existing trail and bikeway system.

Maintenance

Maintenance of the trails, bikeways and open space in the City of Laguna Hills is somewhat inconsistent. Currently the City, the County and homeowners associations (in particular Nellie Gail) are providing maintenance. The three main parties responsible for maintenance are in agreement that further dialogue would be valuable in developing a partnership approach to defining responsibilities and ownership.

The Urban Village

The proposed Urban Village plan presents an excellent opportunity for expanding the Bikeway system in the City of Laguna Hills. Communities in Southern California that provide outdoor eating and shopping opportunities, with adjacent, visible bicycle racks, regularly attract large numbers of bicyclists. An outstanding example is seen in Huntington Beach.

Redevelopment

Redevelopment can present opportunities to upgrade the existing trails and bikeways system. Integrating trails and bikeways into commercial developments not only provides benefit to business owners and trails and bikeway users, it encourages "pride of ownership" by the community - resulting in more attractive and safer trails and bikeways. Providing bicycle facilities such as showers and bicycle lockers at appropriate locations encourages bicycle commuting that can help relieve traffic congestion and air pollution. The addition of development guidelines in the development plan would encourage this vision for the future.

Funding

The most likely sources of money are City contributions and state and federal transportation dollars. To be competitive for transportation dollars the City will need to review the State requirements for an approved bikeway plan and complete the elements that are not yet done, or work with the County trails coordinator to get the desired elements included in the official County Bikeway plan.

Future Development

With the exception of the Nellie Gail community, past development has done little to integrate the trail system into the community. As a result, several exciting opportunities have been missed.

Economic Benefit

In communities where the trail system is integrated into the community there is direct economic benefit. This is accomplished by providing access to the trail and bikeway system from commercial establishments that provide amenities that are useful and attractive to bicyclists, hikers and equestrians. Wayfinding signage provides trail and bikeway users with information about the location of the amenities and the businesses are offered an opportunity to adopt a portion of the trail or bikeway. Common amenities that are attractive to bikeway and trail users include:

Outdoor eating establishments, including fast food and cafes
Outdoor eating establishments that cater to dog owners
Shops selling sports wear
Shops selling equestrian supplies
Bicycle shops – with rentals
Shops selling outdoor equipment
Health clubs that might use walking as part of their workout
Candy, cookie and coffee stores
Convenience stores

The anticipated Urban Village would provide an excellent venue to incorporate bicycles into a commercial setting.

Safety

Placing trails and bikeways in full view of the public discourages unsafe behavior
This can be accomplished in several ways:

Placing commercial buildings so that their windows overlook trails and bikeways
Removing walls, fencing and high shrubs and dense trees between commercial buildings and trails and bikeways
Placing eating patios along bike and trailways

Commuting

Traffic and congestion and air pollution are persistent problems throughout Southern California that can be partially ameliorated by the development of user-friendly bikeways. While the presence of safe bikeways is a first step in encouraging commuter use, these alone are not enough. Providing appropriate facilities at key locations, including bus terminals, are also important components of encouraging people to commute by bicycle. In reality, compared to automobiles, the required facilities are relatively minimal. One of the chief concerns of bicyclists is bicycle theft and while bike racks in good public view are adequate

for short-term storage, most bicyclists are reluctant to leave a bicycle all day without safe storage such as bicycle lockers. Additionally, showers at the destination also encourage bikeway commuting. While the Orange County Transit Authority has bicycle racks on their buses, the space is limited and storage at the bus terminal will accommodate more commuters.

Not all destinations are large enough to provide these facilities, however, a standard could be set for future development that establishes the minimum number of employees requiring lockers and showers.

Bicycle sensitive traffic control devices have been used successfully in some cities, however, generally, not on streets where speeds exceed 35- 40 mph maximum. As most of the arterials in the City of Laguna Hills accommodate vehicles moving at faster speeds, many bicyclists would find it difficult to move safely with traffic and bicycle sensitive traffic control devices would not be of value.

However, the Urban Village could potentially provide a safe bicycling environment, and this coupled with the potential location of a transportation center at this location warrants the consideration of installing bicycle sensitive traffic control devices.

Updating development standards to include bicycle and trails planning for redevelopment and new projects would be strong addition to the existing bikeways and trails system.

Open Space

Introduction

Much of the open space in the City of Laguna Hills is limited to steep slopes adjacent to residential areas and along utility corridors. Notable exceptions are riparian areas adjacent to Aliso Creek and San Diego Creek. The majority of open space island scaped with ornamental plants, however, there are areas of disturbed European grasses, Coastal Sage Scrub and riparian habitat as outlined below.

Information regarding existing open space was collected from the following sources:

- Field observation
- City of Laguna Hills Master Plan
- Communications with the City of Laguna Hills staff
- Communications with County of Orange staff
- Stakeholder meetings and communications
- Parks and Recreation Commission Meetings

A habitat inventory performed by a qualified biologist identified some good examples of riparian habitat at the following locations:

- The Aliso Creek corridor - south of Los Alisos Blvd.
- The revegetation area - west side of Alicia Parkway at Moulton Parkway along Alicia Creek
- The Lakes area - between Moulton Parkway and Mill Creek Drive
- Veeh Ranch Park – north Laguna Hills
- Edison Easement - west end between La Paz Road and Alicia Parkway

Coastal sage scrub is more limited and of lower quality and has either been recently revegetated or is mixed with ornamental landscape. It is located at:

- Alicia Parkway - east and west sides of Alicia Parkway at intersection of Via Lomas
- Oso Parkway - south side of street just west of Cabot and along east side of Cabot Road at intersection of Oso Parkway and Cabot Road
- Cabot Park along Rapid Falls Road

The largest open space area in the southern part of the City is the open space through which the Edison Easement runs. It is particularly significant due to its central location and

proximity to the Community Center. Although the space is owned by the City there is a 100 foot wide utility easement.
In North Laguna Hills adjacent to Veeh Ranch Park is a large open space with man-made lakes, and surrounded by a good example of riparian habitat. While it is a significant open space area, it is privately owned and could be more difficult to develop for trails and bikeways.

A detailed inventory of Laguna Hills open space is included on the following matrix and maps.

Open Space Opportunities and Constraints

Edison Easement - La Paz Road to Alicia Parkway

The open space areas over which Southern California Edison holds easements offer opportunities for habitat development.

In particular, the drainage swales on the western end of the open space bordered by La Paz Road, Alicia Parkway, Aliso Hills Drive and Paseo de Valencia present an opportunity to augment the riparian habitat already existing in the swales. The willows provide excellent mid-city bird watching opportunities. However, theses sites are threatened by adjacent Pampas Grass, an invasive species that will compete with the native vegetation. The Pampas Grass should be eradicated from this site before it spreads further and a program set in place to prevent its recurrence.

The proposed trail plaza presents an opportunity to plant small groves of native trees, possibly oaks, to provide both shade and enriched habitat for the residents of the City. However, the proximity of residences to the open space limits the potential for coastal sage scrub revegetation in this area, because of the high fire risk associated with it. Invasive thistles are quite prevalent on the slopes of the easement and are exacerbated by discing the slopes. New types of mowers can handle steep terrain and would reduce the proliferation of this unsightly plant.

La Paz Road

The open space along the northwestern side of La Paz Road is a good candidate for revegetation. Eradication of the Pampas Grass would be required prior to revegetation. This could be costly, however an on-going volunteer program utilizing local youth and environmentally oriented non-profit organizations could reduce the cost. The open space would be a good location to introduce the California Sycamore and related plant species, another habitat group that is not currently seen in the City of Laguna Hills. In addition to enriching the palette of habitat in the City it would provide a scenic setting for the proposed Multi-Use Trail.

Lakes

The west shore of the Lakes in North Laguna Hills supports a healthy riparian and emergent riparian habitat. This scenic area provides habitat for a variety of wildlife, in particular birds. Dual goals might be to protect the existing habitat while providing opportunities for local residents to appreciate this unique open space.

Placing the proposed trail upslope 50' or more would provide views of the Lakes and habitat without minimal disruption. A trail plaza at either the north or south end of the trail could provide up-close views of the Lakes habitat while limiting habitat disruption to a small area.

Bikeways

Introduction

The City of Laguna Hills has an existing system of bikeways that provides internal community links as well as bicycle access to many of the surrounding communities. In addition, there are several arterials that have adequate right of way to accommodate additional bikeways that would provide missing links, allowing for a more complete circulation pattern.

The addition of the new Community Center as an attraction to children of Laguna Hills increases the need for safe passages for bicyclists. Currently there are very few off-road (Class I) bikeways. While there are several Class II and Class III Bikeways, safe transit is compromised because these bikeways are located on roadways where traffic can be very heavy and speeds can approach 50 mph.

Information regarding existing Bikeways was collected from the following sources:

- Field observation
- City of Laguna Hills Master Plan
- Communications with the City of Laguna Hills staff
- Communications with County of Orange staff
- Stakeholder meetings and communications
- Parks and Recreation Commission Meetings

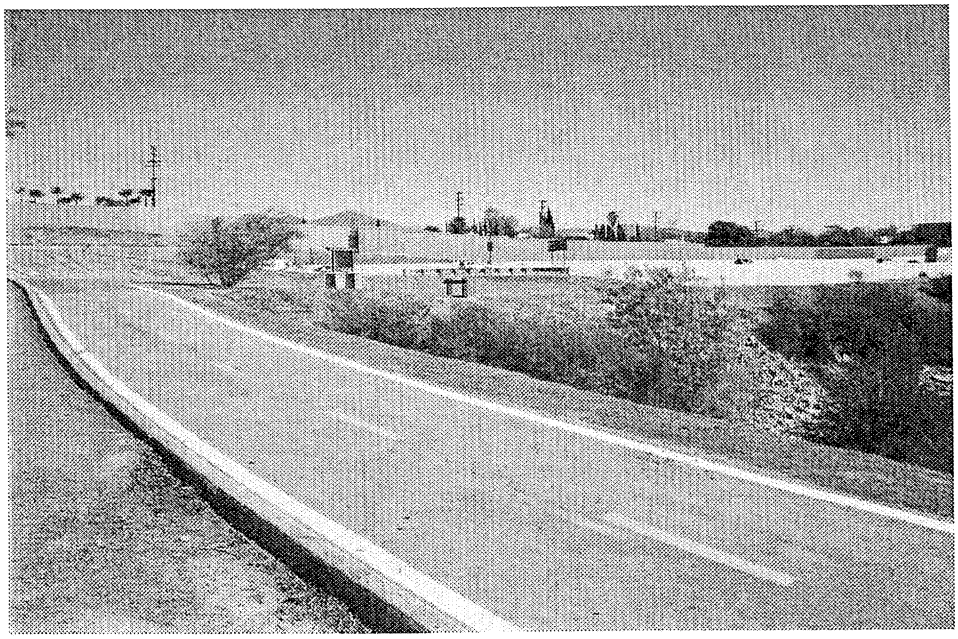
To provide a consistent method of defining bikeways this planning effort utilizes the Cal Trans standards for classifying bikeways. It defines class I, class II and class III as follows:

- Class I Bikeway (Bike Path). Provides a completely separated right of way for the exclusive use of bicycles and pedestrians with cross flow minimized.
- Class II Bikeway (Bike Lane). Provides a striped lane for one-way bike travel on a street or highway.
- Class III Bikeway (Bike Route). Provides for shared use with pedestrian or motor vehicle traffic.

In addition to bikeways and trails, multi-use corridors may exist for both bikeway and trail users. These can consist of either of two alternatives; a bikeway and trail separated by a fence or median or a bikeway with a soft shoulder wide enough to be used as a trail.

Existing Bikeways

- A class II bikeway on Paseo de Valencia, southbound from Avenida de La Carlota to La Paz Road. Due to its central location it forms a strong north-south spine. Class I and class II bikeways eastbound from Moulton Parkway to Cabot Road, with connections into Laguna Niguel and Mission Viejo.
- A combined City and County bikeway system southbound from the I-5 Corridor, along the north bank of Aliso Creek, the east side of Paseo de Valencia, the south side of Laguna Hills Drive to the City limit.



Aliso Creek Multi-Use Trail, north. The County's Aliso Creek Multi-Use Trail continues beneath the I-5 Freeway northbound into Mission Viejo.

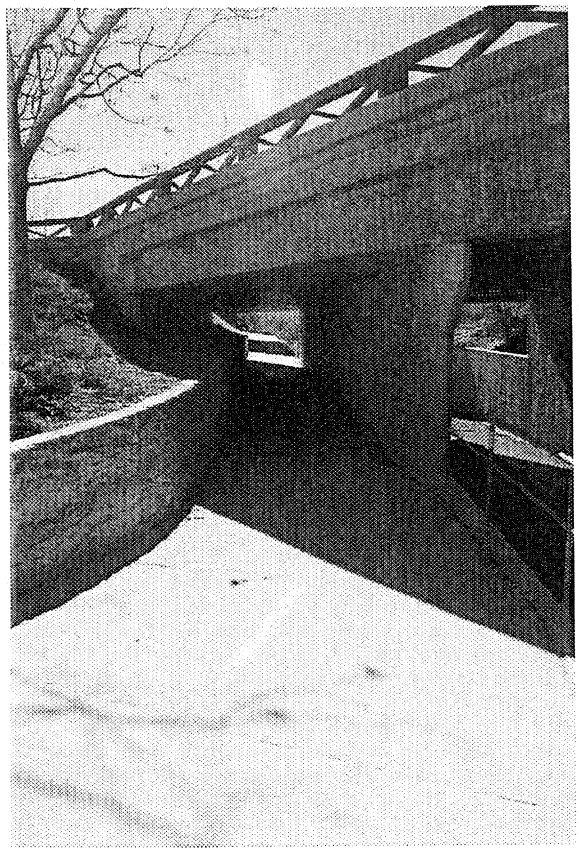
- This system also continues southbound from Laguna Hills Drive to Alicia parkway and westbound to Moulton.

Connections between the main body of the City and north Laguna Hills are a significant challenge.

- There is insufficient Right-of-Way to provide a bicycle connection along Avenida de La Carlota from Ridge Route Drive to Los Alisos Blvd.
- There are segments of Moulton Parkway with insufficient right of way adjacent to Laguna Woods.
- There is no bike lane on El Toro Road as it passes through Laguna Woods.

External links include:

- An extension of the bikeway beneath the I-5 corridor, connecting into Mission Viejo on the north A southern link along Aliso Creek into Aliso and Wood Canyons
- Wilderness Park



Aliso Creek Multi-Use Trail, south. The County's Aliso Creek Multi-Use Trail passes southbound beneath Moulton Parkway to continue into Aliso and Wood Canyons Wilderness Park.

The newer communities to the west and south have existing class II bikeways on most arterials. These include:

- Moulton Parkway, La Paz Road and Oso Parkway on the southwest and Oso Parkway on the east.

The older communities to the north and east do not have existing class II or class III on most arterials nor do they have existing right of way to include them on most.

- Those without existing right of way include Alicia Parkway, El Toro Road, and Moulton Parkway.

- Los Alisos Blvd. has an existing class bikeway connection into Mission Viejo.

Although there may be opportunities within the City to add additional bike lanes, unless there are destinations within the city or links outside the city, the expense may not be justified. The development of class I bikeways will be particularly expensive.

A detailed inventory of existing Laguna Hills bikeways is included on the following matrix and maps.
While much of the infrastructure in the City of Laguna Hills is in place, there are still practical opportunities for additional bikeways that would increase the livability of the community. In particular, planning emphasis was directed toward identifying:

- Safe and convenient routes to schools and the Community Center
- Linkages to nearby wilderness and open space areas including:
  - Aliso and Wood Canyons Wilderness Park
  - Laguna Coast Wilderness Park
  - Aliso Creek
  - Oso Creek-Trabuco Canyon Corridor
  - San Diego Creek-Santa Ana River Corridor

Additionally, other objectives used to evaluate bikeway and trail opportunities and constraints included:

- Safe and convenient links between residential neighborhoods and the Laguna Hills Mall
- Safe and convenient links between north Laguna Hills and the main body of the City to the south
- Links to existing and potential bikeways in adjacent cities including:
  - Laguna Niguel – to the south
  - Mission Viejo – to the east and north
  - Irvine – to the northwest
  - Laguna Woods – to the northwest
  - Lake Forest - to the north
  - Aliso Viejo – to the west
- Cost
- Stakeholder acceptability

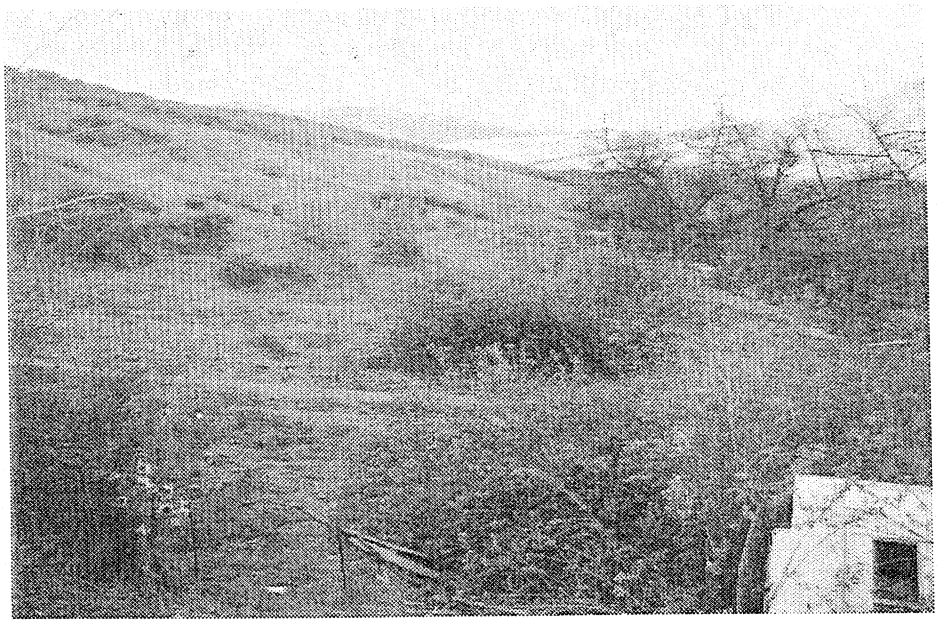
Bikeway Opportunities and Constraints

1. A bicycle route from the north Laguna Hills portion of the city to the Laguna Hills Mall and the Community Center would provide an important linkage, helping to unite the two portions of the city. Each of the following alternative routes were explored, however, each presented significant constraints:

    - Avenida de La Carlota from Ridge Route Drive to Los Alisos Blvd. – there is inadequate right of way for a safe bicycle route. Although there is a sidewalk along the west side of the street, in addition to conflicts with pedestrians, there are many commercial aprons that make bicycle travel on the sidewalk additionally hazardous.
    - Moulton Parkway from Ridge Route Drive has varying widths with inadequate right of way in some areas. Adding more right of way would require an easement upon Leisure World property.
    - El Toro road from Moulton Parkway to Paseo de Valencia has adequate right of way as it passes through Laguna Woods. However, creating a bikeway would be the responsibility of the City of Laguna Woods. No other linkages suitable for bicycles were found between north Laguna Hills and the main portion of the City.

2. Linkages from north Laguna Hills into adjacent cities are likewise, severely constrained, primarily because of insufficient right of way in the adjacent city. Routes that were explored include:

    - Santa Vittoria Drive into Aliso Viejo – Santa Vittoria ends at Leisure World
    - Santa Maria Avenue and Ridge Route Drive into Irvine – There is a small sliver of privately owned land interposed between the City of Laguna Woods and Laguna Coast Wilderness Park. This would need to be purchased before a bikeway route could be approved.



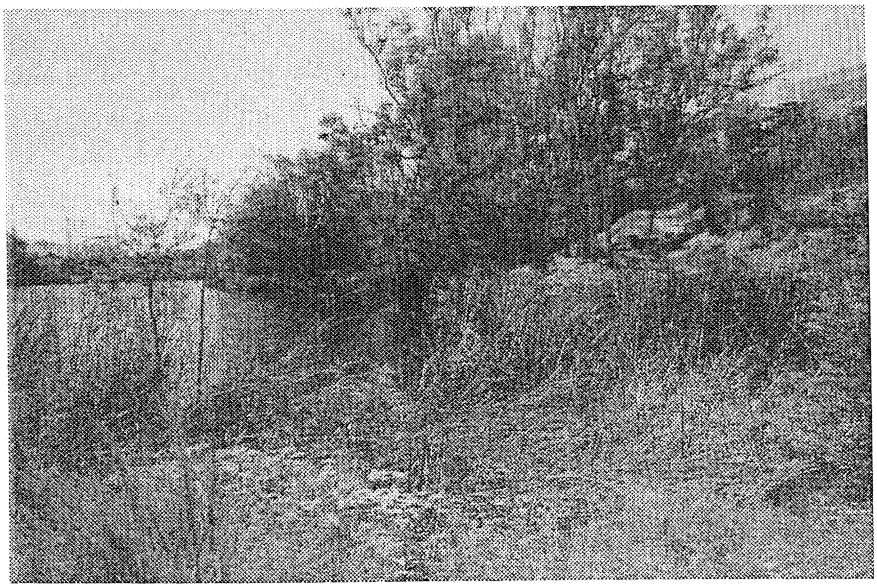
Santa Maria Avenue eastern terminus. Proposals for extending Santa Maria Avenue and Ridge Route Drive would create links into Laguna Coast Wilderness Park.

- Lake Forest Drive into Irvine – Construction of an extension of Lake Forest Drive is currently underway. Although there is insufficient right of way on Lake Forest Drive within the City, the portion from Santa Vittoria Drive could be widened if sufficient right of way is available in Irvine.

- Moulton Parkway into Irvine – There is insufficient right of way in Irvine for a bikeway.
- Lake Forest Drive into Lake Forest – There is insufficient right of way in Irvine for a bikeway.

There is however, the possibility of a Class I bikeway or multi-use corridor utilizing the existing utility road along the south side of the San Diego Creek tributary leading into Irvine and potentially linking into the Santa Ana River trail system.

3. While linkages outside the north Laguna Hills area are limited, there are potential linkages within this area. A loop could be created by the addition of the following Bikeway links.
    - Santa Maria Avenue from Moulton Parkway westbound to Santa Vittoria Drive – There is adequate right of way for a Class II bikeway.
    - Santa Vittoria Drive from Santa Maria Avenue northbound past Veeh Ranch Park to Lake Forest Drive – There is adequate right of way for a Class II bikeway.
    - West side of lakes from Veeh Ranch Park southbound to Ridge Route Drive – Privately owned commercial parcels may lend themselves to a bikeway easement.



Slope west of Lakes in North Laguna Hills. Some of the best habitat in the City of Laguna Hills could be appreciated from a trail along the slopes just west of the Lakes.

Existing links that would complete the circuit include:

- A small Class I bikeway segment extending from Santa Vittoria Drive on the west to the west edge of the lakes.
- A Class II bikeway extending from Santa Maria Avenue, northbound to Lake Forest Drive.

4. In the main portion of the City there are three strong existing corridors:
   - Paseo de Valencia provides a strong north-south bikeway linkage, with a Class II bikeway extending from the I-5 corridor on the north to Cabot Road on the south.
   - Aliso Creek Bikeway - An existing Class I bikeway extends along the north side of Aliso Creek, but veers away from the creek at Paseo de Valencia to circumvent Leisure World. It continues southbound along the east side of Paseo de Valencia, heads westbound along the south side of Laguna Hills Drive, into Aliso Viejo where it becomes a widened sidewalk and joins Aliso Creek again as a multi-use corridor just west of Sheep Hills Park.
   - Oso Parkway from Moulton Parkway to Cabot Road – There are existing Class I and a Class II bikeway that provide a strong east-west linkage at the southern end of the City. Other routes are lacking essential links to provide a comprehensive system within the city.

5. Linkage opportunities into adjacent communities to the north and east of the City are limited. The following routes for Class I, Class II and Class III linkages into Aliso Viejo, Laguna Woods, Lake Forest and Mission Viejo to the northeast were explored. They were found to present significant constraints:

    - El Toro Road into Lake Forest – There is insufficient right of way in Lake Forest for a bikeway.
    - Alicia Parkway into Mission Viejo – There is insufficient right of way in Mission Viejo for a bikeway.
    - Paseo de Valencia provides an important link within the City of Laguna Hills, however, the Class II bikeway terminates at the I-5 corridor at its northern extent and has too little right of way to extend beyond La Paz Road at its southern extent.

    Two existing, adjacent routes extend into Mission Viejo:

    - Los Alisos Blvd northeast bound into Mission Viejo - Existing Class II bikeways provide a link from Los Alisos Blvd in Laguna Hills to Mission Viejo.
    - Aliso Creek Trail northeast bound into Mission Viejo – An existing Class I bikeway traverses beneath the I-5 corridor linking the City of Laguna Hills with Mission Viejo.

6. Existing linkages to adjacent cities to the south, southwest and southeast of the City are more common and include:

    - La Paz Road – An existing Class II bikeway on the north side of La Paz Road in the City of Laguna Hills passes beneath the San Joaquin Hills Transportation Corridor (SJHTC) where it links with an existing northbound Class II in Laguna Niguel. However, La Paz Road eastbound into Mission Viejo is constrained by inadequate right of way on La Paz Road in Mission Viejo.
    - Oso Parkway – An existing Class II bikeway in the City of Laguna Hills links beneath the SJHTC with an existing Class II bikeway in Laguna Niguel on the west and with an existing Class II bikeway in Mission Viejo on the east. A Class I bikeway along the north side of Oso Parkway ends at the SJHTC.
    - Moulton Parkway – An existing Class III bikeway passes beneath the SJHTC where it links with an existing Class II bikeway in Laguna Niguel.
    - Cabot Road – An existing southbound Class III bikeway begins at Oso Parkway and connects with existing Class III bikeways in Mission Viejo and Laguna Niguel as it passes in and out of the City of Laguna Hills.

7. Opportunities in the City are available to connect existing bikeways and complete several circuits. These would link residential neighborhoods with important destinations within the city, such as:

- The Community Center
- Laguna Hills Mall
- Elementary and Middle Schools
- Laguna Hills High School
- Several of the City Parks
- Aliso Creek

Because the City of Laguna Hills has grown and there has been growth in adjacent communities, the major arterials, including

- Alicia Parkway
- La Paz Road
- Paseo de Valencia
- Oso Parkway

have developed into corridors that link neighborhoods to the I-5 and SJHTC expressways. This has resulted in heavy traffic loads and increased speeds on these roads. As providing safe corridors for bicyclists, especially children, is a main objective of this plan, off-road routes, where possible, were given special consideration.

Alicia Parkway – The existing eastbound Class I bikeway on the north side of Alicia Parkway from Moulton Parkway to Paseo de Valencia could be extended by adding an eastbound class II bikeway linking to the Aliso Creek bikeway and leading into Mission Viejo. There is also an existing connection to Los Alisos Blvd. by way of Christina Court, also leading into Mission Viejo.

La Paz Road -The segment of La Paz Road, eastbound from the Falcon Hills neighborhood to the Edison easement, presents an excellent opportunity to expand the bikeway network in the City of Laguna Hills. Along the north side of the road there is an undeveloped drainage basin that provides an opportunity for a Multi-use corridor. It could provide several good links including:

- A link to Paseo de Valencia
- A link to Aliso Hills Drive
- A link to the Edison Easement - This would be useful assuming a cooperative agreement can be reached to allow a Multi-use corridor easement over the existing Edison utility road
- A link to Aliso Creek – Via the existing westbound County trail A link to Oso Parkway – If an easement could be obtained over the existing Nellie Gail trail passing just east of the Falcon Hills Community

- Cabot Road – Extending the existing Class III bikeway northbound from Oso Parkway to La Paz Road would complete a circuit back along La Paz Road back to Moulton Parkway. More importantly, however, it would have the potential to link to either or both of the potential Aliso Hills Drive and Edison Easement bikeways, thus providing a link from Laguna Niguel to the following destinations:
  - Community Center
  - Aliso Creek Bikeway – northern segment
  - Aliso Creek Bikeway – southern segment in Aliso and Wood Canyons Wilderness Park
  - The Laguna Hills Mall
  - Mission Viejo

Edison Easement -The Edison Easement extends from La Paz Road westward to Sheep Hills Park. It has the potential to carry school aged children from neighborhoods and local schools to the Community Center. The segment from La Paz Road to Alicia Parkway has many steep grades and adding a bike trail to this site would require extensive grading and retaining walls. The existing Edison maintenance road would lend itself well to a pedestrian/equestrian trail with minimal improvements. The Segment from the Community Center west to Sheep Hills Park is more conducive to a multi-use trail.

8. Additional bikeway opportunities that would add significant value to the City of Laguna Hills bikeway system and are located in adjacent communities include:

- El Toro Road – Laguna Woods – Add Class II bikeway eastbound from Moulton Parkway to Paseo de Valencia.
- Edison Easement - Aliso Viejo – Add Multi-use corridor by augmenting existing Edison utility road from City of Laguna Hills city limit to Sheep Hills Park.
- San Diego Creek tributary – Irvine – Add Multi-use corridor by obtaining easement to use utility company easement along the south side of the tributary to San Diego Creek.

Introduction to Existing Trails

The trail system in the City of Laguna Hills is composed of trails maintained by the City of Laguna Hills, The County of Orange and the Nellie Gail and Lomas Laguna Homeowners Association. Most of the trail segments are owned in fee by the agency maintaining them.

The primary values of the trail system within the City of Laguna Hills are: 1. To provide internal trails for local walking and horseback riding, and 2. To serve as links to trails into nearby wilderness areas. Because of the suburban nature of the City and the limited open space hiking is generally limited to suburban sidewalks. Notable exceptions include the County Aliso Creek trails and the Nellie Gail trails, which are primarily intended for Nellie Gail resident and guest equestrian use. Signal buttons at equestrian height are provided at several intersections and there are four existing tunnels beneath major arterials in the City to provide safer linkages for equestrians.

Inventory

Information regarding existing open space was collected from the following sources:

- Field observation
- City of Laguna Hills Master Plan
- Communications with the City of Laguna Hills staff
- Communications with County of Orange staff
- Stakeholder meetings and communications (including Nellie Gail Home Owners Association)
- Parks and Recreation Commission Meetings

Existing Trails

City of Laguna Hills:

Sidewalks constitute the majority of pedestrian by-ways provided by the City of Laguna Hills. Equestrian-zoned property within the city is limited to the Nellie Gail community that has built its own system of trails. Additionally, internal trails connecting to the open space in surrounding communities are maintained by the County of Orange.

Currently the City is providing minimal maintenance of a trail along the south side of Oso Parkway eastbound from Moulton Parkway to Bridlewood on an informal basis. There is a Nellie Gail trail upslope.

County of Orange:

The County of Orange maintains several trails within the City of Laguna Hills, creating cross-city connections and providing access to neighboring communities. Although a few of the County trails are surfaced with greenwaste mulch, most have a decomposed granite surface. The County trails coordinator has expressed an intention to pave the remaining County trails with decomposed granite as well.

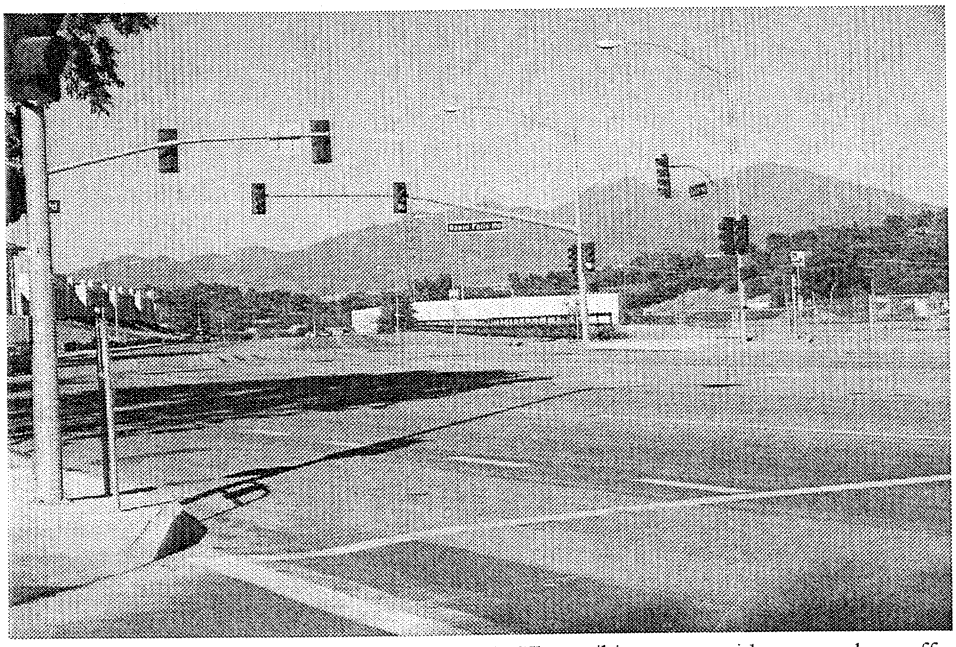
Although the City of Laguna Woods has been approached by the County to allow an easement for continuation of the Aliso Creek Trail through their city, they have not approved this concept to date. An existing alternate route along Paseo de Valencia and Laguna Hills Drive links the north and south components of the Aliso Creek Trail.

Trails along Aliso Creek are an important component of the County trail system within the City. They provide an important link from the I-5 corridor to the Aliso and Wood Canyons Wilderness Park.

- The Aliso Creek Trail system begins north of the city entering beneath the I-5 corridor just north of the Juan Avila Adobe site.
- It proceeds southbound along the south bank of Aliso Creek to Paseo de Valencia.
- The trail then abandons the creek route, circumventing Laguna Woods by continuing along the east side of Paso de Valencia.
- It then proceeds westbound on Laguna Hills Drive to the City Limit where it becomes a county trail again, proceeding to the east bank of Aliso Creek.
- It then becomes a multi-use trail as it passes beneath Moulton , heading south into Aliso and Wood Canyons Wilderness Park.

The County maintains a southbound trail along the east side of Cabot Road that connects into the Oso Creek/Trabuco Canyon system near Crown Valley Parkway, providing a future link to the southern communities and the beach.

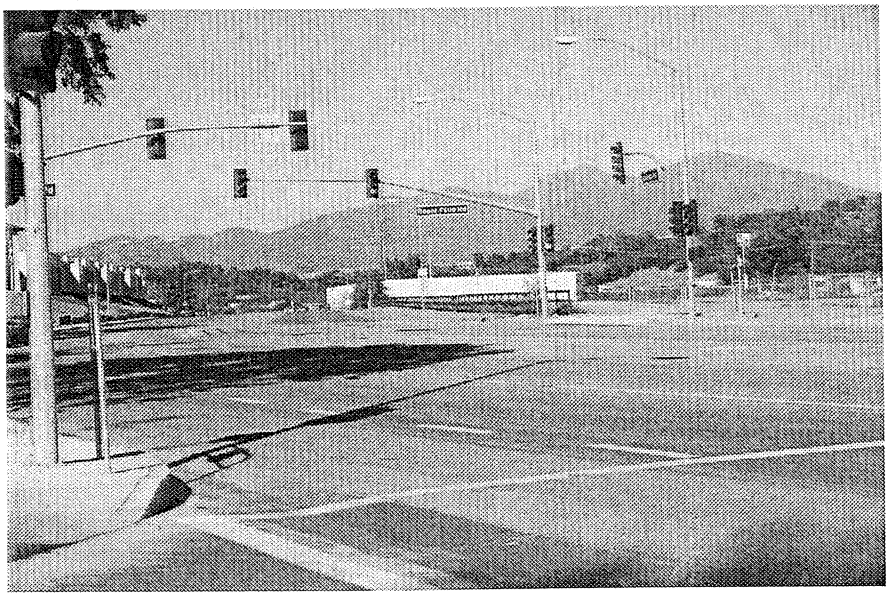
- The trail is narrow and adjacent to a moderately steep slope. As there is a Nellie Gail trail along the west side of Cabot, the County trail is little used.



County Trail along east side of Cabot Road. The trail is narrow with a steep drop off and is not often used. It continues south to Dana Point.

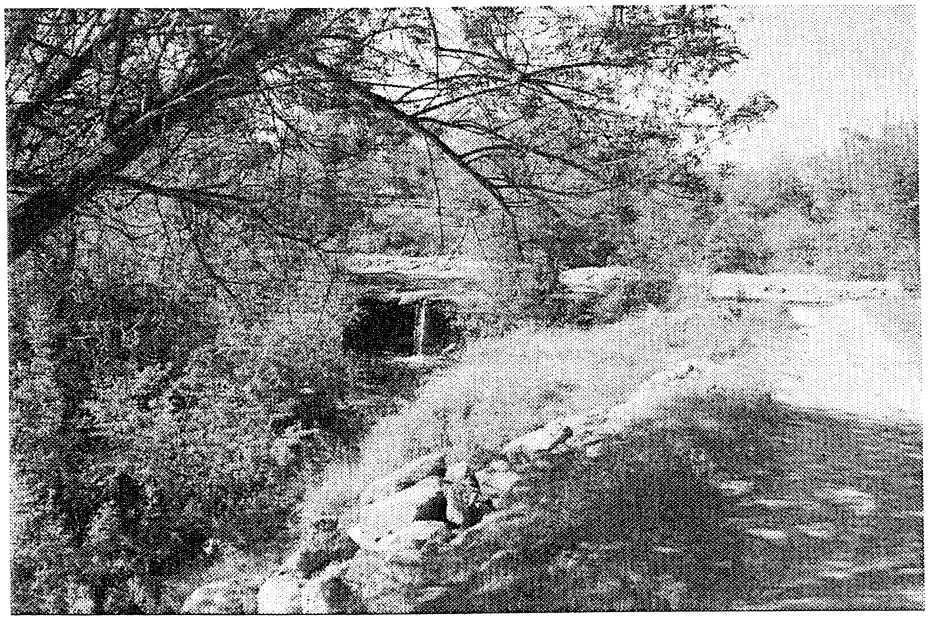
The County maintains an important small trail segment in the City of Laguna Hills that links the existing Nellie Gail trail with the County maintained Aliso Creek Trail into Aliso and Wood Canyons Wilderness Park.

- The trail runs along the north side of La Paz from the Nellie Gail tunnel, crossing westbound beneath Moulton and ultimately joins with the Aliso Creek Trail west of Alicia Parkway.



County Trail along north side of La Paz Road. The trail passes beneath Moulton Parkway to continue into Aliso and Wood Canyons Wilderness Park. The County maintains a small trail segment that crosses Alicia Creek and ultimately joins with the Aliso Creek Trail. This segment is important because it provides access to the Middle School in Aliso Viejo, as well as access to the Aliso Creek Trail.

- The trail proceeds westbound from the intersection of Alicia Parkway and Ramona
- It crosses Alicia Creek at an at-grade crossing that has been undermined and is in serious need of repair (or an alternate crossing).



Alicia Creek crossing. The crossing has been undermined and needs repair. The trail surface is slippery and treacherous when wet.

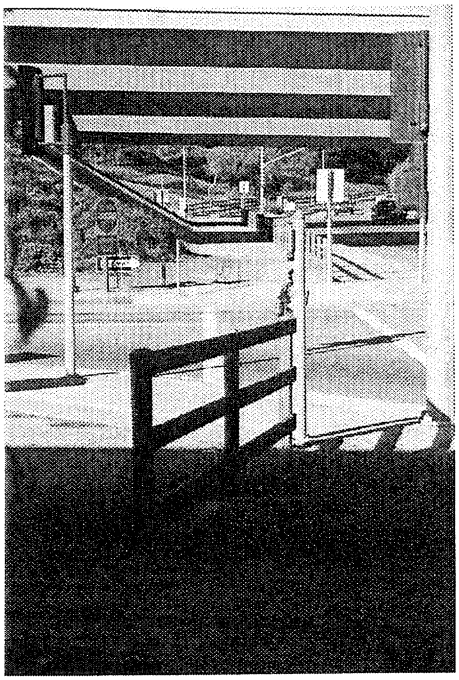
- It continues westbound to join the Aliso Creek Trail.
- An alternate route is to take the sidewalk north to the intersection of Moulton Parkway and Alicia Parkway and head south on the Class I bikeway on the west side of Alicia Parkway that joins the Aliso Creek Bikeway to the southwest.

Nellie Gail trails:

A unique component of the Laguna Hills trail system is the Nellie Gail trails network. Nellie Gail, located in the southeast portion of the city, is a community of high end homes on large lots that are zoned for horses. The homes are connected by a trail network that was built and is maintained by the Nellie Gail Homeowners Association. The trail network provides not only an internal trail system, it also provides connections to county trails leading into large wilderness parks in adjacent communities. The trails are unpaved and surfaced with greenwaste mulch. Steep grades and loose mulch limit the use of the trails to equestrians and sure-footed pedestrians. Accessibility standards are exceeded in many places and the surface is unfavorable for strollers and joggers. Although signs are posted along the trails, notifying visitors that the Homeowners Association will accept liability only for residents or their guests, the trail is used by non-resident equestrians and pedestrians on an unofficial basis.

While most of the trail system is internal to the Nellie Gail community, a few segments are important links to other trail systems.

- A trail along the northern perimeter of the San Joachin Hills Transportation Corridor (SJHTC) lacks only a small segment to link Moulton Parkway with the County maintained southbound Niguel Trail.



Nellie Gail Trail at the SJTC at Greenfield Drive. This trail would connect with Moulton Parkway if an arrangement could be egotiated to use the existing Caltrans access easement..

- A Caltrans access barrier fence interrupts a complete east-west trail corridor, blocking the trail from Pinestrap Circle to just west of Greenfield Drive. If this segment were opened the link would be complete.

The trail continues northwest where it completes an important link to the Aliso Creek Trail southbound into Aliso and Wood Canyons Wilderness Park.

- The Nellie Gail Trail continues northbound along the east side of Moulton Parkway, then eastbound along Oso Parkway, on the south side (see above for discussion of City maintained Oso Parkway trail).
- It crosses beneath Oso Parkway and then westbound, heading northbound just west of Buckboard and Buckskin to La Paz.
- It then crosses beneath La Paz and completes a westbound link to the County maintained trail along the north side of La Paz.
- Northbound it proceeds to the County maintained Aliso Creek Trail. (see above).

A detailed inventory of existing Laguna Hills trails is included on the following matrix and maps.

Most of the trails in the City of Laguna Hills are County or Nellie Gail trails. However, there are still good opportunities for additional trails and linkages that would increase the livability of the community. In particular, planning emphasis was directed toward identifying

- Safe and convenient routes to schools and the Community Center
- Linkages to nearby wilderness and open space areas including:
  - Aliso and Wood Canyons Wilderness Park
  - Laguna Coast Wilderness Park
  - Aliso Creek
  - Oso Creek-Trabuco Canyon Corridor
  - San Diego Creek-Santa Ana River Corridor

Additionally, other objectives used to evaluate bikeway and trail opportunities and constraints included:

- Safe and convenient links between residential neighborhoods Safe and convenient links between the annexed area to north and the main body of the City to the south
- Links to existing and potential trails in adjacent cities including:
  - Laguna Niguel – to the south
  - Mission Viejo – to the east and north
  - Irvine – to the northwest
  - Aliso Viejo – to the west
- Cost
- Stakeholder acceptability

Adding wayfinding, educational and safety signage would be valuable addition to the existing trails system and excellent opportunities are available throughout the City.

Trails Opportunities and Constraints

The majority of trail opportunities in the City of Laguna Hills have been developed, however, the remaining opportunities could add significant value to the existing trail system.

With the exception of the Nellie Gail trail system pedestrian trail use in the City of Laguna Hills is very limited. The lack of open space limits pedestrian oriented to the numerous sidewalks many of which are sandwiched between block walls and the street with only a parkway to separate them. While they serve as pedestrian traffic corridors, they lack the aesthetics to provide a recreational walking environment.

While equestrian trail users in the City of Laguna Hills are primarily Nellie Gail residents, the presence of the county trail system that links adjacent communities together provides opportunities for long-distance equestrian use.

Objectives used to identify trail opportunities and constraints are similar to those used for identifying bikeway opportunities and constraints and include:

- Safe and convenient routes to schools and the Community Center Linkages to nearby wilderness and open space areas including:
  - Aliso and Wood Canyons Wilderness Park
  - Laguna Coast Wilderness Park
  - Aliso Creek
  - Oso Creek-Trabuco Canyon Corridor
  - San Diego Creek-Santa Ana River Corridor
- Links to existing and potential trails in adjacent cities including:
  - Laguna Niguel – to the south
  - Mission Viejo – to the east and north
  - Irvine – to the northwest
  - Laguna Woods – to the northwest
  - Lake Forest - to the north of annexed area
  - Aliso Viejo – to the west
- Cost
- Stakeholder acceptability

The following study of the opportunities and constraints helps to highlight those trail improvements that would be most valuable additions to the existing trail system.

- An existing Nellie Gail equestrian and hiking trail connects Oso Parkway to La Paz Road. It runs between Falcon Hills and Nellie Gail and could provide an important trail connection, ultimately connecting to the Niguel Trail in Laguna Niguel and extending to Aliso Creek via La Paz Road if an easement could be arranged.

- An existing Nellie Gail equestrian and hiking trail along the northern edge of the SJTC was interrupted by a Caltrans access fence when the corridor was built. Negotiating a realignment of the fence would allow a long-range connection from the Niguel Trail in Laguna Hills to Moulton Parkway.

- An existing hiking trail in Veeh Ranch Park could be connected to the Moulton-Niguel Water company utility easement on the north and a trail along the west edge of the lakes, providing access to riparian habitat along the Lakes and San Diego Creek and the potential for a long range connection up San Diego Creek to the Santa Ana River Trail.

- The Edison utility corridor could provide an equestrian/hiking trail connecting La Paz to the Community Center. Similar easements have been granted by Southern California Edison in adjacent communities. This trail could connect to a similar trail along the north edge of La Paz.

- A trail connection along the north side of La Paz Road could provide a scenic corridor connecting the County trail at Moulton to the Edison easement at La Paz Road.

Bikeway and Trail Alternatives

As part of the planning process alternatives were selected based on the information compiled in the Opportunities and Constraints studies. The suggested alternatives were selected based on a three-tiered approach.

Alternative I includes improvements that provide the important links to complete the trails system, in particular links to the Community Center, provide wayfinding and informational signage and upgrade safety and maintenance.

The Alternative II improvements include the elements of Alternative I but add some more expensive elements such as landscaping and invasive plant eradication.

Alternative III upgrades include elements all of the elements of Alternatives I and II and add some costly elements such as a bridge over Alicia Creek.

Later in the planning process, alternatives will be reevaluated based on value to the community, estimated construction costs, aesthetics. After presentation to the Parks and Recreation Commission and the City Council a final Priority list will be developed.

Alternative I

- Edison easement Multi-Use Corridor from La Paz Road to Alicia Parkway linking residential neighborhoods to the Community Center
- Edison easement Multi-Use Corridor from Community Center west to City limit
- Mendocino Park Trail Connection to Edison Easement
- Upgrading the Class II Bikeway at the northeast corner of Paseo de Valencia and Los Alisos to a Class I Bikeway
- Alicia Parkway overpass to Community Center
- Santa Maria Avenue
- Santa Vittoria Avenue

Adding wayfinding and information signage at the following locations

- Community Center
- Edison Easement – above willow wash
- Edison Easement at Alicia Parkway
- Mendocino Park
- Aliso Creek at Paseo de Valencia
- La Paz Road at Moulton Parkway
- Oso Parkway at Moulton Parkway
- Veeh Park at Santa Vittoria Drive
- Santa Vittoria Park at Santa Maria Avenue
- OCTA Transportation Terminal

Safety, Maintenance and Facilities Upgrades

- Equestrian/hiking tunnel lighting

- Upgraded maintenance or replacement of Eucalyptus trees north side of Oso Parkway
- Bicycle lockers at Orange County Transportation Center

Alternative II

- All of the elements in Alternative I

Additional linkages

- Multi-Use Corridor northwest side of La Paz Road
- Trail linkage from Oso Parkway to La Paz Road
- Oso Parkway/La Paz road connector
- Lakes area trail

Additional Class II and III Bikeway linkages

- Cabot Road Class II Bikeway
- Aliso Hills Drive Class II Bikeway Addition

Adding wayfinding and information signage at the following locations

- La Pa Road between Alameda Avenue and Aliso Hills Drive
- Clarington Park at Aliso Creek
- Alicia Parkway at Moulton Parkway
- La Paz Road at Paseo de Valencia
- La Paz Road at Aliso Hills Drive
- Oso Parkway at Cabot Road
- Lakes area along west shore of lakes
- Sheep Hills Park at juncture with Aliso Creek Trail

Alternative III

- All of the elements in Alternatives I and II

Additional linkages

- San Joaquin Transportation Corridor Trail link
- Sheep Hills Park Trail
- San Diego Creek Tributary Class I Bikeway
- Replace current Alicia Creek crossing with a bridge

Additional Class II and III Bikeway linkages

- Ridge Route Drive Class III Bikeway

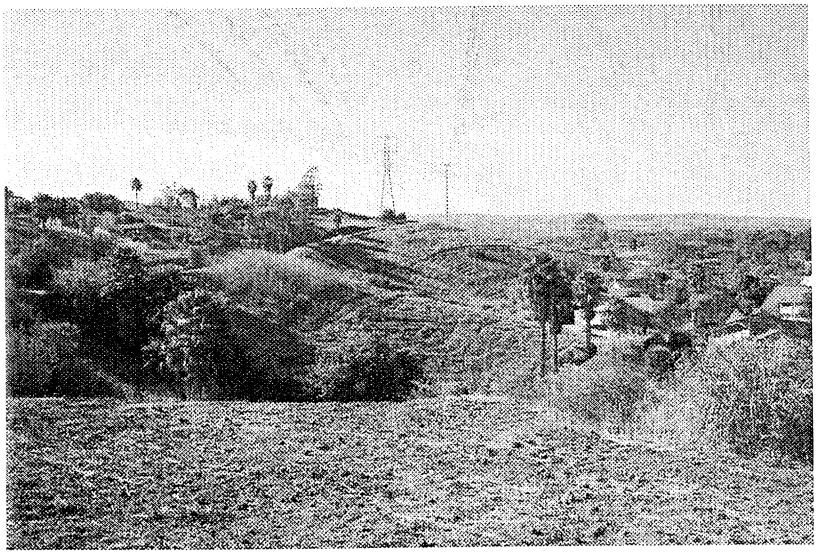
Adding wayfinding and information signage at the following locations

- SJTC/Nellie Gail Trail at Greenfield Drive
- Cabot Park at base of trail
- Costeau Park along Alicia Parkway
- Aliso Creek at Juan Avila Adobe Site

Conceptual Plans Overview

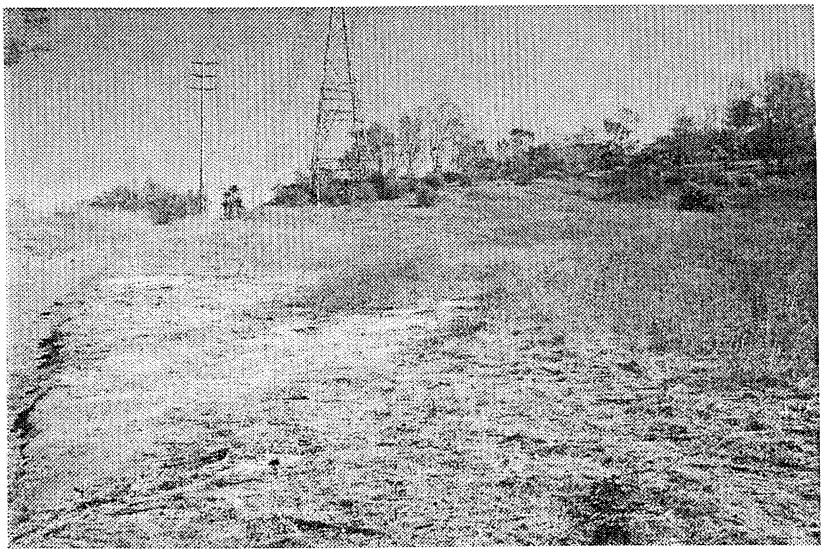
Edison Easement – east

The steep and undulating terrain of the open space bounded by La Paz, Alicia, Aliso Hills Drive and Paseo de Valencia creates a design challenge for creating a Class I Bikeway. CalTrans Class I Bikeway standards dictate a 5% grade and, when designing for maximum speeds of 25 mph, turning radii no greater than 150 feet. At 20 mph this radius can be reduced to 79 feet. These turning radii require a superelevation of 5% which is the maximum for use by individuals in wheel chairs.



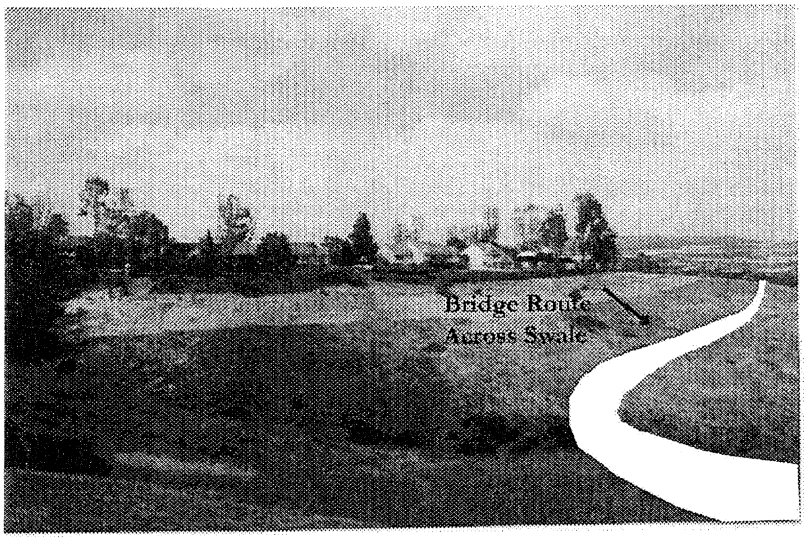
Edison Easement – East. The Edison easement open space terrain is steep and undulating requiring substantial grading to accommodate a Class I Bikeway.

In particular the grades along Alicia Parkway are especially steep. Based on preliminary grading studies, a Class I Bikeway would intersect Alicia Parkway near via Lomas, where the natural contours allow a less steep ascent.



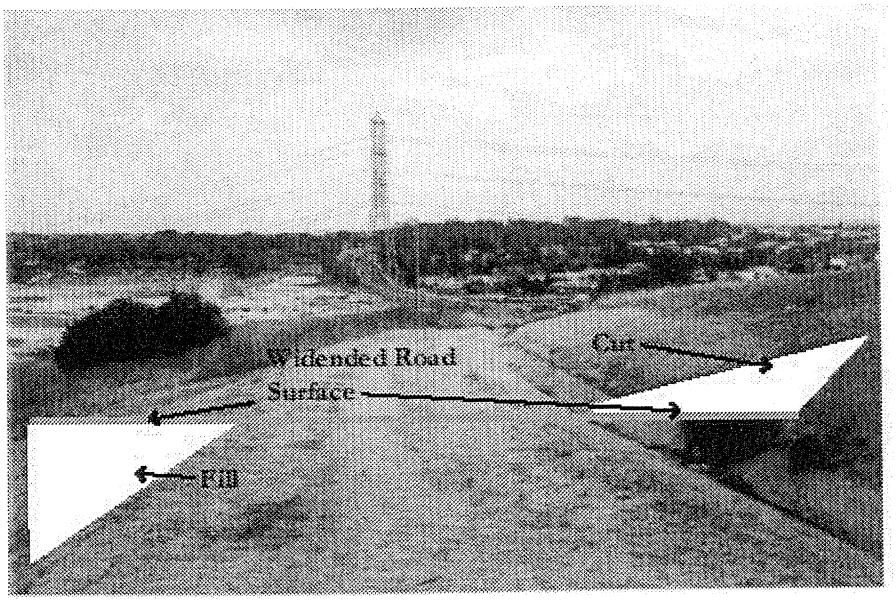
Edison Easement – East along Alicia Parkway. Steep grades along Alicia Parkway limit access points.

To achieve the elevation necessary for the Bikeway to avoid the majority of large swales, while maintaining CalTrans standards, an 85' curved bridge would be necessary to traverse the large swale along Alicia.



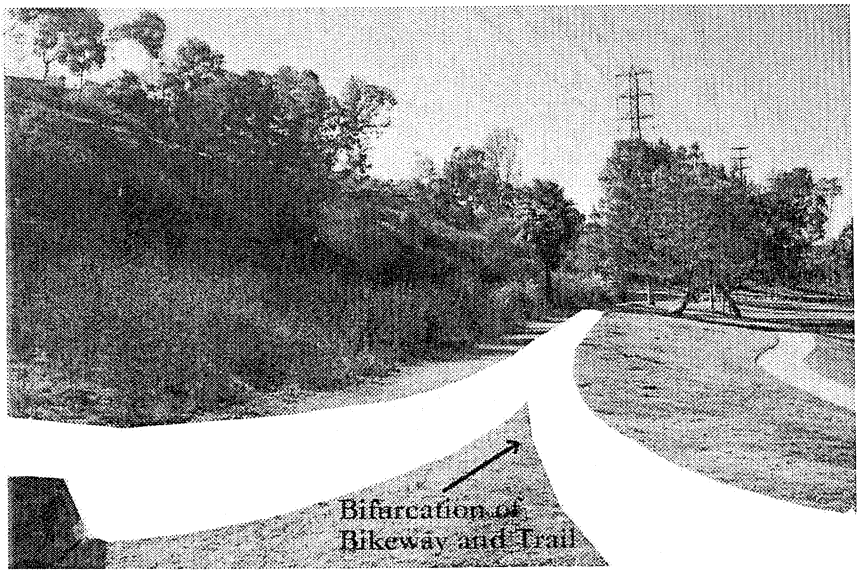
Edison Easement – East Swale. Achieving elevation quickly can be accomplished by placing a bridge over the large swale adjacent to Alicia Parkway.

The Bikeway would join the existing Edison Utility road just north and downslope of the water tower. Grades would permit placing the Bikeway upslope and adjacent to the utility road, requiring cuts that would steepen the slope above the Bikeway. The Bikeway could also be placed on the downslope side of the utility road which would necessitate significant fill. If an agreement with Edison could be reached, cut and fill could be balanced by displacing the utility road approximately 6' either direction.



Edison Easement – East Road Alignment. Moving the Edison utility road to the right or left would allow for a better balance of cut and fill during grading operations.

At El Conejo Park the Bikeway would bifurcate permitting connections to 1.) the corner of La Paz Road and Paseo de Valencia and 2.) the proposed La Paz Multi-Use trail at the corner of Aliso Hills Drive and La Paz Road.



Edison Easement – East at El Conejo Park. To provide access to the elementary school and the proposed La Paz Multi-Use Trail the Edison Easement Trail would diverge at El Conejo Park

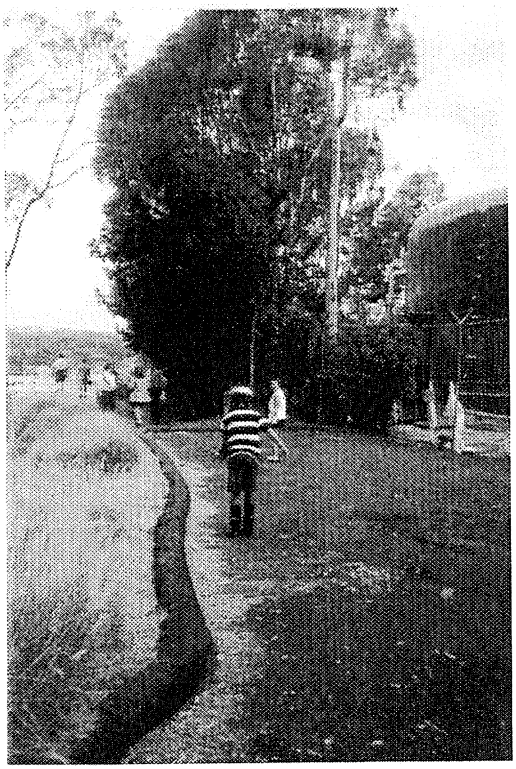
The route to La Paz Road and Paseo de Valencia would follow the toe of slope, adjacent to the residential block walls or upslope from them about 20' – 25'. At the Bikeway's approach to the corner maximum privacy to residences could be achieved by remaining upslope. Screening could be achieved if needed with the use of plants.

Edison Easement – East at La Paz Road and Paseo de Valencia. To respect the privacy of adjacent residents, the trail would be placed upslope.

The route to the La Paz Multi-Use trail would proceed along the slope until it reaches the corner of Aliso Hills Drive and La Paz Road, where steep grades necessitate a wide curve to the top of slope at road's edge.

The Edison utility road, while quite steep in some areas, provides an adequate route for a hiking and equestrian trail.

Grades are too steep to connect the Moulton-Niguel utility road adjacent to Mendocino Park to the proposed Class I Bikeway along the Edison easement. However, the utility road can be utilized as a trail connection for pedestrians and equestrians.

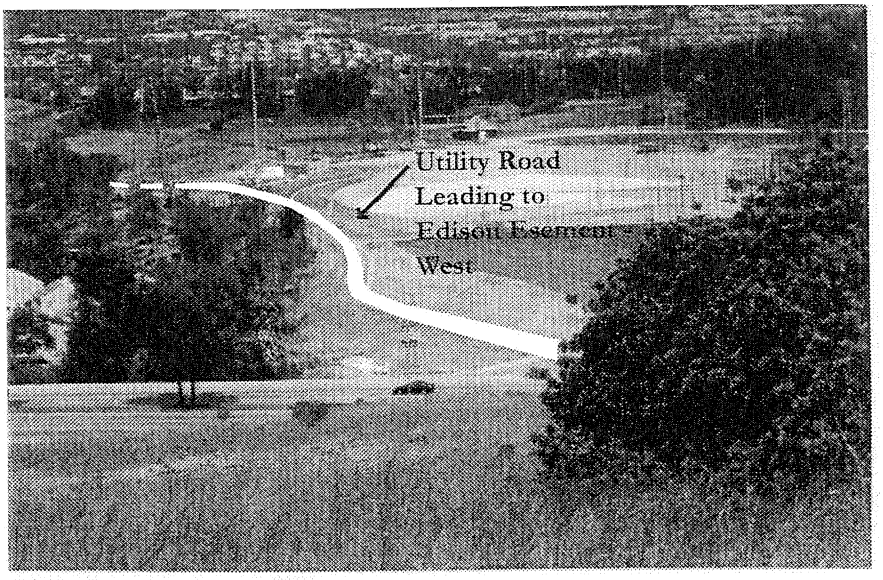


Mendocino Park Connection. The existing utility road adjacent to Mendocino Park would make a good trail connection to the proposed Edison Easement trail.

Similar use of existing Southern California Edison utility roads exist in nearby communities including Lake Forest.

Edison easement – west

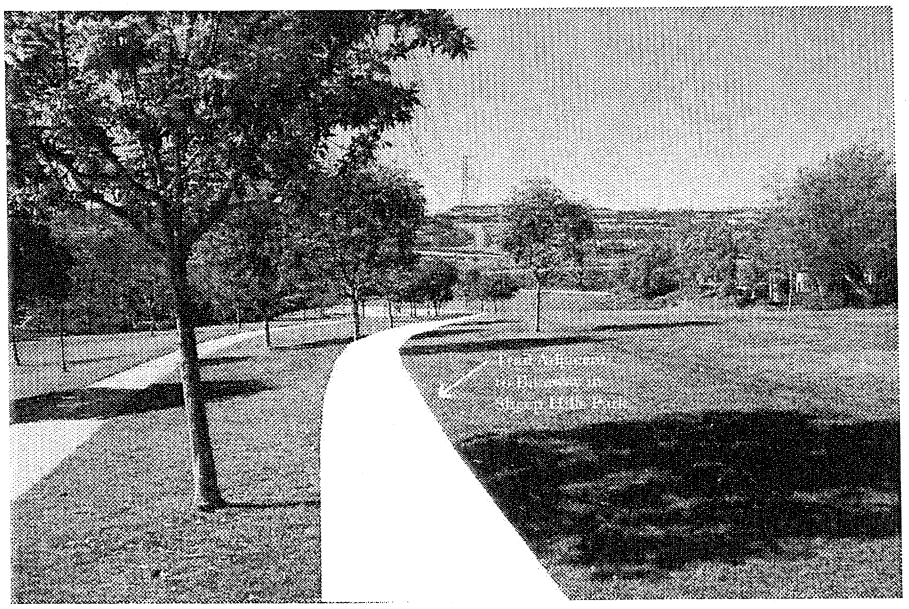
The utility road along the south perimeter of the Laguna Hills Community Center provides a connection to the west. The utility road connects to the existing Edison utility road where the grades are adequate for use as a hiking/equestrian trail, but too steep for a standardized Class I Bikeway.



Edison Easement – West. The utility road along the south side of the Community Center connects with the Edison utility road to the west.

The downslope is especially steep as the utility road approaches Sheep Hills Park. A route along the south side of the slope would be a better route for a Class I Bikeway. To connect with Sheep Hills Park an at-grade crossing would be required at Indian Hills Lane.

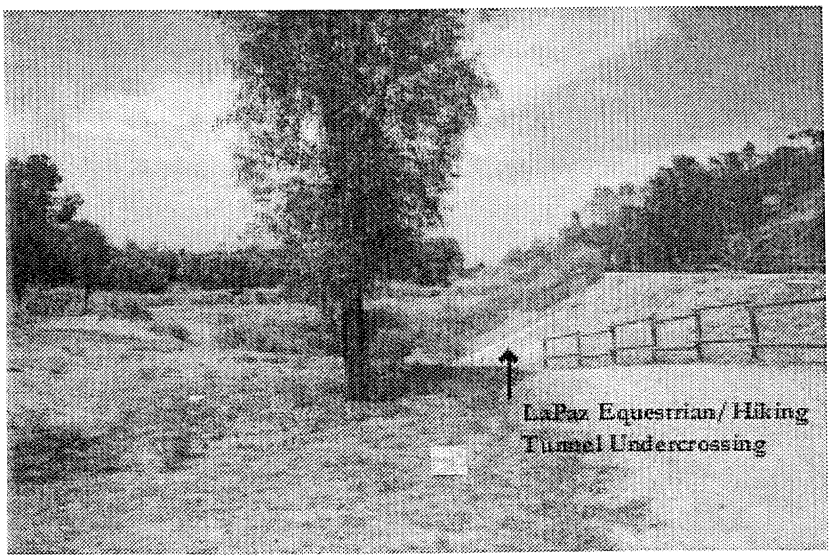
A sinuous concrete sidewalk at Sheep Hills Park connects to the County Multi-Use trail leading beneath Moulton and into Aliso and Wood Canyons Park. The sidewalk would make a good Bikeway and a trail could be constructed adjacent to it. Sheep Hills Park is a privately owned HOA park and a trail easement would be required.



Sheep Hills Park. The existing sidewalk at Sheep Hills Park connects to the County Aliso Creek Trail. This could be converted to a bikeway and trail built adjacent to it.

La Paz open space

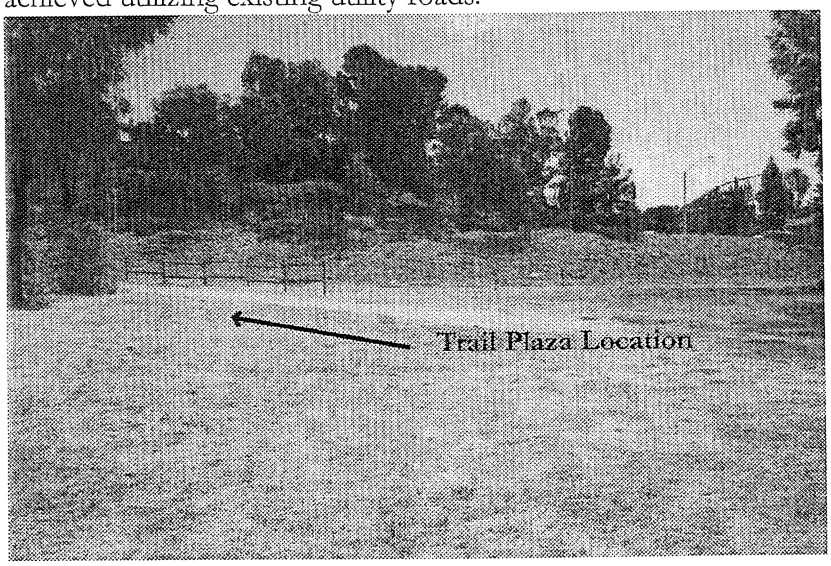
The existing county trail located in the open space area along the north side of La Paz Road provides a connection to the Nellie Gail system through a tunnel passing beneath La Paz to the north. It connects to the County Aliso Creek trail after it passes beneath Moulton Parkway to the south.



La Paz Open Space Connection. A tunnel undercrossing allows access to the existing Nellie Gail trails on the south side of La Paz Road.

The existing City owned open space, however, continues north to Aliso Hills Drive with adequate width and grades amenable to both a trail and Class I Bikeway. The open space currently supports a large pampas grass 'forest'. However, pampas grass is very invasive, and the City would benefit by its eradication and revegetation with vegetation that is indigenous to the area, such as California sycamore and related plants.

Although there is a gradual upslope from Moulton Parkway to Aliso Hills Drive, the open space is wide enough through most of its length to allow for several undulating switchbacks to reduce the grade. Grades would exceed 5% as the Bikeway approached Aliso Hills Drive, but the distances would be short. An on-grade crossing at Alameda Avenue could be achieved utilizing existing utility roads.

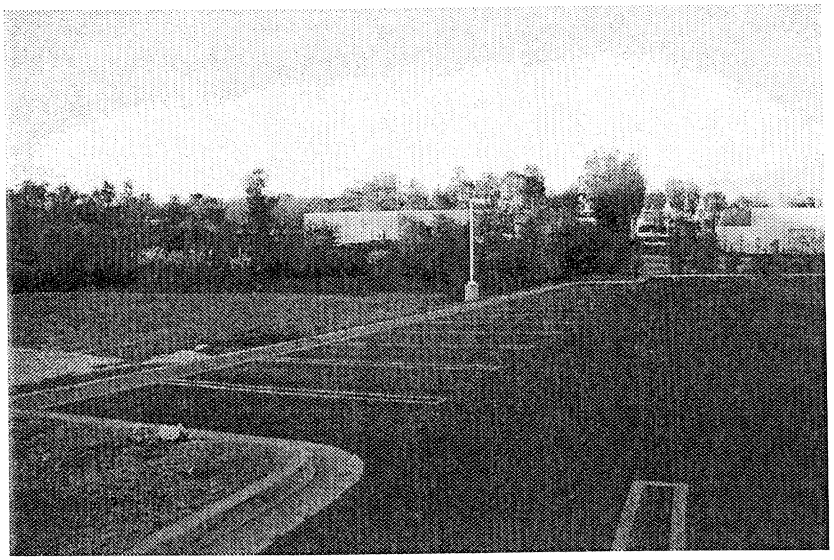


La Paz Open Space. The utility road at Alameda Avenue would provide an accessible route for an at grade crossing of the La Paz multi-use trail.

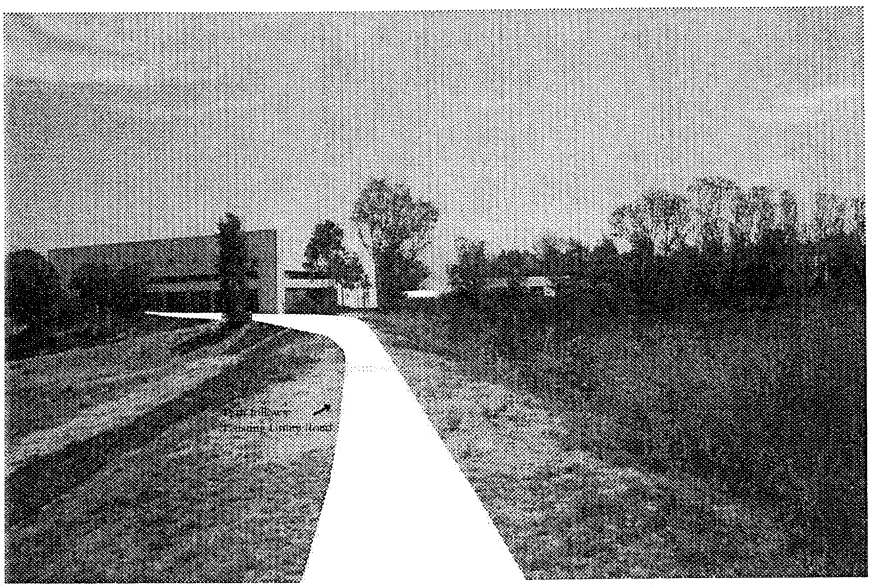
At Aliso Hills Road an at-grade crossing would provide a connection to the proposed Edison Trail and Bikeway.

Lakes

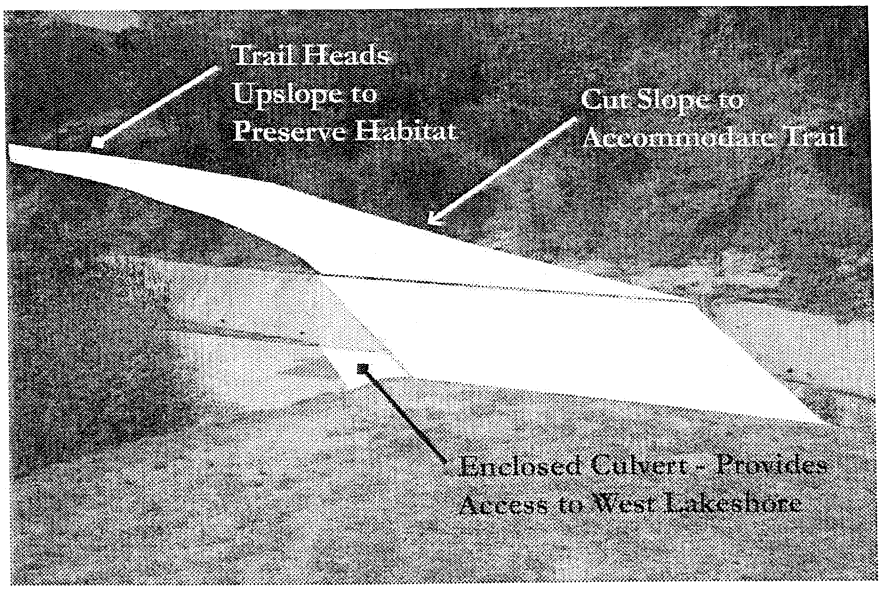
The area behind the County courthouse provides a good staging area for a trail along the western perimeter of the lakes with adequate parking.



Lakes Trail Staging. The parking area behind the County courthouse could serve as a staging area for the proposed Lakes Trail . There is an existing utility road leading from this parking area to the western edge of the lakes where an enclosed culvert would be necessary to replace an existing drainage channel.

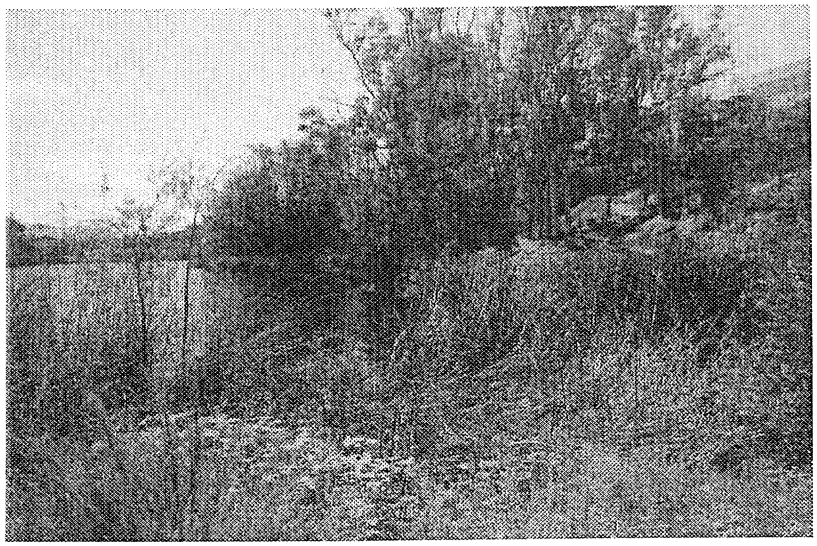


Lakes Trail Access. The existing utility road leading from the parking area to the west shore of the lakes would provide good access to the proposed plaza and trail.



Lakes Trail Access. Existing open drainage could be replaced by a closed culvert to provide a trail crossing to the west shore of the lakes.

A plaza area would allow hikers to enjoy the lake's shoreline and habitat area. To minimize disruption of riparian habitat the trail would then proceed approximately 40' upslope to continue along the western shore of the lake.



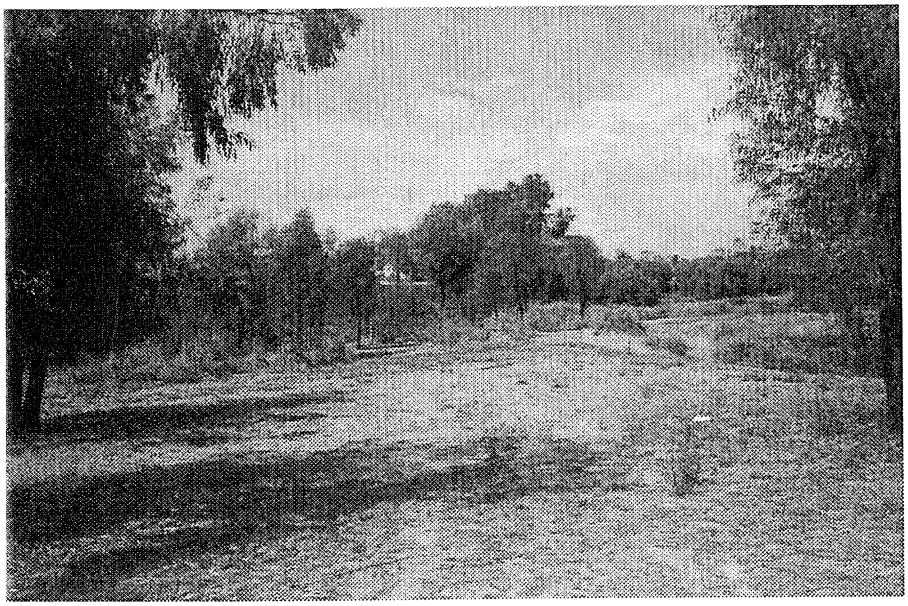
Lakes Trail. Placing the trail part way up the slope would provide a view of the lakes and limit destruction of the habitat.

Trail Plazas

The need for trail plazas varies from site to site. At a busy corner where corridor information is needed, a small plaza with few facilities would be most appropriate. In more interesting venues, particularly where there is wildlife and habitat to view, more extensive facilities would be valuable. The following recommended trail plazas have been grouped according to the type of facilities that would best serve the community. Wherever appropriate the Trail Plazas have been located in existing parks that already provide upgraded facilities. Descriptions of the facilities types can be found on the accompanying Plaza Cost Estimate sheet.

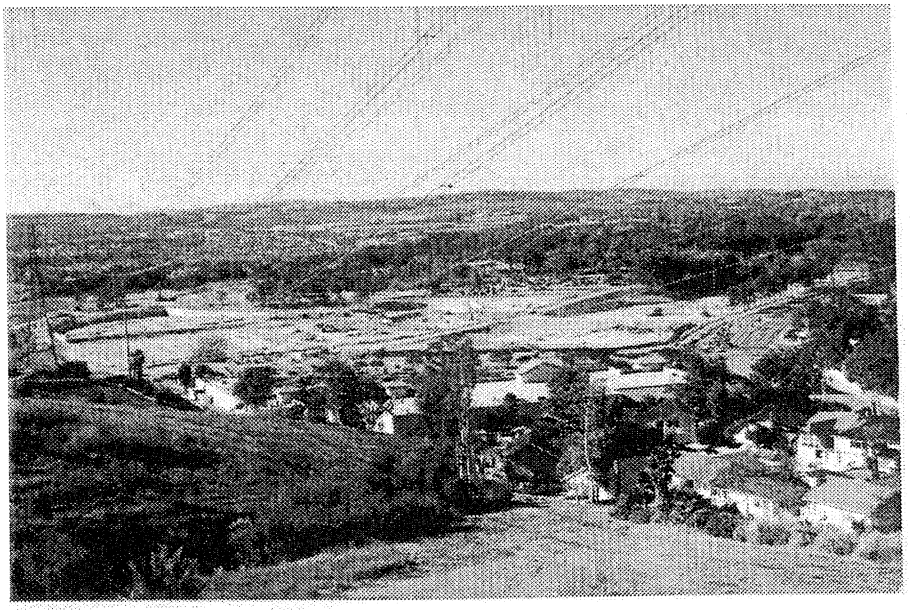
Type 1a

La Paz Road between Alameda Avenue and Aliso Hills Drive



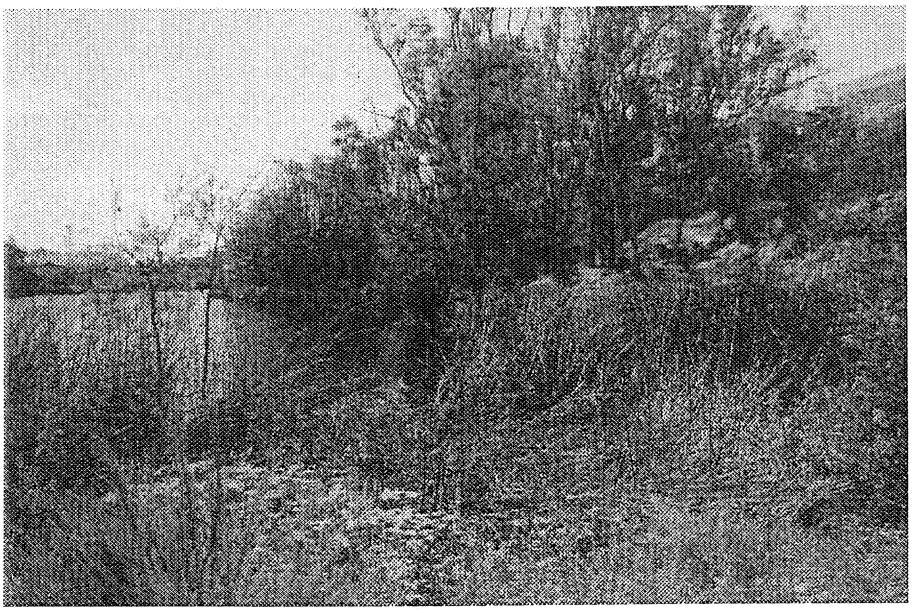
La Paz Road between Alameda Avenue and Aliso Hills Drive. A plaza located in the La Paz Road open space could offer a shady respite for travelers and provide a location for habitat information signage including information about invasive species and revegetated habitat.

Edison Easement – above willow wash



Edison Easement, West above willow wash. The uphill location of this plaza would provide excellent long distance views as well as good bird watching opportunities in the willow wash below.

Lakes area along west shore of lakes



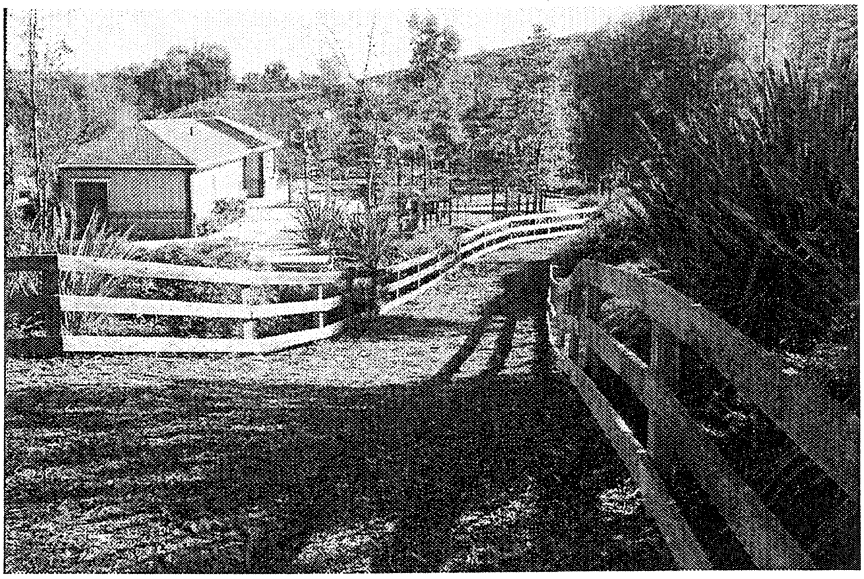
Lakes area. A plaza located along the west shore of the Lakes would provide a restful respite and an opportunity to appreciate the riparian habitat. Placing the trail upslope would provide overviews of the Lakes with minimal disruption of the habitat.

Type 1b

Veeh Ranch Park at Santa Vittoria Drive – Southeast corner

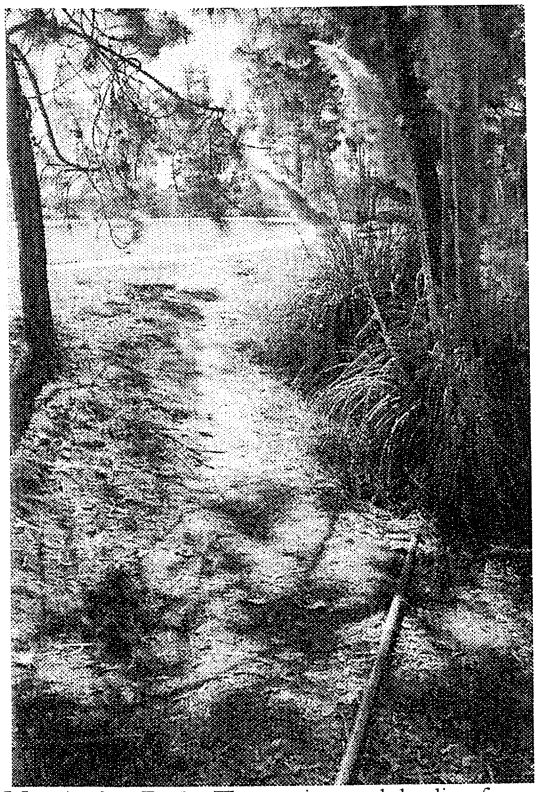
Veeh Ranch Park at Santa Vittoria Drive. Veeh Ranch Park is well located to provide a shady plaza with wayfinding signage for travelers along Santa Vittoria Drive and through the park.

Cabot Park at base of trail south of parking lot



Cabot Park. Wayfinding signage would be useful to travelers transitioning from the Nellie Gail to the County trail system.

Costeau Park – visible along Alicia Parkway
Mendocino Park



Mendocino Park. The service road leading from Mendodino Park to the proposed Edison Easement Trail can serve double duty as a trail head, and would benefit from wayfinding signage.

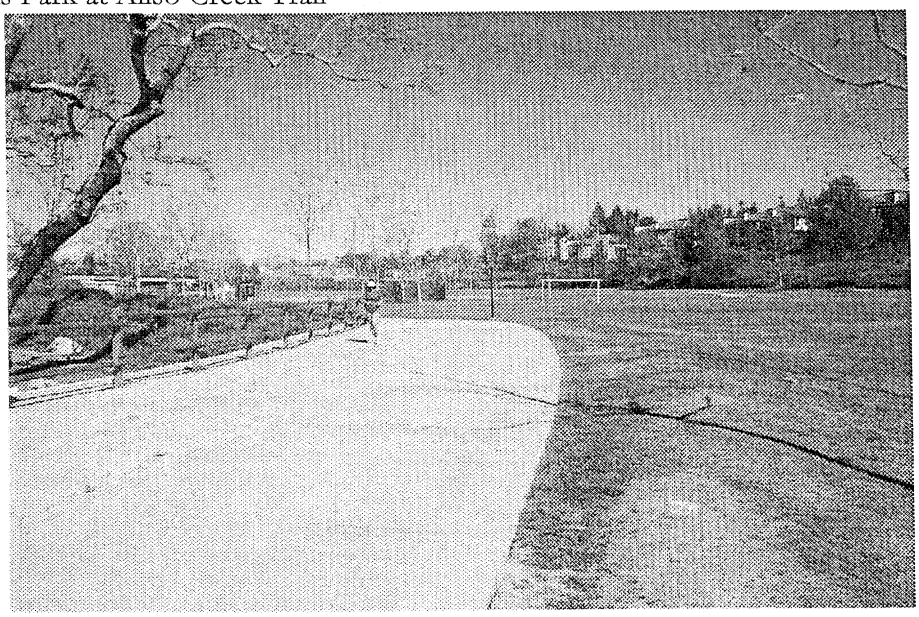
Santa Vittoria Park at Santa Maria Avenue

Type 1c

Community Center
Clarington Park at Aliso Creek

Type 2a

Sheep Hills Park at Aliso Creek Trail



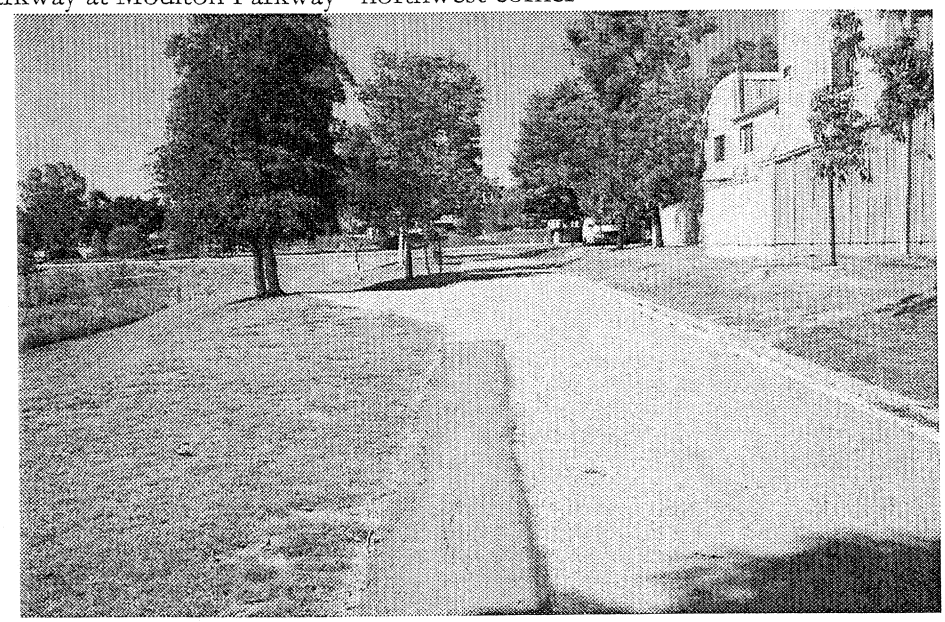
Sheep Hills Park at Aliso Creek. Wayfinding signage where the proposed Sheep Hills Trail intersects the County Aliso Creek Trail would help travelers orient themselves to the City's Trail system.

Aliso Creek at Juan Avila Adobe Site – add to existing signage

Juan Avila Adobe Signage. The signage at the Aliso Creek location could be expanded to include wayfinding and habitat information for residents and long distance visitors. A plaza with shade and a bench would add to the value of the site.

Type 2b

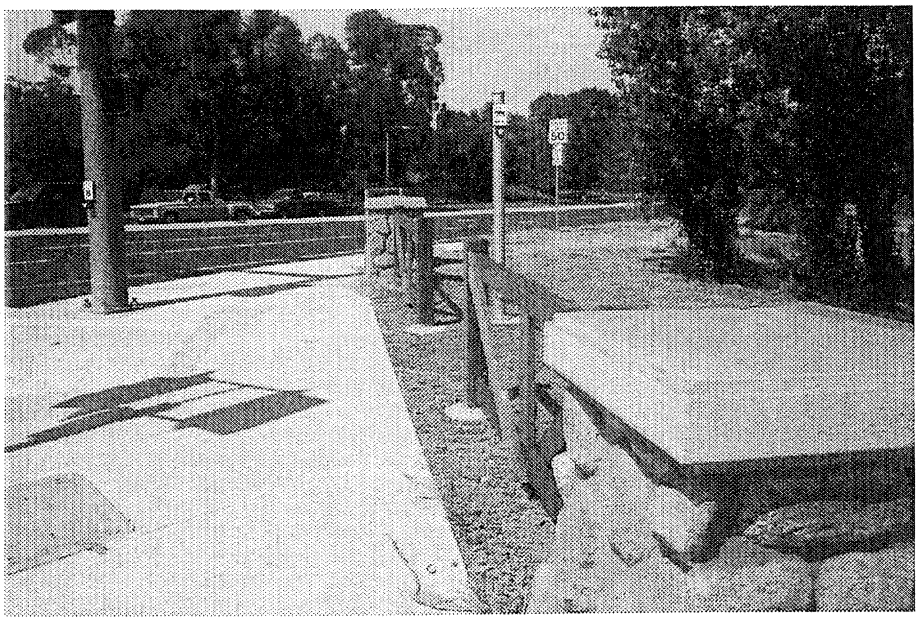
Alicia Parkway at Moulton Parkway– northwest corner



Alicia Parkway at Moulton Parkway Plaza Location. The revegetation area at Alicia Parkway presents an excellent opportunity for wayfinding and habitat signage and a good resting place for long-distance travelers.

Type 2c

Oso Parkway at Moulton Parkway – southeast corner



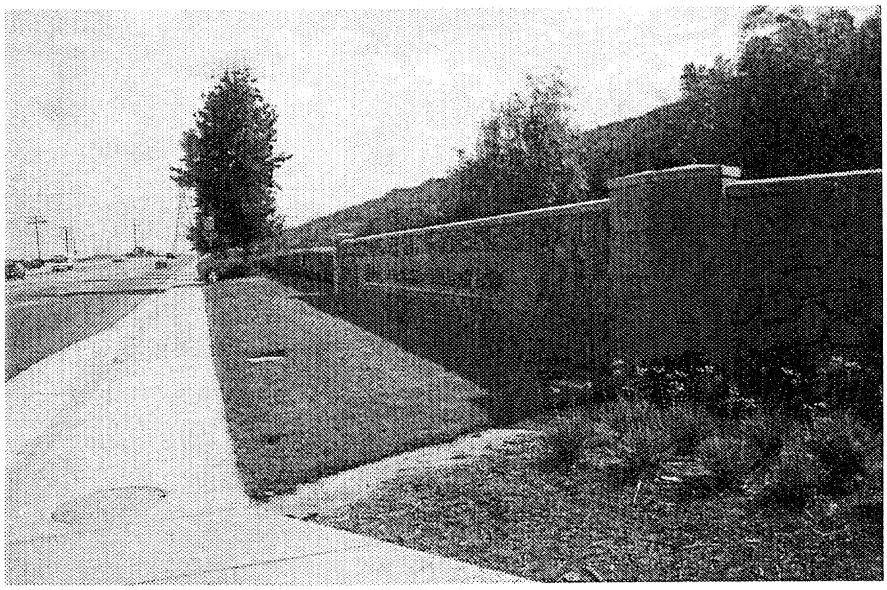
Oso Parkway at Moulton Parkway Plaza Location. A shady plaza with wayfinding and safety signage would be a good addition to the existing County Trail.

La Paz Road at Paseo de Valencia – southwest corner

La Paz Road at Paseo de Valencia. This shady Eucalyptus grove would provide a pleasant venue in which to consult wayfinding signage.

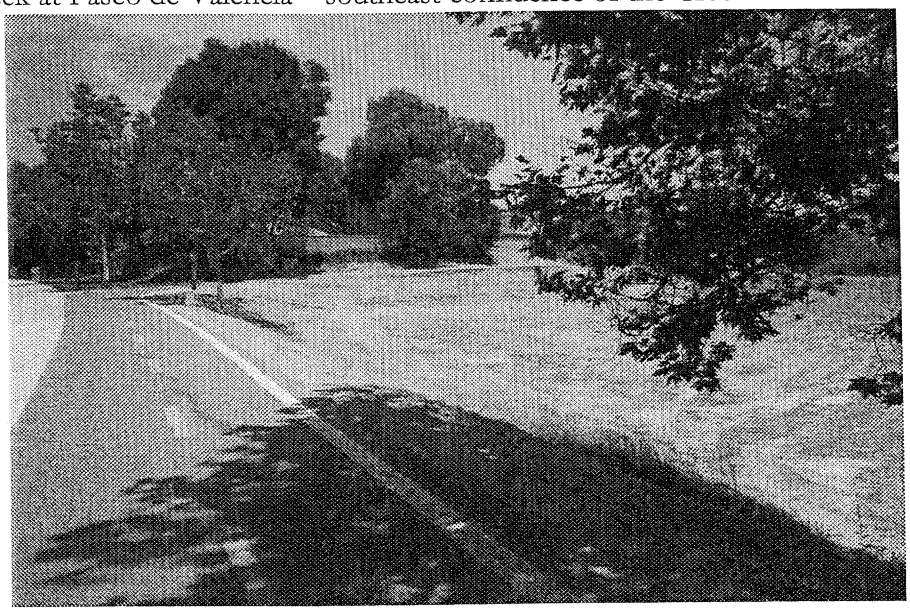
Type 3

OCTA Transportation Terminal
Oso Parkway at Cabot Road – southwest corner



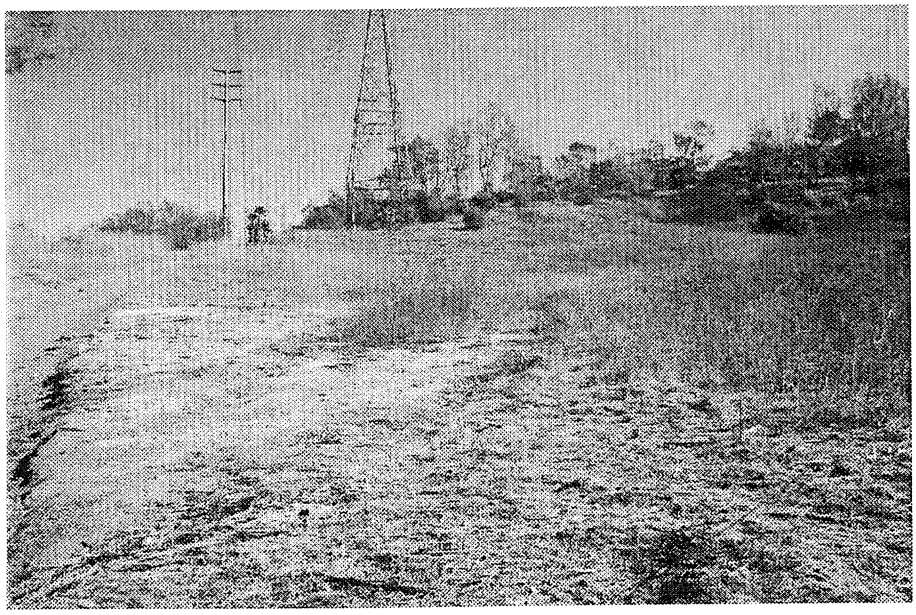
Oso Parkway at Cabot Road. There is a small area at the far end of the wall on Cabot with adequate space for a trail plaza providing wayfinding signage.

Aliso Creek at Paseo de Valencia – southeast confluence of the Creek.



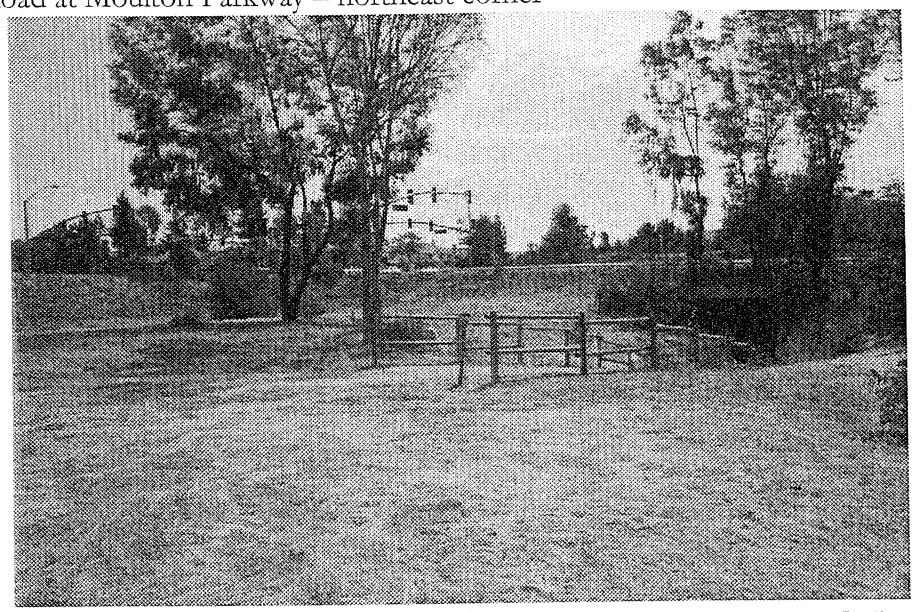
Aliso Creek at Paseo de Valencia Plaza Location. Wayfinding and safety signage would enhance a plaza at the juncture of the Creek Trail with Paseo de Valencia.

Edison Easement Trail at Alicia Parkway – east side of Alicia



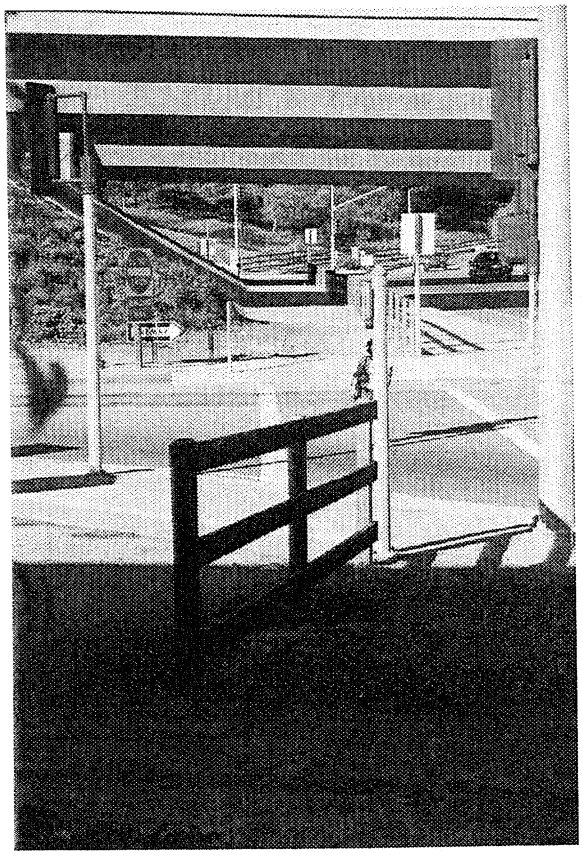
Edison Easement Trail at Alicia Parkway. Wayfinding signage at the base of the Proposed Edison Easement along Alicia Parkway would inform travelers about the trail and bikeway connections through the easement and along La Paz Road.

La Paz Road at Moulton Parkway – northeast corner



La Paz Road at Moulton Parkway Plaza Location. A shady plaza with wayfinding and safety signage would be a good addition to the existing County Trail.

La Paz Road at Aliso Hills Drive – southwest corner
SJHTC at Greenfield



San Joachin Hills Transportation Corridor at Greenfield Drive. The Niguel trail passes beneath the SJHTC at Greenfield and connects to the proposed westbound trail to Moulton. Wayfinding signage would aid long distance travelers in negotiating the Laguna Hills trail system.

Hiking/Equestrian Trails Design Guidelines

Introduction

These Hiking/Equestrian Trial Design Guidelines have been prepared to implement the Trails portion of the Open Space, Bikeways and Trails Master Plan. They have been adapted from several successful plans referenced in the bibliography.

Equestrian/hiking trails as designated on the General Plan Map are intended to be designed as an independent trail system to serve the riding and hiking needs of the community. Some trail alignments have been designed to utilize existing or proposed service roads. Service roads, paved or unpaved, are designed to provide service vehicle access (fire, utility or maintenance). They may also be used by private vehicles restricted to servicing individual equestrian stables. Trails utilizing said service routes should be designed to accommodate said vehicles use, for example entrance barricades should be designed to allow for restricted vehicle passage.

Strict standardization among hiking and riding trails or even segments of the same trail is impractical because of the vast difference in topography and other physical characteristics and because of dissimilarities in kinds and extent of use. Standards are good, but flexibility is necessary. Therefore, design may vary among different trails or segments of trails according to development constraints and various special conditions. Nevertheless, certain basic standards allowing for flexibility and for the safety and maintenance of the trail and their related facilities should be followed. The specific design standards contained herewith have been prepared to achieve the following goals and policies:

Alignment: The equestrian/hiking trail system should provide for a continuous passage from all areas of the City zoned for equestrian use.

Guidelines:

- Wherever possible, General Plan trail alignments should use existing paths and/or unimproved roads (i.e., maintenance roads, flood control berms, unused access roads, etc.).
- Trails should have a relationship to identifiable destination points of interest to both hiking and equestrian users.
- Trail alignments should be compatible with existing and future land uses.
- Alignments should minimize potential impacts on non-equestrian areas.
- Trail alignments should provide an interconnect system with the adopted Orange County Master Trail System and State of California Trail System developed adjacent to the City.
- Trail alignments, when included as a part of the County Master Trail System and located within the City, should be generally consistent with City Standards in both intent and design. Equestrian/hiking trail alignments should connect community parks and recreation facilities when feasible.
- Hiking trail alignments should connect residential neighborhoods to local schools.

Safety: The equestrian/hiking trail system should be designed and implemented in such a manner as to enhance the public safety and welfare of the community.

Guidelines:

- Priority should be given to the physical separation of vehicles and trail users where possible.
- Equestrian/hiking trails should not be aligned in such a manner as to make them susceptible to periodic flooding or erosion.
- Signage identifying equestrian/hiking trails and crossings should be located to meet public safety requirements.
- Trail alignments should not exceed a maximum gradient of fifteen percent; trail width may vary in order to achieve the fifteen percent grade.
- Where trail easements are limited by steep grades and obstacles, the system should be fenced to preclude use outside the trail easement.
- Where trails are located in a designated open space area accessible to the general public, an open trail system may be used. The open trail should be clearly marked and need not be fenced.
- The use of a switchback trail system should be discouraged except when absolutely necessary. Acute angles should be avoided.
- At-grade road crossings should be perpendicular to the road and should be adequately signed. (See Exhibits K & L)
- Adequate lighting should be considered in tunnels at all times to reduce contrast upon entering the tunnel.

Environment: The equestrian/hiking trail system should be designed in such a manner as to respect the natural environment of the immediate area.

Guidelines:

- Trail alignments should preserve existing native and ornamental vegetation by removing only as much as necessary to accommodate the trail.
- Trail shoulder widths may be limited in sensitive areas in order to preserve scenic amenities and valuable habitat.
- Where trail alignments include existing trees, particular attention to preservation should be incorporated into design plans.
- Trail alignments should respect natural landforms and avoid significant grading to implement.
- Trail improvements should be minimal and respect the natural terrain and vegetation in the immediate area.

In response to these goals and policies, the following specific standards have been developed for implementing the trail system.

Design Standards:

Equestrian and Hiking Trails

Methods: Visible evidence of trail construction should be confined to the trail width. Construction should attempt to make as little impact on the natural environment as possible by using appropriate equipment and hand work where possible (e.g.CCC crews, volunteers, etc.)

Grades: Grades should be held to a maximum of 8 percent whenever possible. Steep grades are tiring for hikers and horsemen and create erosion problems. Long stretches of a given grade should be avoided.

- The grade should undulate gently to provide natural drainage and to eliminate monotonous level stretches.
- No grade should be so steep that erosion is a problem.
- Grades should be lessened at approaches to switchbacks. Long, gradual switchbacks should be used where practical. Acute angles should be avoided when possible.
- Approaches to road crossings should be nearly level.

Maximum grades should be as follows:

Less than 500'	15%
Greater than 500'	10%

Construction Guidelines: Generally, trail width should be 10' to 20' wide. The trail may be narrower if approved by the city, but under no circumstances less than 8' and only when surrounded by open space. The trail width should be determined by amount and intensity of use, as well as topography, cost of construction and vegetation.

In order to reduce erosion and, therefore, maintenance problems, disturbance of the soil surface should be kept to a minimum. Only those rocks, stumps, and roots which interfere with passage should be removed.

The degree of cut allowed on a slope depends on the soil type, hardness, etc.; make slope cuts at a maximum of 2:1, but not so steep that erosion or loss of stability will result. Ease transitions at the top of all cuts so that the trail will be molded into the terrain. Construct the trail with provision for settling and sloughing. On side slopes, loose material which may slide onto the trail should be removed. Also, a berm of earth or rock, on the outside edge of the trail may be necessary.

Steep areas may be handled by terracing and building steps. These must be reinforced with stone or wood. Steps simply cut into the slope should not be used, as these become slippery when wet, and eventually erode. Steps should be negotiable by horses and they must be broad, flat terraces, at least 8' between steps.

Vegetation: Vegetation should be preserved as much as possible to protect the aesthetic quality of the trail. Vegetation should be cleared to a height of 12' within the boundaries of the trail tread (See Exhibit B). Pruning along trails should be selective. Good pruning practices should be followed, including cutting branches off flush with the limb, and stems flush with the ground (See Exhibit C). Stumps may be treated to prevent sprouting. Large limbs should be pruned flush with the trunk. Dead and dying limbs and snags which may fall on the trail should be removed. Ground cover plants and low shrubs should be removed only from the actual trail. Spot spraying with herbicides is permissible when poison oak predominates or hand pruning is ineffective in keeping trails clear.

Where a trail is on a side slope, the vegetation on the uphill side will be more invasive and should be cut back more severely than vegetation on the downhill side (See Exhibit A).

Vegetation should be allowed to return to cut slopes to increase stability. Where appropriate, any replanting should be in conformance with land use development plans. Replant areas with vegetation indigenous to those areas or compatible with plantings already in place.

Drainage: Drainage is the most important item in trail construction; it requires a special study of the soils, precipitation, runoff, springs, and streams in the area. Surface water must be diverted from the trail's surface before it builds up to an erosive force. The method used to drain the trail will depend on the quantity and speed of water and the type of soils in the area. The best and simplest drainage is to out-slope the trail surface, 1 - 3 percent, to allow the water to sheet off, rather than run in a stream. Low grades help prevent drainage problems; steep grades allow the water to run faster building up erosive force.

For steeper conditions water bars divert water off a trail at controlled points along the trail. They can be incorporated in the original construction of a trail, or they can be installed later as a maintenance measure. Water bars can effectively eliminate erosion and stabilize a trail. They can be made from 4 x 6 redwood timber, native logs or stones. The elements of a properly installed water bar are:

- Set the water bar at a 60 degree angle across the trail. A water bar set perpendicular (90 degrees) across the trail will not diver the water off. A water bar set 30 degrees across the trail can be awkward to hike or ride over.
- Extend the water bar such that water is carried completely off the trail to a steep side slope. Otherwise, the water flow will bypass the water bar and erosion will occur
- Provide rock at the down slope end of the water bar to dissipate the energy of the flowing water, thereby minimizing erosion.
- The top of the water bar should be nearly flush with the trail tread to minimize tripping hazards. Regular maintenance will be necessary to remove silt that will accumulate behind the water bar (See Exhibits G and H).

Larger streams, whether permanent or intermittent, may require a bridge, an "Arizona" crossing (drainage pipe system) or culvert. If a drainpipe system is used, it is very important to prevent erosion at the outfall end by providing riprap or other hard surface for the water to hit first. If this is not provided, the water leaving the pipe can erode the surface below it, and eventually the fill around the down slope end of the pipe. The installation of rip-rap is to be placed such that it does not conflict with the trail area. Avoid causing off-trail drainage problems, such as erosion or siltation, by careful culvert placement.

Surfacing: Trails should be surfaced with decomposed granite or remain in a natural state, if suitable. The color of the material shall be compatible with the environment through which the trail passes. When a trail crosses driveways or other paved surfaces, a non-slip surface should be applied (broom/rake finish).

Structures: Structures may include water bars, drain pipes, retaining walls, bridges, etc. If possible, structures should be avoided because of their installation and maintenance cost. Ideally, trail structures should be built using on-site materials or imported materials that blend into the environment. They should be designed so that they are harmonious with the surroundings. Structures should be as vandal-proof as possible. Use recessed bolt heads wherever possible. Bridges should be a minimum of 10' wide.

Fences: Trail fencing should be provided where horses need to be firmly confined within the trail width or for safety such as at separations from bikeways, steep slope areas, bridges, and other potential hazard or high-traffic and general public use areas.

Fencing should be constructed of materials that blend with the surrounding community, are in character with the recreational nature of the trails and that weather well. Suggested materials include wood such as cedar or redwood. The following are suggested dimensions for materials:

Fencing Component	Split-Rail Fencing	Pole
Fencing		
Rail (size) 2 ½" min.	2" x 3" min.	
Post (size) 4 ½ min.	4" x 5" min.	
Post (spacing)	6 - 1/2' max.	7' – 8'

Other dimensions include:

- Fence height is not to exceed four feet at the maximum. A three- foot fence height may be appropriate for trails bordering on residential areas (bridge fencing excepted).
- The top of the post shall not exceed 6" above the top rail.
- The maximum height above ground of the top rail shall be 48" $\pm$ 2" maximum.
- All posts shall be pressure treated with a preservative as required by city codes. Posts shall exhibit a minimum penetration of 1/8" on all treated surfaces. The center to center distance between the top and bottom rails shall be 21" $\pm$ 3" See Exhibit P).

Hitching posts shall be constructed of 6" square posts, set two feet into the ground, reaching a 4' height. Rings for tethering horses shall be attached to the top of the post.

Plantings such as trees, hedges, or large rocks can also serve as trail fencing or barriers.

Barbed wire is prohibited as a trail fencing material.

Barriers: A trail can discourage entry by motorcyclists by placing a log barrier at the entrance or by leaving fallen logs on the trails. These are difficult to cross with a motorcycle, but may be stepped over by hikers and riders. Wherever barriers are used to prevent vehicle access, appropriate signage shall be installed.

Bollards should be installed at the entry to service road trails to allow hiking and equestrian access but exclude large vehicles. They should be of the folding type to allow easy access for utility vehicles.

Utilities: Utility boxes and vaults, manholes, pole lines or other above grade utilities shall be located outside the trail easement whenever feasible.

Rest Areas: Rest areas are smaller facilities that accommodate fewer people than staging areas, and they may or may not accommodate parking spaces. Rest areas for trail users should be located within regional or local parks, state parks, and staging areas as first priority and at other feasible locations to seek a desirable minimum spacing of 3 – 5 miles. Rest areas should also be near neighborhoods and other areas to reduce the need for large staging facilities. Rest areas should ideally provide the following:

- Benches
- Hitching posts
- Water for horses
- Water for hikers and riders
- Identification signs
- Picnic tables
- Shade

- Trash receptacles

Multi-purpose Trail Design Guidelines:

All multi-purpose trails shall include a paved Class I Bikeway separated from an adjacent unpaved hiking/equestrian trail.

Class II Bikeways allow for preferential use by bicycles and are established within the paved area of highways. They are delineated by the use of lane stripes, bike lane signs and pavement markings.

Widths

- Class II Bikeways shall be one-way facilities.
- Where parking stalls are marked, Class II Bikeways shall be a minimum width of 5 feet.
- Where parking is permitted but stalls are not marked the minimum width of the bike lane shall be 11-12 feet depending on the type of curb.
- If no gutter exists, the minimum bike lane width shall be 4 feet.
- With a normal 2 foot gutter, the minimum bike lane width shall be 5 feet.
- Striping bike lanes next to curbs where parking is prohibited only during certain hours should be avoided.

Striping and Signing

- Raised barriers shall not be used to delineate bike lanes.
- Bike lanes with parking permitted shall not be directed toward the curb at intersections or localized areas where parking is prohibited.
- Striping delineation shall be dropped at the approach of the right-turn lane (or off-ramp).

Intersections

- When bicyclists are directed from bike lanes to sidewalks, curb cuts should be flush with the street.
- Curb cuts shall be provided at each intersection.
- Curb cuts shall be wide enough to accommodate adult tricycles and two-wheel bicycle trailers.
- Bikeway yield or stop signs shall be provided at uncontrolled intersections.

Intersections pose serious hazards for bicyclists (See Exhibits R-S). While all solutions require that the bicyclists assume responsibility for understanding the inherent danger at major conflict points, some designs are preferred because they have the fewest conflicts and are therefore inherently safer (See Exhibits T-W).

Bikeway Design Guidelines

Introduction

The following Bikeway Design Guidelines were primarily derived from Chapter 1000, Bikeway Planning and Design, of the California Department of Transportation Highway Design Manual, July 1, 1995. Other references can be found in the bibliography.

They are referenced to provide basic Bikeway Design Guidelines applicable to conditions in Laguna Hills. For more comprehensive and detailed information please reference the original document.

The Bikeway network should provide a hierarchical system of Bikeways that provides a continuous passage through all areas of the City and links to surrounding communities.

Definitions:

- Class I Bikeways shall provide a bikeway used to serve corridors not served by streets and highways or where wide right of way exists, permitting such facilities to be constructed away from the influence of parallel streets. They are primarily for recreational use.
- Class II Bikeways shall be lanes established in corridors where there is significant bicycle demand by improving conditions for bicyclists where feasible. Parking lanes shall be prohibited adjacent to Class II bikeways on major arterials. Improvements for Class II bikeway surfaces shall include augmented sweeping programs and special signal facilities.
- Class III Bikeways shall provide continuity to other bicycle facilities and/or designate preferred routes through high demand corridors.

General Bikeway Design Guidelines

Surface Quality

- The surface to be used by bicyclists should be smooth, free of potholes, and the pavement edge uniform.
- On new construction, the finished surface of bikeways should not vary more than ¼ inch from the lower edge of an 8 foot long straight edge when laid on the surface in any direction.

Bikeway Surface Tolerances

Direction of Travel	Grooves[1]	Steps[2]
Parallel to travel	No more than ½" wide	No more than 3/8" high
Perpendicular to travel	------	No more than ¾" high

(1) Groove – a narrow slot in the surface that could catch a bicycle wheel, such as a gap between two concrete slabs.
(2) Step – A ridge in the pavement, such as that which might exist between the pavement and a concrete gutter or manhole cover; or that might exist between two pavement blankets when the top level does not extend to the edge of the roadway.

- Drainage Grates, Manhole Covers, and Driveways. Drainage inlet grates, manhole covers, etc., on bikeways shall be designed and installed in a manner that provides an adequate surface for bicyclists. They should be maintained flush with the surface when resurfacing.
- Drainage inlet grates on bikeways shall have openings narrow enough and short enough to assure bicycle tires will not drop into the grates (e.g., reticuline type), regardless of the direction of bicycle travel).
- Where it is not immediately feasible to replace existing grates with standard grates designed for bicycles, 1" x ¼" steel cross straps shall be welded to the grates at a spacing of 6 inches to 8 inches on centers.
- Vertical barriers and obstructions, such as abutments, piers, and other features causing bikeway constriction, shall be marked to gain the attention of approaching bicyclists.

Class I Bikeway Design Guidelines

Class I bikeways are facilities with exclusive right of way, with cross flows by motorists minimized.

Widths and Clearances

- The minimum paved width for a two-way bike path shall be 10 feet.
- The preferred width for a two-way bike path shall be 12 feet to allow bicyclists to ride side by side.
- A minimum 2 foot wide graded area shall be provided adjacent to the pavement,
- A 3 foot graded area is recommended where clearance from poles, trees, walls, fences, guardrails or other later obstructions are present.
- No one-way bike paths shall be allowed due to enforcement difficulties.
- A minimum 2 foot clearance to obstructions shall be provided adjacent to the pavement
- The vertical clearance to obstructions across the clear width of the path shall be a minimum of 10'.
- A yellow centerline stripe shall be used to separate opposing directions of travel in the following circumstances:
  - Where there is heavy use.
  - On curves with restricted sight distance.
  - Where the path is unlighted and nighttime riding is expected.

Crossings

- Where motor vehicle cross traffic and bicycle traffic is heavy, grade separations are desirable to eliminate intersection conflicts.
- Where grade separations are not feasible, assignment of right of way by traffic signals should be used if feasible.
- When crossing an arterial street, the crossing should either occur at the pedestrian crossing or completely out of the influence of any intersection to permit adequate opportunity for bicyclists to see turning vehicles.
- When crossing at mid-block locations, right of way should be assigned by devices such as yield signs, stop signs, or traffic signals which can be activated by bicyclists.
- Stop or yield signs for bicyclists should be placed at all crossings to minimize potential for conflict resulting from turning autos.
- Ramps should be installed in the curbs, to preserve the utility of the bike path. Ramps should be the same width as the bicycle paths where feasible (See Exhibits K and L).

Separation

- Class I Bikeways should be separated from the curb by a minimum of 2' and a desired 5' whenever feasible.
- Class I Bikeways separated from the curb by less than 5' should include a barrier to prevent bicyclists from encroaching onto the highway. Suitable barriers include fencing or landscaping.
- Low barriers (e.g., dikes, raised traffic bars) are to be avoided next to a highway.
- Class I Bikeways immediately adjacent to streets and highways are to be avoided.
- Class I Bikeways in the median of highways are to be avoided.

Class I Bikeway Design Speeds

- The minimum design speed for Class I Bikeways shall be 25 mph except on long downgrades.
- The minimum design speed for Class I Bikeways shall be 30 mph on long downgrades (steeper than 4%, and longer than 500 feet).

Horizontal Alignment and Superelevation

- Refer to standards outlined in Chapter 1000 of the Bikeway Planning and Design of the California Department of Transportation Highway Design Manual and standard engineering practices.

Stopping Sight Distance

- Refer to standards outlined in Chapter 1000 of the Bikeway Planning and Design of the California Department of Transportation Highway Design Manual and standard engineering practices.

Length of Crest Vertical Curves

- Refer to standards outlined in Chapter 1000 of the Bikeway Planning and Design of the California Department of Transportation Highway Design Manual and standard engineering practices.

Lateral Clearance on Horizontal Curves

- Refer to standards outlined in Chapter 1000 of the Bikeway Planning and Design of the California Department of Transportation Highway Design Manual and standard engineering practices.

Grades

- The maximum grades for Class I Bikeways shall be 5% except for occasional short segments of 50 feet. Where unavoidable due to steep topography 8% grades shall be acceptable.
- Where feasible grades shall be limited to 2%.
- The minimum pavement thickness shall be 3 inches.
- Basement soil shall be sterilized to preclude weed growth through the pavement.

Drainage

- The surface of the Class I Bikeways shall have a one direction cross slope of 2% when feasible.
- Where necessary, catch basins with drains will be provided to carry intercepted water across the path. Such structures shall provide no undue obstacle to bicyclists.
- Culverts or bridges are necessary where a Class I Bikeway crosses a drainage channel.

Barrier Posts

- Installation of barrier posts at entrances to Class I Bikeways to prevent motor vehicles from entering, shall be well marked and visible to bicyclists, day or night (i.e., install reflectors or reflector tape).
- When more than one post is necessary, a 5 foot spacing shall be used.
- Barrier post installations shall be removable to allow emergency and service vehicle entry.

Class II Bikeways Design Guidelines

Class II Bikeways allow for preferential use by bicycles and are established within the paved area of highways. They are delineated by the use of lane stripes, bike lane signs and pavement markings.

Widths

- Class II Bikeways shall be one-way facilities.
- Where parking stalls are marked, Class II Bikeways shall be a minimum width of 5 feet.
- Where parking is permitted but stalls are not marked the minimum width of the bike lane shall be 11-12 feet depending on the type of curb.
- If no gutter exists, the minimum bike lane width shall be 4 feet.
- With a normal 2 foot gutter, the minimum bike lane width shall be 5 feet.
- Striping bike lanes next to curbs where parking is prohibited only during certain hours should be avoided.

Striping and Signing

- Raised barriers shall not be used to delineate bike lanes.
- Bike lanes with parking permitted shall not be directed toward the curb at intersections or localized areas where parking is prohibited.
- Striping delineation shall be dropped at the approach of the right-turn lane (or off-ramp).

Intersections

- When bicyclists are directed from bike lanes to sidewalks, curb cuts should be flush with the street.
- Curb cuts shall be provided at each intersection.
- Curb cuts shall be wide enough to accommodate adult tricycles and two-wheel bicycle trailers.
- Bikeway yield or stop signs shall be provided at uncontrolled intersections.

Intersections pose serious hazards for bicyclists (See Exhibits R-S). While all solutions require that the bicyclists assume responsibility for understanding the inherent danger at major conflict points, some designs are preferred because they have the fewest conflicts and are therefore inherently safer (See Exhibits T-W).

Class III Bikeway Design Guidelines

Class III Bikeways are shared facilities, either with motor vehicles on the street, or with pedestrians on sidewalks, and bicycle usage is secondary. They are established by placing Bike Route signs along roadways and are intended to provide continuity to the bikeway system.

Uses

They are to be designated in the following situations:

- To provide for through and direct travel in bicycle-demand corridors.
- To connect discontinuous segments of Class II Bikeways.

Improvements

- Street parking shall be removed or restricted in areas of critical width to provide improved safety.
- An effort shall be made to adjust traffic control devices (stop signs, signals) to give greater priority to bicyclists, as compared with alternative streets. (May include bicycle-sensitive detectors on right-hand portion of road).
- Surface imperfections or irregularities shall be corrected (e.g., utility covers adjusted to grade, potholes filled).
- When bicyclists are directed from bike lanes to sidewalks, curb cuts should be flush with the street.
- Curb cuts shall be provided at each intersection.
- Curb cuts shall be wide enough to accommodate adult tricycles and two-wheel bicycle trailers.
- Bikeway yield or stop signs shall be provided at uncontrolled intersections.

Multi-purpose Trail Design Guidelines:

All multi-purpose trails shall include a paved Class I Bikeway separated from an adjacent unpaved hiking/equestrian trail.

Bicycle Storage

To protect bicycles from damage and theft there are three primary methods of protecting them:

- Enclosing the bicycle in a lockable space such as a locker or cabinet.
- Locking the bicycle to a post, rack or other stationary object.
- Wrapping a chain through the frame and wheels to make the bicycle inoperable.
-

Lockers are the most effective method of protecting bicycles but tend to be large and expensive. They should be used at major commuter transportation destinations such as

schools and transportation centers. They may also be used at work destinations such as large medical, office or industrial destinations.

Racks are less effective in preventing theft, as chains can be cut and bicycle hardware such as seats and pedals can be removed. They should be located in well-lit, high visibility areas not more than 50' from the destination. If they are located further from the destination they encourage people to lock their bicycles to building columns, trees and parking meters, where they may serve as an impediment to pedestrian traffic. Devices that provide lateral support only at one wheel leave the bicycle vulnerable to damage (Exhibit Q).

Signage Guidelines for Trails and Class I Bikeways

Visitor-friendly uniform signage would add to the Laguna Hills trails and bikeways experience by providing safe, way finding and educational information. These guidelines have been prepared to respond to assist public recreation providers in providing better information to their users.

Several types of signs are desirable and will add to the enjoyment and safety of the user. These include:

- Guide signs including:
- Warning signs
- Regulatory signs

Warning signs : Warning signs caution the user about conditions not reasonably apparent and should be placed sufficiently in advance of the hazard to allow for responsive action. Examples include:

- Bump
- Pavement ends
- Dip
- Road Narrows
- Bike Xing
- Narrow Bridge

Regulatory signs: Regulatory signs inform users of traffic laws and regulations governing movements, parking, speeds, etc. Examples include:

- Motor vehicles prohibited
- No Parking
- Bicycles only

Guide signs: Guide signs, such as bike route, should be placed where a route begins, ends, changes direction or intersects with other bikeways. Intermediate guide signs should be provided to reassure bicyclists of their position if distances are great between major decision points.

- Directional Signs
- Information node panels
- Interpretive panels

Signs erected at the roadside to be read by motorists should be mounted with the lower edge of the sign no less than 7 feet above the pavement in residential, business and commercial districts. Signs for bicyclists and along Class I Bikeways should be placed at 4-5 feet above the pavement. Bicycle-oriented warning signs should be positioned far enough in advance of the condition to allow time for perception and response, based upon design speeds and sight/stopping distances (See Exhibit X). The nearest projection of a sign should be a minimum of 3' from the edge of the bikeway surface.

Care should be taken to place signs where they will not be obscured by other elements such as parked cars or vegetation.

Pavement Markings: Pavement markings are particularly valuable to bicyclists since they are in the line of vision.

Stenciled message markings are normally white, with a minimum letter and arrow height of 4 ft and include such messages as

- Stop
- Yield
- Slow
- Ped Xing
- RR Xing
- Bike Lane

Because pavement markings can reduce friction, making stopping more difficult and increasing the dangers of sideslip, their occurrence should be limited and avoided at critical stopping points when possible.

Durability: Provide a durable sign that will withstand the outdoor environment
Guidelines:

I. Durable woods such as redwood or cedar
II. Aluminum
III. Plastic
IV. Fade resistant paint and ink should withstand weathering and UV light

Readability: Provide a sign that will be easily readable
Guidelines:

I. Clean lines
II. Color coded
III. A simple shape that can be well-executed
IV. Sign size should be the minimum required to convey the message to the viewer. The size of lettering should be determined by considering legibility factors such as distance, mode of transportation, and speed at which the intended audience is traveling.
V. One-inch letters are adequate for most non-motorized trail situations.
VI. Interpretive-informational signs: Letter size for interpretive, safety, and other informational signs is dependent upon the distance from which the message is to be viewed:

Viewed from 4 feet or less	5/8" letters
Viewed from 5 to 7 feet	3/4" letters
Viewed from 8 to 12 feet	1" letters
Viewed from 13 to 20 feet	2" letters
Viewed from over 20 feet	3" letters

Type Series	Legibility Distance Per Inch of Letter Height
Weaker typefaces	40ft. ABCDEFGHIJKLM
Bold typefaces	50ft. **ABCDEFGHIJKLM**

I. The appropriate letter height for signage is typically 2-3 times the minimum legibility letter height for a given distance.

II. Gothic, Helvetica and similar fonts have been selected for signing by many public agencies because of their easy readability. These and similar typefaces should be the first considered.

III. Comparison of lower case and capital letters shows that lower case letters have a slightly greater legibility distance. Capitals are seen more quickly, but lower case letters can be read more rapidly.

IV. Symbol size is also a function of the viewing distance and the amount of time available for viewing.

Roads:

0-25 mph	12"
25-50 mph	18"
Over 50 mph	24"
Motorized Trails:	
0-25 mph	12"
Over 25 mph	18"

Non-motorized Trails:

Viewed from 0-20 ft	3-4"
Viewed from 21-75 ft	6"
Viewed from over 75 ft	8"

Signs should be located to be easily read from the trail. Height of signs should be determined by vegetation and other surroundings, but normally, 40" from ground to bottom of a single sign, and 36" from ground to bottom of a double sign is a good rule. Signs may be incorporated as part of the fencing.

I. Lettering and symbols should be white or light colored against a dark background.

II. Illuminated signs should be carefully lit from remote mounted fixtures not visible by sign viewers.

Uniformity: Provide uniformity and trail and bikeway recognition.

Guidelines:

I. Sign frame and supports such as blue, green and brown complement natural settings and do not provide overt contrast.

II. All signs used should be a consistent size, shape color, layout and symbology.

III. Utilize "universal" symbols" traffic and facilities symbols (See Exhibit P).

IV. The sign concepts described are intended for use as recreational identifiers only and should not be used for other purposes.

Community Pride: Promote a sense of pride in the City of Laguna Hills

Guidelines:

I. All signage should clearly identify facilities as City facilities.

II. A damaged sign should be replaced or repaired such that the repair is not noticeable.

Safety: Contribute to the safety of the user

Guidelines:

I. A recreational sign should not mimic a regulatory sign in shape or color, potentially creating confusion as to the purpose or message of the sign.

II. Regulatory signs should be in conformity with Cal Trans standards.

III. Signs should be offset from the trail edge a minimum of 2 ft. However, exact location for the best visibility can only be done in the field.

IV. Signs should identify hazard points, clearance requirements or safety precautions, as warranted.

V. Trail user yielding signs should be placed at all trailheads and posted periodically, especially at trail crossings and along trails that accommodate a variety of users.

VI. Trail name signs should be place at entry points, halfway points and other points where trail identification is needed.

VII. Street signage to warn motorists of impending trail/bikeway crossings should be located in advance of trail crossings. Signs should meet City, County and State standards. Marking for trail/bikeway crossings should consist of striping on the roadway surface and, where feasible, texturing (sandblasting) of the roadway surface.

Enjoyment: Inform and add to the enjoyment of the user

I. Provide Interpretive Panels that use graphics and text to provide interpretive and educational messages, enhancing the user's appreciation of environmental, archeological and historical elements (See Exhibit N).

II. Corridor Information Panels should be installed at major decision making points where trails, bikeways and roads meet and provide a map showing;

- an overview of the systems important destinations
- trail difficulty
- travel distances
- allowed uses
- hours of operation
- hazards
- adjacent facilities locations such as telephones and first aid
- phone number where to obtain trail maps and other trail information (See Exhibit M)

III. Trail and bike route markers should be installed at access points for trails and bikeways.

IV. Make available an educational handout that provides information and serves as a guide to the entire trail system.

V. Directional signs should be placed, as appropriate, to clarify trail destination and direction to trail users.

Trail Etiquette

1. Reckless/negligent use on all trails will be prohibited. All persons shall ride or operate at a safe, controlled speed and in a responsible manner. Excessive speed and reckless/negligent operation are prohibited.

2. Control your horse or bike. Be alert and attentive.

3. Keep to the right of the trail.

4. Be sensitive to the trail. Even on open trails, you should not ride or hike under conditions where you will leave evidence of your passing, such as on certain soils shortly after rain. Respect the surrounding environment and sensitive habitats. Be sure to "pack-out" at least as much as you "pack-in."

5. Remain on designated trails only. Respect trail closures and do not trespass on private property. Obey all directional and instructional signs.

6. Safety helmet use is recommended for mountain bikers and equestrians.

7. Yielding: Except as dictated by special conditions, bikers shall yield to both pedestrians and equestrians, and pedestrians shall yield to equestrians. Equestrians shall be aware and considerate of bikers and pedestrians.

8. Make known your approach well in advance. A friendly greeting is considerate and works well; don't startle others. Show your respect when passing others by slowing down or even stopping. Anticipate that other trail users may be around corners or in blind spots.

9. Never spook animals. All animals are startled by an unannounced approach, sudden movement, or loud noises. This can be dangerous for you, for others, and for the animals. Give animals extra room and time to adjust to you.

10. Motorized vehicles are prohibited.

I. Plant Materials

Plant materials shall conform to "Horticultural Standards" of American Association of Nurserymen as to kind, size, age, etc.

Quality

Plants shall be sound, healthy, vigorous, free from plant disease, insect pests or their eggs, and shall have healthy normal root systems and comply with all state and local regulations governing these matters, and shall be free from any noxious weeds.

a. Plant materials shall be symmetrical, and/or typical for variety and species.
b. Trees shall not have been topped.
c. Roots shall not have been allowed to circle or become bound at any stage of growth.
d. All plant materials must be provided from a licensed nursery and shall be subject to acceptance as to quality by the supervisor.

Plant Materials Guarantee

All shrubs shall be guaranteed to live and remain in healthy condition for no less than thirty (30) days from the date of acceptance as to quality by the supervisor.

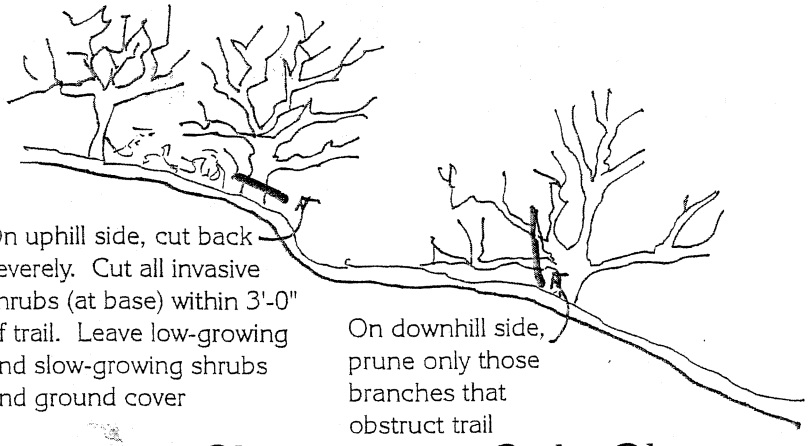
Newly planted areas shall receive special attention until plants are established. Adequate water shall be applied to promote normal, healthy growth. Proper berms or basins shall be maintained during the establishment period.

Plaza Planting Palettes

Suggested Trees – Ornamental
Bauhinia variegate – Purple Orchid Tree
Brachychiton populneus – Bottle Tree
Pistacia chinensis – Chinese Pistache
Suggested Shrubs – Ornamental
Rhaphiolepis indica – Rhaphiolepis
Pittosporum tobira, dwarf species - Pittosporum
Lavandula sp - Lavender
Lupinus sp. - Lupine
Artemisia 'Powis Castle'

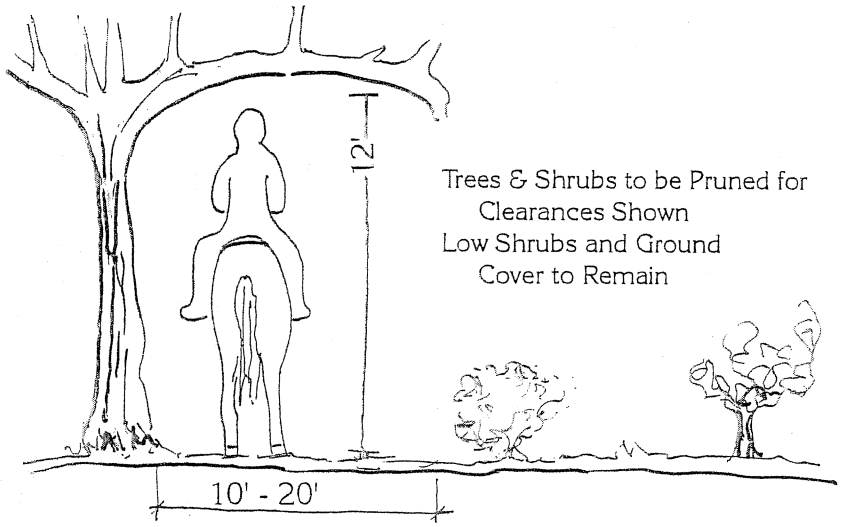
Suggested Trees – Native
Quercus agrifolia – California Live Oak
Platanus racemosa – Western Sycamore
Suggested Shrubs – Native
Rhus ovata – Sugar Bush
Heteromeles arbutifolia – Toyon
Myrica californica – Pacific Wax Myrtle
Rhamnus californica – California Coffeeberry

Exhibit A



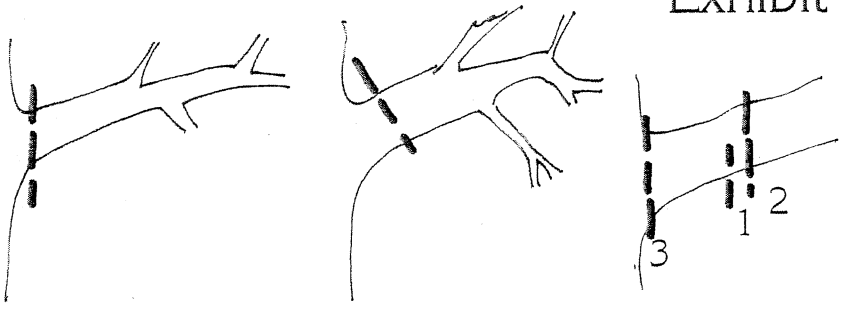
Vegetation Clearing on Side Slopes

Exhibit B



Vegetation Clearing on Flat Terrain

Exhibit C



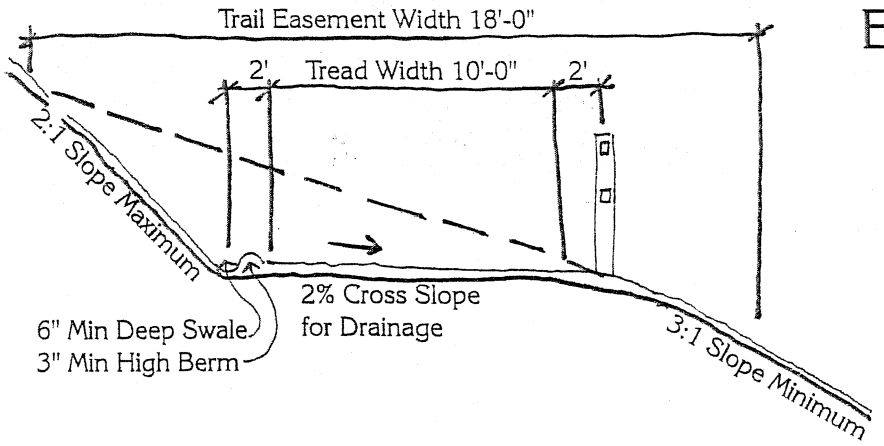
RIGHT:
Branches cut flush with limb or trunk

WRONG:
Stubs are unsightly & Hazardous

LARGE LIMBS:
Make Cuts in Order Shown

Proper Pruning Practices

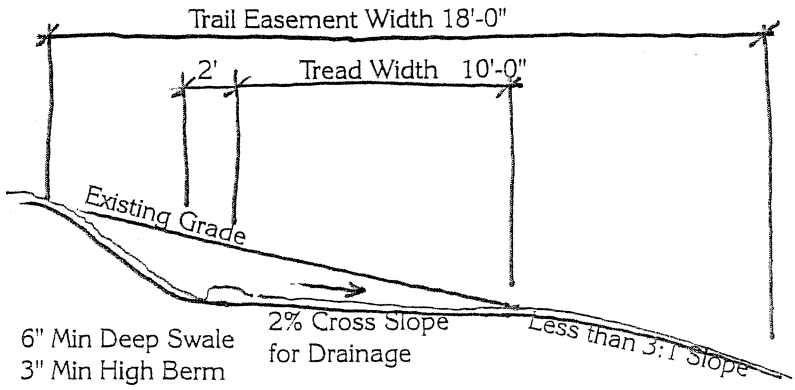
Exhibit D



Swale & Berm Typical Size, Actual Dimensions will be Determined by Field ConditionsDrainage and Irrigation Systems for all Up-Slopes shall be Designed to Prevent Run-off onto Trail

Trail Standards
Side Slopes More Than 2:1

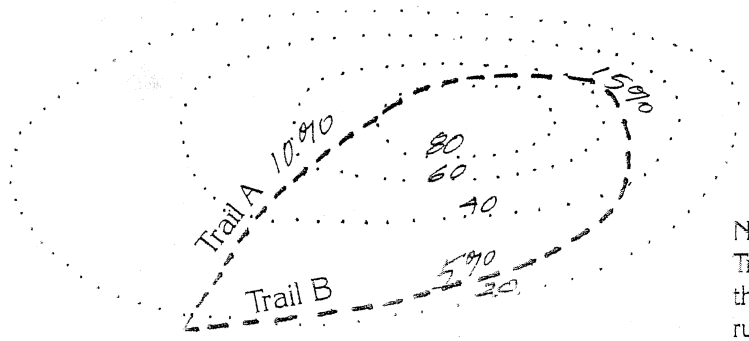
Exhibit E



Swale & Berm Typical Size, Actual Dimensions will be Determined by Field ConditionsDrainage and Irrigation Systems for all Up-Slopes shall be Designed to Prevent Run-off onto Trail

Trail Standards
Side Slopes Less Than 2:1

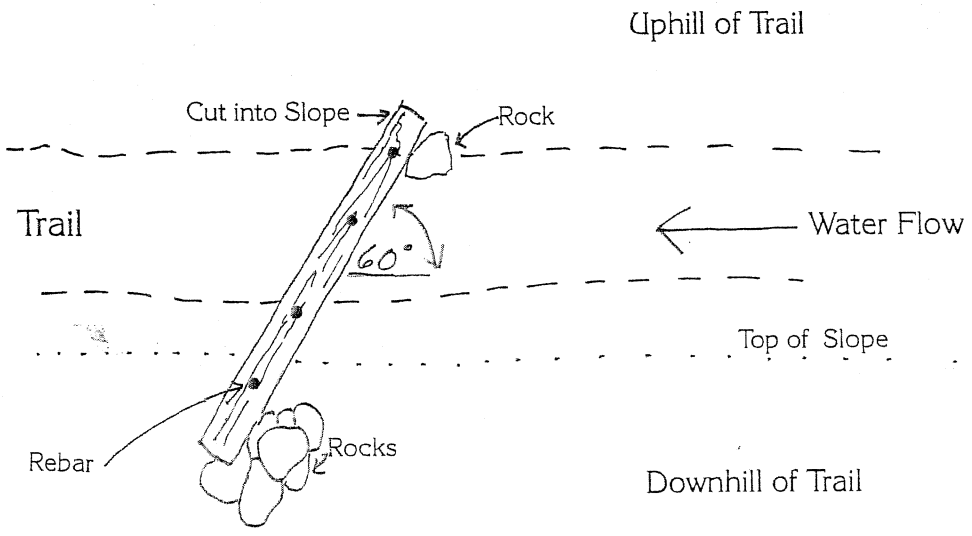
Exhibit F



Note:
Trail A travels perpendicular to the contours, causing water to run down the middle of the trail
Trail B traverses the natural slope allowing water to run off the side of the trail

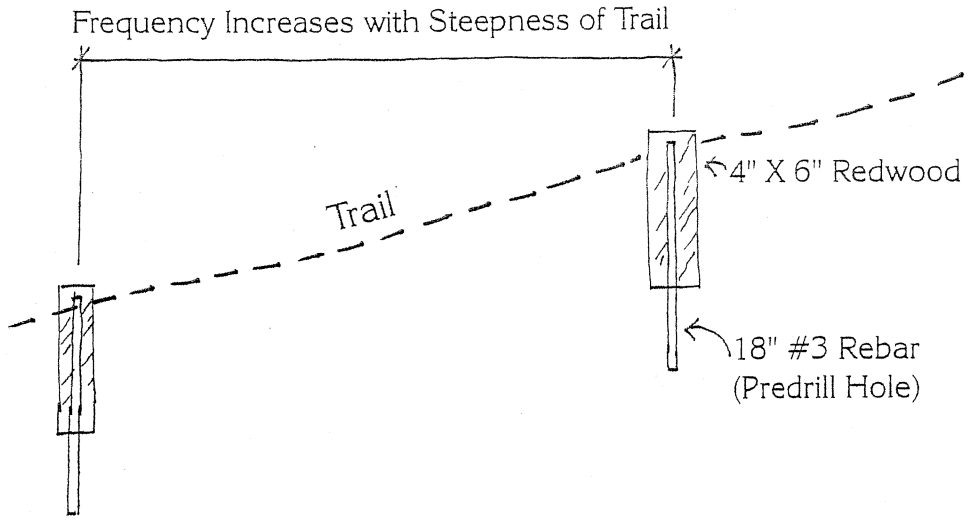
Traversing the Slope

Exhibit G



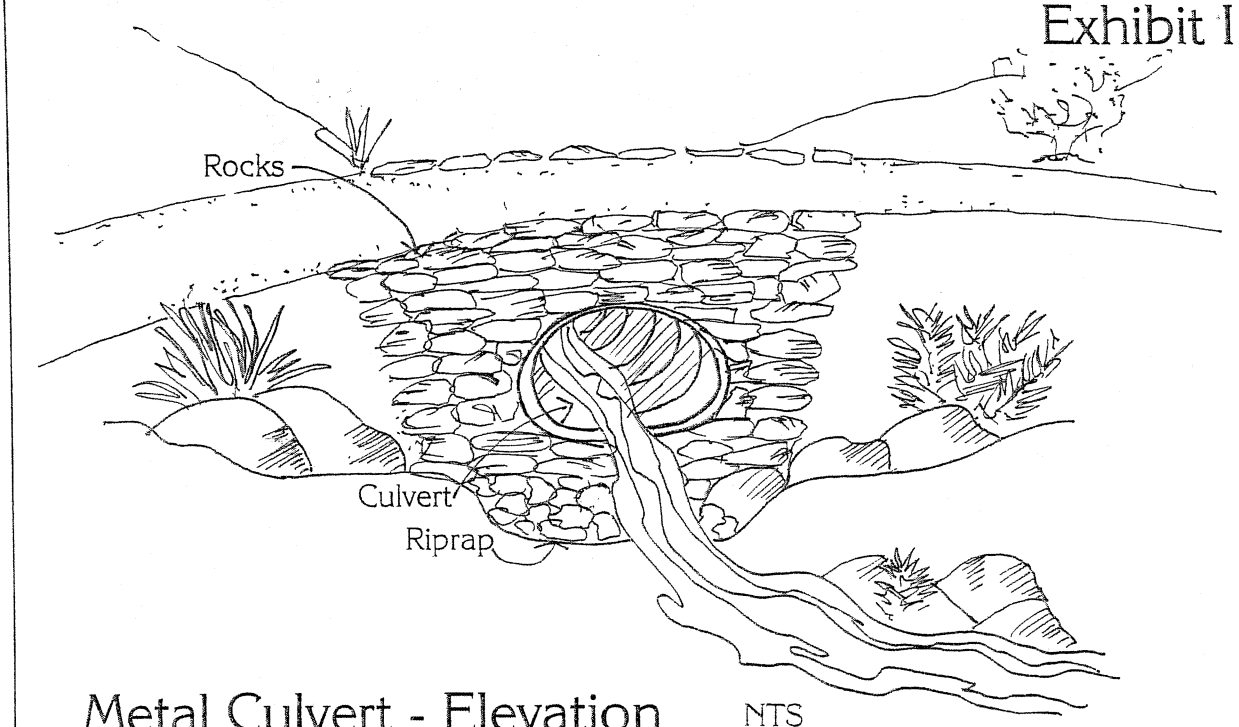
Wooden Water Bar Installation - Plan

Exhibit H



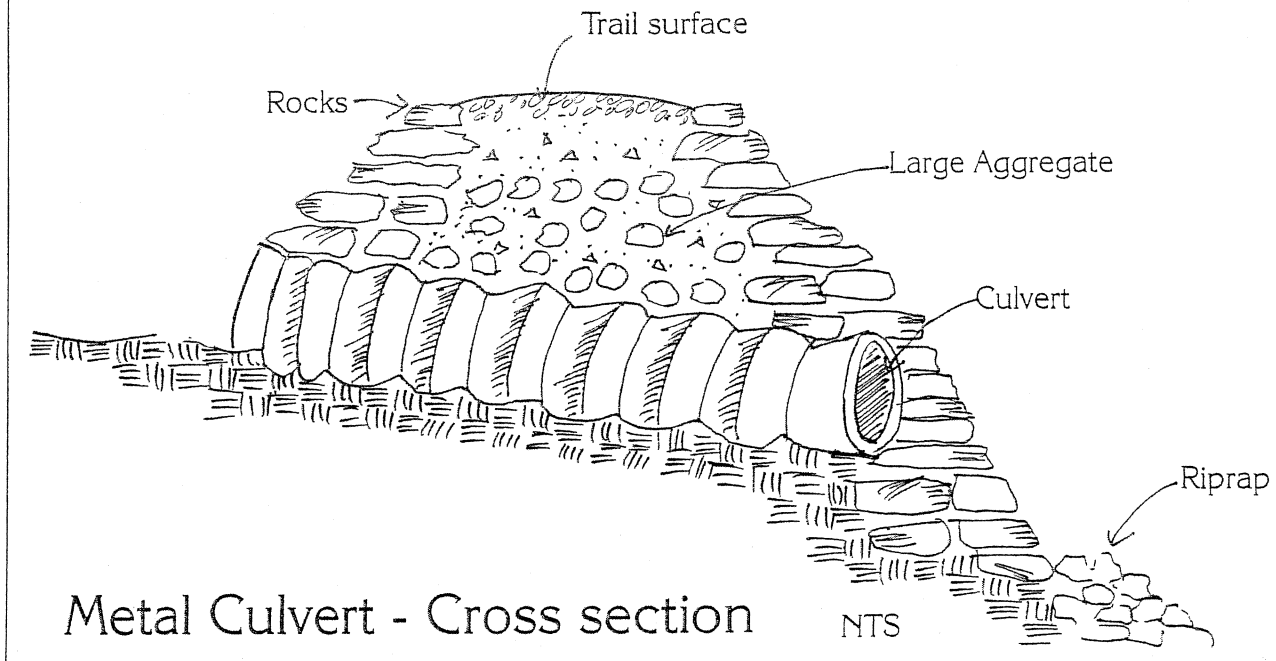
Wooden Water Bar Installation - Section

Exhibit I



Metal Culvert - Elevation NTS

Exhibit J



Metal Culvert - Cross section NTS

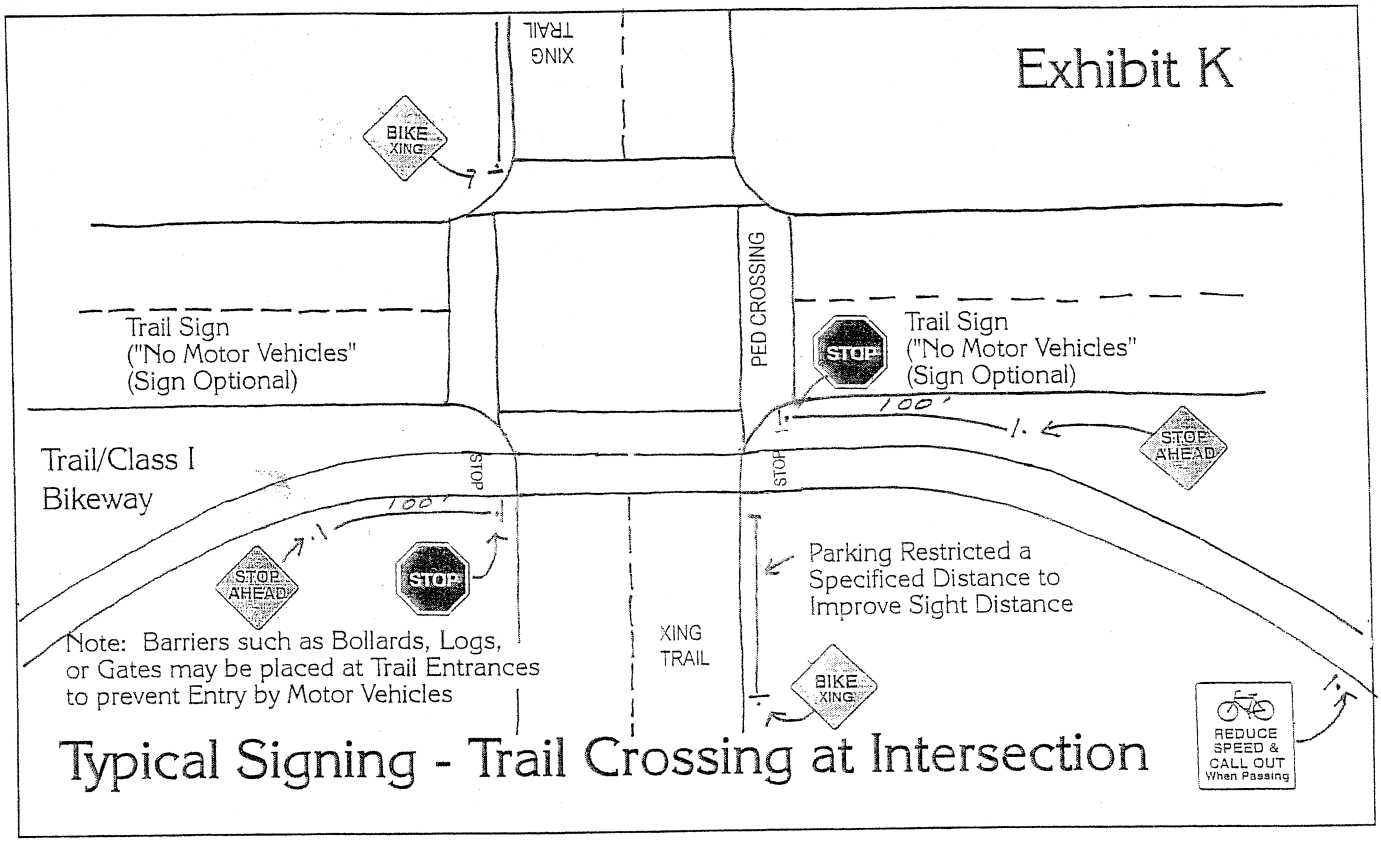


Exhibit K
TRAIL XING
BIKE XING
PED CROSSING
Trail Sign ("No Motor Vehicles" (Sign Optional)
STOP
Trail Sign ("No Motor Vehicles" (Sign Optional)
100'
STOP AHEAD
Trail/Class I Bikeway
STOP
STOP
100'
STOP AHEAD
STOP
Parking Restricted a Specificed Distance to Improve Sight Distance
Note: Barriers such as Bollards, Logs, or Gates may be placed at Trail Entrances to prevent Entry by Motor Vehicles
XING TRAIL
BIKE XING
REDUCE SPEED & CALL OUT When Passing
Typical Signing - Trail Crossing at Intersection

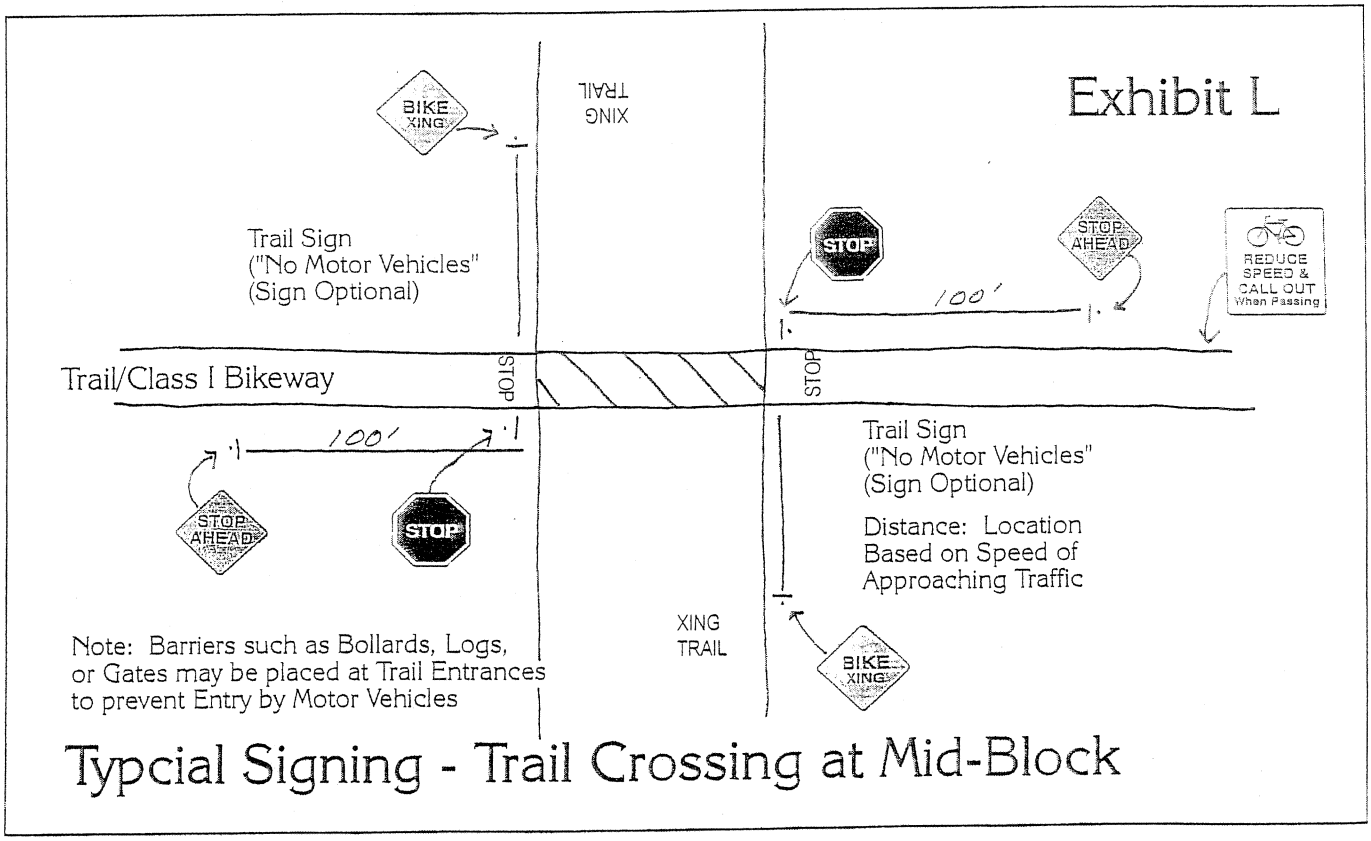
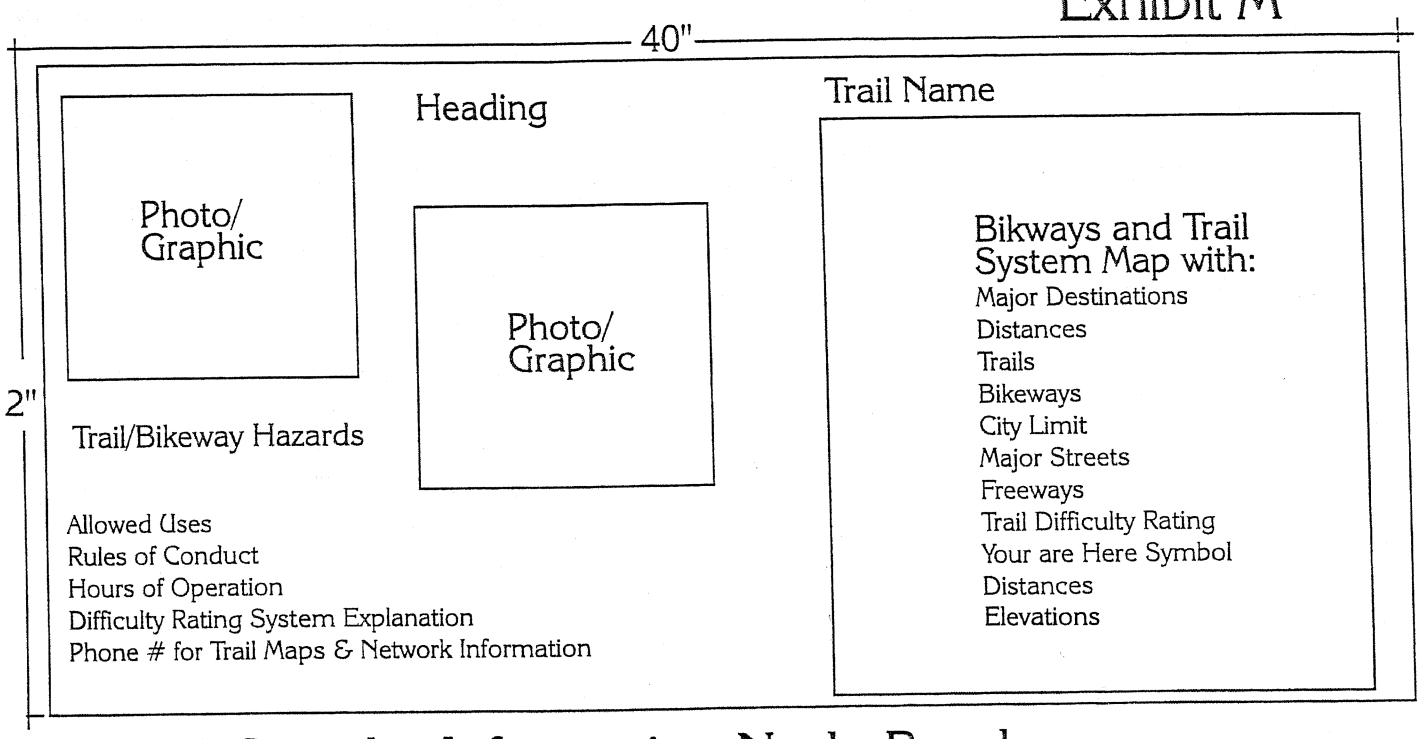


Exhibit L
TRAIL XING
BIKE XING
Trail Sign ("No Motor Vehicles" (Sign Optional)
STOP
STOP AHEAD
100'
REDUCE SPEED & CALL OUT When Passing
Trail/Class I Bikeway
STOP
STOP
100'
STOP AHEAD
STOP
Trail Sign ("No Motor Vehicles" (Sign Optional)
Distance: Location Based on Speed of Approaching Traffic
Note: Barriers such as Bollards, Logs, or Gates may be placed at Trail Entrances to prevent Entry by Motor Vehicles
XING TRAIL
BIKE XING
Typcial Signing - Trail Crossing at Mid-Block

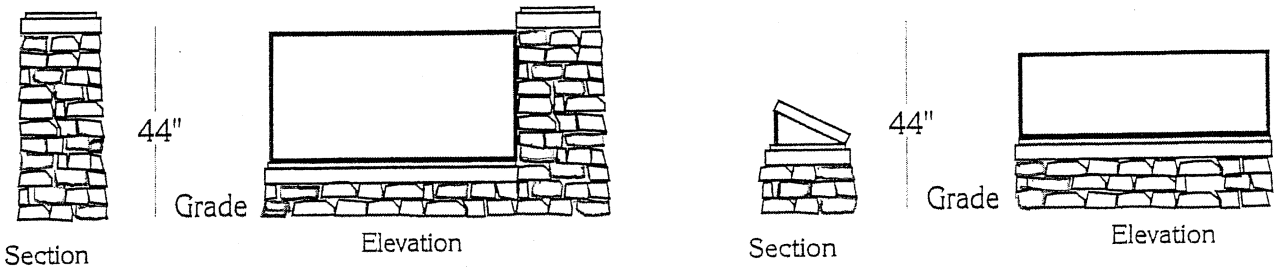
Exhibit M



Typical Corridor Information Node Panel

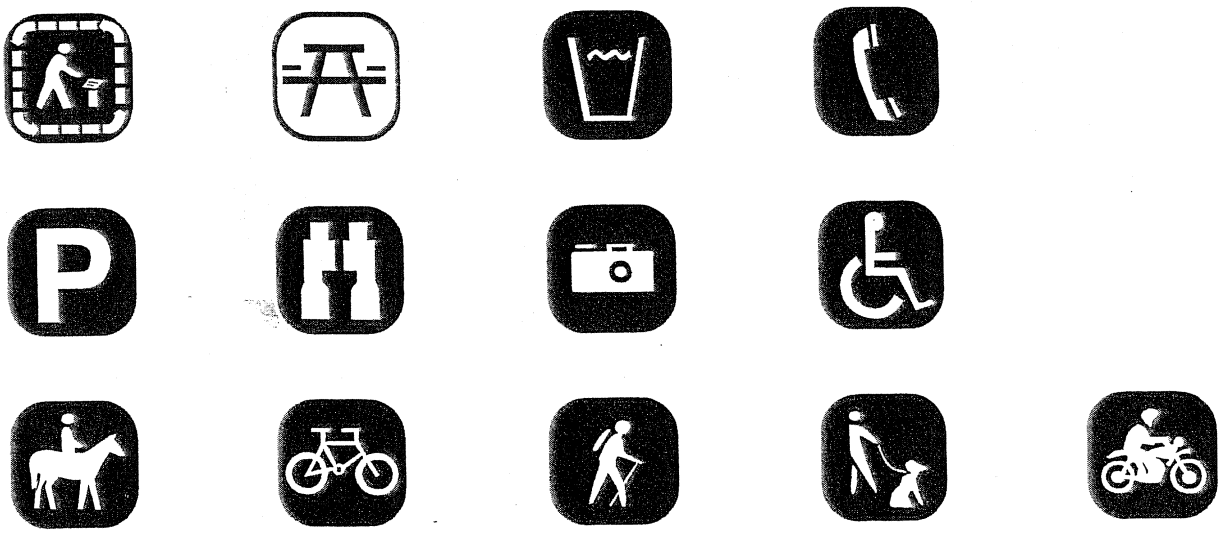
Exhibit N

Location Wayfinding) Map



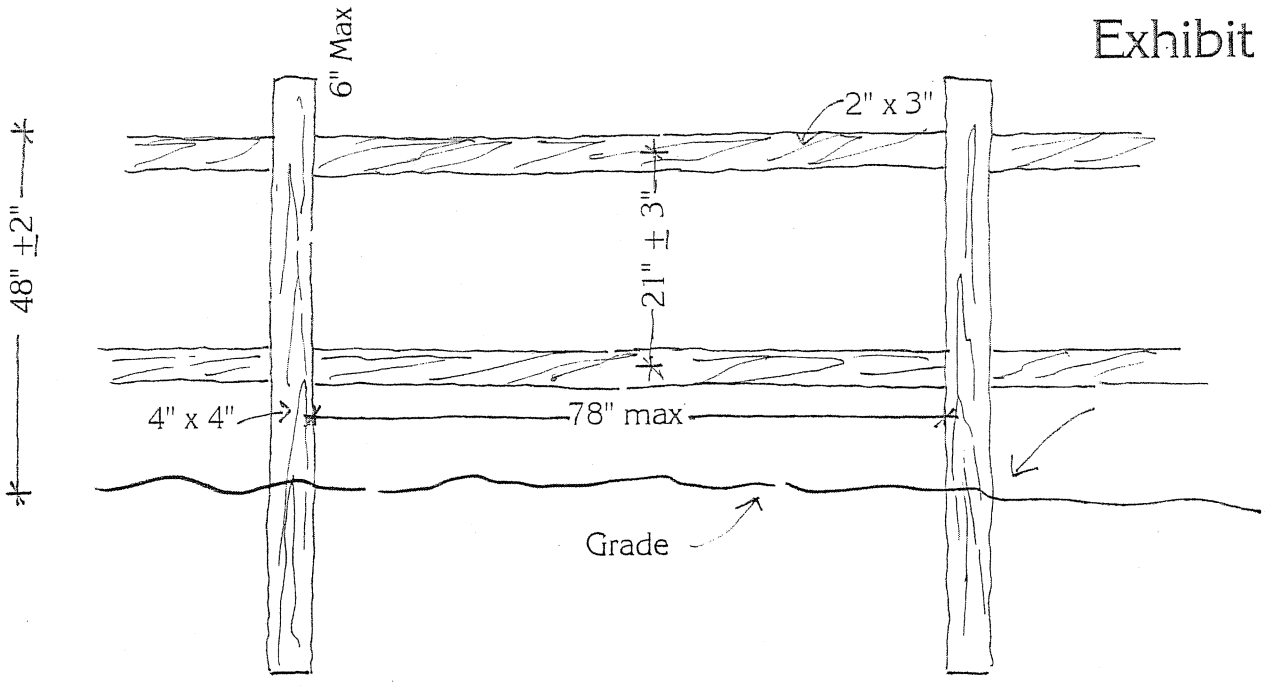
Typical Panel Installation

Exhibit O



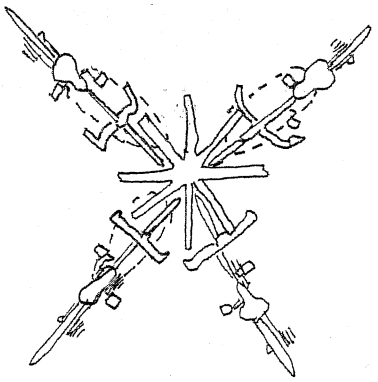
Typical Trail and Class I Bikeway Signs

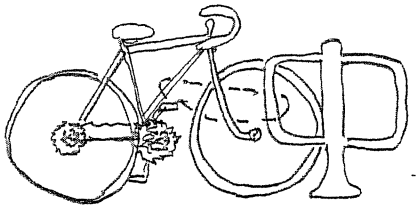
Exhibit P

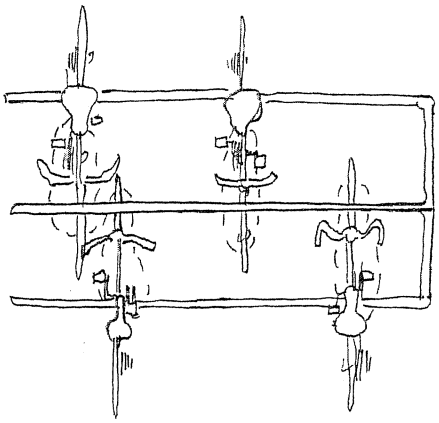


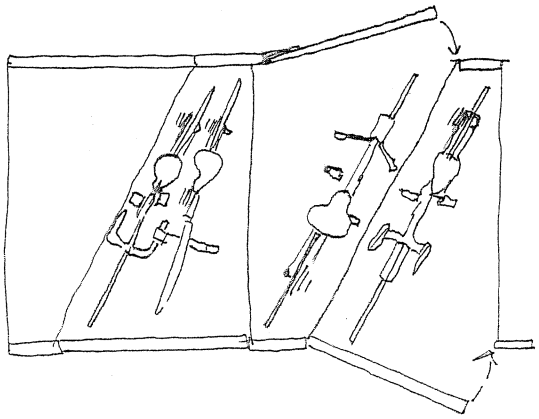
Typical Trail Fencing

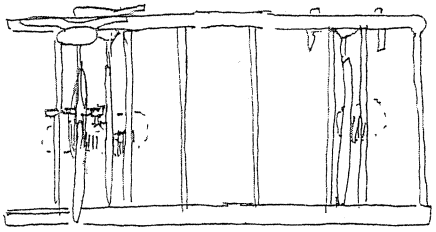
Exhibit Q

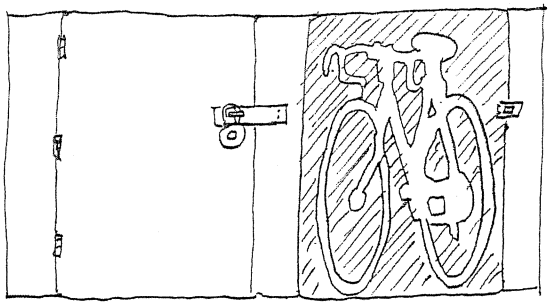






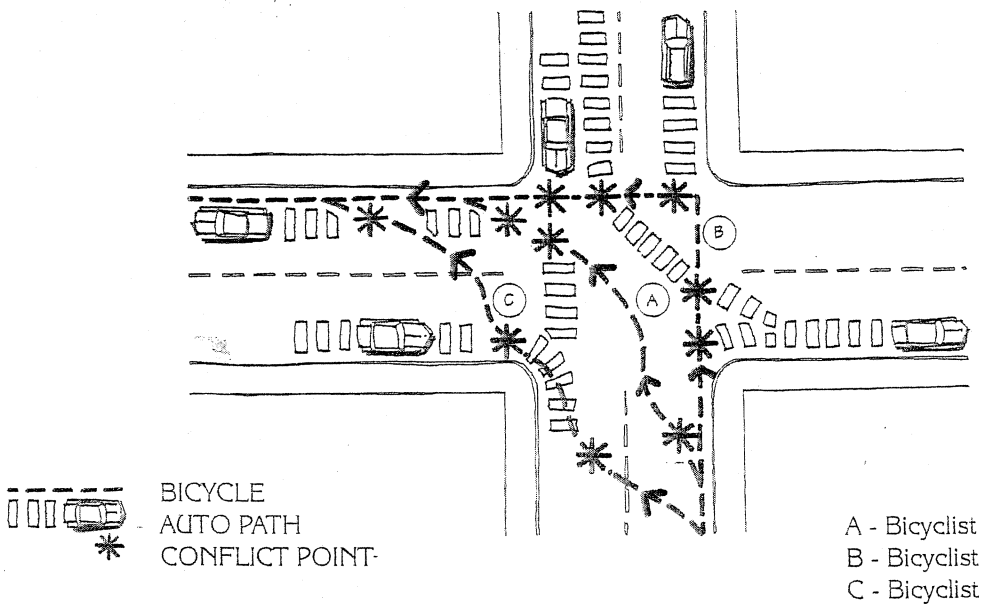






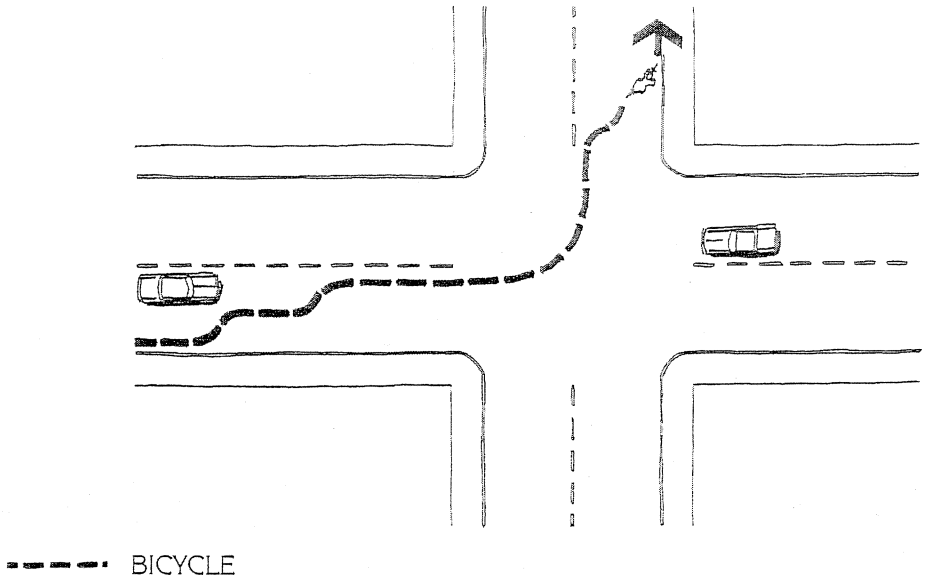
Bicycle racks and Storage Lockers

Exhibit R



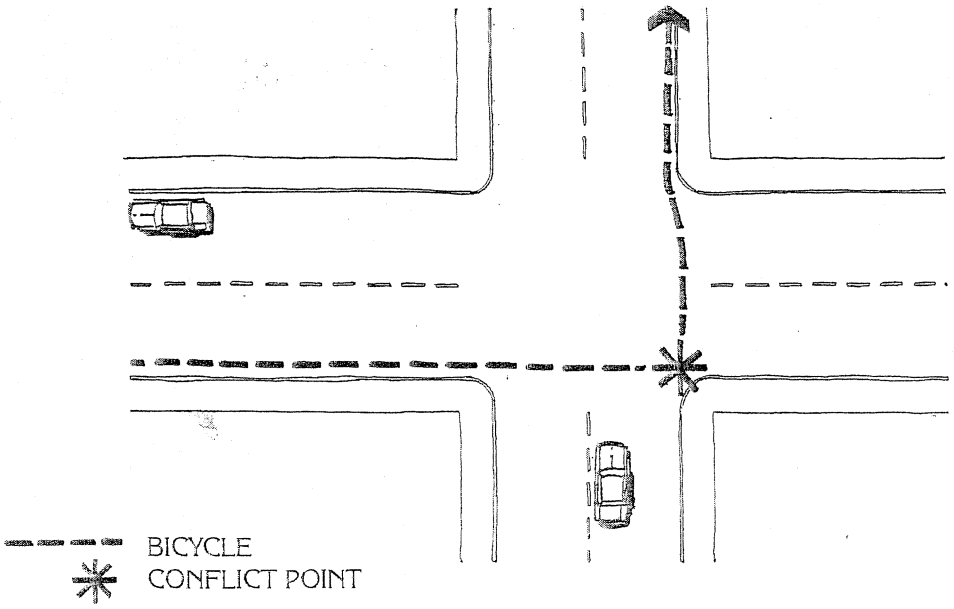
Intersection Conflict Points for Left Turning Bicyclists

Exhibit S



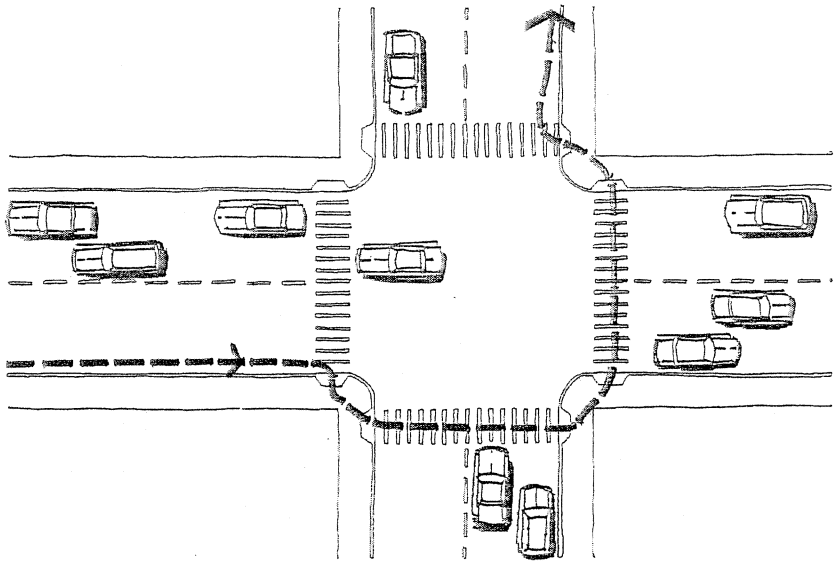
Left Turning Bicyclists - In Lane Alternative

Exhibit T



Left Turning Bicyclists - Curbside Alternative

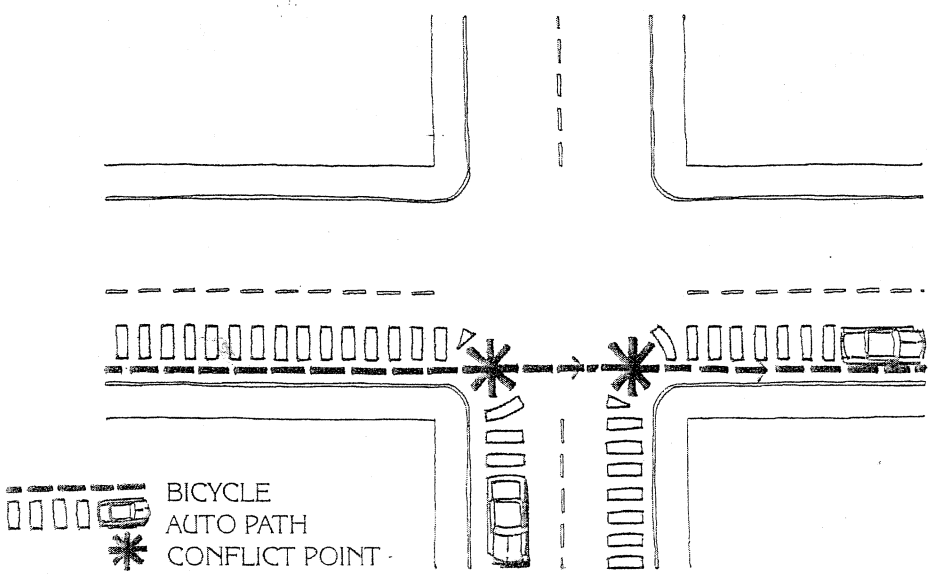
Exhibit U



Note: Bicyclists walk bicycles in crosswalk

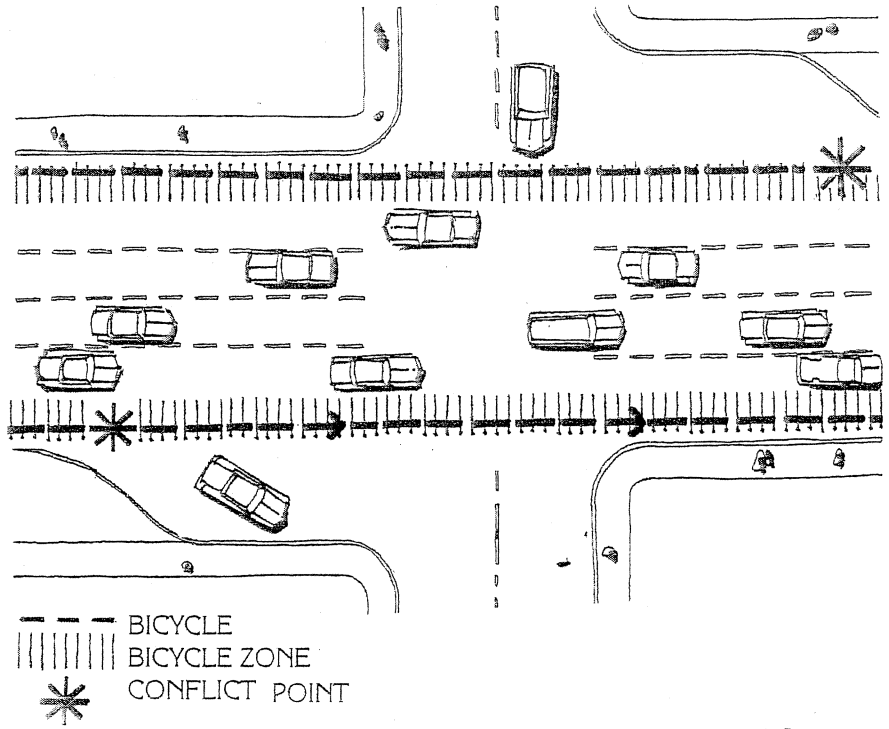
Left Turning Bicyclists - Crosswalk Alternative

Exhibit V



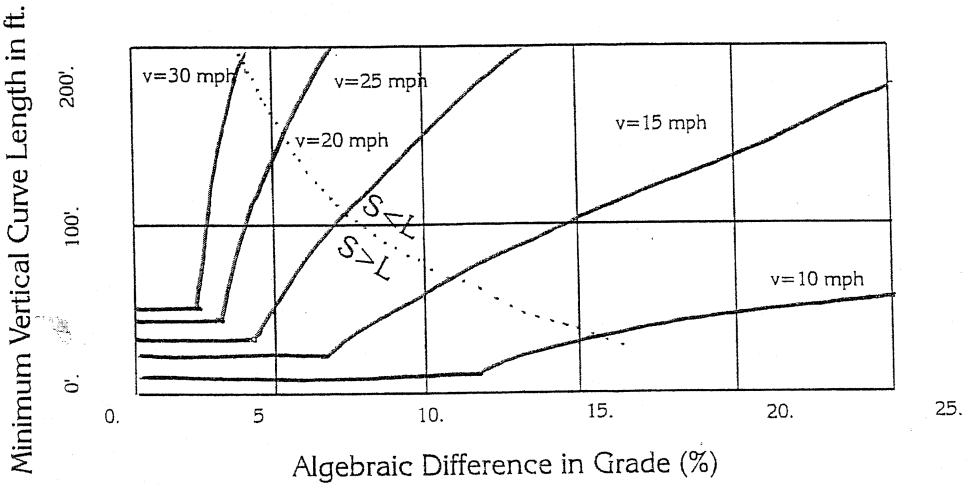
Intersection Conflict Points for Bicycle through-traffic

Exhibit W



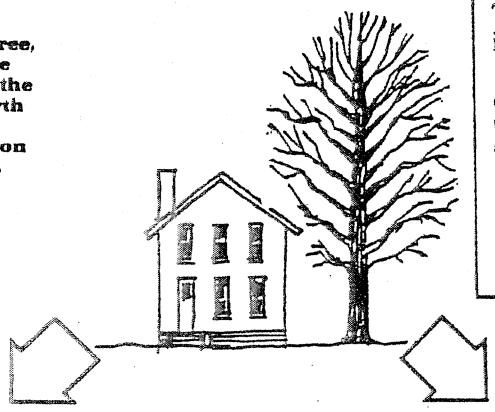
Through-traffic Bicyclists - In Lane Alternative

Exhibit X



Bicycle Sight/stopping Distance for Crest Vertical Curves

When a decision is made to reduce the size of an older tree, it can be topped, or it can be pruned properly. Although the speed and nature of regrowth will depend on species and local factors, any comparison of irresponsible topping vs. competent pruning will be dramatic.

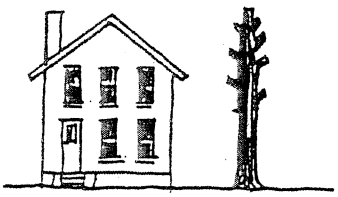


Topping by Any Other Name is Just as Ugly

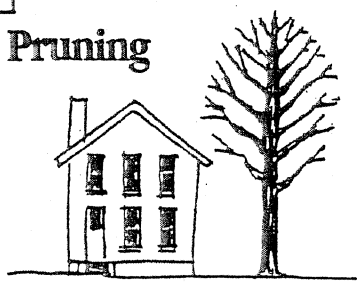
Sometimes pseudo tree experts use different terms for the malpractice of topping. Here is a rogues' gallery of synonyms:

- Stubbing
- Heading
- Heading-back
- Stubbing-off
- Hatracking
- Topping-off
- Dehorning
- Lopping

Topping

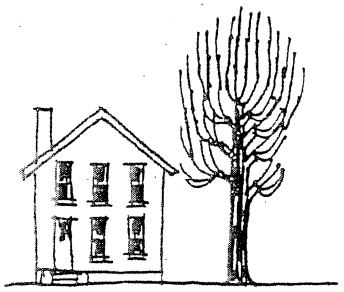


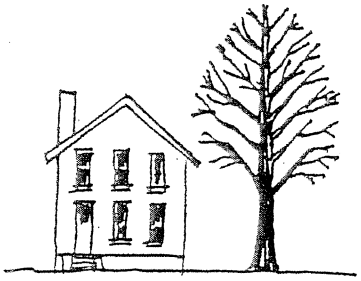
Pruning



Year 1

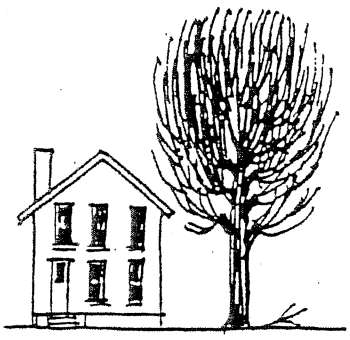
The topped tree is an ugly stub and a remnant of a once lovely tree. If pruned properly, size is reduced but form and beauty are retained.





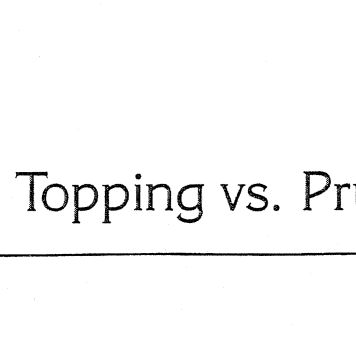
Year 3

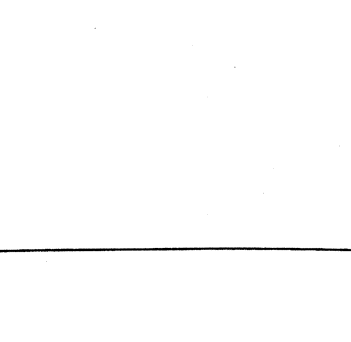
Vigorous sprouts have sprung out of the topped tree in large numbers and are growing with abnormal rapidity. The pruned tree adds growth more slowly and more normally distributed.



Year 6

In a relatively short time, the topped tree is as tall – and far bushier and more dangerous – than it was to begin with. The properly pruned tree is safer, more beautiful, and its size better controlled.





Tree Topping vs. Pruning

Following is an overview of major federal and state sources of funding for recreation projects.

State of California

State

Funds Administered by the California Department of Parks and Recreation

The Recreational Trails Program

Funded by the Transportation Equity Act, this program provides funds to develop and maintain recreational trails for both motorized and nonmotorized recreational trail users. Total federal funding for TEA-21 for each year through 2003 is $50 million. Funds are administered through the states which receive the funds by formula. The uses of the funds are to be distributed between motorized, nonmotorized and diverse trail uses. California's allocation for the current grant cycle is $3.2 million. About 2.2 million will be available for non motorized trail projects and $1.0 million for motorized trail projects.

Land and Water Conservation Fund

The LWCF is a federal fund that provides matching grants to the states for land acquisition and the development of recreational facilities. It is funded from revenues obtained from outer continental shelf oil royalties. The fund averages $4 billion a year. The Land and Water Conservation Fund Act provides for congress to appropriate up to $900,000,000 annually for LWCF.

In recent years, relatively little money has been appropriated to LWCF and the state portion has not been funded at all. Funding could be restored in the next year, since such bills are pending.

Habitat Conservation Fund

Matching grants for wildlife corridors and urban trails.

Additional Sources Funded by Proposition 12

Per Capita, Roberti/Z'berg, Murray/Hayden

Contact:

Odel King, California State Department of Parks and Recreation, Local Assistance Section 1416 Ninth Street, Room 1449-1, P.O. Box 942896, Sacramento, CA 94296-0001 Telephone (916)653-8758, FAX: (653)653-9824

Funds administered by the Resources Agency

Environmental Enhancement and Mitigation Program

Projects related to eligible transportation facilities.

Contact:

Bill Borden, Program Coordinator
Resources Agency
1416 Ninth Street, Suite 1311
Sacramento, CA. 95814
(916) 653-5656
FAX (916) 653-8102

Federal

Funds administered by the National Park Service

Rivers, Trails and Conservation Assistance Program

Provides technical assistance to citizen groups, local communities and governments working to conserve river corridors and watersheds and to establish trails and greenways. The program provides staff support for planning projects.

Challenge Cost-Share Program

This program can provide funding for projects receiving assist through the Rivers, Trails and Conservation program.

Contact:

Pacific Great Basin Support Office
National Park Service
600 Harrison Street, Suite 600
San Francisco, CA 94107
(415) 427-1446

(415) 427-1300 (Can work with Rivers, Trails and Conservation Assistance Program)

Bike Demonstration Program

Construction and maps and educational materials relating to safe use of bicycles for transportation.

US Forest Service

Education Programs for Bicyclists and Motorists

Bicyclists and motorist education programs are key ingredients to building a successful bicycle transportation system and fostering the growth of bicycle use in a community. A primary reason is the great amount of mis-information that has spread about bicycling. Education programs can help to dispel the myths, encourage courteous and lawful behavior among motorists and bicyclists of all ages, and enhance the skill level of bicyclists and motorist awareness, thus leading to a reduction in crashes. The education program can be administered through a number of different agencies and interest groups, such as police departments, schools, libraries, bicycle clubs, and community service departments.

There are four primary audiences for bicycle safety education and awareness efforts. For each group, an education program can stress basic messages that focus on the most frequent causes of crashes and injury. The following represent messages and skills that should be stressed for each group:

Young Bicyclists:

- How to ride in a straight line without wobbling or swerving
- Importance of stopping, looking and yielding before entering or crossing a roadway
- Importance of riding with traffic (on the right-hand side of the road), rather than against traffic
- How to scan behind for traffic before moving or turning left
- Importance of helmet use
- Importance of using hand signals
- Knowledge and understanding of traffic control devices
- Methods of crossing intersections

Parents of Young Bicyclists:

- Age and developmental factors in bicycle safety
- Common cause of crashes
- Importance of riding with traffic (on right-hand side of the road), rather than against traffic
- Driveway intersection sight distance problems
- Importance of helmet use for themselves and their children
- Importance of setting a good example

Adult Bicyclists:

- Bicycles are vehicles and should be operated according to traffic laws
- Importance of riding with traffic (on the right-hand side of the road), rather than against traffic
- Importance of helmet use
- Importance of using lights and reflectors at night
- Importance of using hand signals
- Importance of courtesy toward other road users, motorists and pedestrians
- Knowledge and understanding of traffic control devices

Motorists:

- Bicycles are vehicles and have legal rights to use the roadway
- Skills for sharing the road with bicyclists
- Improper turning movements that endanger bicyclists (do not turn in front of bicyclists)
- Importance of courtesy toward other road users including bicyclists and pedestrians

Inventory of Biological Resources

Habitat Types Within the City of Laguna Hills

To support the City of Laguna Hills Open Space Management and Trail Network Master Plan, vegetation within the areas of greatest interest relative to open space and trails was characterized and mapped. Vegetation has been mapped onto aerial-photograph based figures, and these are presented in the accompanying Habitat Maps. There are several basic types of vegetation communities within the City of Laguna Hills. These include native or naturalized upland and wetland communities, and landscape or developed communities. These vegetation types are discussed below.

Wetlands communities within the City include open water, emergent riparian and various types of riparian scrub vegetation.

Open Water

Open water habitat may be characterized by relatively large areas of either still or slowly flowing waters. Within the City, Veeh Reservoir provides a large area of this high quality habitat. Very small patches of open, ponded water may be associated with Aliso Creek, but these more closely resemble freshwater marsh.

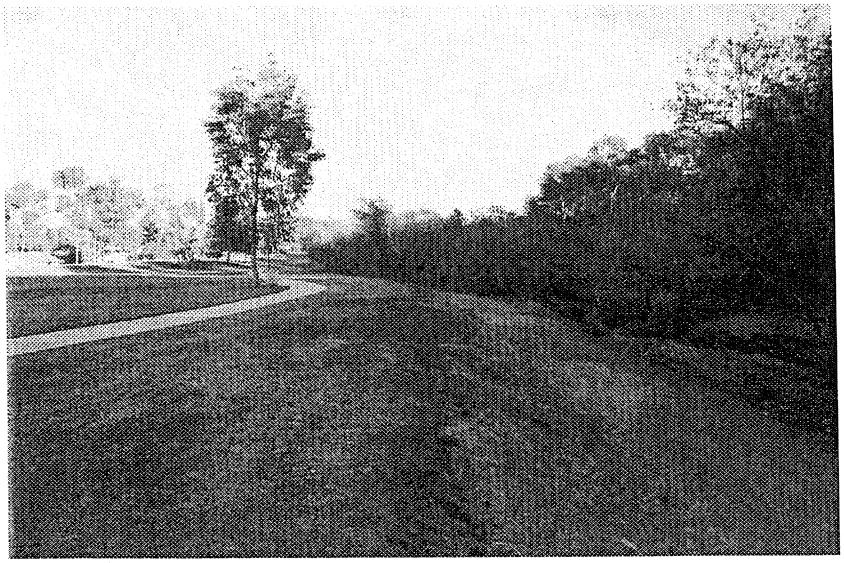
Emergent Riparian

Emergent riparian is a wetland vegetation type dominated by tall, emergent herbs. Cattail and bulrush are generally the dominant species and may form closed canopies. Coastal and valley freshwater marsh is another term for this vegetation type. Freshwater marsh habitat occurs on sites permanently flooded by fresh water. This habitat also occurs on sites that are inundated part of the year, but which have saturated soils year-round. Within the City, emergent riparian vegetation occurs primarily along the edge of the open water of Veeh Reservoir. This area provides high quality habitat for a variety of open water birds and marsh birds, including the common yellowthroat. Small patches of cattails are present in scattered locations, including in the drainage just northwest of the intersection of La Paz Road and Alameda Avenue.

The Veeh Reservoir (Lakes). This area is the best example of emergent riparian habitat in the City.

Willow Riparian Vegetation

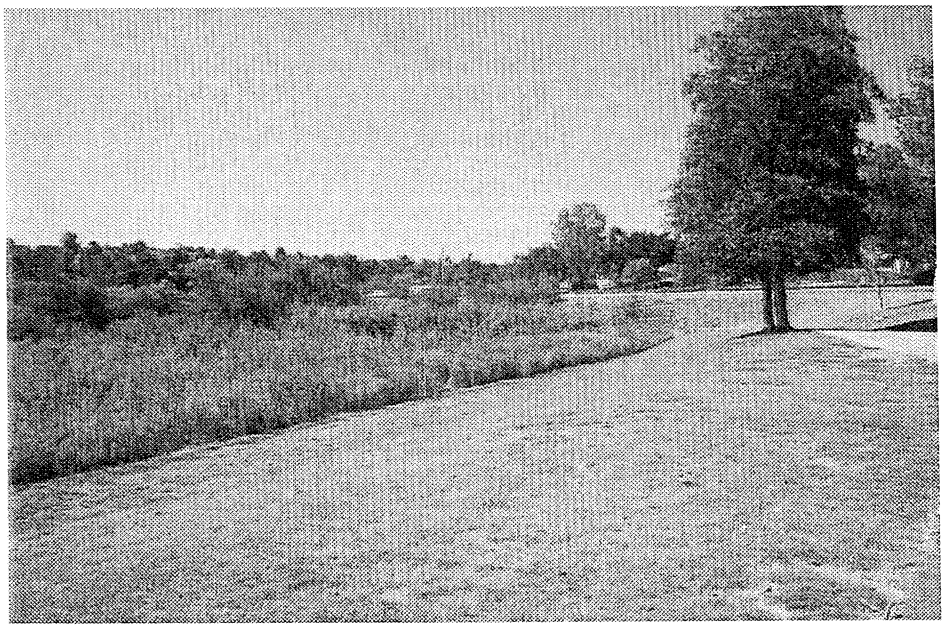
Much of the riparian habitat within the City is dominated by arroyo willow trees and shrubs. Mule fat shrubs are also present. Willow riparian vegetation is characterized by dense thickets of arroyo willow trees and arroyo willow and mule fat shrubs. The highest quality willow riparian vegetation, also described as southern willow scrub, occurs along Aliso Creek. Aliso Creek supports a well-developed, structurally diverse stand of willow riparian vegetation that provides high quality wildlife habitat. Willow riparian vegetation, although not as structurally diverse, also occurs along Veeh Creek. Upstream of Veeh Reservoir is a relatively wide swath of willow riparian vegetation, with a large amount of associated non-native species. Smaller patches of willow riparian vegetation occur in drainages south of Oso Parkway and within the Edison easement.



Willows along the Creek in Veeh Ranch Park. The willows at Veeh Ranch Park are interspersed with associated non-native species.

Riparian Revegetation

Within the drainage downstream and southwest of the Laguna Hills Community Center and Sports Complex, the City has undertaken a riparian revegetation project. The goal of this revegetation effort is to create willow riparian and mule fat scrub vegetation. Trees and shrubs planted include black willow, Fremont cottonwood, western sycamore, arroyo willow, red willow, blue elderberry, mule fat, California rose, and California blackberry. Once developed, the resultant vegetation will contain a high degree of species and structural diversity and will represent high quality wildlife habitat. This revegetation is being undertaken within and adjacent to areas that currently support various sized patches of existing willow riparian vegetation.



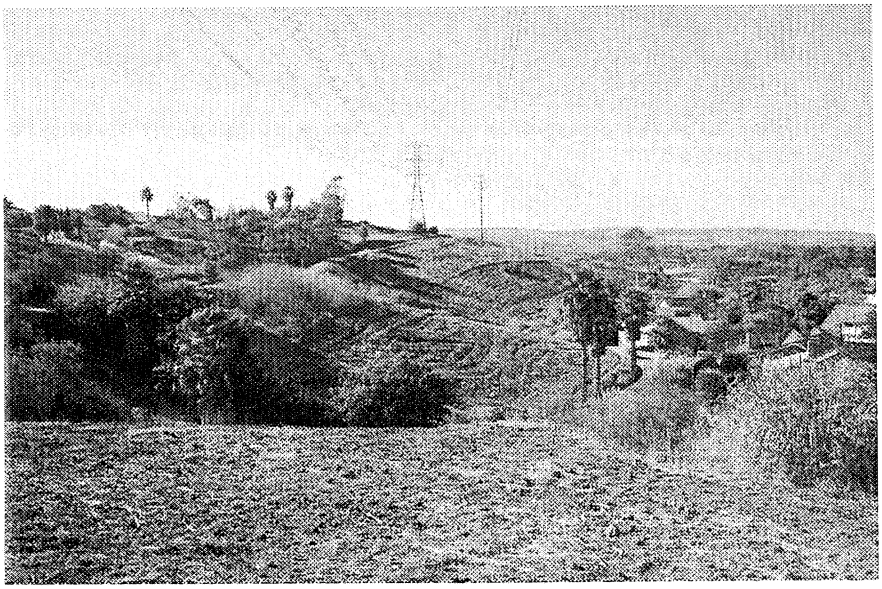
Revegetation area along Alicia Parkway. The revegetation area, once developed will represent high quality wildlife habitat.

Mule Fat Scrub

Mule fat scrub is typically a mature riparian habitat dominated by mule fat shrubs with various co-dominants. Mule fat scrub was used to characterize the plant community along a small drainage to the north of Aliso Hills Drive just east of Alicia Parkway. The mule fat occurs in a narrow band along the bottom of this drainage. Mule fat scrub functions primarily as edge habitat, and is used principally as foraging habitat by birds. Mule fat shrubs are also components of other riparian vegetation types, including willow riparian scrub. Mule fat scrub may represent an early stage in a series leading to the eventual establishment of a more complex riparian vegetation. It may also occur on sites where willows and other riparian tree species do not attain dominance due to the depth to groundwater or insufficient average annual flows.

Disturbed Riparian

Certain drainages within the City support a vegetation characterized as disturbed riparian. While this vegetation may contain willows, the remainder of the vegetation, and that providing the greatest diversity, is dominated by non-native species. Among the non-native species sharing the overstory with the willows are eucalyptus, acacia, and California fan palm. Non-native species sharing the middle and lower canopies and understory are pampas grass, myoporum, tamarisk, and thistle. An example of a drainage supporting disturbed vegetation is located within the western portion of the Edison easement. The habitat quality of these disturbed riparian communities can be improved through removal of non-native plants.



Edison Easement Drainage. California Palms share the over story with native willows.

Coastal Sage Scrub

Coastal sage scrub habitat is characterized by a dominance of drought-deciduous plant species of the coastal hills, and is dominated by predominantly low-growing shrubs and subshrubs such as California sagebrush and flat-top buckwheat. The dominant species generally grow actively during the winter and spring and may respond to seasonal drought by shedding leaves. Coastal sage scrub is generally able to grow on drier sites than other vegetation types, frequently on south- or southwest- facing slopes. Slopes may vary from steep to gentle. The distribution of dominant species may vary in a patchy manner within coastal sage scrub, resulting in variable levels of habitat diversity. Coastal sage scrub habitat provides a moderate level of vegetative structural diversity to support bird, reptile, and small mammal species.

Within the City, coastal sage scrub occurs as a relatively pure, small remnant patch northwest of Veeh Reservoir. In addition, coastal sage scrub species such as California sagebrush and flat-

topped buckwheat are present in mixed coastal sage scrub/landscape areas along Cabot Road and Oso Parkway.

Revegetated Areas of Coastal Sage Scrub

The coastal sage scrub present along the northwest side of Alicia Parkway near the Laguna Hills Community Center and Sports Complex, at two road cuts along the southeast side of Alicia Parkway at the Edison easement, and along Cabot Road near Oso parkway was planted there through revegetation. Near the Laguna Hills Community Center and Sports Complex, this habitat

is less diverse than the remnant native habitat, probably as a result of the seed mix used in the landscaping. This area is dominated by California bush sunflower or brittlebush. On the steep slopes of the two road cuts across the street, flat-top buckwheat dominates. At the sites along Cabot Road, several species form a large component of the assemblage including California sagebrush, flat-top buckwheat, and deerweed.

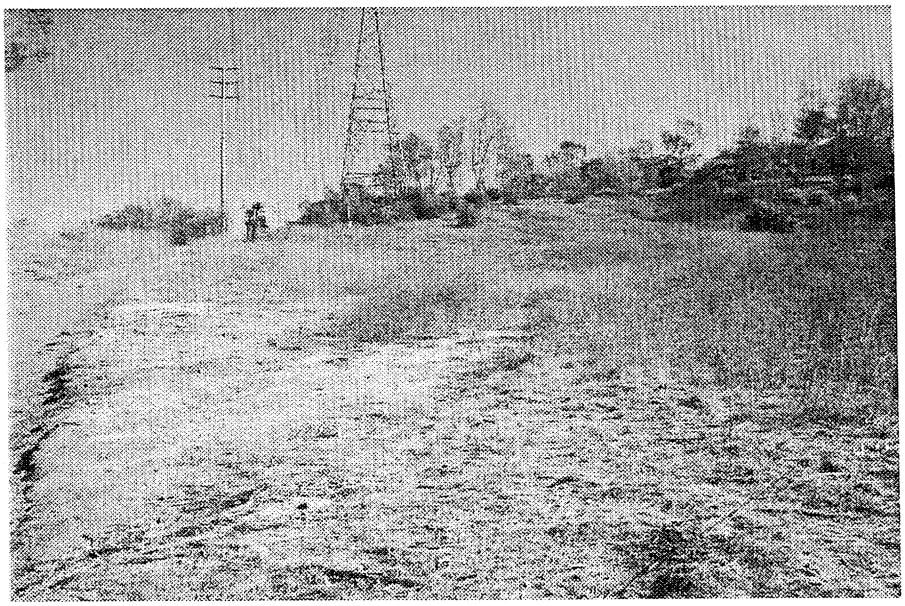
Non-Native Annual Grassland

Non-native annual grassland is characterized by a dense to sparse cover of annual grasses, the seeds of which generally germinate with the onset of late fall rains. Growth, flowering, and seed-set occur during the winter and spring. The growth cycle finishes when the soil dries after the end of the rainy season. During the summer and fall, the dominant species persist as seeds. Typical dominant non-native annual grasses include wild oats, slender wild oats, ripgut grass, rattail fescue, soft chess, red brome, and annual ryegrass. Native and non-native annual herbs are often present, and may include red-stemmed filaree, tarweeds, vinegar weed, goldfields, owl's clover, horseweed, lupines, fiddleneck, and others.

Non-native annual grassland is relatively widespread in the remaining open spaces within the City. This vegetation has been mapped as either part of a larger-scaled moaisic of non-native grassland/ruderal/landscape vegetation, or as a non-native grassland/coyote brush scrub. Habitat mosaics generally result from previous disturbance and subsequent recovery, or variations in soils, soil moisture or other physical aspects of an undisturbed habitat. They may also be produced by a combination of disturbance and natural variation.

The non-native grassland/coyote brush scrub habitat is dominated by coyote brush, a native shrub that typically colonizes recently disturbed areas. This vegetation is present along the north side of the Cabot Road open space, just south of the ball fields.

The non-native grassland/ruderal/landscape vegetation mosaic is common in the Edison easement, in the Cabot Road open space, along the south side of Oso Parkway and both sides of La Paz Road, and between the edge of the riparian willow vegetation along Aliso Creek and the adjacent residential areas.



Edison Easement landscape. The Edison Easement presents a mosaic of habitats including non-native grassland, ruderal and ornamental landscape.

Ruderal vegetation is characterized by predominantly fast growing weedy species that persist in areas of repeated soil disturbance and have the ability to quickly flower and set seed when conditions are favorable. Ruderals, often considered weeds, are species adapted to adverse and disturbed conditions including roadsides and vacant lots. Repeated soil disturbance typically prevents the establishment of perennial species, resulting in an annual vegetation association with short, sparse, low-diversity ground cover dominated by introduced plants typical of disturbed or waste places. Ruderals can be either native or non-native; however, the majority of the ruderal species within the City are non-native. Among the most abundant ruderals are several species in the mustard family, including short-podded mustard, wild radish, London rocket, and hedge mustard. Other ruderal species present include tocalote, cardoon, prickly lettuce, common sow-thistle, lambs quarters, horehound, cheeseweed, yellow sweet clover, and Russian thistle.

A large amount of landscape vegetation is present within the City. Within residential and commercial areas, landscape vegetation is typically associated with front yards and steep back yards, commercial facility and office building landscaping, and surface street medians. These landscape species typically include low maintenance or drought-tolerant non-native plants.

The non-native grassland/ruderal/landscape vegetation mosaic can be considered to have a non-native grassland and ruderal understory, with an overstory of scattered landscape trees and shrubs. Within the Edison easement, grassland and ruderal vegetation form a mosaic on the hillsides, with landscape vegetation present along the tops of the hills adjacent to residential areas. Individual scattered acacia shrubs, myoporum shrubs, eucalyptus trees and Peruvian pepper trees are present further down the slope. Within the Cabot Road open space, this mosaic consists primarily of non-native grasses and ruderal species including artichoke thistle. Along the south sides of Oso Parkway and La Paz Road, the landscape vegetation from steeply sloping backyards in the hilltop residential areas intergrade downslope with the non-native grassland and ruderal components.

Between the edge of the riparian willow vegetation along Aliso Creek and the adjacent residential areas, non-native grassland and landscape species form a mosaic.

Along the north side of La Paz Road primarily between Aliso Hills Drive and Alameda Avenue, a unique vegetation assemblage has developed. Because of the prevalence of the introduced, aggressive pampas grass, this area has been termed the pampas grass forest. A drainage parallels La Paz Road in this area, and collects water from landscape irrigation and local runoff. Interspersed with the pampas grass plants along the lower part of the drainage are scattered arroyo willow and mule fat shrubs. In a small area of ponded water caused by the constriction of the culvert under Alameda Avenue, a small amount of emergent riparian vegetation has become established. A common yellowthroat was observed within this small patch of cattails, and likely breeds at this site. Higher up the sides of the drainage are eucalyptus trees that have been planted as landscape. These intergrade into the landscape vegetation associated with the adjacent residential areas. This area is well suited to invasive, non-native plant eradication efforts discussed elsewhere in this document. With restoration and revegetation of this area, the value of the wildlife habitat can be increased dramatically.

Developed

Developed areas are represented by roadways, parks, residential, and commercial areas. These habitats are characterized by high levels of human activity. Native vegetation is generally not present and much of the land surface is covered by impermeable materials including concrete, asphalt, and buildings. Residential and commercial areas may include the previously discussed landscape vegetation that contributes some habitat for wildlife species tolerant of human presence.

General Wildlife and Sensitive Wildlife Species Known to Occur Within the City of Laguna Hills

General Wildlife

The vegetation types previously described provide wildlife habitat of varying qualities. Native vegetation that has not been previously disturbed typically supports a more diverse fauna than disturbed vegetation dominated by relatively few non-native plants. Native vegetation that contains varying layers of structural complexity (for example, riparian vegetation along Aliso Creek) typically supports a more diverse fauna than open, disturbed or monotypic communities. However, open disturbed areas supporting non-native grasses do provide foraging habitat for wildlife (including raptors), and landscape vegetation provides nesting and foraging habitat for a variety of birds.

Most wildlife species are not restricted to a single plant community, occurring instead in several communities, especially those of similar composition and physical structure. However, some animals (birds and wide-ranging mammals in particular) may utilize an array of dissimilar

communities for forage and cover. With a few exceptions noted below, most wildlife species occurring within the City of Laguna Hills are common, widespread, and highly adaptable.

To evaluate the wildlife species that have been identified within the City of Laguna Hills, environmental documents previously prepared for the City were accessed and reviewed. These documents include *City of Laguna Hills General Plan Environmental Impact Report* dated March 31, 1994; *City of Laguna Hills Community Center Park Draft Environmental Impact Report* dated May 12, 1997; *Biological Resources Survey Report for the Community Center Development Project* dated May 1996; *Conceptual Mitigation and Monitoring Plan for the Laguna Hills Community Center Development Project* dated April 1997; *Supplemental Mitigation and Monitoring Plan for the Laguna Hills Community Center Development Project in Laguna Hills, California* dated March 1999; *Results of presence/absence surveys for the coastal California gnatcatcher at the Laguna Hills Community Center Development Project in Laguna Hills* dated December 31, 1997; *Results of presence/absence surveys for the least Bell's vireo at the Laguna Hills Community Center Development Project in Laguna Hills* dated June 21, 1996. Wildlife species reported from the City of Laguna Hills in these environmental documents are presented in Table 1. Also included in Table 1 are wildlife species observed during limited field visits conducted in 1999 and 2000 in support of the Open Space Management and Trail Network Master Plan. This list of wildlife species should not be considered complete, because intensive, focused surveys have only been conducted in a few areas of the City. Additional data sources could be accessed to help complete the list of bird species known to occur in the City (for example the local Audubon Society chapter or other bird enthusiasts).

Invertebrates

No specific documentation of invertebrate populations or status was contained within the environmental documents examined. The County Department of Agriculture may have accumulated insect distribution and abundance data during their trapping and monitoring for agricultural pests. The invertebrates occurring within the City of Laguna Hills are expected to be those typical of the various wildlife habitats present, including the landscape vegetation.

Fish

The open water of Veeh Reservoir and the slowly flowing water along Aliso and Veeh creeks provide habitat for fish within the City of Laguna Hills. One species has been documented, the introduced mosquito fish.

Amphibians

Amphibian species generally require standing water for at least a portion of their life cycle. As such, the riparian and wetland habitats along Aliso and Veeh creeks and at Veeh Reservoir provide the highest quality amphibian habitat within the City, as most of the habitats present are too dry to support many amphibians. However, the Pacific slender salamander likely occurs (but has not been documented) in areas without water, especially in the bottom of canyons or other locations which accumulate sufficient leaf litter for moisture retention. The Pacific treefrog is the

only amphibian species known to occur within the City of Laguna Hills, although the western toad also likely occurs in habitats supporting standing or slowly flowing water, and the common bullfrog may occur in Veeh Reservoir.

Reptiles

The relatively dry coastal sage scrub and non-native grassland communities provide the highest quality reptile habitat within the City of Laguna Hills. In addition, reptiles may occur in or adjacent to the standing or slowly flowing water, for example along Aliso Creek. Reptile species known to occur within the City include the western fence lizard, side-blotched lizard, and western rattlesnake. The southern alligator lizard, gopher snake, and common kingsnake are also expected to occur but have not been documented.

Birds

Forty-three bird species have been recorded within the City of Laguna Hills (Table 1). Many other species are expected to occur, including seasonal migrants. Common and characteristic birds known to occur within the City are discussed below.

The riparian scrub vegetation along Aliso Creek and the open water habitat with emergent riparian vegetation (cattails) at Veeh Reservoir provide the highest quality habitat for birds within the City. The small drainages within the Edison easement also provide relatively high bird habitat. Birds observed in the open water habitat include double-crested cormorant, great egret, snowy egret, mallard, ring-billed gull, and belted kingfisher. A bird closely associated with cattails at Veeh Reservoir and at the degraded emergent riparian vegetation in the pampas grass forest at La Paz and Alameda is the common yellowthroat. Typical riparian scrub birds include Bewick's wren, ruby-crowned kinglet, yellow-rumped warbler, orange-crowned warbler, and song sparrow. As previously mentioned, the open non-native grassland on the hillsides of the Edison easement provide foraging habitat for several species of raptors, including red-tailed hawk, American kestrel, and turkey vulture. Landscape and ruderal areas, especially with large trees adjacent to open areas, also provide bird habitat. California quail, mourning dove, Anna's hummingbird, black phoebe, western scrub-jay, common raven, bushtit, northern mockingbird, European starling, northern oriole, lesser goldfinch, and house finch have all been recorded from open space and landscape areas within the City.

The degraded nature and small patch size of the remnant coastal sage scrub vegetation within the City does not support birds typically associated with this habitat in the region, including coastal California gnatcatcher and coastal cactus wren.

Mammals

The mammal fauna is likely relatively diverse within the undisturbed portions of the City, especially along Aliso Creek. Aliso Creek serves as a wildlife movement corridor through the otherwise heavily urbanized City. Mammals known to occur within the City include desert cottontail, California ground squirrel, Botta's pocket gopher, common raccoon, striped skunk, and coyote. Domestic dogs and cats are also present within the City, including open spaces and areas of native habitat.

Table 1 -Vertebrate Wildlife Species Known to Occur Within the City of Laguna Hills[1]

Common Name	Scientific Name
Fish	
Mosquito fish	*Gambusia affinis*
Amphibians	
Pacific treefrog	*Pseudacris (Hyla) regilla*
Reptiles	
Southwestern pond turtle	*Clemmys marmorata pallida*
Side-blotched lizard	*Uta stansburiana*
Western fence lizard	*Sceloporus occidentalis*
Western rattlesnake	*Crotalus viridis*
Birds	
Double-crested cormorant	**Phalacrocorax auritus**
Great egret	*Casmerodius albus*
Snowy egret	*Egretta thula*
Mallard	*Anas platyrhynchos*
Turkey vulture	*Cathartes aura*
Cooper's hawk	*Accipiter cooperii*
Red-shouldered hawk	*Buteo lineatus*
Red-tailed hawk	*Buteo jamaicensis*
American kestrel	*Falco sparverius*
California quail	*Callipepla californica*
Killdeer	*Charadrius vociferus*
Ring-billed gull	*Larus delawarensis*
Common ground-dove	*Columbina passerina*
Mourning dove	*Zenaida macroura*
Anna's hummingbird	*Calypte anna*
Belted kingfisher	*Ceryle alcyon*
Nuttall's woodpecker	*Picoides nuttallii*
Downy woodpecker	*Picoides pubescens*
Black phoebe	*Sayornis nigricans*

Western kingbird	*Tyrannus verticalis*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Western scrub-jay	*Aphelocoma californica*
American crow	*Corvus brachyrhynchos*
Common raven	*Corvus corax*
Bushtit	*Psaltriparus minimus*
Bewick's wren	*Thyromanes bewickii*
Ruby-crowned kinglet	*Regulus calendula*
American robin	*Turdus migratorius*
Hermit thrush	*Catharus guttatus*
Wrentit	*Chamaea fasciata*
Northern mockingbird	*Mimus polyglottos*
European starling	*Sturnus vulgaris*
Orange-crowned warbler	*Vermivora celata*
Yellow-rumped warbler	*Dendroica coronata*
Common yellowthroat	*Geothlypis trichas*
California towhee	*Pipilo crissalis*
Song sparrow	*Melospiza melodia*
White-crowned sparrow	*Zonotrichia leucophrys*
Brewer's blackbird	*Euphagus cyanocephalus*
Northern oriole	*Icterus galbula*
House finch	*Carpodacus mexicanus*
Lesser goldfinch	*Carduelis psaltria*
House sparrow	**Passer domesticus*
Mammals	
Desert cottontail	*Sylvilagus audubonii*
California ground squirrel	*Spermophilus beecheyi*
Botta's pocket gopher	*Thomomys bottae*
Domestic dog	**Canis familiaris*
Coyote (scat)	**Canis latrans**
Common raccoon	*Procyon lotor*
Striped skunk	*Mephitis mephitis*
Domestic cat	**Felis domesticus*

Note: Listings in bold type denote sensitive species.

[1] Reported in environmental documents prepared for the City of Laguna Hills in 1994, 1996, 1997 and 1999; and during limited site visits conducted during 1999 and 2000.

• Introduced species.

Sensitive wildlife

Wildlife species that are officially listed as threatened or endangered by the federal government or State of California, proposed for listing as threatened or endangered, or are candidate species for such listing are considered sensitive. In addition, wildlife designated California species of special concern, special animals, or fully protected in the state of California, as well as federal species of concern (the pool from which federal candidate species may be drawn) are also considered sensitive.

Several species of sensitive wildlife have been recorded within the City of Laguna Hills. Of the four sensitive wildlife species known to occur, one is considered to represent a reproducing population, one likely breeds within the City, and two are expected to use habitats within the City from time to time. None of these is officially listed by the federal government or State of California as a threatened or endangered species. The sensitive species known to occur within the City of Laguna Hills are briefly discussed below.

Southwestern Pond Turtle (*Clemmys marmorata pallida*): The southwestern pond turtle is a federal species of concern and a California species of special concern. It occurs uncommonly in and west of the coastal ranges, from San Francisco Bay to Baja California, Mexico, and also in the Mojave River. Habitat typically consists of ponds, small lakes, reservoirs, and slow-moving streams, where rocks, logs or mud banks provide basking sites. It has been reported in brackish and seawater, and is frequently associated with areas having abundant aquatic vegetation. A multi-aged class population of pond turtles was discovered within ponded water along the creek at the Laguna Hills Community Center Development Project site. To mitigate the impacts of that project, the City is temporarily maintaining this population in captivity and will translocate the population to newly created offsite habitat. The southwestern pond turtle is not expected to occur within the City outside of this translocated population.

Double-crested Cormorant (*Phalacrocorax auritus*): The California Department of Fish and Game considers the double-crested cormorant to be a California species of special concern due to the sensitivity of nesting sites. Double-crested cormorants nest on rocky sea cliffs, and will sometimes forage at large inland bodies of water. Double-crested cormorants were observed during surveys conducted in 2000 at the Veeh Reservoir. This sensitive species is not expected to nest within the City of Laguna Hills. Rather, it apparently uses the open water habitat at Veeh Reservoir from time to time.

Turkey Vulture (*Cathartes aura*): The California Department of Fish and Game considers roost and nest sites of the turkey vulture to be sensitive. Turkey vultures were observed flying over the Edison easement and other open areas within the City. Turkey vultures are not expected to nest or roost within the City. Rather, they apparently use the open habitat in the Edison easement and other open areas from time to time.

Cooper's Hawk (*Accipiter cooperii*): The Cooper's hawk is a California species of special concern. It is a common migrant and rare summer resident in southern California that breeds in oak woodland habitats and southern cottonwood-willow riparian woodland. Food items include small mammals, reptiles, and amphibians. Human disturbance, urban, and agricultural

development are thought to be leading to loss of the hawk's riparian woodland breeding habitat. A Cooper's hawk was observed in the vicinity of the Laguna Hills Community Center and Sports Complex and Edison easement. This sensitive species may breed in the highest quality riparian vegetation within the City, along Aliso Creek.

In addition to sensitive species known to occur within the City, several other sensitive species may occur. The threatened and endangered species with the highest potential for occurring within the City is the least Bell's vireo (*Vireo bellii pusillus*). Least Bell's vireo breed in more or less well-developed riparian scrub vegetation. On-going recovery programs involving regulatory protection of riparian habitat, habitat creation and enhancement projects, and brown-headed cowbird (*Molothrus ater*) trapping programs within major southern California drainages have resulted in a substantial increase in the region's least Bell's vireo population. As such, the higher quality riparian habitats within the City (such as along Aliso Creek) may support least Bell's vireo. No least Bell's vireo were observed during intensive protocol surveys conducted at the Laguna Hills Community Center Development Project site. The coastal California gnatcatcher (*Polioptila californica californica*), a resident species strongly associated with coastal sage scrub vegetation, may have occurred within the City. However, as previously mentioned, the degraded nature and small patch size of the remnant coastal sage scrub habitat within the City likely preclude the gnatcatcher from occurring. No coastal California gnatcatcher were observed during intensive protocol surveys conducted at the Laguna Hills Community Center Development Project site. Several other California species of special concern may occur within the City, including coastal western whiptail (*Cnemidophorus tigris multiscutatus*), northern harrier (*Circus cyaneus*), sharp-shinned hawk (*Accipiter striatus*), yellow warbler (*Dendroica petechia brewsteri*), yellow-breasted chat (*Icteria virens*) and possibly others.

Open Space/Habitat Restoration Opportunities

Within the City of Laguna Hills, opportunities exist to enhance currently degraded open space areas to increase their value as wildlife habitat, and to provide educational opportunities and recreational amenities through careful trail planning and placement. Several open space areas could be restored and revegetated in association with construction of new trails. However, the following sites are considered to represent the best opportunities for enhancement of wildlife values without compromising the current land use or adjacent land uses of the open space areas, or planned trail opportunities. These sites are described below, and specifics are discussed for each relative to non-native plant eradication and native plant replacement.

Pampas Grass Forest

The pampas grass forest is located along La Paz Road just northeast of Alameda Avenue. As its name implies, this area is infested with numerous established and spreading pampas grass clumps. As previously mentioned, a drainage parallels La Paz Road in this area, and collects water from landscape irrigation and local runoff. Interspersed with the pampas grass plants along the lower part of the drainage are scattered arroyo willow and mule fat shrubs. In a small area of ponded water caused by the constriction of the culvert under Alameda Avenue, emergent riparian vegetation has become established. Higher up the sides of the drainage are eucalyptus trees that have been planted as landscape.

Riparian Drainages within the Edison Easement

There are two drainages located in the west-central portion of the Edison easement that support riparian vegetation. The westernmost drainage contains primarily disturbed riparian vegetation in the upper reaches, dominated by non-native species. The easternmost drainage contains higher quality, less disturbed riparian vegetation that could be enhance through focused removal of non-native vegetation and planting of additional native species.

Invasive, Non-Native Plant Eradication

Pampas Grass Forest

The primary invasive plant to be removed at the pampas grass forest site is pampas grass. Pampas grass is considered an invasive species because it spreads quickly, is difficult to eradicate and "out-competes" the native vegetation, quickly taking over an area. Because there are remnants of native riparian habitat in these areas that would add value to the community's open space, it is important to remove the existing pampas grass to allow the native habitat to expand and prevent its extinction. This invasive plant forms large clumps, to eight feet or greater in diameter. Eradication of pampas grass requires focused effort conducted over a multi-year period. Control of pampas grass can be accomplished with less effort; however, focused efforts are still required. Eradication of pampas grass can refer to the complete elimination of the species from a site for the foreseeable future, whereas control can refer to substantial reduction and control of pampas grass numbers to enhance biodiversity. Pampas grass can be removed using

two methods, based on the size of the clump. Prior to removal attempts, the seed stalks may be trimmed off and bagged to reduce seed scatter, if necessary. Smaller plants with a basal diameter up to 4 or 5 feet may be removed by hand using hand tools such as shovels, polaskis and pick axes. Care must be taken to completely dig out the roots of these smaller plants. In addition, the clump must be removed from the site and placed in an authorized landfill to prevent reestablishment of the individual plant once removed.

Larger pampas grass individuals can be removed by hand cutting stems to within 6 to 8 inches of the ground and applying a 1.5 percent solution of a glyphosate herbicide approved for aquatic ecosystem use (such as Rodeo), with a 0.5 percent nonionic surfactant and marker dye within two minutes of cutting. The surfactant enables the herbicide to remain on the cut surface, while the dye helps minimize overspray. The solution should be applied by hand to individual cut stems using hand sprayers under the supervision of a certified herbicide applicator. Cut material should be removed from the site and placed into an approved disposal site, as pieces of material left behind may resprout. Treatment with herbicides requires follow up applications within 30 and 60 days. It is preferable to remove pampas grass clumps by hand to ensure a more appropriate substrate for planting replacement native vegetation.

Eradication or control of pampas grass from the pampas grass forest would likely require several removal efforts over a period of several weeks or months. Work crews from service organizations such as the California Conservation Corps or Urban Corps can be hired to assist in the eradication efforts. These organizations typically have experience in non-native species removal or habitat enhancement, are considerably less expensive than a commercial crew, and are dedicated to providing environmental education as well as instilling a strong work ethic in the young people they work with.

Other opportunities for assistance with this habitat enhancement effort can come from the community itself. The City could schedule work days at the pampas grass forest site which could combine eradication efforts with environmental education. Local school, service and environmental groups could be targeted, as well as community members in general, to assist with these efforts. By having the local community assist with enhancement of the habitat, a sense of ownership and understanding of the effort is instilled, and a greater appreciation for the local environment is generated.

Specific groups that could be contacted to help on work days include biology students from local colleges and universities (contacted through the university's Biology Department); local high school service clubs; local Boy Scout, Girl Scout, and Cub Scout troops; local chapters of environmental organizations such as the Audubon Society and Sierra Club; local trails and recreational organizations such as Trails for All; and local environmental businesses such as backpacking gear/outdoors retailer/bike shops and Tree of Life nursery, a local (San Juan Capistrano) native plant nursery. These groups may provide people, provide advertising or provide resources to assist the effort.

In addition, funding may be available to assist in habitat enhancement efforts. However, funding for such efforts is typically limited, and tends to focus on larger, regional habitat protection/enhancement efforts. A local enhancement project may have difficulty attracting funding from outside sources. Nevertheless, Transportation Enhancement Act funding could be explored, and the Department of Motor Vehicles could be contacted relative to availability of special funding. In addition, private foundations such as the Packard Foundation could be contacted concerning grant opportunities. Finally, large local businesses could be solicited to provide a sponsorship for the enhancement effort or a single work day.

Riparian Drainages within the Edison Easement

Invasive plants to be removed at the eastern drainage include pampas grass, artichoke thistle, myoporum, California fan palm, tamarisk, eucalyptus, and acacia. These species can be eradicated and controlled using the hand removal and herbicide application methods previously described. Small sized individuals can be dug out by hand. All artichoke thistle can be removed by hand. Larger tress and shrubs can be treated with herbicides.

Because the western drainage contains primarily native vegetation with relatively few non-native species, a more precise approach to eradication should be used. Individual trees and shrubs to be removed should be identified and marked, and removal should occur by hand to the greatest extent feasible. Only in certain cases where it is absolutely necessary should herbicides be used on cut surfaces.

Native Plant Replacement

Pampas Grass Forest

To further enhance the habitat value of the pampas grass forest area, once the pampas grass has been removed, native riparian plants can be replaced. The plant palette to use in this area is presented in Table 2 and consists of native willow riparian vegetation species.

Planting of the replacement native vegetation should be conducted after October 1 to reduce hot weather stress and to allow establishment to occur during the cool, wet portion of the year.

Planting between October 1 and February 1 takes advantage of the winter rainy season, dormancy of foliage, and rooting period and helps ensure the survival of plantings.

Some of the native riparian plant material for revegetation can be derived from cuttings of arroyo willow and mule fat in the Aliso Creek drainage. Cuttings should be selected from healthy appearing individuals with numerous available branches. To increase likelihood of survival, arroyo willow and mule fat cuttings should be planted using a jetstream technique or a hand-held auger or similar tool. Planting holes can be bored to a depth of about 3 feet, and the cuttings placed midway into the hole. While gathering cuttings, stems with a minimum length of about 18 inches and a maximum length of about 3 feet should be chosen, and all should be stored and replanted in the proper orientation.
In addition to the local cuttings, native container stock can be acquired and planted. These native plants can be purchased in one-gallon containers from a nursery that specializes in local native plants (for example, Tree of Life in San Juan Capistrano). In addition, selected species can be purchased in five-gallon and fifteen-gallon containers and planted. Planting larger-sized trees of the Fremont cottonwood and western sycamore, for example, would help increase structural diversity of the revegetation material.

Container plants should be planted using standard horticultural practices: excavating a planting hole twice the diameter of the root ball, filling the hole twice with water, and leaving the plant crown approximately 1 inch above grade after planting. After planting, moats should be constructed around each plant to allow ponding of water. Plants should be placed in soils that have been thoroughly watered before planting, and watered immediately after planting until the moats are full.

The final planting layout should cluster the arroyo willow and mule fat cuttings in randomly spaced, clumped patterns to provide structural diversity. The container plants can also be planted in randomly spaced clusters to simulate natural patterns.

Prior to planting the cuttings (or container stock) of arroyo willow and mule fat, an inoculum of mychorizal fungi should be placed into the augured hole. This inoculum can be provided through placement of a small amount of hand-collected leaf litter and surface soil from underneath these existing shrubs.

In addition, native coast live oak trees can be planted within this area, but should not be planted in the lower portions of the drainage. Rather, they could be planted higher up the slopes. One-gallon coast live oak trees could be planted and provided supplemental irrigation for the first two years to ensure establishment. After these trees have become established, they should receive no further irrigation water. Clusters of live oak trees can be placed to create an oak savannah.

Supplemental watering of the replacement plants can be provided when natural moisture conditions are inadequate to ensure survival of plants. If necessary, supplemental watering could be provided for a period of at least two years from planting. Watering could be phased out during the fall/winter of the second year. Watering can be conducted using a hand-held hose from a water truck. Individual plants could be hand-watered with the hose, using a deep watering technique. This technique involves providing a large amount of water to specific plants to deep water the root system, as opposed to broadcast spraying of water that does not penetrate deep

into the root system but that encourages the growth of shallow rooted weeds. Access to individual plants could be on foot, dragging the hose.

Removal and control of specific weeds is important to the success of the replacement plants since non-native species will compete with the native plants. The weeds at the replacement site will have been removed prior to planting. After planting has occurred, weed control techniques can vary depending upon species and plant size. Weeds to be controlled may include pampas grass, tree tobacco, castor bean, and other species. Whenever possible, invasive species should be removed by hand. For example, all small weedy shrubs should be removed by hand, including the root system. However, the size of the weed plant determines the feasibility of complete removal. If plants are too large to dig out by the roots, they can be cut back at the base, and the cut base can be treated within two minutes with an herbicide which is approved for aquatic use, such as Rodeo (Glyphosate). All removed weeds should be removed from the planting site and disposed of in an authorized landfill.

Table 2

Native Riparian Plant Material Suitable for Planting at the Pampas Grass Forest Revegetation Site within the City of Laguna Hills

Scientific Name	Common Name	Material Type	Density
Salix lasiolepis	Arroyo willow	Cuttings, one-gallon container	100/acre
Salix gooddingii	Black willow	Cuttings, one-gallon container	25/acre
Salix laevigata	Red willow	Cuttings, one-gallon container	50/acre
Baccharis salicifolia	Mule fat	Cuttings, one-gallon container	650/acre
Platanus racemosa	Western sycamore	One- and five-gallon containers	25/acre
Populus fremontii	Western sycamore	One- and five-gallon containers	25/acre
Sambucus mexicana	Blue elderberry	One-gallon container	25/acre

Riparian Drainages within the Edison Easement

To further enhance the habitat value of the west drainage, once the non-native plants have been removed from the disturbed riparian vegetation, native riparian plants can be replaced. The plant palette to use in this area includes arroyo willow and mule fat. These two native riparian species have the greatest potential to become established in this small drainage with relatively small amounts of moisture available. Methods and timing of replacement planting are the same as previously described. However, in this area one-gallon containers should be used instead of cuttings due to the lesser amount of moisture available.

Supplemental watering at this site could be provided if a trail is constructed to reach the drainage. Absent a trail, no access is available for supplemental watering or heavy weed removal.

Because the western drainage contains primarily native vegetation with relatively few non-native species, relatively few plants should be replaced. Individual Fremont cottonwood, western sycamore, and arroyo willow trees should be planted, and provided supplemental water as described above. Weeding should also occur as described above.

Other potential sites for habitat enhancement include the existing riparian vegetation along the creek in Veeh Ranch Park where additional native riparian species can be planted; upstream of Veeh Reservoir in the wide swath of willow riparian vegetation where non-native species can be eradicated and replaced with native riparian species; and within the Edison easement where hillsides currently supporting non-native grassland/ruderal vegetation can be replaced with clusters of native coast live oak trees.

Maintenance Introduction

Currently the maintenance of open space, Class I Bikeways and trails in the City of Laguna Hills is shared by three entities; the City of Laguna Hills, the County of Orange and various homeowners associations and in particular the Nellie Gail Homeowners Association. However, there are ambiguities concerning maintenance responsibilities and a primary goal should be to come to an agreement regarding ownership of maintenance responsibilities at sites throughout the City. All three entities have expressed a desire to reach a mutual agreement, however, an investigation into title documents to identify existing dedication agreements would facilitate this arrangement.

There are several primary concerns regarding maintenance including:

Invasive species eradication, in particular Pampas Grass

- While eradication of Pampas Grass is not essential, it is a very invasive species and is deteriorating the quality of open space in Laguna Hills.

Thistle control

- The current practice of discing the slopes in the Edison Easement contributes to the spread of thistles, which is unsightly. Flail mowing would be a better alternative.

Tunnel lighting

- Lighting the tunnels during the day would reduce the hazards present when entering a dark tunnel from a brightly lit trail.

Eucalyptus tree maintenance or removal

- Removal or increased maintenance of Eucalyptus trees along Oso Parkway south side would reduce the danger from falling branches and litter on the trails.

Trail crossing Alicia Creek

- The trail surface over Alicia Creek has been undermined and is likely to be further damaged during rainy seasons. The existing slippery surface presents an additional hazard. This should be resurfaced or the crossing replaced with a bridge. Although this is a County crossing, historically repairs have continued to be undermined. Although the County is unable to budget a replacement bridge, a partnership between the County of Orange, the City of Laguna Hills and the Army Corps could potentially provide the funding.

Trail surface along Oso Parkway on the south side

- The City maintained horse trail along the south side of Oso Park becomes muddy and slippery during the rainy season. Providing a regraded and resurfaced tread would reduce hazards.

A regular maintenance schedule or preventive would provide a higher quality trail system. The utilization of an adopt-a-trails program (particularly, working with a volunteer organization) would increase community pride of ownership.

City of Laguna Hills
Draft Maintenance Requirements

I. Administrative Specifications

A. General Requirements

1. **Professional workmanship, quality equipment, and materials services to include:**

a) Bikeway

1. Sweep
2. Cut vegetation along the edges
3. Cut overhead vegetation/debris removal
4. Tree root pruning
5. Weed, disease and pest control
6. Shrub bed cultivation and weeding
7. Maintain signage/map boards
8. Striping
9. Repair potholes
10. Maintain unpaved shoulders
11. Resurface
12. Erosion control
13. Clean drainage culverts
14. Litter pickup
15. Drinking fountain maintenance
16. Litter pickup
17. Outdoor furnishings maintenance
18. Gates/Bollards maintenance
19. Patrols

b) Trails

1. Rake surface
2. Control vegetation (grass/weeds) on surface
3. Cut vegetation along the edges
4. Cut overhead vegetation/debris removal
5. Tree root pruning
6. Weed, disease and pest control
7. Shrub bed cultivation and weeding
8. Maintain fences
9. Erosion control
10. Clean drainage culverts
11. Maintain signage/map boards
12. Resurface
13. Litter pickup
14. Drinking fountain maintenance
15. Litter pickupOutdoor furnishings maintenance

16. Gates/Bollards maintenancePatrols
17. Horse trough/tie-up maintenance

c) Tunnels
   1. Clean floor of tunnel after flooding, sweep
   2. Remove graffiti
   3. Maintain light bulbs

d) Open space
   1. Mow slopes
   2. Dead/diseased tree removal/replacement
   3. Irrigation for fire control

e) Habitat
   1. Brian Arnold

e) Stream crossing maintenance
   1. Debris removal after flooding
   2. Check footings
   3. Repair/replace/resurface bridge elements
   4. Repair wash-outs
   5. Erosion control

B. Facilities to be Maintained

1. City owned trails
2. Class I Bikeways
3. Roadways
4. All areas designated open space
5. Private trails included in City system (by others)
6. County trails/bikeways included in City system (by County)

C. Maintenance Schedules

1. Daily recurring maintenance
2. Weekly recurring maintenance
3. Biweekly recurring maintenance
4. Monthly recurring maintenance
5. Quarterly recurring maintenance
6. Semi-annually recurring maintenance
7. Annul recurring maintenance
8. Extraordinary maintenance - as required

D. Use of Chemicals

1. Federal, State and local laws for chemical use will be complied with.
2. Licensed Pest Control Operator will direct use of chemicals. All regulations and safety precautions listed in the "Pesticide Information and Safety Manual" published by the University of California shall be adhered to.
4. Pesticide and herbicide use shall be limited to within 50 feet of water bodies whenever feasible

II. On-going Maintenance Tasks

A. Weeds and Grass

1. All weeds and grass shall be removed from trails and adjacent shrub beds
2. Dead weeds to be removed from the areas treated
3. Chemical and herbicides shall be applied in accordance with product labeling and applicable law

B. Pruning and Tree Trimming

1. Trimming, pruning of and removal of debris from trees and shrubs for vehicular and pedestrian and equestrian clearance, visibility, plant health, appearance, access and safety shall be done as needed, at least monthly.
2. All pruning shall conform to National Arborists Association Standards.
3. Maintain trees to achieve a 12' minimum clearance for branches overhanging beyond curb lines on Class II and Class III Bikeway designated roadways.
4. Maintain trees to achieve a 10' minimum clearance for branches overhanging class I bikeways and trails.
5. Tree pruning shall be performed with the intent of developing healthy, structurally sound trees with natural form and proportion, symmetrical appearance and proper vertical and horizontal clearance.
6. Prune shrubs to encourage healthy growth, natural form and proportion. Restrict growth of shrubbery to area behind curbs and beyond edges of bikeways and trails.
7. No more than 30% of a plant's foliage shall be removed during pruning operations.
8. All trimmings and debris shall be removed and disposed of offsite or at approved composting area(s).

C. Litter, Leaf and Debris Control

1. Removal of all litter, paper, glass, trash, undesirable materials, siltation and other accumulated debris from bikeways and trails
2. Supplemental hand sweeping of edges, corners and all areas inaccessible to or surfaces inappropriate for power equipment of bikeways.
3. Removal of litter from bikeways weekly
4. Removal of litter from trails monthly
5. Accumulation of leaves and debris shall be removed from all landscaped areas including beds, planters, turf areas under trees and placed in appropriate containers.
6. Raking should only be used in ground cover or mulched areas to remove heavy accumulation of leaves and debris. When raking is necessary, it should be done lightly, taking care not to damage plants or displace mulch. Raking of turf areas

should only be needed when leaf drop is heavy and mowing is not sufficient to remove leaves.

D. Trash Containers

1. Exterior trash containers shall be emptied weekly and all material shall be placed in appropriate trash bin(s). Trash bins shall be conveniently located for public use as approved by the Supervisor.
2. Containers and container appurtenances shall be maintained free of rust and kept painted at all times. The paint pallet shall be approved by the supervisor.
3. Each container shall have a plastic liner at all times to contain trash.

E. Sweeping and Washing

1. Sweeping will be accomplished by the use of blowers, or other approved methods as needed or after heavy winds or rain. Power equipment shall be limited to hours of the day when the public will be least impacted by noise. The supervisor will approve hours for equipment utilization.
2. Check paved areas for cracks, crevices and deterioration and notify supervisor in writing within 24 hours. Frequency - when sweeping.
3. Benches will be washed quarterly. Check for carvings, graffiti and needs of repair and notify supervisor in writing within 24 hours of discovery.
4. Check tunnels for accumulation of debris after rainfall.
5. Check tunnels for graffiti and notify supervisor in writing within 24 hours of discovery.

F. Open Space

1. Remove ornamental species from habitat areas including pampas grass, California fan palms, artichoke thistle, myoporum, tamarisk, eucalyptus, acacia, mustard, non-native grasses, tree tobacco, castor bean, and other weed species. Whenever possible remove by hand including the root system.
2. If plants are too large to dig out by the roots, they can be cut back at the base, and the cut base can be treated within two minutes with an herbicide which is approved for aquatic use, such as Rodeo (Glyphosate).
3. All removed weeds should be removed from the planting site and disposed of in an authorized landfill.
4. Provide supplemental watering of the replacement plants when natural moisture conditions are inadequate to ensure survival of plants. If necessary, supplement for at least two years from planting. Phase out during the fall/winter of the second year.

G. Light standards

1. Inspect light fixtures in tunnels and replace bulbs as required.
2. If repairs are required to light standards, immediately notify supervisor in writing.

H. Trail Closures

Temporary Trails Closures

1. There are four times to temporarily close a trail or section of a trail; during construction of a trail, when a high fire hazard exists in the area, when a hazardous condition exists on the trail, and during periods of very wet weather.
2. In the case of high fire hazard, the Orange County Fire Department shall monitor weather conditions and provide input to the City when park and trail closures are necessary.
3. If a trail is determined to have a hazardous condition, such as a landslide or washout, it may be closed until the hazard is repaired. Any staff person may make a request to the Director of Community Services to have a trail closed for this reason. The Director of Community Services shall make the decision whether or not to close the trail.
4. A trail may also be closed during periods of heavy rains if the trail becomes dangerously slippery, or if use of the trail while the surface is wet would result in serious damage to the trail. It is especially important to keep vehicles off service trails during the rainy season except in emergencies.
5. If a trail is closed for any reason, the trail shall be posted as closed at main entry points, and blocked to use where possible.
6. Trail closures shall be as short as possible; repair shall be done promptly. The safety of the trail users and the long-term adverse effects to the trail shall be considered before reopening the trail.

Permanent Trail Closures

Short sections of trails may require rerouting, due to landslides or other problems. The original route shall be closed to use when a reroute is provided. The Community Services Director, in cooperation with the Parks and Recreation Commission, shall determine when such rerouting is necessary, and will flag and construct it.

Maintenance Requirements Matrix

	Frequency April-September	Frequency October-March	Avg Production
			Method
Bikeway			
Sweep	Monthly or as required	Monthly or as required	Hand sweep Power vacuum Blower
Edges - Shrub & groundcover pruning	Monthly	Monthly	By hand Electric
Edging	Monthly	Monthly	Power edger String trimmer
Shrub bed cultivation and weeding	Monthly	Bi-Monthly	Weed,till Rake Spray Mulch
Weed, disease and pest control	As required	As required	Truck sprayer Manual sprayer Tractor with boom Sprayer
Tree trimming/debris removal	Monthly	Bi-Monthly	By hand lift By aerial lift
Tree root pruning	As required	As required	N/A
Maintain signage/map boards	As required	Annually	Check Repair Install
Striping	Annually	As required	N/A
Repair potholes	As required	As required	N/A
Repair bituminous road surfaces (3 laborers, 2 equip. oper.)	As required	As required	N/A
Erosion control/drainage maintenance	As required	After Rain	

Drinking fountain maintenance	As required	As required	Check Repair Install
Litter pickup	Bi-weekly	Bi-weekly	Empty/cleaning Distribute/retrieve Painting
Outdoor furnishings maintenance	Monthly	Monthly	Check, repair, wash; paint
Gates/Bollards maintenance	Monthly	Monthly	
Patrols	As required	As required	
Trails			
Edges - Shrub & groundcover pruning	Monthly	Monthly	By hand Electric
Edging	Monthly	Monthly	Power edger String trimmer
Shrub bed cultivation and weeding	Monthly	Bi-Monthly	Weed,till Rake Spray Mulch
Weed, disease and pest control	As required	As required	Truck sprayer Manual sprayer Tractor with boom Sprayer
Tree trimming/debris removal	Monthly	Bi-Monthly	By hand lift By aerial lift
Tree root pruning	As required	As required	N/A
Maintain fences	Monthly	Monthly	
Clean drain pipes and culverts	After rains	After rains & bi-weekly	N/A
Repair cut and fill slopes	As required	As required	N/A
Maintain signage/map boards	As required	As required	Check Repair Install

Maintain surface (stone chips, asphalt, concrete)	As required	As required	N/A
Drinking fountain maintenance	As required	As required	Check, repair Install
Litter pickup	Monthly	Bi-weekly	Empty/cleaning Distribute/retrieve Painting
Outdoor furnishings maintenance	Monthly	Monthly	Check, repair, wash; paint
Gates/Bollards maintenance	Monthly	Monthly	
Patrols	As required	As required	
Horse tie-up maintenance	Monthly	Monthly	
Tunnels			
Clean floor of tunnel	Monthly	Bi-weekly	
Remove graffiti	As required	As required	
Maintain light fixtures	Monthly	Monthly	
Stream crossing maintenance			
Debris removal after flooding	As required	After rains	
Check footings	As required	After rains	
Repair/replace/resurface bridge elements	Yearly	Yearly	
Repair wash-outs	As required	As required	
Erosion control	As required	After rains	
Open space			
Mow slopes	Monthly	Monthly	
Repair cut and fill slopes	As required	As required	N/A
Habitat			

Implementation Plan

Introduction

The recommended elements of the Open Space, Bikeways and Trails plan have been prioritized based on the following value system:

- **Community Center as a hub for the Trails and Bikeways System**

  Proposed projects that provide safe access to the Community Center are given priority.

- **Safety Concerns**

  Proposed projects that address safety concerns of the community are given priority.

- **Amenities in North Laguna Hills**

  As the North Laguna Hills area has poor bikeway and trail linkages to South Laguna Hills and poor internal bikeway circulation, proposed projects that increase amenities in North Laguna Hills are given priority.

Based on these values the projects have been grouped into the following four priority groups:

Priority I:
Priority I projects provide direct safe access to the Community Center, projects that address safety concerns of the community, and projects that provide internal linkages within North Laguna Hills

Priority II:
Priority II projects provide linkages completing circuits with the Priority I projects. Projects that add recreational amenities to North Laguna Hills

Priority III:
Priority III projects provide on-street linkages throughout the City, projects that provide linkages to amenities outside the City.

The following proposed schedule is based on a 10-year projection. It is recommended that Trails, Bikeways and Open Space needs be reevaluated at that time:

Priority I - 2001 – 2004
Priority II - 2005 – 2007
Priority III - 2008 - 2010

Action items are included where there are unusual circumstances that need to be resolved before the project can proceed.

Priority I

Trail Plazas

Intent:

- To provide a stopping area along the trails for pedestrians, equestrians and bicyclists
- To provide information regarding wildlife and habitat of interest to trail user
- To provide an overview of the bikeway and trail system to users accessing the trails and bikeways

Goals:

- To provide a shady, comfortable area for trail users to safely stop
- Combine rest area with information panels, interpretive panels or both
- To add to the City Trail identity
- Utilize existing City Parks when possible
- Utilize existing signage location when possible
- Create a flexible concept that varies in the level facilities but has unifying design components (level 1 has highest level of facilities)
- To increase public awareness of and respect for the natural environment
- To increase public enjoyment of open space area
- Provide visual unity within the Laguna Hills Open Space system
- Display map of bikeway and trail system
- Provide comfortable and attractive rest area at major bikeway and trail junctions
- Provide a visual icon for bikeway and trail system at major intersections with roadways

Locations:

- Community Center
- Edison Easement – above willow wash
- Edison Easement at Alicia Parkway
- Mendocino Park
- Aliso Creek at Paseo de Valencia – southeast confluence of creek
- Oso Parkway at Moulton Parkway – southeast corner
- Veeh Park at Santa Vittoria Drive – Southeast corner
- Santa Vittoria Park at Santa Maria Avenue

- OCTA Transportation Terminal
- SJTC/Nellie Gail Trail at Greenfield

Actions:

- Open discussion with OCTA regarding placement of plaza at OCTA Transportation Terminal

Priority Considerations:

- Many plazas provide signage to projects with proximity to the Community Center.
- Provide signage for projects in North Laguna Hills.
- The OCTA Terminal will cost the City no money

Acreage/Length:

- See Table – Estimated Construction Costs

Proposed Improvements:

- See Table - Estimated Construction Costs: $114,400

Edison Easement Trail (only) Corridor – La Paz to Alicia Parkway

Intent:

- Establish a Pedestrian/equestrian corridor connecting Alicia Parkway with LaPaz Road and enhance habitat at critical areas of Edison Easement

Goals:

- Limit new construction by utilizing the Edison Utility Road for the Corridor when feasible
- Provide an off-road connection from the Elementary School to the Community Center
- Provide a walkable off-road scenic trail loop in the center of the City
- Respect the privacy of the surrounding residents
- Provide interpretive opportunities

Ownership:

- City owned in fee
- Southern California Edison has utility easement over 100' wide corridor of open space

Actions:

- Continue discussions with Southern California Edison Company regarding trail easements over utility road including submittal of more specific information regarding proposed modifications, design guidelines and anticipated use of the Southern California Edison Company road (if determined to be preferred option)
- Contact affected owners to discuss potential privacy issues with residents at southeast corner of property along Aliso Hills Road
- Due to sloped conditions on this site engineering and soils studies should be performed prior to construction to ensure safety

Priority Considerations:

- Proximity to Community Center, providing an off-street connection from schools and residential neighborhoods to the Community Center

Acreage/Length:

- 1.5 mi (9,000')

Proposed Improvements:

- Clearing
- Grading
- Retaining wall
- Drainage upgrades
- Surface trail
- Screening landscaping
- Signage to include warning, regulator and directional information node panels and interpretive panels included separately in trail plaza improvements)Fencing

Estimated Construction Costs:

- $220,500

Addition of Loop Trails to Edison Easement

Intent:

- Establish a trail loop system linking to the proposed Edison Multi-use Corridor

Goals:

- Provide a loop trail for runners
- Respect the privacy of the adjacent residents

Ownership:

- City of Laguna Hills

Actions:

- Contact affected owners to discuss potential privacy issues with residents at southeast corner of property along Aliso Hills Drive

Priority Considerations:

- Proximity to the Community Center and adds an additional link from residential neighborhoods to the Edison Easement

Acreage/Length:

- 0.5 miles (2,700')

Proposed Improvements:

- Signage includes warning, regulatory and directional signs

Estimated Construction Costs:

- $60,000

Edison Easement Multi-Use Corridor – Alicia Parkway to Sheep Hills Park

Intent:

- Establish a Multi-Use Corridor connecting Alicia Parkway with Sheep Hills Park

Goals:

- Limit new construction by utilizing the Edison Utility Road for the Corridor when feasible

- Connect the Community Center to residential areas to the west
- Provide a connection to Aliso Creek
- Respect the privacy of the surrounding residents

Ownership:

- City owned in fee
- Southern California Edison has utility easement over 100' wide corridor of open space
- County ownership of Sheep Hills Park

Actions:

- Continue discussions with Southern California Edison Company regarding trail easements over utility road including submittal of more specific information regarding proposed modifications, design guidelines and anticipated use of the Southern California Edison Company road (if determined to be preferred option)
- Open discussions with affected parties to complete trail corridor from City limit west to Sheep Hills Park
- Priority Considerations:
- High capital outlay, high value to community, connection to outside destination, moderate roadblocks include:
- Negotiation with Southern California Edison for trail easement over utility Obtaining cooperation to complete segment west of city limit connecting to Sheep Hills Park

Priority Considerations:

- Proximity to Community Center, providing an off-street connection from residential neighborhoods to the Community Center

Acreage/Length:

- 0.33 miles (1,800')

Proposed Improvements:

- Clearing
- Grading
- Retaining wall
- Drainage upgrades
- Surface trail
- Screening landscaping
- Irrigation
- Signage to include warning, regulator and directional information node panels and interpretive panels included separately in trail plaza improvements)
- Fencing

Estimated Construction Costs:

- $168,000

San Joaquin Transportation Corridor (SJHTC) Trail – Cal Trans link

Intent:

- Link the existing Nellie Gail SJHTC trail segments to provide a connection from Greenfield Drive to Moulton Parkway

Goals:

- Establish a connection with the County Niguel Trail
- Provide an alternate to the County's proposed trail through the Nellie Gail Community
- Provide additional trail opportunity within the Nellie Gail Community

Ownership:

- Cal Trans access easement

Actions:

- Continue discussions with Cal Trans regarding trail easement

Priority Considerations:

- Provides external trail link to County Niguel Trail

Acreage/Length:

- 0.25 mi (1,300')

Proposed Improvements:

- Regrade existing bench at top of freeway slope
- Reroute drainage
- Move chain link fence
- Surface trail
- Signage to include warning, regulatory and guide signs (information node panel included in plaza improvements)

Estimated Construction Costs:

- $52,500

Mendocino Park Trail Connection to Edison Easement

Intent:

- Establish a trail connection from Medocino Park to the Edison Easement Trail

Goals:

- Utilize the existing Moulton-Niguel Water District service road where feasible
- Extend trail to connect with proposed Edison Easement Trail
- Respect the privacy of the adjacent residents

Ownership:

- City of Laguna Hills
- Utility easement by Moulton-Niguel Water District

Actions:

- Continue discussions with Moulton Niguel Water District regarding use of existing utility road for trail use

Priority Considerations:

- Proximity to the Community Center and adds an additional link from residential neighborhoods to the Edison Easement

Acreage/Length:

- 0.25 miles (1,300')

Proposed Improvements:

- Signage includes warning, regulatory and directional signs

Estimated Construction Costs:

- $3,000

Tunnel Upgrades

Intent:

- Increase tunnel safety

Goals:

- Provide safety lighting in existing tunnels
- Provide upgraded maintenance in existing tunnels

Ownership:

- City of Laguna Hills

Actions:

- Install safety lighting in existing tunnels

Priority Considerations:

- Promotes safety for equestrians and hikers utilizing existing trails

Acreage/Length:

- Three tunnels @ 50' – 60' each

Proposed Improvements:

- 12 Ceiling fixtures with safety cages

Estimated Construction Costs:

- $13,500

Transportation Center Bicycle Lockers

Intent:

- Provide enclosed bicycle lockers at the OCTA Transportation Center

Goals:

- Encourage non-motorized commuting

Ownership:

- Orange County Transportation Authority (OCTA)

Actions:

- Contact OCTA to request the addition of bicycle lockers to Transportation Center

Priority Considerations:

- No cost to City

Acreage/Length:

- N/A

Proposed Improvements:

- Bicycle lockers

Estimated Construction Costs:

- No cost to City
- Estimated Maintenance Costs:

Santa Vittoria Drive Class II Bikeway Addition

Intent:

- Establish a Class II Bikeway along Santa Vittoria Drive

Goals:

- Provide a connection from North Laguna Hills residential neighborhoods to Veeh Ranch Park
- Provide a connection to the proposed San Diego Creek Tributary Multi-use Trail
- Create a scenic bicycle loop through North Laguna Hills

Ownership:

- City of Laguna Hills

Priority Considerations:

- Provides internal bicycle loop in North Laguna Hills

Acreage/Length:

- 1.33 mi (7,000')

Proposed Improvements: Striping both sides of roadway

- Signage includes warning, regulatory and directional signs

Estimated Construction Costs:

- $6,250

Santa Maria Avenue Class II Bikeway Addition

Intent:

- Establish a Class II Bikeway along Santa Maria Avenue from Moulton Parkway to Vittoria Drive

Goals:

- Create a scenic bicycle loop through North Laguna Hills

Ownership:

- City of Laguna Hills

Priority Considerations:

- Provides internal bicycle loop in North Laguna Hills

Acreage/Length:

- 0.75 mi (4,000')

Proposed Improvements:

- Striping both sides of roadway
- Signage includes warning, regulatory and directional signs

Estimated Construction Costs:

- $3,500

Paseo de Valencia Class I Bikeway Addition

Intent:

- Establish a Class I Bikeway along Paseo de Valencia along the east side from Aliso Creek north to Los Alisos Boulevard

Goals:

- Provide continuity by extending the existing Class I Bikeway north of Aliso Creek to the intersection at Los Alisos Boulevard

- Provide a safe bicycle crossing at the corner of Paseo de Valencia and Los Alisos Boulevard

Ownership:

- City of Laguna Hills

Priority Considerations:

- Upgrades safety at intersection of Paseo de Valencia and Los Alisos Boulevard

Acreage/Length:

- 0.20 mi (800')

Proposed Improvements:

- Striping both sides of roadway
- Signage includes warning, regulatory and directional signs

Estimated Construction Costs:

- $40,500

Alicia Creek Bridge

Intent:

- Replace the existing Alicia Creek Crossing with a bridge

Goals:

- Provide a safe and convenient route from southwestern Laguna Hills to the middle school
- Provide a safe and convenient equestrian and pedestrian route from southwestern Laguna Hills to Aliso and Wood Canyons Park

Ownership:

- County of Orange

Actions:

- Open dialogue with County of Orange and other interested parties to determine the potential for a cooperative effort in building a bridge over Alicia Creek
- Establish value to the community by neighborhood phone surveys and seasonal field surveys to determine user groups and frequency.

Priority Considerations:

- Safety upgrade for middle school students and equestrians

Acreage/Length:

-

Proposed Improvements:

- 25' (approximate length) Pre-fabricated bridge
- Engineered bridge abutments

Estimated Construction Costs:

- $165,000

La Paz Road Multi-Use Corridor

Intent:

- Establish a Multi-Use Corridor connecting the existing County trail near Moulton to the proposed Edison Easement Multi-use Corridor

Goals:

- Provide an off-road bicycle and trail connection from Moulton to Aliso Hills Drive
- Provide a connection to the proposed La Paz Road Class II Bikeway
- Provide an off-road bicycle and trail connection to Aliso and Wood Canyons Wilderness Park
- Provide a walkable off-road scenic trail loop in the center of the City
- Replace existing invasive plants with native vegetation
- Provide interpretive opportunities

Ownership:

- Irrevocable offer north side of La Paz Road from Moulton Parkway to Alameda Avenue
- City owns in fee north side from Alameda Avenue to Paseo de Valencia

Actions:

- Accept irrevocable offer north side of La Paz Road from Moulton Parkway to Alameda Avenue
- Develop a plan for eradicating invasive species

Priority Considerations:

- Provides internal bikeway and trail link

Acreage/Length:

- .5 mi (2,700')

Proposed Improvements:

- Pampas grass eradication
- Grading
- Draining upgrades
- Surface trail
- Landscaping
- Irrigation
- Fencing
- Signage to include warning, regulatory and directional signs (Information node panels and interpretive panels included in plaza improvements)

Estimated Construction Costs:

- $387,000

Priority II

Oso/La Paz Connector

Intent:

- Establish a City trail connecting the Oso Parkway trail with the proposed La Paz Road Multi-use Corridor

Goals:

- Establish a City trail connecting the Oso Parkway trail with the existing County La Paz Road Trail
- Establish a connection with the County Niguel Trail via the proposed SJHTC trail
- Provide an alternate to the County's proposed trail through the Nellie Gail Community

Ownership:

- Nellie Gail Homeowners Association

Actions:

- Open discussions with Nellie Gail Homeowners Association regarding the possibility of City's assuming responsibility for this section of trail

or

- Contact the County of Orange regarding the possibility of their negotiating with Nellie Gail Homeowners Association for the County to assume responsibility for this portion of the trail

Priority Considerations:

- Provides internal trail link

Acreage/Length:

- 0.85 mi (4,600')

Proposed Improvements:

- Upgrade trail surface to decomposed granite
- Signage to include warning, regulatory and directional signs

Estimated Construction Costs:

- $4,500

Trail Plazas

Intent:

- To provide a stopping area along the trails for pedestrians, equestrians and bicyclists
- To provide information regarding wildlife and habitat of interest to trail user
- To provide an overview of the bikeway and trail system to users accessing the trails and bikeways

Goals:

- To provide an shady, comfortable area for trail users to safely stop
- Combine rest area with information panels, interpretive panels or both
- To add to the City Trail identity

- Utilize existing City Parks when possible
- Utilize existing signage location when possible
- Create a flexible concept that varies in the level facilities but has unifying design components (level 1 has highest level of facilities)
- To increase public awareness of and respect for the natural environment
- To increase public enjoyment of open space area
- Provide visual unity within the Laguna Hills Open Space system
- Display map of bikeway and trail system
- Provide comfortable and attractive rest area at major bikeway and trail junctions
- Provide a visual icon for bikeway and trail system at major intersections with roadways

Locations:

- Clarington Park at Aliso Creek
- Alicia Parkway at Moulton Parkway
- La Paz Road at Moulton Parkway – northeast corner
- La Paz Road between Alameda Avenue and Aliso Hills Drive
- La Paz Road at Paseo de Valencia
- La Paz Road at Aliso Hills Drive
- Oso Parkway at Cabot Road – southwest corner
- Lakes area along west short of lake
- Sheep Hills Park at juncture with A liso Creek Trail Actions:
- Open discussions with Nellie Gail regarding the potential for a trail plaza on the northwest corner of Oso Parkway and Cabot Road if space limit issues cannot be resolved on the southwest corner

Priority Considerations:

- Provide signage for proposed Priority II projects and wayfinding along internal bikeway and trail linkages**Acreage/Length:**
- See Table – Estimated Construction Costs

Proposed Improvements:

- See Table – Estimated Construction Costs

Estimated Construction Costs:

- $161,700

Lakes Area Trail

Intent:

- Establish a multi-use Corridor along the western edge of the Lakes area in North Laguna Hills

Goals:

- Provide a connection with the existing Veeh Ranch trail
- Provide a scenic bicycle loop through North Laguna Hills
- Provide interpretive opportunities

Ownership:

- Private ownership of large commercial parcels

Actions:

- Open discussions with owners regarding potential for trail easement

Priority Considerations:

- Provide open space amenity in North Laguna Hills

Acreage/Length:

- 1.0 mi (5,200')

Proposed Improvements:

- Decomposed granite trail
- Signage to include warning, regulatory and directional signs

Estimated Construction Costs:

- $159,000

Cabot Road Class III Bikeway Extension

Intent:

- Extend the existing Class III Bikeway along Cabot Road north from Oso Parkway to La Paz Road

Goals:

- Provide a connection from the proposed La Paz Road Class II Bikeway to Laguna Niguel
- Provide a connection from the proposed La Paz Road Class II Bikeway to Mission Viejo
- Provide a connection from the proposed La Paz Road Class II Bikeway to the Oso Creek Multi-use Corridor

Ownership:

- City of Laguna Hills

Priority Considerations:

- Provides internal bikeway connection

Acreage/Length:

- 1.33 mi (7,100')

Proposed Improvements:

- Signage to include warning and regulatory and directional signs

Estimated Construction Costs:

- $3,750

Aliso Hills Drive Class II Bikeway Addition

Intent:

- Establish a Class II Bikeway along Aliso Hills Drive from La Paz Road to Alicia Parkway

Goals:

- Provide a feeder route connecting La Paz Road to Alicia Parkway

Ownership:

- City of Laguna Hills

Priority Considerations:

- Provide internal bikeway link – some redundancy with Edison Easement Bikeway

Acreage/Length:

- 1 mi (5,100')

Proposed Improvements:

- Striping both sides of roadway
- Signage includes warning, regulatory and directional signs

Estimated Construction Costs:

- $4,500

Priority III

Sheep Hills Park Trail

Intent:

- Establish a Multi-Use Corridor connecting the Community Center and Sheep Hills Park

Goals:

- Provide an off-road bikeway and trail link to Aliso and Wood Canyons Park
- Limit new construction by utilizing the Edison Utility Road for the Corridor when feasible

Ownership:

- Homeowners Association

Actions:

- Open discussions with Homeowners Association regarding potential for unpaved trail easement to be placed alongside existing paved trail

Priority Considerations:

- Provides link to external destination

Acreage/Length:

- 0.6 mi (1,300')

Proposed Improvements:

- Grade and surface trail adjacent to existing path
- Fencing
- Signage to include warning, regulatory and directional signs (information node panel included in plaza improvements)

Estimated Construction Costs:

- $40,700

Alicia Parkway Overpass

Intent:

- Establish an overpass across Alicia Parkway at the Community Center or in relative close proximity

Goals:

- Provide an off-road alternative for bicycle and pedestrian crossing to the Community Center

Ownership:

- City of Laguna Hills

Actions:

- Evaluate the potential traffic impacts of building an Alicia Parkway overpass in close proximity to the Community Center

Priority Considerations:

- Proximity to Community Center and forms a link to the off-street trail and bikeway proposed for the Edison Easement

Acreage/Length:

- 12' wide, 77' long, 350' ramp

Proposed Improvements:

- Enclosed pedestrian roadway overpass with ramped approach to meet accessibility and Class I Bikeway standards (8% max) or
- Underground tunnel (multiple plate arch) with ramped approach to meet accessibility and Class I Bikeway standards (8% max) to be installed without tearing up the street. Includes moving existing infrastructure.

Estimated Construction Costs:

- $530,000 – prefabricated bridge
- $850,000 – constructed overpass

Edison Easement Class-I Bikeway Corridor – La Paz to Alicia Parkway

Intent:

- Enhance the Priority – I Trail by the addition of a Class- I Corridor connecting Alicia Parkway with LaPaz Road and enhance habitat at critical areas of Edison Easement

Goals:

- Limit new construction by utilizing the Edison Utility Road for the Corridor when feasible
- Balance cut and fill where feasible
- Provide an off-road connection from the Elementary School to the Community Center
- Respect the privacy of the surrounding residents
- Provide interpretive opportunities

Ownership:

- City owned in fee
- Southern California Edison has utility easement over 200' wide corridor of open space

Actions:

- Continue discussions with Southern California Edison Company regarding trail easements over utility road including submittal of more specific information regarding proposed modifications, design guidelines and anticipated use of the Southern California Edison Company road (if determined to be preferred option)
- Contact affected owners to discuss potential privacy issues with residents at southeast corner of property along Aliso Hills Road
- Due to sloped conditions on this site engineering and soils studies should be performed prior to construction to ensure safety

Priority Considerations:

- Proximity to Community Center, providing an off-street connection from schools and residential neighborhoods to the Community Center

Acreage/Length:

- 1.5 mi (9,000')

Proposed Improvements:

- Clearing
- Grading
- Retaining wall
- Curved bridge (optional)
- Drainage upgrades
- Surface trail
- Screening landscaping
- Signage to include warning, regulator and directional information node panels and interpretive panels included separately in trail plaza improvements)Fencing

Estimated Construction Costs:

- $892,500 – if built in conjunction with Alicia Parkway overpass
- $992,500 – includes curved bridge that would be required if Alicia Parkway overpass is not built.

Ridge Route Drive Class III Bikeway Addition

Intent:

- Establish a Class III Bikeway along Ridge Route Drive from Santa Vittoria Drive to Moulton Parkway

Goals:

- Create a scenic bicycle loop through North Laguna Hills

Ownership:

- City of Laguna Hills

Priority Considerations:

- Provides internal bikeway connection in North Laguna Hills connecting residential to commercial areas

Acreage/Length:

- .75 mi (4,000')

Proposed Improvements:

- Signage includes warning, regulatory and directional signs

Estimated Construction Costs:

- $2,000

Oso Parkway Landscaping

Intent:

- Improve the safety and appearance of the Oso Parkway Corridor

Goals:

- To provide a quality landscape that reflects the environment of the surrounding neighborhoods
- To provide a landscape that presents minimal hazards

Ownership:

- City of Laguna Hills/Nellie Gail Homeowners Association

Actions:

- Open discussions with Nellie Gail Association to sort out maintenance responsibilities

Priority Considerations:

- Upgrades aesthetics of Oso Parkway corridor

Acreage/Length:

- 12 acres (8,800' x north and south sides 12' width each)

Proposed Improvements:

- Demolition
- Landscaping
- Irrigation

Estimated Construction Costs:

- $195,000

Oso Parkway Trail

Intent:

- Formalize the existing City trail along the south side of Oso Parkway

Goals:

- Provide a useable trail in all weather

Ownership:

- City of Laguna Hills

Actions:

- Open discussions with the Nellie Gail Homeowners Association to discuss the best route for this trail and who will maintain it

  or

- Upgrade existing City route

Priority Considerations:

- Provides internal trail link

Acreage/Length:

- 1.66 mi (8800')

Proposed Improvements:

- Regrading as needed
- Drainage improvements
- Decomposed granite trail surface
- Street-side rail fence

- Signage includes warning, regulatory, directional (Information node panels included separately in plaza improvements
- (Landscaping and irrigation as part of Oso Parkway Landscaping)

Estimated Construction Costs:

- $225,000

San Diego Creek Tributary Class I Bikeway

Intent:

- Establish a Multi-use Corridor along the San Diego Creek Tributary from Veeh Ranch Park to the Irvine City Limit

Goals:

- Limit new construction by utilizing the existing El Toro Water District Utility Road where feasible
- Provide long-range bikeway and trail connection to the Santa Ana River Trail along San Diego Creek

Ownership:

- Moulton Niguel Water District

Actions:

- Contact Utility Company to obtain permission for trail easement over existing utility road
- Contact the City of Irvine to discuss their plans to develop a trail/Class I Bikeway along the adjacent segment of San Diego Creek

Priority Considerations:

- Potential long range external linkage to Santa Ana River Trail

Acreage/Length:

- 0.25 mi (1,300')

Proposed Improvements:

- Fence
- Signage to include warning, regulatory and directional signs (Information node panels included in plaza improvements)

Estimated Construction Costs:

- $59,500

Trail Plazas

Intent:

- To provide a stopping area along the trails for pedestrians, equestrians and bicyclists
- To provide information regarding wildlife and habitat of interest to trail user
- To provide an overview of the bikeway and trail system to users accessing the trails and bikeways

Goals:

- To provide an shady, comfortable area for trail users to safely stop
- Combine rest area with information panels, interpretive panels or bothTo add to the City Trail identity

- Utilize existing City Parks when possible
- Utilize existing signage location when possible
- Create a flexible concept that varies in the level facilities but has unifying design components (level 1 has highest level of facilities)
- To increase public awareness of and respect for the natural environment
- To increase public enjoyment of open space area
- Provide visual unity within the Laguna Hills Open Space system
- Display map of bikeway and trail system
- Provide comfortable and attractive rest area at major bikeway and trail junctions
- Provide a visual icon for bikeway and trail system at major intersections with roadways

Locations:

- Cabot Park at base of trail
- Costeau Park – along Alicia Parkway
- Aliso Creek at Juan Avila Adobe Site

Actions:

- Open discussions with private land owners along Lakes to acquire easement
- Open discussions with Homeowners Association at Sheep Hills Park to acquire easement
- Continue discussions with CalTrans regarding easement over missing trail segment

Priority Considerations:

- Low to moderate capital outlay, land acquisition required, high value to the community. Plazas deferred to be done in tandem with related improvements.

Acreage/Length:

- See Table – Estimated Construction Costs

Proposed Improvements:

- See Table – Estimated Construction Costs

Estimated Construction Costs:

- $34,200

Oso Parkway Landscaping

Intent:

- Improve the safety and appearance of the Oso Parkway Corridor

Goals:

- To provide a quality landscape that reflects the up-scale quality of the surrounding neighborhoods
- To provide a landscape that presents minimal hazards

Ownership:

- City of Laguna Hills
- Nellie Gail Homeowners Association

Actions:

- Open discussions with Nellie Gail Association to sort out maintenance responsibilities

Priority Considerations:

- Moderate capital outlay, no acquisition costs, high value to community, no significant roadblocks

Acreage/Length:

- 12 acres (8,800' x north and south sides 30' width each)

Proposed Improvements:

- Demolition
- Landscaping
- Irrigation

Estimated Construction Costs:

- $195,000

City of Laguna Hills - October 26, 2001
Implementation Plan Cost Estimate

Priority I		***Alternative***
Trail Plazas		
Community Center	$8,400	
Edison Easement - above willow wash	$30,900	
Edison Easement @ Alicia Parkway	$10,000	
Mendocino Park	$5,600	
Aliso Creek @ Paseo de Valencia	$10,000	
Oso Parkway @ Moulton Parkway	$18,300	
Veeh Park @ Santa Vittoria Drive	$5,600	
Santa Vittoria Park @ Santa Maria Avenue	$5,600	
OCTA Transportation Terminal	$10,000	
SJTC/Nellie Gail Trail at Greenfield	$10,000	**$114,400**
Edison Easement Trail only - La Paz Road to Alicia Parkway - 6000 l.f.		
Clearing	$12,500	
Upgrade surface road to trail standards and surface	$95,000	
Construct trail, grading, drainage - 2000 l.f.	$60,000	
Screening landscaping - 1000 l.f.	$10,000	
Irrigation - 1000 l.f.	$10,000	
Signage to include warning, regulatory and directional signs	$3,000	
Engineering costs	$30,000	**$220,500**

Edison Easement Multi-use Corridor - Alicia Parkway to Sheep Hills Park - 1800 l.f.		
Clearing	$3,000	
Construct Class I Bikeway, grading and drainage	$80,000	
Upgrade surface road to trail standards and surface	$35,000	
Fence - split rail	$35,000	
Signage to include warning, regulatory and direction signs	$3,000	
Upgrade utility road to trail standards and surface	$12,000	**$168,000**
Engineering fees		
Addition of Loop Trails to Edison Easement		
Clearing	$13,500	
Grading	$20,000	
Construct Trail	$50,000	
Signage includes warning, regulatory and directional signs	$1,500	**$85,000**
Mendocino Park Trail Connection to Edison Easement - 2600 l.f.		
Striping both sides of roadway	$500	
Signage includes warning, regulatory and directional signs	$1,500	
Bollards at entry	$1,000	**$3,000**
Tunnel Upgrades		
12 celiling mounted fixtures with safety cages	$6,000	
Electric supply	$7,500	**$13,500**
Transportation Center Bicycle Lockers		
Bicycle lockers	no cost to City	**$0**
Santa Vittoria Drive Class II Bikeway addition - 14,000 l.f.		
Striping both sides of roadway	$2,500	
Signage includes warning, regulatory and directional signs	$3,750	**$6,250**

Santa Maria Avenue Class II Bikeway addition - 8,000 l.f.			
Striping both sides of roadway	$1,440		
Signage includes warning, regulatory and directional signs	$2,000	**$3,440**	
Paseo de Valencia Class I Bikeway Addition - 800 l.f.			
Construct Class I Bikeway including grading, drainage,	$28,000		
Signage includes warning, regulatory and directional signs	$500		
Landscaping	$6,000		
Irrigation	$6,000	**$40,500**	
Alicia Creek Bridge =- 12' wide by 100' long			
12' x 100' bridge and footing	$150,000		
Engineering Costs	$15,000	**$165,000**	
La Paz Road Multi-Use Corridor - 2700 l.f.			
Construct trail, grading and drainage	$55,000		
Construct Class I Bikeway, grading and drainage	$122,000		
Pampas grass eradication	$100,000		
Landscaping	$40,000		
Irrigation	$40,000		
Fencing - split rail	$27,000		
Signage to include warning, regulatory and directional signs	$3,000	**$387,000**	
San Joaquin Hills Transportation Corridor Trail - CalTrans link - 1300 l.f.			
Construct trail, grading, drainage	$40,000		
Move chain link fence	$6,500		
Signage (complete trail - 6300 l.f.) to include warning, regulatory and guide signs	$6,000	**$52,500**	
Priority I Total			**$1,259,090**

Priority II

Oso Parkway/La Paz Road Connector - 4600 l.f.

Upgrade trail surface to decomposed granite	$3,500		
Signage to include warning, regulatory and directional signs	$1,000	**$4,500**	
Trail Plazas			
Clarington Park @ Aliso Creek	$8,400		
Alicia Parkway @ Moulton Parkway	$20,200		
La Paz Road @ Moulton Parkway	$10,000		
La Paz Road @ Paseo de Valencia	$18,300		
La Paz Road @ Aliso Hills Drive	$10,000		
La Paz Road between Alameda Avenue and Aliso Hills Drive	$30,900		
Oso Parkway @ Cabot Road	$10,000		
Lakes area along west shore of lakes	$30,900		
Sheep Hills Park at juncture with Aliso Creek Trail	$23,000	**$161,700**	
Lakes Area Trail - 5200 l.f.			
Underground culvert	$2,000		
Construct trail, grading and drainage	$150,000		
Signage	$7,000	**$159,000**	
Cabot Road Class III Bikeway Extension - 14,200 l.f.			
Signage to include warning, regulatory and directional signs	$3,750	**$3,750**	
Aliso Hills Drive Class II Bikeway Addition - 5,100 l.f.			
Striping both sides of roadway	$2,000		
Signage includes warning, regulatory and directional signs	$2,500	**$4,500**	
Priority II Total			**$333,450**

Priority III

Sheep Hills Park Trail -1300 l.f.		
Construct trail, grading and drainage upgrades	$25,800	
Fencing	$12,900	
Signage to include warning, regulatory and directional signs	$2,000	**$40,700**
Ridge Route Drive Class III Bikeway Addition - 8000 l.f.		
Signage includes warning, regulatory and directional signs	$2,000	**$2,000**
Oso Parkway Landscaping - 17,600 l.f. (12' width)		
Grubbing	$35,000	
Landscape	$80,000	
Irrigation	$80,000	**$195,000**
Oso Parkway Trail - 8800 l.f.		
Resurface, regrading and drainage improvements	$133,000	
Stree-side rail fence	$88,000	
Signage includes warning, regulatory, directional	$4,000	**$225,000**
San Diego Creek Tributary Class I Bikeway - 1300 l.f.		
Construct Class I Bikeway, grading and drainage	$45,500	
Fence	$13,000	
Signage to include warning, regulatory and directional signs	$1,000	**$59,500**
Trail Plazas		
Cabot Park @ base of trail	$5,600	
Costeau Park - along Alicia Parkway	$5,600	
Aliso Creek @ Juan Avila Adobe Site	$23,000	**$34,200**
Alicia Parkway Overpass 12' wide, 77' overpass, 350' ramps		
Enclosed prefa bridge overcrossing	$450,000	
Engineering fees	$80,000	**$530,000**
Enclosed overpass with ramped approach (8% max grade)	$770,000	

Edison Easement Class I Bikeway Corridor - La Paz Road to Alicia Parkway - 9000 l.f.				
Clearing	$17,000			
Grading	$60,000			
Construct Class I Bikeway, drainage	$450,000			
Displace existing utility road	$225,000			
Retaining Wall	$25,000			
Screening landscaping - 1000 l.f.	$10,000			
Irrigation - 1000 l.f.	$10,000			
Signage to include warning, regulatory and directional signs	$5,500			
Engineering costs	$90,000	**$892,500**		
**85' Curved bridge	$100,000			**$992,500**
Priority III Total			**$1,944,700**	
Master Plan Total			**$3,537,240**	

** Optional - Instead of Alicia Parkway Overpass

Plaza Cost Estimate

October 19, 2000

Type 1a - interpretive only — $30,900 ea

Locations

- La Paz Road between Alameda Avenue and Aliso Hills Drive
- Edison Easement - above willow wash
- Lakes area along west short of lakes

not apart of proj
not apart of proj
not apart of proj

Description

- 15'x15' paved area
- 4 boulders
- 1 interpretive panel
- 1 bench
- 1 trash receptacle
- 1 bicycle rack
- 4' landscape & irrigation perimeter

Type 1b - in existing park - interpretive only — $5,600 ea

Locations

- Veeh Park at Santa Vittoria Drive - Southeast corner
- Cabot Park at base of trail south of parking lot
- Costeau Park - visible along Alicia Parkway
- Mendocino Park
- Santa Vittoria Park at Santa Maria Avenue

← mendocino

Description

- 2 boulders
- 1 interpretive panel
- 1 bicycle rack
- Existing facilities

Type 1c - in existing park - interpretive & corridor information — ,400 ea

Locations

- Community Center
- Clarington Park @ Aliso Creek Trail

Community Center
Clarington Park

Description

- 2 boulders
- 1 interpretive panel
- 1 corridor information panel
- 1 bicycle rack
- Existing facilities

Type 2a - combined — $23,000 ea

Locations

Aliso Creek at Juan Avila Adobe Site - append existing signage

Sheep Hills Park at Aliso Creek Trail

Description

10'x12' paved area
4 boulders
1 interpretive panel
1 corridor information panel
1 bench
1 trash receptacle
1 bicycle rack
3' landscape & irrigation perimeter

Type 2b - interpretive only — $20,200 ea

Locations

Alicia Parkway at Moulton Parkway - northwest corner

Description

10'x12' paved area
4 boulders
1 interpretive panel
1 bench
1 trash receptacle
1 bicycle rack
3' landscape & irrigation perimeter

Type 2c - corridor information only — $18,300 ea

Locations

Oso Parkway at Moulton Parkway - southeast corner

La Paz at Paseo de Valencia - southwest corner

Description

10'x12' paved area
4 boulders
1 corridor information panel
1 bench
1 trash receptacle
1 bicycle rack
3' landscape & irrigation perimeter

Type 3 - corridor information only — $10,000 ea

Locations

OCTA Transportation Terminal

Oso Parkway at Cabot Road - southwest corner

Aliso Creek at Paseo de Valencia - southeast confluence of creek

Edison Easement Trail at Alicia Parkway - east side of Alicia

La Paz Road at Moulton Parkway - northeast corner

La Paz Road at Aliso Hills Drive - southwest corner

SJHTC at Greenfield Drive

Description

6'x8' paved area

2 boulders

1 corridor information panel

1 trash receptacle

2' landscape & irrigation perimeter

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Laguna Hills

Stakeholder Input

Meetings with Nellie Gail and Comments at Parks and Recreation Commission Meetings

Issues	Bicyclists/Commuter	Bicyclists/Recreational	Equestrians	Pedestrians	Adjacent Residents
Speed and volume of cars on La Paz, Alicia, Paseo de Valencia and Cabot where Class I is not an option is particularly dangerous for children. Enforcing reduced speeds could be a solution.	3	3	3		
Security issues on Edison easement areas during peak hours of useage by children riding to Community Center - may need supervision during peak hours.		2			
Privacy of residences along the Edison Easement may be violated if a Multi-Use Corridor is built adjacent to the homes.					4
Access to Laguna Hills Mall is difficult for bicyclists - removing on street parking on Louisa and Caballeros could be a solution	2	2			
Entering dark tunnels from daylit trails presents a hazard and daytime lights in the tunnels would reduce this risk	2	2	2	2	
Landscaping, in particular Eucalyptus tree litter alongside the trail, north side of Oso, is a hazard and maintenance responsibilities need to be better defined to reduce the existing hazards.			2		
Crossing of Alicia Creek near Lomas Laguna is a hazard to middle school students and equestrians due to slippery surface and undermining by the stream. An alternate bridge crossing would be a desired solution.	3		3	3	
The existing Nellie Gail Trail along the northern perimeter of the San Joachin Hills Transportation Corridor has been interrupted just west of Greenfield Drive by a CalTrans access easement and a chainlink fence. Possible solution is to move the fence further downslope and develop the existing bench into a trail link. This would require CalTrans cooperation.			5	5	
Wood chips on trails are difficult for jogging and for pushing strollers - northwest of La Paz near Moulton				2	
Automobile speed at Nellie Gail crossings is a hazard - enforcing reduced speeds is a desired solution.			2		
At-grade crossing at Laguna Hills and Moulton is a hazard			3		
The southwest corner of Oso Parkway does not provide adequate room for equestrians to stack when waiting to cross the street. A suggested solution was to remove the Society Garlic planted at this location and replace it with a surface suitable for equestrians			3		

1 = Minor hazard
2 = Moderate hazard
3 = Major hazard
4 = Privacy issue
5 = Circulation issue