

# Traffic and Congestion Reduction Advisory Task Force Findings and Recommendations

CITY OF MILL VALLEY, CALIFORNIA



## Acknowledgements

### MILL VALLEY TRAFFIC AND CONGESTION REDUCTION ADVISORY TASK FORCE

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## Traffic and Congestion Reduction Advisory Task Force

Traffic congestion in the City of Mill Valley (City) has progressively increased over the past several years. While the increase is not unique to this community, the City of Mill Valley has prioritized it as a major concern that threatens the overall quality of life within the city.

The City Council recognized the complexity of the problem and requested the development of sustainable solutions. To accomplish this challenging task the Council assembled a Traffic and Congestion Reduction Advisory Task Force (hereafter referred to as the "Task Force"). The Task Force was charged with the responsibility to both identify the root causes of traffic congestion, as well as to develop strategies that would potentially address the problem.

For the Task Force to successfully address issues affecting the greater Mill Valley community, it was necessary to include representatives from local, regional, and state agencies, as well as residents of Mill Valley. In July and August of 2015, the former City of Mill Valley Mayor Ken Wachtel, in consultation with City Manager Jim McCann, appointed a group of said people to the Task Force. These Task Force members and the jurisdictions they represent / represented at the time of formation are listed below.

<b>Name</b>	<b>Representing</b>
Ken Wachtel (Chair)	Mill Valley Mayor
Stephanie Moulton-Peters	Mill Valley Councilmember
Mike McGuire	State Senator
Marc Levine	State Assembly Member
Kate Sears	Marin County Board of Supervisors
Paul Johnson	Mill Valley School District Superintendent
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Stephen Burke	Mill Valley Resident
Jeff Brown	Tamalpais Community Services District

The Task Force held a total of five meetings that were open to the public, including a citywide meeting during which members of the community were invited to learn about the Task Force's work, and provide input on traffic congestion in Mill Valley. The meetings were on the following dates:

- August 31, 2015;
- September 15, 2015;
- October 21, 2015;
- October 27, 2015 (Community Meeting); and,
- November 2, 2015.



Task Force meetings were led by City Manager, Jim McCann, and included presentations by City transportation consultants Parisi Transportation Consulting (Parisi), and representatives from the California Department of Transportation (Caltrans), Mill Valley School districts, the Town of Tiburon, and the Marin Transit district. Parisi presented the results of various traffic studies conducted along city streets that informed Task Force discussions. Joy Lee, a Senior Transportation Engineer with Caltrans, gave the Task Force a summary of the agency's road improvement projects in Mill Valley and the surrounding area. The Mill Valley School District Superintendent, Paul Johnson, and the Tamalpais High School Principal, Julie Synyard, provided a presentation of Mill Valley School's transportation policies and recent surveys. The Task Force also heard presentations on various school busing initiatives in communities around Marin County, by the Town of Tiburon's Police Chief, Mike Cronin, and the Director of Planning and Operations for Marin Transit, Robert Betts.

The succeeding sections of this report detail the information and progress accomplished by the Task Force during these meetings.

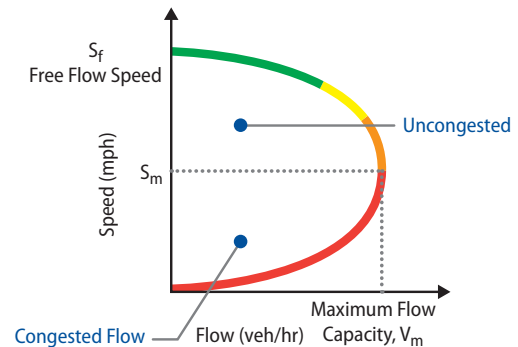
## Background

The recent increase in traffic congestion along local roadways is not unique to Mill Valley. Traffic congestion has been recognized as a regional problem experienced by residents throughout Marin County, as well as the greater San Francisco Bay Area. Increased employment rates, limited housing development, and rising housing costs, have contributed to longer commute distances for many Bay Area workers. This has resulted in considerable increase of traffic congestion along the region's highways.

Highway 101 is the north-south route for Marin County, and connects Marin County (and points further north) with San Francisco (and points further south). The highway and its various interchanges within Marin County, including the Highway 101 / East Blithedale Avenue interchange in Mill Valley, have inadequate capacity to serve the existing traffic demands. This leads to heavy congestion with vehicles experiencing exceptionally long delays that frequently extend outside of traditional peak commute times. Traffic congestion along Highway 101, and the resulting spillback onto local streets is a major concern for Marin County residents.

### Limited Capacity of Regional and Local Roadways

Mill Valley's roadway system was designed with limited vehicular carrying capacity. Additionally, the geographical nature of the City restricts the ability to expand capacity of the existing roadway system. The Mill Valley roadway network makes up a fragile ecosystem of local and regional roadways with limited capacity that can be pushed beyond its means with just a moderate increase in the number of cars on those roads. Such a roadway system is very sensitive to sudden changes in traffic demand. A sudden increase in traffic volumes can significantly impact free-flow speeds.



This graph illustrates the relationship between vehicular capacity and free flow travel speeds. A slight increase in vehicular volume can transform a roadway previously operating at acceptable and uncongested conditions into a roadway experiencing recurring congestion and intolerable traffic delays.

As an example, in 2012 a new traffic signal was installed on Shoreline Highway at Tennessee Valley Road. This change in traffic control caused traffic delays and congestion which resulted in many motorists diverting trips to the East Blithedale Avenue corridor; the traffic shift was great enough to then congest this arterial roadway.

### Demographic Factors Contributing to Traffic Conditions

Several demographic factors to varying degrees contribute to the noted increase in both vehicular demand and subsequent traffic congestion along Mill Valley's roadways.

Between 1970 and 2013 the population of Mill Valley increased by about 10 percent (from about 12,950 in 1970 to 14,300 persons in 2013). However, between 2000 and 2010, the City saw only a 3.9 percent rise in the number of total housing units. Only 209 new housing units were built between 2000 and 2015, averaging 14 units per year.

Resurgence of a strong regional economy has been coupled with a boom in construction and renovation projects within Mill Valley. While new construction has remained relatively low, there has been a much larger increase in building renovations in recent years. The number of building permits issued by the city has increased by about 58 percent from 727 permits during the 2009 / 2010 fiscal year to 1,151 permits during the 2014 / 2015 fiscal year.

Additionally, the number of households with children under 17 has grown, resulting in a spike in school demands. School enrollment for the Mill Valley School District increased by about 43 percent from about 2,250 students in the 2004 / 2005 school year, to about 3,220 during the 2015 / 2016 school year. This has resulted in an increase in school-based trips along Mill Valley's roadways. These and a wide variety of other reasons, have caused Mill Valley roads to be regularly pushed well beyond their capacity, particularly during morning and early afternoon peak commute times.

## 2001 Mill Valley Transportation Committee

The efforts of the Task Force built upon the work of the 2001 Mill Valley Transportation Committee, formed by the City Council in February 2000. The objectives of the 2001 committee were to; identify and analyze the causes of increased traffic congestion on arterial roadways, develop and assess alternative proposals to alleviate increased traffic congestion, and recommend specific actions to the City Council that could mitigate the causes of traffic congestion.

The 2001 committee prepared a report titled *Solving Traffic Problems in Mill Valley: A Community Responsibility* (January 2001) that documented its findings and provided recommendations for both near-term and long-term solutions to the problem. The 2001 committee found that while Mill Valley's (and most of Marin's) streets were originally designed to accommodate the equivalent of six daily trips per household (based on 1950 traffic studies), Mill Valley households at the time generated an average of 11 vehicular trips per day. These trips were made for a

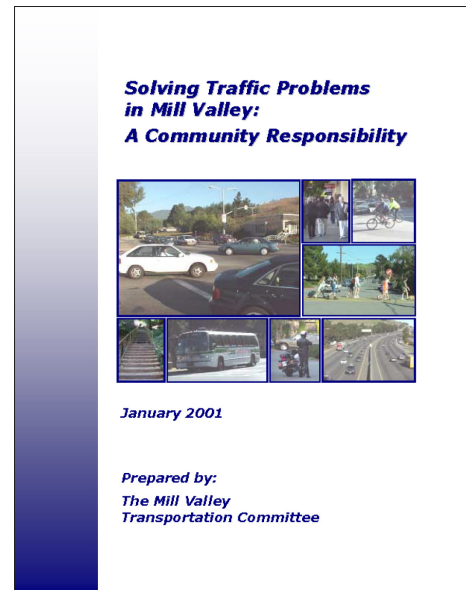
variety of reasons, including but not limited to; shopping, a boom in commercial and residential development and remodeling, and the number of trips taken to drive elementary and middle school students to and from school.

A further examination of school-related trips made in 2001 found that generally between 60 and 70 percent of all students were driven to and from school. Additionally, these trips mainly comprised of vehicles in which the students were the only passengers in the vehicles (many high school students drove themselves to school). More than 80 percent of middle and high school students lived more than one-half mile away from the schools they attend, and had limited alternatives to traveling to and from school by family vehicle. Parents interviewed as part of the 2001 study expressed their support for a shuttle bus in lieu of having to drive their children to and from school.

Based on the results of their study and input from community members, the 2001 committee presented the City Council with recommended transportation actions categorized into two overall areas:

- Transportation Demand Management measures, that focused on single-occupancy vehicular trips; and,
- Transportation System Management measures, that addressed a variety of actions that would make the then-existing transportation system operate more efficiently.

The City Council was receptive to the committee's recommendations, and approved the action plan recommended for implementation over time. The specific recommendations of this plan, and the near-term actions already taken by the City Council are detailed in the table below.





**Table 1: 2001 Action Plan – Transportation Demand Management**

RECOMMENDATION	RESPONSIBILITY	STATUS
<b>Education</b>		
Implement educational TDM program	City	Developed informational TDM program
Conduct biennial traffic counts	Public Works	Performs periodic traffic counts along city roadways
Monitor traffic Collisions	Police Department	Regularly monitors frequency and location of reported collisions
<b>Enforcement</b>		
Enhance police enforcement	Police Department	Performed targeted enforcement of city traffic regulations
Expand citizen's letter warning program	Police Department	Developed an improved citizen's letter warning program
<b>School-Related</b>		
Coordinate with Safe Routes to School (SR2S) Program	City and Schools	Participated in regular SR2S task force meetings; procured and distributed millions of dollars in SR2S infrastructure grants
Improve school circulation	Individual School	Increased number of students walking and bicycling to school; improved drop-off/pick-up conditions
Expand school crossing guard program	Individual School	Worked with TAM to provide adult crossing guards at multiple intersections serving city schools
Provide safety training	Police Department	Police participated in pedestrian training and bicycle rodeos
Conduct joint City Council and School Board Meetings	City and School District	Joint meetings occasionally conducted
Evaluate school hours	City and School District	No action
<b>Transit</b>		
Conduct shuttle bus study	City Task Force and Consultant	Formed Shuttle Bus task force; evaluated potential shuttle bus system
Improve coordination with GGBHTD	City	Regularly coordinated with Golden Gate Transit and Marin Transit
Provide coordination with Manzanita P&R	City	No action
<b>Pedestrians and Bicyclists</b>		
Implement BPAC actions	Public Works	Supported BPAC committee and actions
Provide crosswalk enhancements	Public Works	Developed crosswalk guidelines and enhanced crosswalks
Develop pedestrian and bicycle circulation program	City	Updated Pedestrian and Bicycle Master Plans; Coordinated with BPAC
Commit funding to Steps, Lanes and Paths (SLP) program	Parks Department	Planned, designed and funded improvements to SLPs
Provide sidewalk maintenance	Public Works	Provided ongoing sidewalk maintenance

Source: Mill Valley Transportation Committee, 2001.

**Table 2: 2001 Action Plan – Transportation System Management**

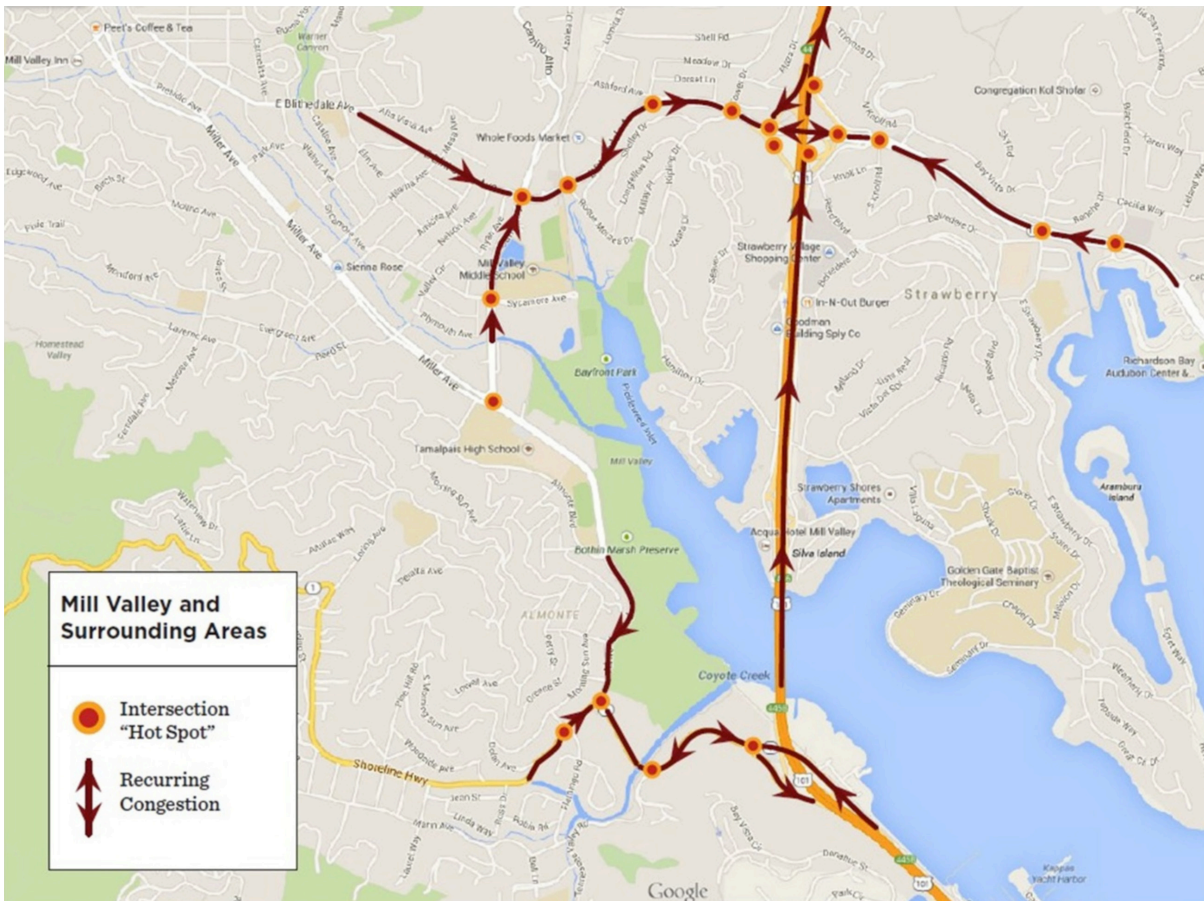
RECOMMENDATION	RESPONSIBILITY	STATUS
<b>Local Intersections</b>		
Improve traffic signal timing and coordination	Public Works	Continued updating timing at signalized intersections along East Blithedale Avenue and Camino Alto corridors
Provide operational improvements at major intersections	Public Works	Provided improvements to a number of key intersections, e.g., changed signal phasing at key intersections
Study minor intersections	Public Works	Added traffic controls to minor intersections, as appropriate, and developed crosswalk policy
<b>State Highways</b>		
Revise Caltrans signals at US 101/ East Blithedale Avenue	Public Works	Supported Caltrans and County project to improve Highway 101 southbound off-ramp intersection
Review traffic conditions at US 101/ East Blithedale Avenue	Public Works	Studied traffic volumes and conditions; developed phased improvement plan
Monitor TAM junction planning	Planning Department	Led corrections to Hwy. 1/Tennessee Valley Road and evaluating Hwy. 1/Almonte Blvd.
Meet regularly with Marin County and Caltrans	Planning Department	Met regularly with Caltrans and County staff to improve conditions
<b>Technology</b>		
Implement technological solutions	Public Works	Upgraded traffic signal controllers for time-based signal coordination
<b>Community Livability</b>		
Update General Plan's level-of-service standard	Planning Department	Updated signalized intersection policy as part of Mill Valley 2040 General Plan
Provide gateway treatments	Planning Department	Gateway treatments proposed as part of Miller Avenue Precise Plan
Conduct Miller Avenue Precise Plan	Planning Department	Evolved into Miller Avenue Streetscape Plan; improvements underway in 2016
Conduct downtown "Main Street" plan	City Council & Planning Department	No action
Improve Street Lighting	Public Works	Street lighting transitioning to LED technology
Support undergrounding program		No action
Monitor emergency preparedness	Police	City's Emergency Preparedness Commission meets regularly
<b>Road Capacity</b>		
Re-examine two-way Hamilton Drive	Public Works and Consultant	Proposed and rejected as part of Mill Valley 2040 General Plan update
Study widening narrow segment of East Blithedale	Public Works and Consultant	Proposed and rejected as part of Mill Valley 2040 General Plan update
Evaluate Sycamore Avenue extension	Public Works and Consultant	Proposed and rejected as part of Mill Valley 2040 General Plan update

Source: Mill Valley Transportation Committee, 2001.

## Existing Conditions

### Traffic Conditions along Gateway Corridors

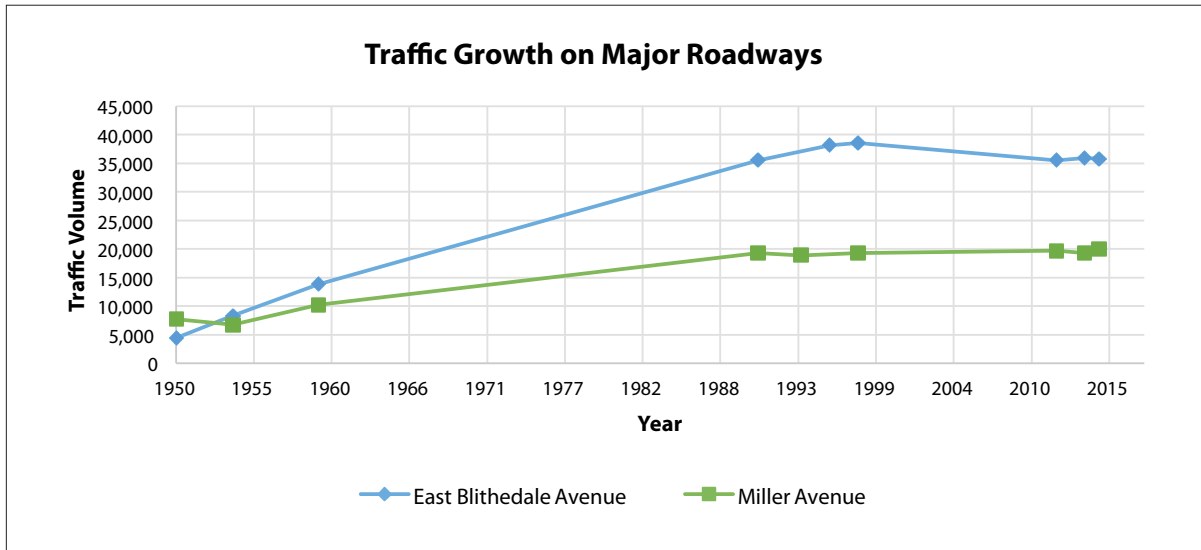
Traffic congestion patterns along the City of Mill Valley’s principal streets were analyzed using traffic monitoring software (Inrix), which provides real-time traffic congestion information for key roadways, via actual vehicular travel time surveys. The data was evaluated to identify traffic congestion “hot spots”, i.e., intersections and roadway segments that experience recurring congestion throughout the day, with exceptionally long delays during the peak commute times. As shown in the illustration below, the majority of these hotspots are located along Mill Valley’s two major “gateway corridors” i.e., East Blithedale Avenue and Miller Avenue / Almonte Boulevard. Notably, East Blithedale Avenue’s congestion often spills over onto northbound Camino Alto.



Source: Inrix, 2015

East Blithedale Avenue provides access to and from Mill Valley through its interchange with Highway 101. Similarly, Miller Avenue provides access to Downtown Mill Valley through its connection to Almonte Boulevard and subsequently Shoreline Highway (Highway 1). These two roadways represent the primary access routes into and out of Mill Valley.

A comparison of average daily traffic volumes along East Blithedale Avenue and Miller Avenue was conducted to assess traffic growth patterns over the years, beginning with the earliest available traffic volume data in 1950. This comparison is summarized in the graph below.



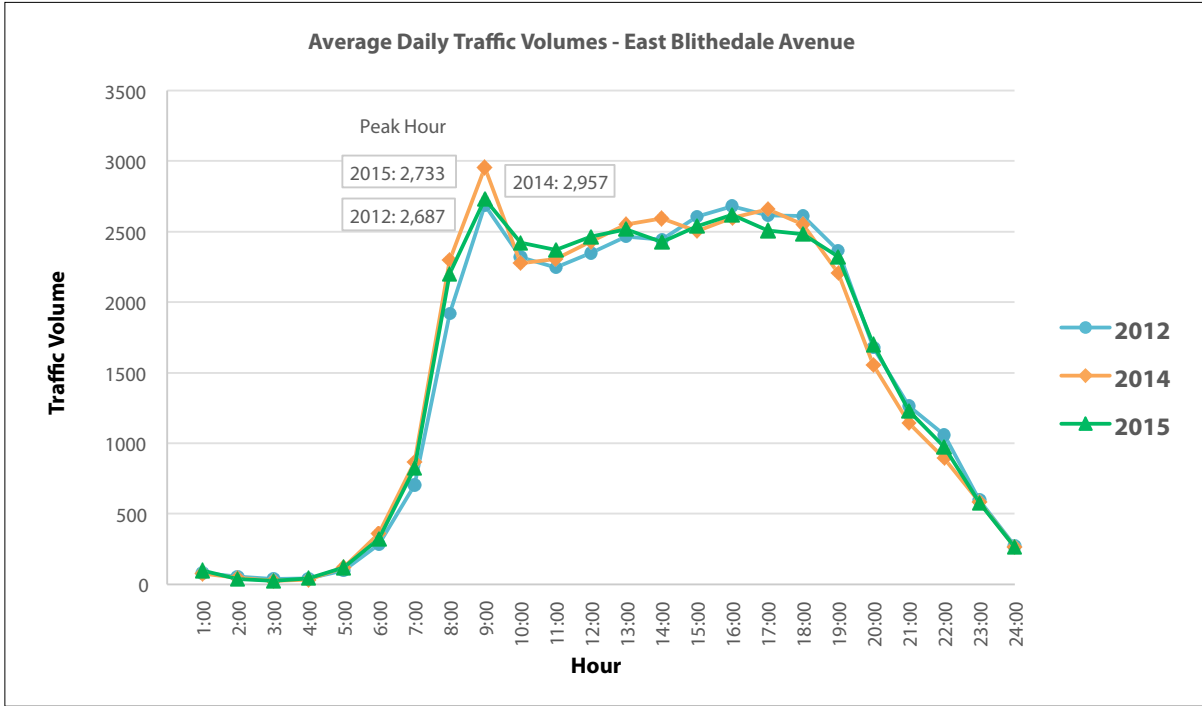
As illustrated, while there was a steady increase prior to 1990, traffic volume have remained within a constant range for the past 15 to 20 years. Total average daily traffic volumes along these roadways are summarized in Table 3.

**Table 3: Comparison of Average Daily Traffic Volumes along Gateway Corridors**

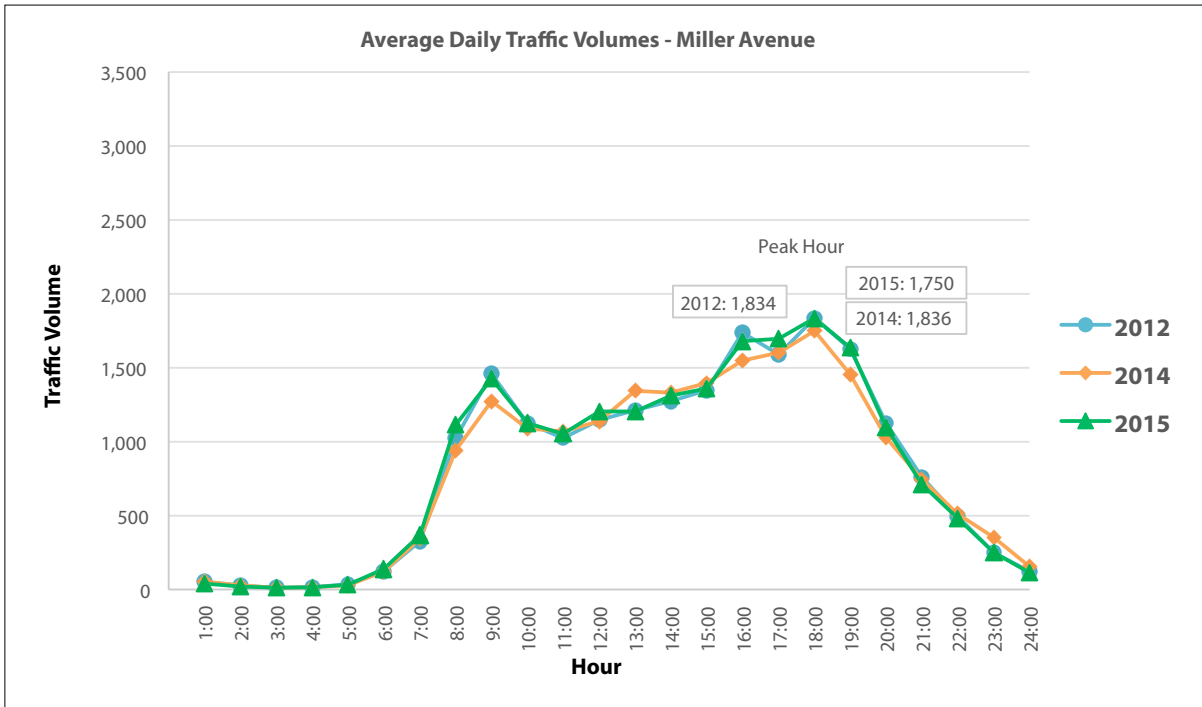
Roadway	Average Daily Traffic Volumes		
	June 2012	June 2014	May 2015
East Blithedale Avenue	35,472	35,903	35,826
Miller Avenue	19,743	19,322	19,928
<b>Total</b>	<b>55,215</b>	<b>55,225</b>	<b>55,753</b>

Source: Parisi Transportation Consulting, 2016.

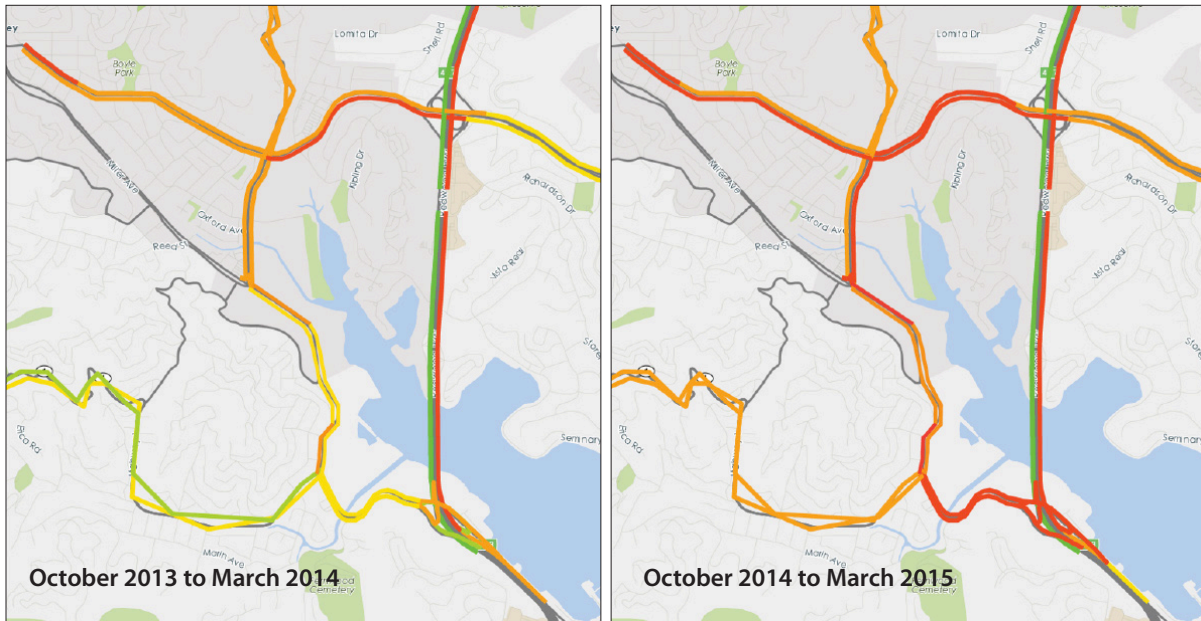
An hour-by-hour analysis of daily traffic volume variations between 2012 and 2015, along both East Blithedale Avenue and Miller Avenue, shows that throughout the course of an average day traffic volumes have remained fairly consistent during the three-year analysis period. This analysis is illustrated in the charts below. Along East Blithedale Avenue traffic volumes vary by less than 500 vehicles per hour during the peak hour.



Whereas, along Miller Avenue traffic volumes vary by less than 200 vehicles per hour, during the peak hour. Despite this minimal variation in traffic volumes over the last few years, travel speeds along these roadways have actually decreased within a similar one-year analysis period (2014 to 2015). The figures below compares vehicular travel speeds during the 2013 / 2014 school year with travel speeds during the 2014 / 2015 school year.



**Evening (5 PM to 6 PM) Travel Speeds – One Year Difference**



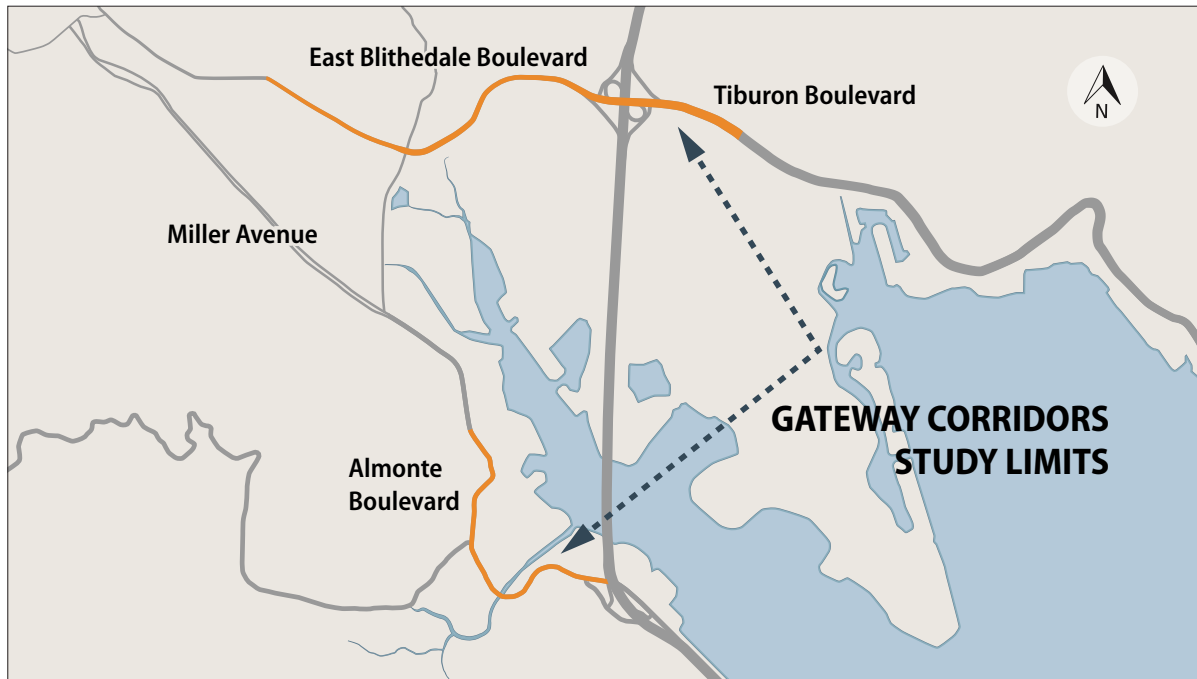
**LEGEND**

- Free flow speeds
- Light congestion
- Moderate congestion
- Heavy congestion.

As shown, during the evening peak hour motorists traveling along East Blithedale Avenue have gone from experiencing moderate traffic congestion (shown in orange) in 2013 / 2014, to heavy traffic congestion (shown in red) in 2014 / 2015. Conversely, vehicles traveling along Miller Avenue and Almonte Boulevard have gone from experiencing light to moderate congestion (shown in yellow and orange respectively) in 2013 / 2014 to experiencing moderate to heavy congestion (shown in red) in 2014 / 2015.



## Traffic Congestion Study Limits



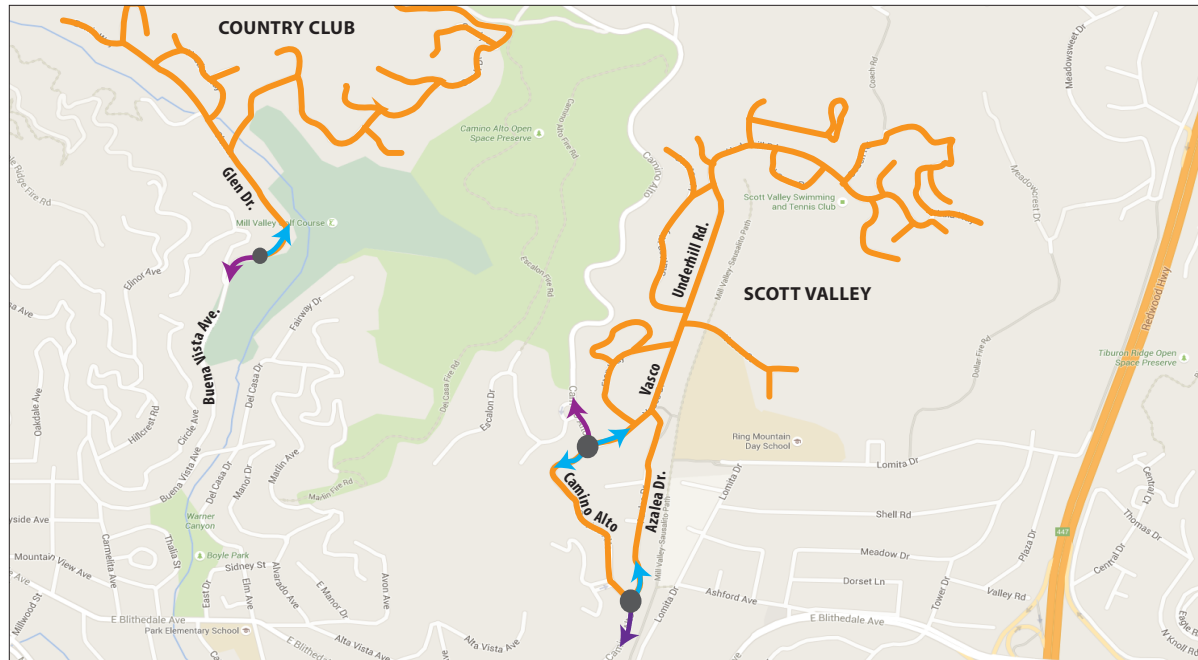
East Blithedale Avenue and Miller Avenue / Almonte Boulevard carry the majority of the City's traffic during the peak periods of the day. For example, on an average weekday, about 80,000 vehicles drive through East Blithedale Avenue / Highway 101 / Tiburon Boulevard interchange (excluding through traffic on Highway 101). Given the high traffic volume, concentration of intersection hotspots, and the significant decrease in travel speeds, the Task Force chose to focus their attention and efforts on the following roadway segments:

- East Blithedale Avenue between Millwood Street and Redwood Highway Frontage Road; and,
- Almonte Boulevard from the Miller Avenue / Almonte Boulevard intersection to the Shoreline Highway / Tennessee Valley Road intersection.

These two roadways defined the Task Force study limits moving forward. It should be noted that a segment of Almonte Boulevard (between Shoreline Highway and about 300 feet southeast of Miller Avenue) and East Blithedale Avenue (from about 150 feet west of Tower Drive / Kipling Drive to the Redwood Highway Frontage Road) are part of the unincorporated areas of Marin County and outside City jurisdiction.

## Vehicle Trip Generation

To identify and evaluate average vehicular trip generation for Mill Valley households, traffic counts were conducted at select locations providing primary access to two of Mill Valley's residential. The counts were conducted at three locations that serve as the only way into and out of these neighborhoods. The Country Club Neighborhood is only accessible via Buena Vista / Glen Drive, while Scott Valley is accessible via Camino Alto / Azalea Drive. The count locations depicted below, were selected so as to capture both inbound and outbound vehicular traffic for these neighborhoods, for a 24-hour period during an average weekday. The counts were conducted on three consecutive weekdays, and the day with the highest peak hour volumes was selected for use in this analysis.



A separate count was conducted at the entrance for the Scott Valley Swimming and Tennis Club, as well as the Mill Valley Golf Course. These counts were conducted in order to discount trip generation from these locations from the overall neighborhood trip generation. These trips were discounted from the overall gateway counts for Scott Valley.

The two neighborhoods include a total of 345 homes, and produced a total of 3,721 daily vehicle trips. This translates to an average of just under 11 vehicle trips per day. The national average according to data obtained from the Institute of Transportation Engineers is 9.5. As previously stated, Mill Valley roadways were built to accommodate the equivalent of six daily trips per households. This means that under existing conditions, Mill Valley households continue to generate more daily trips than the national average and more trips than the City's roadways are designed to accommodate.

### School Trip Origins / Cross-Highway Trips

The City of Mill Valley has seen an increase in school-age children which has led to a spike in school enrollment and subsequent school-based vehicular trips. The Mill Valley School District enrollment is not based on neighborhood boundaries, but rather is conducted using an open enrollment policy that allows parents to enroll their children at any of Mill Valley's schools. This is due to a combination of factors limiting the enrollment capacity at each school. The district's two smallest schools (Old Mill and Park) serve the largest city population areas. Additionally, the district must balance class sizes for all schools, further limiting the enrollment capacities at each school and necessitating accommodation of student enrollment at schools outside of their neighborhood boundaries. This policy allows elementary school students to enroll at any of the city schools despite their residential location.

A sizeable number of students attending Mill Valley Schools reside outside of the City boundary, which is confined to the west side of Highway 101. Additionally, some students that reside in Mill Valley attend Strawberry Point Elementary School in Strawberry (east of Highway 101). This results in a significant number of "cross-highway" student trips. These trips are comprised of students that traverse the Task Force study corridor i.e., East Blithedale Avenue / Tiburon Boulevard and Miller Avenue / Almonte Boulevard as part of their journey to and from school. These student trips are mostly conducted during the morning and afternoon periods, contributing to existing traffic volumes along these roadways.

In order to estimate the number of school-based trips added to the Task Force's study corridor, an analysis of student-origins versus school enrollment was conducted. Data provided by the Mill Valley School District and Tamalpais



High School was used to identify student origins by zip code<sup>1</sup>. These origins were mapped relative to Highway 101 i.e., east or west of the highway. The number of students residing on one side of Highway 101 and attending school on the other side of Highway 101 are summarized in Table 4: Student Origins for Public School-Based Trips.

**Table 4: Student Origins for Public School-Based Trips**

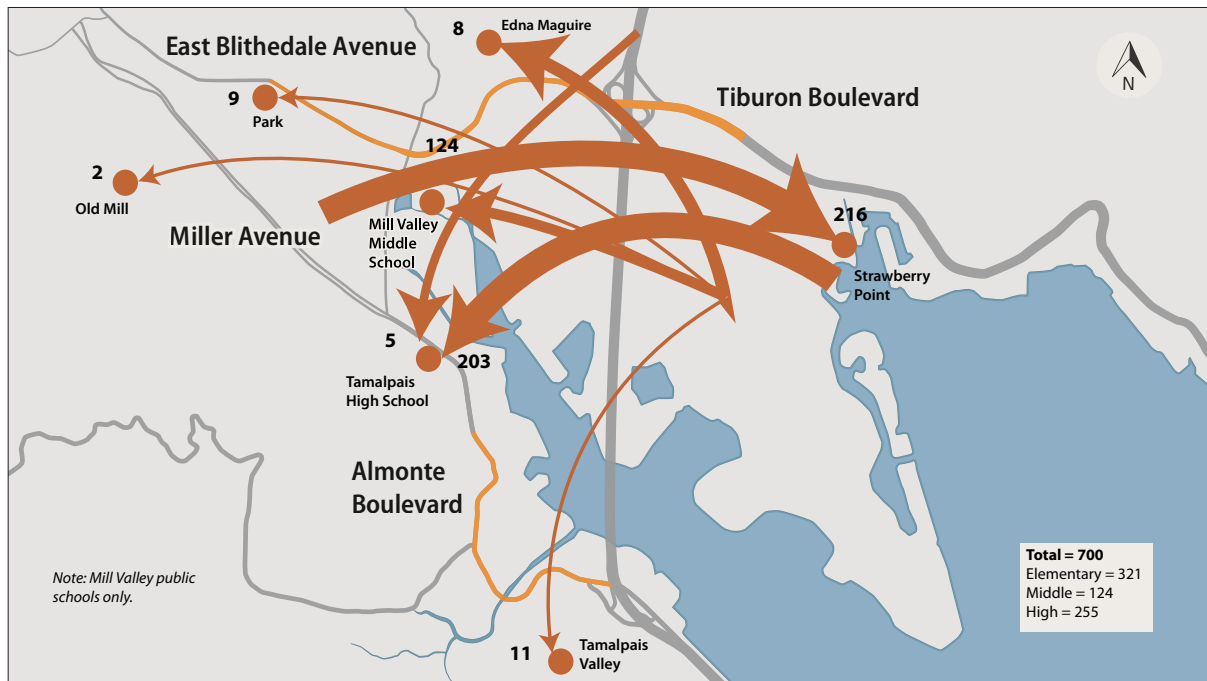
SCHOOL	STUDENT ORIGINS		TOTAL	CROSS-HIGHWAY
	West of Highway 101	East of Highway 101 <sup>1</sup>		
Edna Maguire Elementary School	521	83	604	14%
Old Mill Elementary School	331	2	333	1%
Park Elementary School	347	9	356	3%
Strawberry Point Elementary School	216	205	421	51%
Tamalpais Valley Elementary School	488	11	499	2%
Mill Valley Middle School	896	124	1,020	12%
Tamalpais High School	1,167	255	1,422	18%
<b>Total</b>	<b>3,966</b>	<b>689</b>	<b>4,655</b>	<b>15%</b>

Source: Marin Transit Coordinated Countywide School Transportation Study, 2015.

Notes: “##” represents cross-highway student trips.

<sup>1</sup>Tamalpais High School Students with origins north of Highway 101 were classified under “East of 101”

As shown in Table 4: Student Origins for Public School-Based Trips, about 700 students travel across Highway 101 on their journeys to and from school. These student trips are better depicted below.



<sup>1</sup> The student-origin data used in this study was based on enrollment numbers by zip-code. No information on student-specific home-origins was provided or included in the analysis.

The distance between these student homes and their schools is generally greater than two miles. The two gateway corridors present a geographical challenge, which deter young children from walking and bicycling to school along these paths. Data obtained from the Marin County Safe Routes to School (SR2S) program further supports these observations. Fewer than 20 middle school students with home-origins east of Highway 101 travel to or from school by walking or bicycling. Additionally, virtually no elementary students with home-origins on one side of the highway that attend school on the other side of the highway, travel to or from school by walking or bicycling.

A summary of the students who travel to and from school by family vehicle (i.e., one student per vehicle) is provided in Table 5: Student Travel Data – Commute to School by Family Vehicle.

**Table 5: Student Travel Data – Commute to School by Family Vehicle**

SCHOOL	COMMUTE TO SCHOOL BY FAMILY VEHICLE	
	2001 / 2002 School Year	2014 / 2015 School Year
Edna Maguire Elementary School	69%	59%
Old Mill Elementary School	77%	45%
Park Elementary School	52%	35%
Strawberry Point Elementary School <sup>1</sup>	N/A	60%
Tamalpais Valley Elementary School	77%	59%
Mill Valley Middle School	60%	34%
Tamalpais High School	67%	51%

Source: Marin County Safe Routes to School Program, 2015.

Note: <sup>1</sup> Strawberry Point Elementary School was established.

Mill Valley schools have had success in decreasing student trips by family vehicles. As shown in Table 5: Student Travel Data – Commute to School by Family Vehicle, all of the schools (with comparable data) have seen a reduction in the percentage of students who commute to school by family vehicle. This is in part due to the success of the Safe Routes to School programs of which the schools all participate.

Student travel data from the SR2S program was used to estimate the number of vehicular trips resulting from the 700 cross-highway student trips. An average vehicle occupancy of about 1.2 persons per vehicle was assumed for the student trips. It was estimated that about 50 percent of vehicles that drive across the highway for school drop-offs / pickups, would return to the other side of the highway within the same peak hour. Contributing to both inbound and outbound vehicular traffic along the gateway corridors. The resulting range of vehicular trips are summarized in Table 6: School-based Vehicle Trips.

**Table 6: School-based Vehicle Trips**

SCHOOL	CROSS-HIGHWAY TRIPS	
	Student-Trips	Vehicle-Trips
Elementary Schools	321	380 – 430
Middle Schools	124	110 – 160
High School	255	260 – 310
<b>Total</b>	<b>700</b>	<b>750 – 900</b>

Source: Parisi Transportation Consulting, 2016.

As shown, the 700 student trips generate between 750 to 900 vehicle trips travelling in both directions of the two study corridors.

### Vehicle Trip Purposes

To better understand why there has been an increase in traffic congestion, it was necessary to identify the purpose of other vehicle trips along the study corridors. This was accomplished through a windshield survey in which vehicles driving along East Blithedale Avenue were observed, and classified based on an assumed trip purpose.

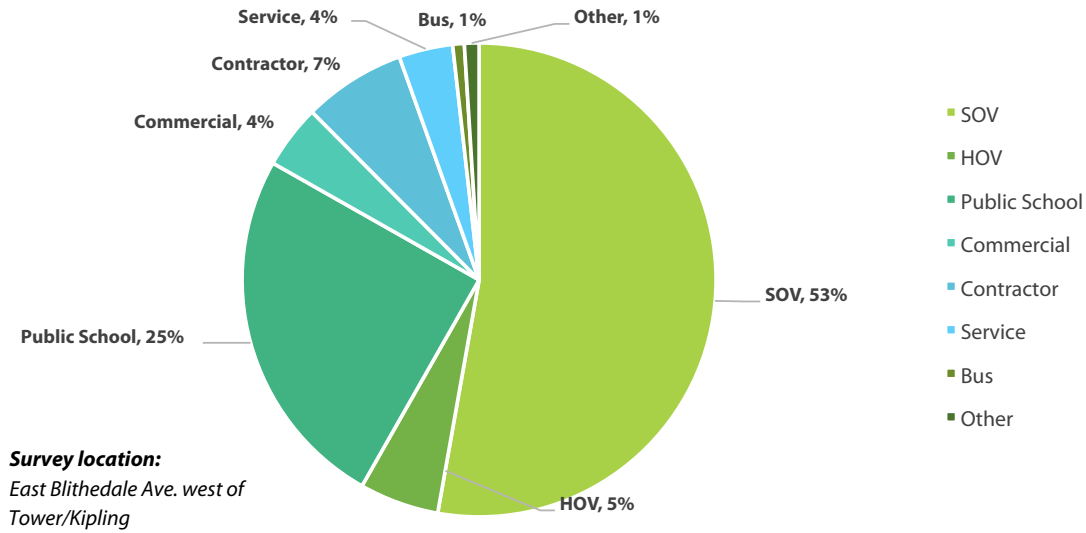
A surveyor was positioned along East Blithedale Avenue west of the intersection of Tower Drive / Kipling Drive, (approximately a quarter-mile northeast of the East Blithedale Avenue / Lomita Drive intersection). At the survey location, East Blithedale Avenue consists of a two-lane roadway (one lane in each direction). The surveyor was able to see vehicles travelling in both directions, and make observations about the vehicle type and occupancy. Data was collected during the morning (7:00 AM to 9:00 AM) and afternoon (3:00 PM to 6:00 PM) peak periods, during three mid-week days in June and September of 2015. The surveys were conducted on fair-weather days while neighborhood schools were in session. During this data collection period a total of about 12,000 vehicles were surveyed, representing an approximate 90% capture rate.

The surveyor based vehicular classifications on professional assumptions associated with the passing vehicle types (standard vehicle, sports utility vehicles, pick-up trucks, bus etc.) and vehicle occupants (single occupant, multiple occupants, school-age children etc.). The resulting vehicular classifications are summarized below:

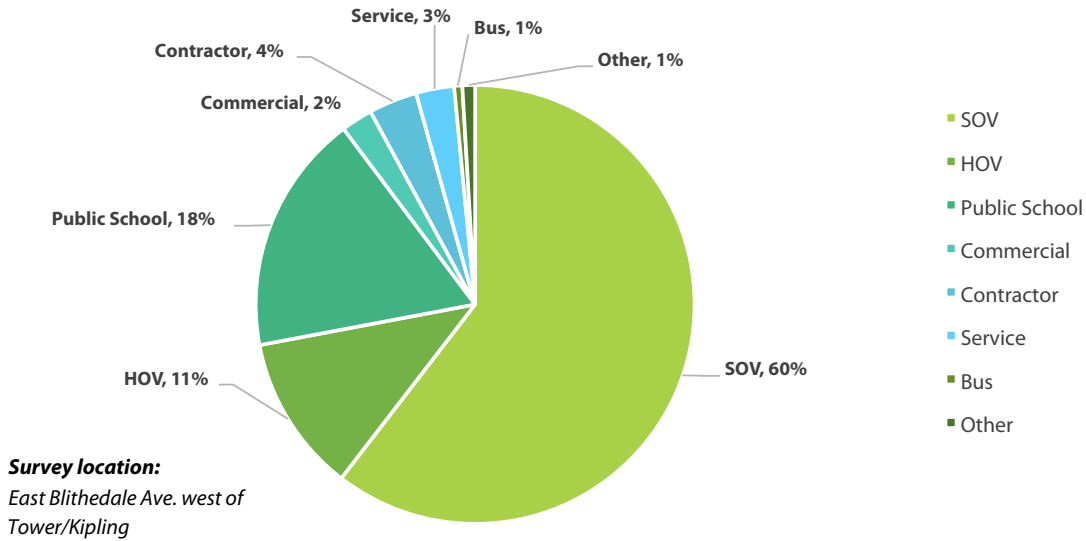
- Single Occupancy – Vehicle with only one occupant
- Multi-Occupancy – Vehicle with two or more adult occupants and non-school age children
- School – Vehicle with at least one school-age child
- Commercial – Utility vehicles, delivery trucks, customer service, etc.
- Contractor – Contracting work vehicles (construction, flooring, drywall, etc.)
- Service – Home maintenance (landscaping, maid service, etc.)
- Bus – Public transit vehicles and school buses
- Other – Emergency vehicles, taxi, motorcycle, etc.

The data collected was later tabulated and summarized to identify the breakdown of vehicular traffic along East Blithedale Avenue based on the aforementioned classifications during both the morning and afternoon peak periods. It should be noted that these percentages represent both inbound and outbound traffic and directional counts vary.

### Two-Way Vehicle Trip Classification - Weekday AM Peak Period



### Two-Way Vehicle Trip Classification - Weekday PM Peak Period



As shown in the two figures, majority of vehicles driving along East Blithedale Avenue during the morning and afternoon peak period consist of single-occupancy vehicles. Public-school related trips comprise of one-quarter of trips during the morning peak period, and about 18 percent of trips during the afternoon peak period.

Another big portion of the trips are made up of contractor (seven percent in the morning and four percent during the afternoon period) and service trips (four percent during the morning and afternoon periods).

## Additional Factors Considered by the Task Force

In addition to the data presented above, Task Force members were also presented with transportation-related data from other agencies operating in and around Mill Valley.

### Highway Improvements

Caltrans maintains and operates Highway 101, its on- and off-ramps, as well as Shoreline Highway (Highway 1), that feed into Mill Valley's roadway system. Joy Lee, a Senior Transportation Engineer with Caltrans, gave the Task Force a summary of the agency's road improvement projects in Mill Valley and the surrounding area. They include:

- Change the left-turn signal on Shoreline Highway at Tennessee Valley Road to improve traffic flow. The design of the project is set to finish in Summer 2016.
- Install traffic delineators on Shoreline Highway at the Arco gas station to prevent drivers from turning left into the station from westbound Shoreline Hwy. The project was installed in March 2016.
- Widen the northbound on-ramps to Highway 101 and provide ramp metering. The ramp metering project is currently seeking full funding, and implementation is expected in a couple of years.

In addition to the aforementioned projects, the Task Force was informed of two much larger, longer-term Caltrans projects:

- Addition of a third eastbound lane along the Richmond—San Rafael Bridge. This is a \$60 million project, which includes a two-way bikeway next to the westbound lanes. The project is expected to be constructed in the winter of 2017.
- Installation of a bicycle lane along Shoreline Highway in Tam Junction on the east side of the street and provision of a sidewalk on the west side of the street. The project would maintain existing vehicular travel lanes. The project has an estimated budget of \$2 million is currently undergoing design, and construction is expected to end by December 2018.

### School Buses

The Task Force received input from the neighboring communities of Tiburon and Belvedere, as well as Ross Valley on strategies they have employed to reduce traffic congestion in their community. Robert Betts, the Director of Planning and Operations for Marin Transit, and Tiburon Police Chief Mike Cronin spoke to the Task Force about these communities busing efforts.

Tiburon Police Chief Cronin discussed the school busing efforts in the Towns of Tiburon and Belvedere. The two towns are subsidizing a one-year pilot bus program that would reduce the price of a round-trip school bus by half. The passes would cost \$410 for the school year (\$205 for one-way service), with 20 routes to and from the Reed Union School District's three schools, serving approximately 1,500 students. The pilot program expanded on a previously existing program that was not widely used.

The program successfully sold its initial target of 1,200 bus passes and has been very popular with the school community. Since the program, travel times along westbound Tiburon Boulevard (from downtown to Trestle Glen) have been reduced by about 23 percent. Chief Cronin emphasized the importance of community outreach for the creation of a successful bus program.

The Ross Valley School District recently began a pilot school bus program for White Hill Middle School. Marin Transit transformed an existing Ross school bus program that used Marin Transit buses, into a program that used a smaller

fleet of yellow school buses. The new program requires parents to pay for and reserve a seat for their students to ride the bus. The program provides various seat reservation options. Parents have the option to buy school year-round passes, semester passes, or monthly passes. Parents can choose to buy either round-trip or one-way service passes. The cost of a round-trip school year pass is \$800 per year. From inception, the program has included a comprehensive outreach effort to encourage continued student participation. Marin Transit has been closely tracking ridership level and has data on individual student ridership. At the time of presentation about 65 percent of all students use the bus to get to school.

## Task Force Recommendations

Task Force members dedicated a portion of each meeting to discussion on the data they were presented with, and members offered potential strategies to address the identified contributors to traffic congestion. Based on the data presented, it was determined that the causes of the existing traffic congestion were multi-faceted. A high-level analysis of the data trends presented identified the three major contributors to traffic congestion; increase were an increase in vehicular demand, operational constraints, and limited capacity along Mill Valley roadways. Various elements of these issues have resulted in a significant increase in vehicular delays along the City's most congested roadways, particularly the two gateway corridors, East Blithedale Avenue and Almonte Boulevard / Shoreline Highway.

## Task Force Objective and Measurement

The increase in vehicular delay has resulted in significant increases in travel time along these corridors. A comparison of the 2014 / 2015 school year travel time with that of the 2012 / 2013 school year peak period, found that travel times have increased by 35 percent during the morning commute hours (7:00 AM to 10:00 AM) and 33 percent during afternoon commute hours (3:00 PM to 7:00 PM).

Upon recommendation from the City's traffic consultant, the Task Force adopted an objective focused on the reduction of travel times.

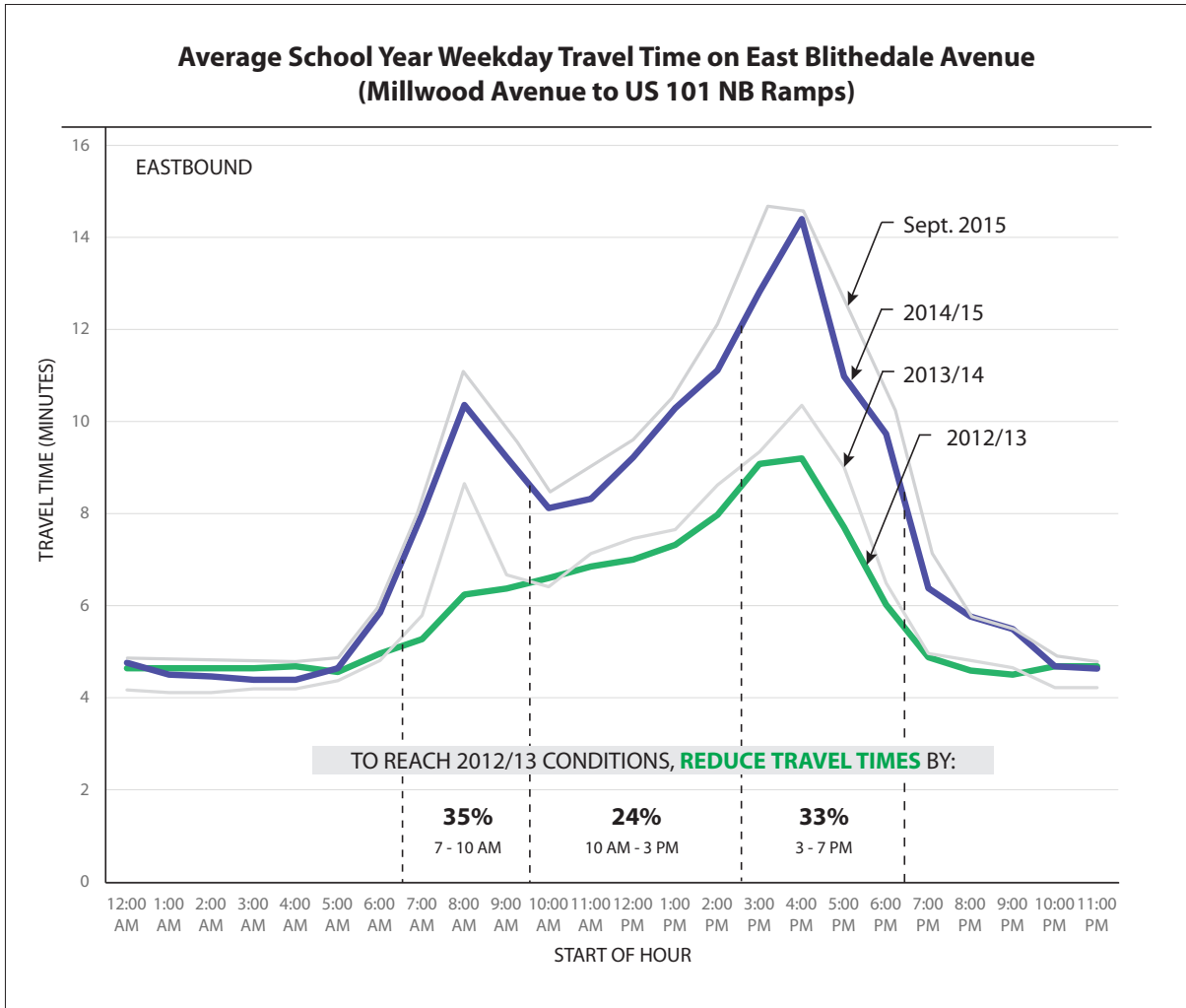
**Objective:** Restore vehicular travel times on East Blithedale Avenue and on Almonte Boulevard/ Shoreline Highway to 2012/2013 conditions.

It was decided that the City of Mill Valley would monitor travel times along a portion of East Blithedale Avenue and along a segment of Miller Avenue/Almonte Boulevard to evaluate progress toward the reduction of travel times. The Task Force adopted the following as a metric for the adopted objective:

**Measurement:** Average vehicular travel times during peak travel periods along eastbound and westbound East Blithedale Avenue between Millwood Street and Redwood Highway Frontage Road and along Almonte Boulevard/Shoreline Highway between Miller Avenue and Tennessee Valley Road.

For example, compared to 2014/2015 school year conditions reduce average vehicular travel times along eastbound East Blithedale Avenue during weekdays by 35% between 7-10 a.m., by 24% between 10 a.m.-3 p.m., and 33% between 3-7 p.m.

The Task Force objective and metric are illustrated in the graph below.



The task force metric and objective would be applied to reduction in travel times for both weekday and weekend traffic along the two corridors.







### Promote and support expansion of Safe Routes to School (SR2S) program (D21)

TAM's SR2S program has substantially reduced vehicle-trips over the past 10 years. Further expansion could maintain and extend success.

- City of Mill Valley will continue to partner with the County of Marin and Transportation Authority of Marin's Safe Routes to School Program, in 2016 focus has been on development of Suggested Routes to School Maps and SchoolPool carpool encouragement.

### Stagger/coordinate school bell times (D3)

Staggering the time when school-based trips are made could reduce peak hour vehicle trips. This measure could be effective if combined with initiating a yellow school bus program (see D1). Potential strategies to be developed by MVSD.

- Bell start and end times will be adjusted at some Mill Valley School District schools for 2016/17 as part of the pilot yellow school bus program to enable efficient and effective school bus routing.
- See Measure "D1"

### Develop a construction-traffic reduction program (D9)

Develop a city-wide construction traffic reduction program, considering hours of operations, potential alternative travel routes, and potential for increased construction costs, etc.

- City of Mill Valley to initiate development of a Construction Traffic Reduction Program.
- Construction Traffic Reduction Program to be completed by Fall 2016.

### Pilot a citywide media campaign focused on reducing traffic trips (D18)

Develop a citywide education and encouragement campaign to encourage reducing vehicle trips.

- City of Mill Valley to pilot a citywide traffic awareness campaign by Fall 2016 to; encourage vehicle trip reduction, increase "off-peak travel", and promote the use of non-auto oriented travel modes.
- Review similar efforts and results of the Town of Fairfax's "Reduce by 2 Campaign"

### Install Class II bicycle lanes and fill sidewalk gaps along East Blithedale Ave. through US 101 interchange (D11)

Conceptual plans have been developed with Caltrans' support. Initial construction estimate is \$1.5 million. Measures could fill key gap in east-west pedestrian and bicycle connectivity and enable converting roadway shoulders on East Blithedale Ave. and Tiburon Blvd. to bike lanes.

- County of Marin, Transportation Authority of Marin, and City of Mill Valley to seek grant funding opportunities, potentially including Active Transportation Program grants.

### Install Class II bicycle lanes on Shoreline Highway and along missing gaps on Almonte Blvd. (D14)

Project planned by the Transportation Authority of Marin, and funded for construction in 2016/17, will install bike lanes on both sides of Shoreline Highway between Tennessee Valley Road and Flamingo Road.

- Transportation Authority of Marin is coordinating this project with Caltrans.
- Project scheduled for implementation in 2016/17.

### **Coordinate public transit services with Marin Transit and Golden Gate Transit (D6)**

City to regularly coordinate with Marin Transit and Golden Gate Transit on bus routes, bus frequencies, and stop amenities in order to increase public transit use.

- City of Mill Valley to continue frequent coordination planning with Marin Transit and Golden Gate Transit.

### **Implement Muir Woods Visitor Access Planning (D8)**

The National Park Service, California State Parks, and County of Marin are studying means to manage visitor access to Muir Woods. Current plans include enhancements to the reservation and shuttle system and transportation and access site improvements, including parking.

- National Park Service and County of Marin recently limited parking along Muir Woods Road; this parking will be eliminated altogether by 2022.
- Advance reservations will be required to drive or take a bus to Muir Woods starting in 2017.

### **Install sidewalk along Almonte Blvd. from Shoreline Highway to Tamalpais High School (D14)**

Project would entail providing a separated sidewalk along Almonte Boulevard to serve pedestrians, including students walking to and from Tam High School.

- Transportation Authority of Marin's Safe Routes to School Program, in partnership with County of Marin, to initiate conceptual planning in 2016/17 school year.

### **Build a pedestrian / bicycle overcrossing of US 101 and Redwood Hwy. aligned with Seminary Dr. and Hamilton Dr. (D12)**

Project would require identifying alternative locations for overcrossing, environmental analysis, and funding. Acquisition of private property could be required for ADA-compliant ramps for overcrossing. Would serve many cross-highway walking and bicycle trips.

- There are currently no ongoing planning efforts related to this potential measure. Stakeholders would include City of Mill Valley, County of Marin, and Caltrans.

### **Conduct regularly-scheduled City Council and School Board meetings (D4)**

Conduct annual Mill Valley City Council and Mill Valley School District meetings focused on school transportation. Include representatives from Tamalpais Union High School District, as well as from private schools located in, or adjacent, to Mill Valley.

- Discuss joint traffic reduction efforts in the Agenda of the Annual Meeting of the Mill Valley City Council and Mill Valley School Board of Trustees
- Evaluate reduction efforts in City Council meetings with the TAM Board of Trustees and in City Manager meetings with Tamalpais High School principal.

### Initiate and promote after-school carpooling program (D5)

Work with after-school programs and ride-matching vendors to develop a ride-matching program.

- There are currently no ongoing planning efforts related to this potential measure. Stakeholders would include City of Mill Valley, County of Marin, Mill Valley School District, and Transportation Authority of Marin (Safe Routes to School program).

### Initiate a citywide shuttle bus program (D7)

Study the feasibility of a citywide shuttle bus program, potentially circulating along East Blithedale Ave., Miller Ave., and Camino Alto, and potentially serving students and non-students. Consider serving Strawberry.

- Based upon the performance and lessons learned by the pilot yellow school bus program (see “D1”), the City of Mill Valley will partner with the County of Marin and Marin Transit to assess the feasibility of a citywide shuttle bus program.
- Consider forming shuttle bus task force in Fall 2017.

### Expand City communication tools to better inform public about traffic conditions (D1)

City has created a dedicated, multi-faceted Traffic and Road Conditions webpage and encourages community members to sign up for communication alerts via Twitter, Nextdoor and email.

- City of Mill Valley will continue to maintain its multiple communication tools to provide up-to-date information on local traffic and road conditions.

## Measures to Improve Traffic Operations

### Review and continuously update traffic signal coordination and timings along East Blithedale Ave./ Tiburon Blvd. (O1)

Conduct weekday and weekend traffic counts every two years, update signal timing plans, and coordinate with County and Caltrans. Focus initially on East Blithedale Avenue at interchange.

- City of Mill Valley is currently coordinating with Caltrans and the County of Marin to evaluate potential minor changes to signal timings; to be implemented in Spring 2016.
- City of Mill Valley, County of Marin and Caltrans will develop a work plan to conduct new traffic counts potentially implement corridor-wide signal changes in 2017.

### Provide operational improvements at Shoreline Highway / Almonte Boulevard intersection (O14)

Explore potential to revert signal to three-phase operations; consider other phasing and/or timing changes.

- Caltrans to evaluate the feasibility of modifying traffic signal phases to reduce traffic congestion.
- Caltrans to study alternatives in Fall 2016.

### Implement and monitor metering of US 101 on-ramps (O9)

Metering on-ramps serving congested highways can reduce highway congestion and spillbacks from ramps to arterial roadways through effective monitoring.

- Physical improvements and metering US 101's northbound on-ramps through South and Central Marin to be implemented by Caltrans, pending availability of funding.
- Final design and construction of southbound on-ramp metering to be implemented in the longer-range.

### Implement and maintain an Adaptive Traffic Control System (O2)

Study feasibility of implementing an Adaptive Traffic Control System. System would require development of numerous timing plans and continuous maintenance. Likely to improve off-peak travel conditions.

- City of Mill Valley to seek funding in 2016 for ATCS feasibility study.
- If study funds are awarded, City of Mill Valley to coordinate with County of Marin and Caltrans to conduct ATCS feasibility study.

### Prohibit southbound left-turns from Shoreline Highway into eastside businesses near Almonte Blvd. (O12)

Evaluate feasibility of prohibiting left-turns from southbound Shoreline Highway into land uses just north of Almonte Blvd. (e.g., potter's studio, surf shop, coffee shop, equipment rental) to reduce southbound back-ups.

- Pending evaluation of northbound left-turn restrictions (into Arco), implemented in March 2016, County of Marin to consider potential merits and effects associated with prohibiting southbound left-turns.

### Prohibit westbound-to-eastbound U-turns at East Blithedale Ave./Camino Alto to enable northbound right-turn arrow (O5)

City prohibited U-turns on a trail in Fall 2015. City is monitoring access and circulation effects.

- City of Mill Valley implemented full-time U-turn prohibition on an interim basis in Fall 2015.
- Pending evaluation of interim measure in Spring 2016, City of Mill Valley to assess if U-turn prohibition should be permanent.

### Stripe East Blithedale Ave. between Nelson Ave. and Amicita Ave. for two eastbound travel lanes (O13)

If feasible, extend two eastbound lanes one additional block to the west to provide increased capacity for the East Blithedale Ave./Camino Alto signalized intersection.

- City of Mill Valley to conduct measurements, operational analysis and assess feasibility of restriping eastbound East Blithedale Avenue between Amicita and Nelson Avenues to provide two through travel lanes.
- Study to be completed in Summer 2016.

### **Prohibit right turns on red from northbound Camino Alto to eastbound East Blithedale Ave. during peak traffic periods (study) (O6)**

Study allowing right-turns on red to decrease overall motorist delays at the intersection. Prohibiting them should be considered along with adding capacity to the intersection, which would require repurposing or adding turning lane(s).

- City of Mill Valley to conduct study on right-turn prohibitions and other potential low-cost capacity enhancements at East Blithedale Avenue/Camino Alto intersection.
- Study to be completed in Summer 2016

### **Prohibit eastbound East Blithedale Ave. traffic from using left-turn lane at Meadow Dr. to bypass traffic (O4)**

City installed raised pavement markings to discourage through traffic traveling on the left-turn lane; raised physical measure may be required to prohibit through movements, but cannot effect emergency response time.

- City of Mill Valley to monitor performance of pavement markings installed in Fall 2015; report findings in Spring 2016.

## **Measures to Increase Vehicular Capacity**

### **Reconfigure the US 101/East Blithedale Ave. interchange in incremental phases (C2)**

Initiate update of Caltrans' PSR, complete environmental analysis, obtain funding and incrementally rebuild the interchange. Initial projects should focus on reducing travel delays along East Blithedale Avenue.

- City of Mill Valley submitted a request to the Transportation Authority of Marin to include a PSR update in the Plan Bay Area 2040 plan (Regional Transportation Plan). The request has been forward to the Metropolitan Transportation Commission.
- A PSR update would likely start no earlier than 2017.

### **Add turning lanes or provide a modern roundabout at Shoreline Highway/Almonte Blvd. (C10)**

The Shoreline Highway/Almonte Blvd. intersection has a limited number of turning lanes and operates with four traffic signal phases. Major capacity-increasing improvements would require property acquisition. Alternatives and environmental analysis would be required.

- There are currently no ongoing planning efforts related to this potential measure. Stakeholders would include County of Marin and Caltrans.

### **Install modern roundabouts at East Blithedale Avenue's intersections with Camino Alto and with Lomita Dr./Roque Moraes Dr. (Study) (C5)**

Conduct feasibility study. Modern roundabouts typically provide higher traffic-carrying capacity than signalized intersections, as well as decreased collision and severity rates. Carefully designed roundabouts can safely serve pedestrians and bicyclists.

- City of Mill Valley to conduct initial "screening level" study in Fall 2016 to assess potential footprint needs for modern roundabouts. Based on study results, City may seek funding for detailed roundabout analysis and design evaluation.

### **Convert shoulder on the lower deck (eastbound) of the Richmond-San Rafael Bridge to a third vehicular travel lane (C12)**

Caltrans and MTC are currently designing this project to convert the bridge's eastbound shoulder to a third travel lane. The project requires substantial highway improvements in advance of and downstream of the bridge in Marin and Contra Costa Counties.

- Caltrans and Metropolitan Transportation Commission are preparing designs and an environmental evaluation for opening a third eastbound lane.
- Scheduled opening for the third lane is in 2018.

### **Add dedicated lane on East Blithedale Ave. to serve on-ramp to southbound US 101 (C3)**

Study the feasibility of repurposing East Blithedale Ave.'s eastbound shoulder between Kipling Dr. and the US 101 southbound diagonal on-ramp as a short third lane to directly serve the ramp.

- Transportation Authority of Marin, in partnership with City of Mill Valley, County of Marin, and Caltrans, are preparing preliminary engineering plans to assess the feasibility of using the eastbound shoulder as a travel lane to the southbound US 101 ramp.
- Feasibility study to be completed by Summer 2016.

### **Further modify Shoreline Highway/Tennessee Valley Rd. traffic signal (C9)**

Caltrans and the County of Marin have increased Shoreline Highway traffic capacity by prohibiting left-turns from Tennessee Valley Road and modifying the traffic signal phasing. Caltrans plans on further timing changes this Fall.

- Caltrans is finalizing construction plans to modify the traffic signal.
- Construction plans to be bid in Spring 2016; installation to occur in Summer 2016.

## Looking Ahead

The City of Mill Valley, in conjunction with other jurisdictions, has already initiated action on several of the Task Force's recommended strategies:

- Initiation of a yellow school bus program (D2)
- Staggering/coordinating school bell times (D3)
- Reviewing and updating traffic signal coordination along East Blithedale Avenue (O1)
- Prohibiting U-turns at East Blithedale Avenue/Camino Alto (O5)
- Installing interim measures at East Blithedale Avenue/Meadow Drive (O4)
- Study feasibility of converting shoulder to serve on-ramp to southbound Highway 101 (C3)
- Further modifying the Shoreline Highway/Tennessee Valley Road traffic signal (C9)

Mill Valley will lead the assessment and/or implementation of several Task Force recommendations, but will also rely on partner agencies (e.g., County of Marin, Caltrans, Transportation Authority of Marin, Mill Valley School District ) to follow through on measures within their jurisdictional limits. Some of the recommended strategies will require jurisdictional coordination, while others will depend on citizen input.

Mill Valley will monitor travel speeds along East Blithedale Avenue and along Almonte Boulevard/Shoreline Highway to compare with the Task Force's objective of restoring travel times to 2012/2013 conditions. The City will provide an annual "report card" summarizing travel time changes along both corridors, along with descriptions of any Task Force measures that were implemented.

POTENTIAL MEASURES TO REDUCE VEHICULAR DEMAND  
RECOMMENDED FOR FURTHER ACTION

POTENTIAL MEASURE TO REDUCE VEHICULAR DEMAND	POTENTIAL TO REDUCE TRAVEL TIME	RELATIVE COST	SHORT, MEDIUM OR LONG-TERM	NOTES
D2 Initiate a yellow school bus program	High	\$\$-\$\$\$	Medium	Consider yellow school bus program initially focused on cross-highway and gateway corridor trips, e.g., serving Edna Maguire, Strawberry Point Elementary, Tam Valley Schools and Mill Valley Middle School.
D21 Promote and support expansion of Safe Routes to School (SR2S) program	Medium-High	\$\$	Medium	TAM's SR2S program as substantially reduced vehicle-trips over the past 10 years. Further expansion could maintain and extend success.
D3 Stagger/coordinate school bell times	Medium	\$	Short	Staggering the time when school-based trips are made could reduce peak hour vehicle trips. Could be effective if combined with initiating a yellow school bus program (see D2). Potential strategies to be developed by MVSD.
D6 Coordinate public transit services with Marin Transit and Golden Gate Transit	Medium	\$\$	Medium	City to regularly coordinate with Marin Transit and Golden Gate Transit on bus routes, bus frequencies, and stop amenities in order to increase public transit use.
D8 Implement Muir Woods Visitor Access Planning	Medium	\$\$	Medium	The National Park Service, California State Parks, and County of Marin are studying means to manage visitor access to Muir Woods. Current plans include enhancements to the reservation and shuttle system and transportation and access site improvements, including parking.
D9 Develop a construction-traffic reduction program	Medium	\$	Short	Would need to consider hours of operations, potential alternative travel routes, potential for increased construction costs, etc.
D11 Install Class II bicycle lanes and fill sidewalk gaps along East Blithedale Ave. through US 101 interchange	Medium	\$\$	Short	Conceptual plans have been developed with Caltrans' support. Initial construction estimate is \$1.5 million. Measures could fill key gap in east-west pedestrian and bicycle connectivity and enable converting roadway shoulders on East Blithedale Ave. and Tiburon Blvd. to bike lanes.
D12 Build a ped/bike overcrossing of US 101 and Redwood Hwy. aligned with Seminary Dr. and Hamilton Dr.	Medium	\$\$\$	Long	Project would require identifying alternative locations for overcrossing, environmental analysis, and funding. Acquisition of private property could be required for ADA-compliant ramps for overcrossing. Would serve many cross-highway walking and bicycle trips.
D14 Install sidewalk along Almonte Blvd. from Shoreline Highway to Tamalpais High School	Medium	\$\$	Medium	Project would entail providing a separated sidewalk along Almonte Boulevard to serve pedestrians, including students walking to and from Tam High School.
D15 Install Class II bicycle lanes on Shoreline Highway and along missing gaps on Almonte Blvd.	Medium	\$\$	Short	Project planned by the Transportation Authority of Marin, and funded for construction in 2016/17, will install bike lanes on both sides of Shoreline Highway between Tennessee Valley Road and Flamingo Road.
D18 Initiate a citywide media campaign focused on reducing traffic trips	Medium	\$\$	Short	Develop a citywide education and encouragement campaign to encourage reducing vehicle trips.
D4 Conduct regularly-scheduled City Council and School Board meetings	Low-Medium	\$	Short	Conduct annual Mill Valley City Council and Mill Valley School District meetings focused on school transportation. Include representatives from Tamalpais Union High School District, as well as from private schools located in or adjacent to Mill Valley.
D5 Initiate and promote after-school carpooling program	Low-Medium	\$\$	Medium	Work with after-school programs and ride-matching vendors to develop a ride-matching program.
D7 Initiate a citywide shuttle bus program	Low-Medium	\$\$\$	Medium	Study the feasibility of a citywide shuttle bus program, potentially circulating along East Blithedale Ave., Miller Ave., and Camino Alto, and potentially serving students and non-students. Consider serving Strawberry.
D1 Expand City communication tools to better inform public about traffic conditions	Low	\$	Short	City has created a dedicated, multi-faceted Traffic and Road Conditions webpage and encourages community members to sign up for communication alerts via Twitter, Nextdoor and email.



**POTENTIAL MEASURES TO REDUCE VEHICULAR DEMAND**  
**NOT RECOMMENDED FOR FURTHER ACTION AT THIS TIME**

POTENTIAL MEASURE TO REDUCE VEHICULAR DEMAND	POTENTIAL TO REDUCE TRAVEL TIME	RELATIVE COST	SHORT, MEDIUM OR LONG-TERM	NOTES
D16 Plan for autonomous vehicles and other technology	Medium	\$\$	Long	Autonomous (self-driving) vehicles will increase roadway efficiency and reduce vehicle trips. Mill Valley should plan ahead for integrating this technology into its transportation system.
D17 Increase capacity of neighborhood schools, i.e., Old Mill and Park	Medium	\$\$\$\$	Long	Expanding the size of Old Mill and Park Schools to enable higher enrollment would require significant reconstruction, if allowable.
D19 Open the Alto Tunnel to provide a flat pedestrian and bicycle path between Mill Valley and Corte Madera	Low-Medium	\$\$\$\$	Long	Consider re-opening the 2,200-foot long Alto Tunnel to accommodate pedestrians and bicyclists along a level route (as an alternative to the more challenging Camino Alto and Horse Hill routes).
D10 Extend US 101's carpool hours, e.g., start at 3:00 p.m. instead of 4:30 p.m.	Low	\$\$	Medium	Requires Caltrans approval, but could potentially increase duration of highway congestion.
D13 Build a ped/bike overcrossing of East Blithedale Ave. at Lomita Dr./Roque Moraes Dr.	Low	\$\$\$	Medium	Project would require alternative identification, environmental analysis (including visual and property impacts), and funding. If at-grade crossing were closed and users used overcrossing, vehicle delays would be lessened at intersection, but not at other upstream/downstream locations.
D20 Eliminate parking on East Blithedale Ave. between Park School and Camino Alto and provide a bicycle lane on both sides	Low	\$	Medium	Prohibiting parking along East Blithedale Ave. between Elm Avenue and Camino Alto would displace on-street parking along the north side of the roadway, potentially enabling providing of narrow four-foot wide bicycle lanes.

POTENTIAL MEASURES TO REDUCE VEHICULAR DEMAND  
RECOMMENDED FOR FURTHER ACTION

	POTENTIAL MEASURE TO IMPROVE TRAFFIC OPERATIONS	POTENTIAL TO REDUCE TRAVEL TIME	RELATIVE COST	SHORT, MEDIUM OR LONG-TERM	NOTES
O1	Review and continuously update traffic signal coordination and timings along East Blithedale Ave./Tiburon Blvd.	Medium	\$\$	Short	Conduct weekday and weekend traffic counts on a regular basis, update signal timing plans, and coordinate with County and Caltrans. Focus initially on East Blithedale Avenue at interchange.
O2	Implement and maintain an Adaptive Traffic Control System	Medium	\$\$\$	Medium	Study feasibility of implementing an Adaptive Traffic Control System. System would require development of numerous timing plans and continuous maintenance. Likely to improve off-peak travel conditions.
O9	Implement and monitor metering of US 101 on-ramps	Medium	\$\$\$	Medium	Metering on-ramps serving congested highways can reduce highway congestion and spillbacks from ramps to arterial roadways through effective monitoring.
O14	Provide operational improvements at Shoreline Highway / Almonte Boulevard intersection	Medium	\$\$	Medium	Explore potential to revert signal to 3-phase operations; consider other phasing and/or timing changes.
O12	Prohibit southbound left-turns from Shoreline Highway into eastside businesses near Almonte Blvd.	Low-Medium	\$	Short	Evaluate feasibility of prohibiting left-turns from southbound Shoreline Highway into land uses just north of Almonte Blvd. (e.g., potter's studio, surf shop, coffee shop, equipment rental) to reduce southbound back-ups.
O4	Prohibit eastbound East Blithedale Ave. traffic from using left-turn lane at Meadow Dr. to bypass traffic	Low	\$\$	Medium	City installed raised pavement markings to discourage through traffic traveling through left-turn lane; raised physical measure may be required to prohibit through movements, but cannot effect emergency response time.
O5	Prohibit westbound-to-eastbound U-turns at East Blithedale Ave./Camino Alto to enable northbound right-turn arrow	Low	\$	Short	City prohibited U-turns on a 24/7 basis. City is monitoring access and circulation effects.
O6	Prohibit right turns on red from northbound Camino Alto to eastbound East Blithedale Ave. during peak traffic periods (study)	Low	\$\$	Short	Study allowing right-turns on red to decrease overall motorist delays at the intersection. Prohibiting them should be considered along with adding capacity to the intersection, which would require repurposing or adding turning lane(s).
O13	Stripe East Blithedale Ave. between Nelson Ave. and Amicita Ave. for two eastbound travel lanes	Low	\$	Short	If feasible (depending upon available roadway width), extend two eastbound lanes one additional block to the west to provide increased capacity for the East Blithedale Ave./Camino Alto signalized intersection.

**POTENTIAL MEASURES TO REDUCE VEHICULAR DEMAND**  
**NOT RECOMMENDED FOR FURTHER ACTION AT THIS TIME**

	POTENTIAL MEASURE TO IMPROVE TRAFFIC OPERATIONS	POTENTIAL TO REDUCE TRAVEL TIME	RELATIVE COST	SHORT, MEDIUM OR LONG-TERM	NOTES
O10	Convert Hamilton Dr. from one-way northbound to two-way roadway	Low-Medium	\$\$	Medium	In 1987 the Mill Valley City Council voted to maintain Hamilton Dr. as a one-way roadway in the vicinity of the Public Safety Building. In 2015 the City Council reaffirmed this direction based on requests from Enchanted Knolls, Eucalyptus Knolls, and Shelter Ridge residents.
O11	Convert Hamilton Dr. from one-way northbound to one-way southbound	Low-Medium	\$\$	Medium	Study the potential benefits and impacts of converting Hamilton Dr. from one-way northbound to one-way southbound in the vicinity of the Public Safety Building.
O3	Stripe eastbound East Blithedale Ave. to separate lanes to northbound US 101 to east of interchange	Low	\$	Short	Provide pavement markings and signing along eastbound East Blithedale Ave. from east of Tower Dr. / Kipling Dr. to US 101 northbound loop on-ramp and provide effective enforcement to discourage last-minute lane changes.
O7	Provide two right-turn lanes on northbound Camino Alto approach at East Blithedale Ave.	Low	\$\$	Short	Provision of two right-turn lanes would require combining the left-turn and through movements into a single lane, requiring northbound and southbound traffic to go at different times. This would increase overall intersection delay and degrade multimodal operations.
O8	Provide large sign at westbound East Blithedale Ave. at Camino Alto directing through motorists to Miller Ave.	Low	\$	Short	Passive sign guidance could be effective for unfamiliar motorists traveling to Mill Valley on an infrequent basis. Placement and size of sign may pose challenges.

POTENTIAL MEASURES TO REDUCE VEHICULAR DEMAND  
RECOMMENDED FOR FURTHER ACTION

	POTENTIAL MEASURE TO INCREASE VEHICULAR CAPACITY	POTENTIAL TO REDUCE TRAVEL TIME	RELATIVE COST	SHORT, MEDIUM OR LONG-TERM	NOTES
C2	Reconfigure the US 101/East Blithedale Ave. interchange in incremental phases	High	\$\$\$	Medium-Long	Initiate update of Caltrans' PSR, complete environmental analysis, obtain funding and incrementally rebuild the interchange. Initial projects should focus on reducing travel delays along East Blithedale Avenue.
C10	Add turning lanes or provide a modern roundabout at Shoreline Highway/Almonte Blvd.	High	\$\$\$	Long	The Shoreline Highway/Almonte Blvd. intersection has a limited number of turning lanes and operates with four traffic signal phases. Major capacity-increasing improvements would require property acquisition. Alternatives and environmental analysis would be required.
C5	Install modern roundabouts at East Blithedale Avenue's intersections with Camino Alto and with Lomita Dr./Roque Moraes Dr. (Study)	Medium	\$\$	Medium	Conduct feasibility study. Modern roundabouts typically provide higher traffic-carrying capacity than signalized intersections, as well as decreased collision and severity rates. Carefully designed roundabouts can safely serve pedestrians and bicyclists.
C12	Convert shoulder on the lower deck (eastbound) of the Richmond-San Rafael Bridge to a third vehicular travel lane	Medium	\$\$\$\$	Medium	Caltrans and MTC are currently designing this project to convert the bridge's eastbound shoulder to a third travel lane. The project requires substantial highway improvements in advance of and downstream of the bridge in Marin and Contra Costa Counties.
C3	Add dedicated lane on East Blithedale Ave. to serve on-ramp to southbound US 101	Low-Medium	\$\$	Medium	Study the feasibility of repurposing East Blithedale Ave.'s eastbound shoulder between Kipling Dr. and the US 101 southbound diagonal on-ramp as a short third lane to directly serve the ramp.
C9	Further modify Shoreline Highway/Tennessee Valley Rd. traffic signal	Low	\$	Short	Caltrans and the County of Marin have increased Shoreline Highway traffic capacity by prohibiting left-turns from Tennessee Valley Rd. and modifying the traffic signal phasing. Caltrans plans on further timing changes this Fall.

**POTENTIAL MEASURES TO REDUCE VEHICULAR DEMAND**  
**NOT RECOMMENDED FOR FURTHER ACTION AT THIS TIME**

	POTENTIAL MEASURE TO INCREASE VEHICULAR CAPACITY	POTENTIAL TO REDUCE TRAVEL TIME	RELATIVE COST	SHORT, MEDIUM OR LONG-TERM	NOTES
C1	Reconstruct the US 101/East Blithedale Ave. interchange completely	High	\$\$\$\$	Long	Initiate update of Caltrans' 2004 Project Study Report (PSR), complete environmental analysis, obtain funding and reconstruct interchange. Estimated cost is at least \$165,000,000.
C11	Construct a bypass route to Shoreline Highway using previous Caltrans' right-of-way east of Shoreline Highway	Medium-High	\$\$\$\$	Long	Providing a new connection between Shoreline Highway and Almonte Blvd. would require extensive alternatives and environmental analysis, and would likely need to demonstrate that widening Shoreline Highway would not meet similar objectives.
C13	Improve northbound traffic operations along US 101 between Tamalpais Dr. and Sir Francis Drake Blvd. with auxiliary lane and ramp improvements	Medium	\$\$\$\$	Long	Potential enhancements to minimize northbound bottlenecks on US 101 at Tamalpais Dr. and near Industrial Way were recently evaluated in the Greenbrae-Twin Cities Corridor Study. An RTP application was recently submitted to TAM/MTC to improve northbound conditions.
C4	Construct two vehicle lanes in each direction on East Blithedale Ave. between Lomita Dr./Roque Moraes Dr. and Meadow Dr.	Low-Medium	\$\$\$\$	Long	Project would require environmental analysis for four lanes, plus bike lanes and sidewalk. Culverting creek and/or hillside work required. Traffic constraints are generally located at upstream and downstream intersections.
C6	Add turning lanes to East Blithedale Ave. between Downtown and Camino Alto	Low-Medium	\$\$\$\$	Long	Adding left-turn lanes on East Blithedale Ave. would require roadway widening (the existing 27-28 foot roadway is too narrow to add turning lanes, even with parking removal). Adding turning lanes would expedite traffic flow west of Camino Alto, but not to the east.
C7	Extend Sycamore Ave. between the Mill Valley Middle School and Hamilton Dr. for general traffic use	Low-Medium	\$\$\$	Long	Extending Sycamore Ave. has been voted down twice by the Mill Valley City Council and defeated by public referendum. Extending the roadway could provide the most relief to East Blithedale Ave. if Hamilton Dr. were two-way.
C8	Install a traffic signal at Miller Ave./La Goma St.-Montford Ave. to minimize Miller Ave. delays and reduce cut-through traffic	Low-Medium	\$\$	Medium	A traffic signal would reduce confusion for motorists (e.g., right-of-way priority) as they navigate the intersection from one of its 10 approach lanes. It would reduce delays along Miller Ave., decrease potential conflicts for all users, and reduce neighborhood cut-through traffic.
C14	Extend Sycamore Ave. between the Mill Valley Middle School and Hamilton Dr. for emergency vehicle use only	Low	\$\$\$	Long	See C7. This proposal would limit the extension's use to emergency vehicles only.

