EXHIBIT A

Tri-Valley Transportation Council

2020 Nexus Fee Update Study

TVTC MEMBER AGENCIES

IN ASSOCIATION WITH

AUGUST 2021 | FINAL

Prepared By:

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CONTENTS

TABLES

FIGURES

ACRONYM LIST

ACTC	Alameda County Transportation Commission
ATP	Active Transportation Program
BART	Bay Area Rapid Transit
BRT	Bus Rapid Transit
CCTA	Contra Costa Transportation Authority
CHP	California Highway Patrol
CMF	Crash Modification Factors
CPM	County Program Manager
EIR	Environmental Impact Report
FHWA	Federal Highway Authority
HOV	High Occupancy Vehicle
HSIP	Highway Safety Improvement Program
I-580	Interstate 580
I-680	Interstate 680
ITE	Institute of Transportation Engineers
JEPA	Joint Exercise of Powers Agreement
JPA	Joint Power Agreement
LAVTA	Livermore Amador Valley Transit Authority
LRSM	Local Roadway Safety Manual
MTC	Metropolitan Transportation Commission
OBAG	One Bay Area Grant Program
OTS	Office of Traffic Safety
PM	Post Mile
PSR	Project Study Report
PSR-PDS	Project Study Report-Project Development Support
RRS	Routes of Regional Significance
RTP	Regional Transportation Plan
SAV	Shared Autonomous Vehicle
SB 1	Senate Bill 1
SEP	Strategic Expenditure Plan
SR 84	State Route 84
STIP	State Transportation Improvement Program
SWAT	Southwest Area Transportation Committee
TAC	Technical Advisory Committee
TAZ	Traffic Analysis Zone
TBD	To Be Determined
TDM	Travel Demand Model

TEP	Transportation Expenditure Plan
TFCA	Transportation Fund for Clean Air
TIF	Transportation Improvement Fee
TRANSPAC	Transportation Partnership and Cooperation
TSP	Transit Signal Priority
TVTC	Tri-Valley Transportation Council
TVTDF	Tri-Valley Transportation Development Fee
TVTP/AP	Tri-Valley Transportation Plan/Action Plan
VHD	Vehicle Hours of Delay

EXECUTIVE SUMMARY

Completed and adopted in early 2008, the Tri-Valley Transportation Council (TVTC) Nexus Study: Fee Update ("2008 Nexus Study") identified 22 projects that the TVTC elected for eligibility to receive funding from the Tri-Valley Transportation Development Fee (TVTDF). The first 11 projects (List A, Table 13) were adopted into the original program in 1995. The second set of 11 (List B, Table 13), were new projects that were included in the 2008 Nexus Study. The travel demand modeling documented in the 2008 Nexus Study projected that these projects would reduce the congestion created by new development within the Tri-Valley.

Since 2008, there have been changes in the funding, planning and traffic conditions under which the TVTDF was originally developed. In addition, many of the 27 original projects have been completed and the TVTC has identified 23 new projects (List C, Table 14) to be considered. Based on these factors an updated nexus study is needed to support updates to the TVTDF.

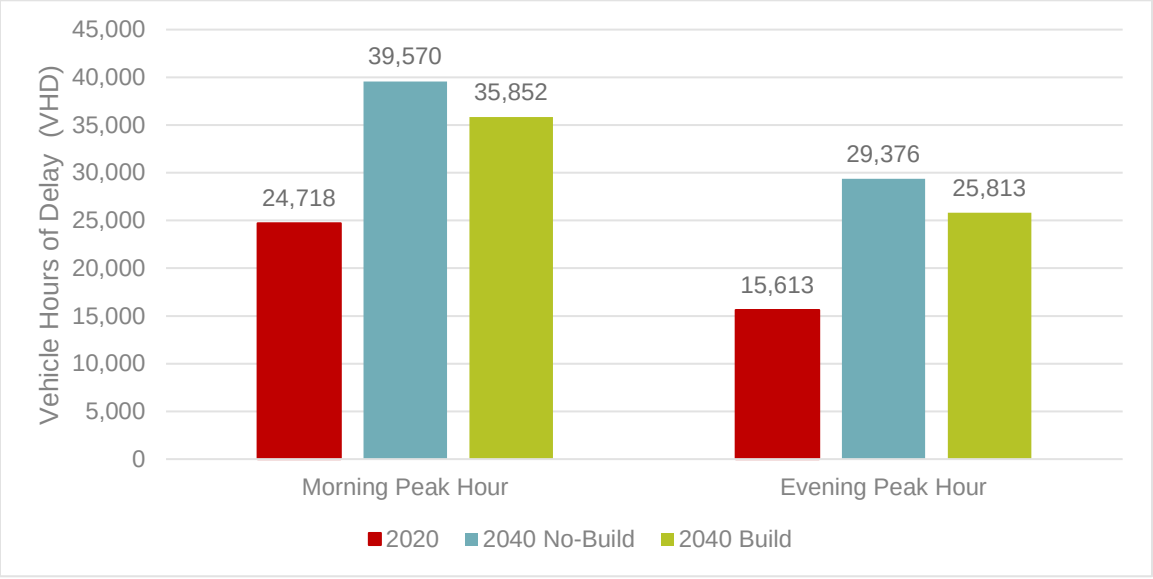
FORECAST GROWTH

New development within the Tri-Valley is forecast to add 33,312 household and 63,947 jobs between 2018 and 2040. This growth will produce an increase of 57,596 average AM/PM peak hour trips.

PROJECT BENEFITS

Based on forecast projection, the vehicle hour of delay is expected to increase by 60 percent during the AM and 88 percent during the PM peak. With the construction remaining improvement projects, this delay is expected to decrease by 15 percent during the AM peak and 23 percent during the PM peak when compared to the 2040 No-Build Scenario. In addition, these projects will result in other benefits to the Tri-Valley Area including improving roadway safety, improving roadway operations, and increasing bicycle ridership.

Figure E-1: Future Build vs No Build Scenario Vehicle Hours of Delay (VHD)



Note: Hours of delay are based on trips with origin or destination in the TVTC region.

UPDATED FEE

The total investment for projects eligible to receive TVTDF funding is estimated to be $4.470 billion, where $3.677 Billion is unfunded. An additional reduction was applied to account for external "cut-though" trips on roadway congestion projects. Future development within the Tri-Valley area is not responsible to pay for these trips since these trips are caused by growth outside of the Tri-Valley area. This reduces the total unfunded cost to be covered by the maximum TVTDF to $2.928 billion. Note that this does not change the overall project costs.

The $2.928 billion unfunded cost was allocated across future development land use type based on the proportion of forecast peak-hour trips to determine the Total Fee per Land Use. Then the maximum fee schedule was determined by dividing Total Fee per Land Use by the 2020-2040 Growth as shown in **Table E-1** below.

Table E-1: Maximum Fee by Land Use Category

Land Use Type	Growth	Maximum Fee
Single-Family Residential	15,857 DU	$43,976 per DU
Multi-Family Residential	17,456 DU	$25,928 per DU
Retail	5,117,500 SF	$84.52 per SF
Office	6,796,800 SF	$58.72 per SF
Industrial	9,289,800 SF	$33.81 per SF
Other	12,441 trips*	$50,839 per trip*

* Average AM/PM trip

The maximum fee schedule shown in in **Table E-1** would generate sufficient revenues to fund the total unfunded cost of all selected projects, however TVTC jurisdictions are not obligated to apply this fee schedule. For instance, the TVTC jurisdiction set rates at approximate 1/3 of the maximum fee calculated in the 1995 and 2008 Nexus studies to help foster growth within the Tri-Valley area, while providing a regional funding source that could be used to match and help compete for Federal and State transportation grants and funding programs.

1 INTRODUCTION AND BACKGROUND

1.1 BACKGROUND AND HISTORY

In 1991, the seven jurisdictions of Alameda County, Contra Costa County, Dublin, Pleasanton, Livermore, Danville, and San Ramon signed a Joint Powers Agreement (JPA) that established the Tri-Valley Transportation Council (TVTC). The purpose of the JPA was for the joint preparation of a Tri-Valley Transportation Plan/Action Plan (TVTP/AP) for Routes of Regional Significance (RRS) and cost sharing of recommended improvements. The TVTP/AP was prepared and presented to all member jurisdictions in April 1995 and updated in 2000. The TVTP/AP created a common understanding and agreement on the Tri-Valley's transportation concerns regarding prioritizing projects for funding and implementation.

In addition to the project priorities, the TVTP/AP also recommended the development of a TVTDF to allocate a fair share of regional infrastructure cost to go towards new development. The nexus study for the fee program, completed in 1995, justified allocating the unfunded cost needed to complete all of the 11 projects identified in the TVTP/AP to new development. The TVTC, however, recommended scaling back by roughly two-thirds the total amount the fee program would collect from the maximum funding needed. The TVTC and its member jurisdictions subsequently created and adopted the TVTDF in 1998 through a Joint Exercise of Powers Agreement (JEPA). The original Strategic Expenditure Plan (SEP) was adopted in 1999.

The JEPA called for a periodic update of the fee program to reflect any significant changes in population growth, project status, and other conditions that would require revisions to the fee program. Since 1995, there have been substantial changes in the funding, planning, and traffic setting in which the TVTDF was originally developed. New funding sources were established; the TVTP/AP was updated in 2000; projects were completed; project schedules and/or funding plans shifted; traffic patterns changed; and new regional transportation projects were identified through various traffic studies. The TVTC responded to these changes by directing the Technical Advisory Committee (TAC) to conduct its first update to the fee nexus study to update the fee and project list.

Completed and adopted in early 2008, the first update to the TVTC Nexus Study: Fee Update ("2008 Nexus Study") identified 22 projects that the TVTC elected for eligibility to receive funding from the TVTDF. The first 11 projects (List A, Table 13) were adopted into the original program in 1995. The second set of 11 (List B, Table 13), were new projects that were included in the 2008 Nexus Study. The travel demand modeling documented in the 2008 Nexus Study projected that these projects would further reduce congestion created by new development within the Tri-Valley. A revised fee structure was released by TVTC for consideration by each member agency in late 2008. While each member agency communicated support for the revised fee structure, it was not approved by all member agencies pending preparation and approval of a corresponding SEP. A TVTC SEP Subcommittee was therefore formed to commence preparation of an SEP.

To facilitate the progress of existing projects while an update to the SEP was underway, an Interim Funding Plan was approved by TVTC in April 2010. The Interim Funding Plan matched the programmed amounts and priorities established in the 2004 SEP Update. It also included a revised disbursement timeline to reflect the current Joint TVTDF account balance and projected fee collections over the next five years.

With respect to the TVTC JEPA, in October 2013 TVTC entered into a new Joint Exercise of Powers Agreement (JEPA) comprised of seven member agencies: the County of Alameda, the County of Contra Costa, the City of Livermore, the City of Pleasanton, the City of San Ramon, the City of Dublin, and the Town of Danville. The purpose of the new JEPA agreement was to establish the TVTC as a **separate agency** responsible for planning, coordinating, and receiving disbursement of traffic impact fee

revenues from member agencies to help implement transportation improvement projects within the Tri-Valley Area.

Strategic Expenditure Plan (SEP)

In January 2015, the TVTC adopted Resolution No. 2015-01 – Adopting the updated Tri-Valley Transportation Development Fee Schedule as a two-year phase-in plan, with no change during the initial year (FY 14-15), an increase to 25% of the maximum allowable rate by the fee nexus study in the second year (FY 15-16) and a final increase to 35% of the maximum allowable rate by the third year (FY 16-17). The new fee was based on the Fee Nexus Study adopted in 2008.

In November 2015, a review of the 2008 Nexus Study was conducted to determine if the analysis establishing a reasonable relationship between the unexpended fees and the purpose for which those fees were collected remained valid. This review analyzed the 2008 Nexus Study Fee Update with current traffic conditions, forecasted growth, and project updates and found that the analysis establishing a reasonable relationship between the unexpended fees and the purpose of which those fees were collected was still valid. The review also identified a number of conditions that had changed since the completion of the 2008 Nexus Study, such as growth projections were lower in the more recent forecasts than at the time of the 2008 Nexus Study. This translated to lower trip generation rate from new development. In addition, a number of the projects in the Nexus Study had been completed or had a change in project description or cost estimate. However, due to inflation and updated cost estimates, the total unfunded project cost had only decreased by 9 percent. The minor decrease in unfunded cost, paired with a decrease in expected new peak hour trips to which the fee would be applied, meant that the maximum fee identified in the 2008 Nexus Study would be higher in an updated calculation.

In January 2017, the TVTC approved the 2008 TVTC Nexus Study Validation Review and adopted the 2017 Strategic Expenditure Plan (SEP)* Update. At that time, the TVTC elected to maintain the current fee rate, with exception of the annual Construction Cost Index (CCI) adjustment. The 2017 SEP update incorporated and built upon the updated project descriptions, funding programs, and progression of the TVTDF over the previous six years. Some of the transportation improvement projects on the original list were completed and schedules and funding for others had changed. The JEPA, adopted in 2013, required approval for the SEP, by a supermajority of the TVTC – six members.

Since 2008, there have been changes in the funding, planning and traffic conditions under which the TVTDF was originally developed. In addition, many of the 22 projects have been completed and the TVTC has identified 16 new projects (List C, Table 14) to be considered. Based on these factors the 2020 updated nexus study was undertaken.

On August 16, 2021, the TVTC approved Resolution No. 2021-10 Adopting the Tri-Valley Transportation Council 2020 Nexus Fee Update Study.

1.2 REPORT ORGANIZATION

The remainder of the report is divided into the following chapters:

- Chapter 2 - Forecast of New Development and Travel Demand: Describes the methodology, assumption, and results used to determine future development forecast
- Chapter 3 - Improvement Projects and Cost Estimates: Presents list of improvement projects the TVTC elected to receive funding from the TVTDF. Detailed project descriptions are provided in Appendix A and Appendix B.
- Chapter 4 - Nexus Findings: Describes relevant findings for the imposition of development impact fees,
- Chapter 5 - Next Steps: Identifies next steps for adopting the updated fee schedule.

2 FORECAST OF NEW DEVELOPMENT AND TRAVEL DEMAND

This chapter describes the methodology, assumption, and results for travel demand forecasting.

2.1 METHODOLOGY AND APPROACH

Travel demand forecasting was conducted using the current version of Contra Costa Transportation Authority Travel Demand Model (CCTA TDM). The use of the CCTA TDM is consistent with the previous 2008 Nexus Study. Based on the outcome of initial discussions with the TAC, the following steps were taken regarding the development of travel demand forecasts:

- Travel demand forecasting was reaffirmed to be based on the latest version of CCTA TDM. In 2019, the CCTA TDM was updated to incorporate assumptions consistent with the current (as of 2017) Metropolitan Transportation Commission (MTC) Regional Transportation Plan (RTP). A 2018 base year validation was also completed as part of that update. The growth projections were based on a base year of 2020 and a horizon year of 2040. Note that the CCTA TDM base year was updated to reflect 2020 conditions and that the 2040 horizon year was also modified to address the specific needs of this study.
- Land use assumptions for households and employment were broken down for the 2020 base and 2040 horizon years by jurisdiction and were distributed to member agencies for review. Detailed data submitted to each jurisdiction included household and employment data at the traffic analysis zone (TAZ) level. In addition, supplemental data from the Alameda County Transportation Commission (ACTC) travel demand model was also provided to member agencies within Alameda County. Kimley Horn worked closely with the individual agencies to appropriately finalize growth forecasts prior to their use in the final modeling for this study.

Given that a recent land use forecast for the Tri-Valley region already exists as incorporated into the 2019 update of the CCTA Model, it is important to provide a context for the basis of this forecast. Specifically, the focus of this effort, unlike the more recent application of the CCTA model which was in support of a Region-Wide RTP, is confined to a limited area that primarily includes City of Dublin, Pleasanton, Livermore, Danville, and San Ramon and parts of unincorporated Contra Costa and Alameda counties. As this constitutes sub-area analysis (although the entirety of the model will be used during analysis), the typical best practice includes carefully assessing land use within the study area to make sure that it is prepared in a manner consistent with the specific goals of the study for which the TDM will be applied. It is important to note that TDMs used in support of RTPs are prepared in accordance with strict control totals and, as such, their land use forecasts do not necessarily reflect certainty as to whether a given development will occur, rather they are more akin to a process of prioritization (the forecaster determines the magnitude and location of development that is most likely to occur rather than determining whether something will NOT occur). Not surprisingly, local jurisdictions sometimes have more detailed perspectives on whether certain concentrations of development within their communities will occur before the RTP planning horizon. A land use assessment, such as that carried out as part of a typical sub-area analysis, is often an opportunity to reconsider jurisdictional land use input without the necessary limitations that an RTP puts on land use forecasting.

Based on these considerations and information shared by the TAC members, as well as input from staff from the member agencies at several individual agency meetings, it was determined that the 2040 land use forecast for the study area as included in the 2019 version of the CCTA TDM had unlikely development patterns in several locations within the study area as compared to the collective perspectives of member

agencies. Accordingly, it was agreed that a process to refine the existing CCTA forecast in a manner that could be reasonably justified based on readily available information and data would be undertaken. Specifically, this forecast is intended to reflect both realistic and achievable 2040 growth within the study area, and not necessarily circumstances that would be reflective of the full potential of the study area or an overly conservative approach such as a "worst-case" scenario.

2.2 TRAVEL DEMAND FORECAST

This section presents the growth forecast based on feedback from member agencies.

2.2.1 HOUSEHOLD GROWTH

Table 1 and **Figure 1** summaries the estimated household growth between 2020 and 2040 the resulted from the process described in the prior section. Between 2020 and 2040 there is an expected total growth of 33,312 households within the Tri-Valley Area. This equates to a 24 percent change or an annual growth rate of 1.09%.

Table 1: Total Household Forecasts by Agency

Agency	2020	2040	2020-2040 Growth	Percent Change	Annual Growth Rate
Danville	15,564	16,557	993	6%	0.31%
Dublin	21,708	29,105	7,397	34%	1.48%
Livermore	30,685	39,759	9,074	30%	1.30%
Pleasanton	27,783	34,099	6,316	23%	1.03%
San Ramon	27,624	36,638	9,014	33%	1.42%
Alameda Unincorporated	2,108	2,362	254	12%	0.57%
Contra Costa Unincorporated	11,921	12,185	264	2%	0.11%
Total Tri-Valley	**137,393**	**170,705**	**33,312**	**24%**	**1.09%**

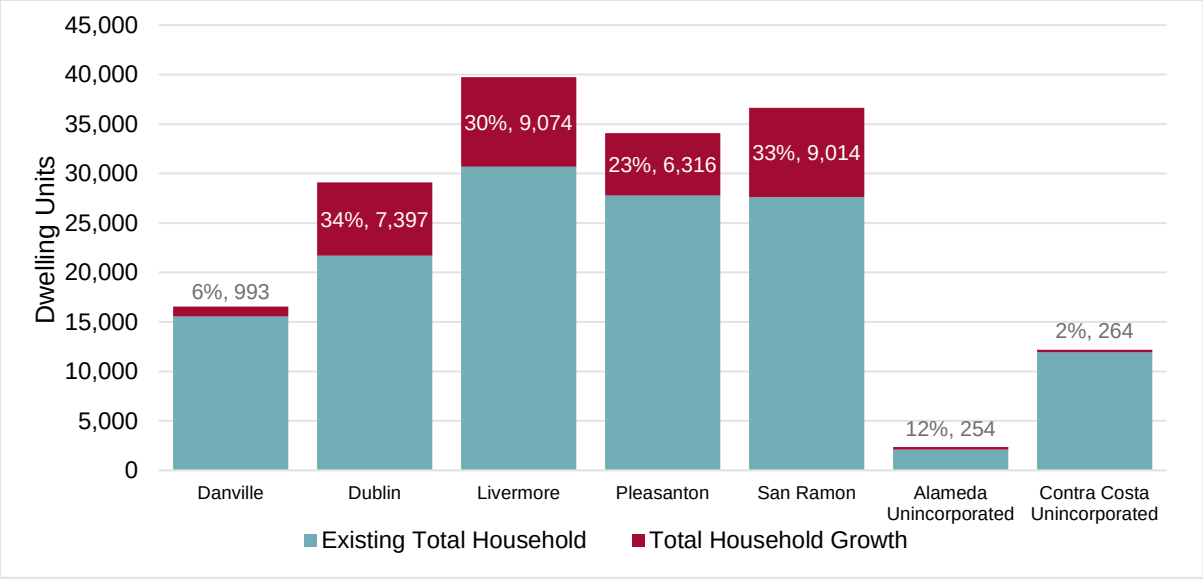


Figure 1:Total Household Forecasts by Agency

Table 2 presents the overall change based on dwelling type. As shown, it is expected that single family units will grow by 15,856 units at an annual growth rate of 0.69%. It is expected that multi-family units will go by 17,456 units at an annual growth rate of 2.35%. **Table 3** and **Figure 2** summarizes growth for single family household by agency. **Table 4** and **Figure 3** summarizes the growth for multifamily households by agency.

Table 2: Projected Dwelling Unit Growth, 2020-2040

Dwelling Type	2020	2040	2020-2040 Growth	Percent Change	Annual Growth Rate
Single Family	107,944	123,800	15,856	15%	0.69%
Multifamily	29,449	46,905	17,456	59%	2.35%
Total	**137,393**	**170,705**	**33,312**	**24%**	**1.09%**

Table 3: Single Family Household Forecasts by Agency

Agency	2020	2040	2020-2040 Growth	Percent Change	Annual Growth Rate
Danville	14,346	14,882	536	4%	0.18%
Dublin	14,579	17,506	2,927	20%	0.92%
Livermore	23,631	29,091	5,460	23%	1.04%
Pleasanton	20,689	24,202	3,513	17%	0.79%
San Ramon	21,704	24,821	3,117	14%	0.67%
Alameda Unincorporated	1,767	1,953	186	11%	0.50%
Contra Costa Unincorporated	11,228	11,345	117	1%	0.05%
Total Tri-Valley	**107,944**	**123,800**	**15,856**	**15%**	**0.69%**

Figure 2: Single Family Household Forecasts by Agency

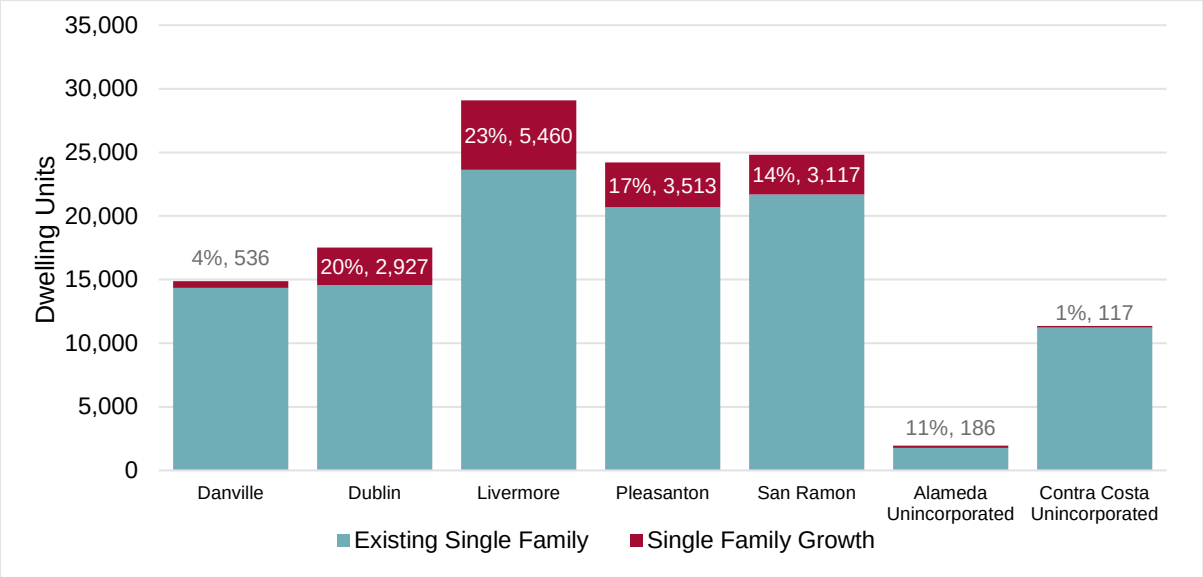
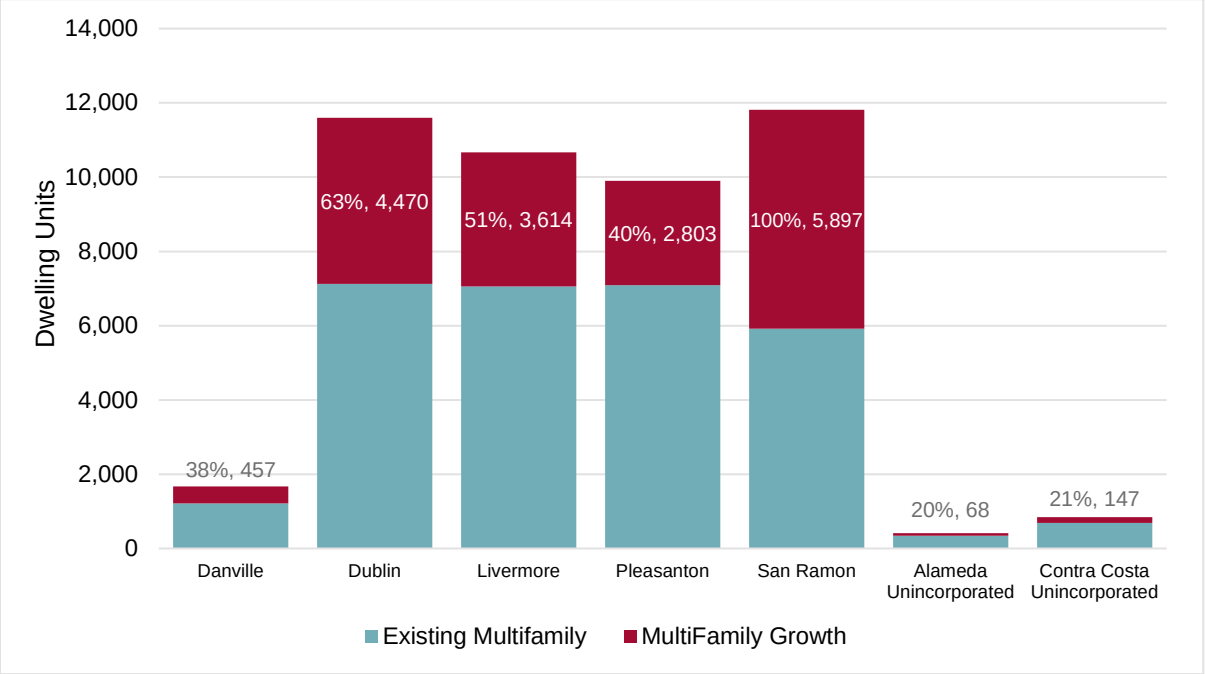


Table 4: Multifamily Household Forecasts by Agency

Agency	2020	2040	2020-2040 Growth	Percent Change	Annual Growth Rate
Danville	1,218	1,675	457	38%	1.61%
Dublin	7,129	11,599	4,470	63%	2.46%
Livermore	7,054	10,668	3,614	51%	2.09%
Pleasanton	7,094	9,897	2,803	40%	1.68%
San Ramon	5,920	11,817	5,897	100%	3.52%
Alameda Unincorporated	341	409	68	20%	0.91%
Contra Costa Unincorporated	693	840	147	21%	0.97%
Total Tri-Valley	**29,449**	**46,905**	**17,456**	**59%**	**2.35%**

Figure 3: Multifamily Household Forecasts by Agency



2.2.2 EMPLOYMENT GROWTH

Table 5 and **Figure 4** summarizes the estimated employment growth between 2020 and 2040. Between 2020 and 2040 there is an expected total growth of 63,947 jobs within the Tri-Valley Area. This equates to an approximate 30% change or an annual growth rate of 1.34%. Detailed information for specific Traffic Analysis Zones (TAZ) are included in **Attachment B** and **C**.

Table 5: Total Employment Forecasts by Agency

Agency	2020	2040	2020-2040 Growth	Percent Change	Annual Growth Rate
Danville	19,330	19,519	189	1%	0.05%
Dublin	23,402	32,716	9,314	40%	1.69%
Livermore	46,038	66,795	20,757	45%	1.88%
Pleasanton	62,196	86,489	24,293	39%	1.66%
San Ramon	50,539	59,027	8,488	17%	0.78%
Alameda Unincorporated	4,358	4,913	555	13%	0.60%
Contra Costa Unincorporated	4,460	4,811	351	8%	0.38%
Total Tri-Valley	**210,323**	**274,270**	**63,947**	**30%**	**1.34%**

Figure 4: Total Employment Forecasts by Agency

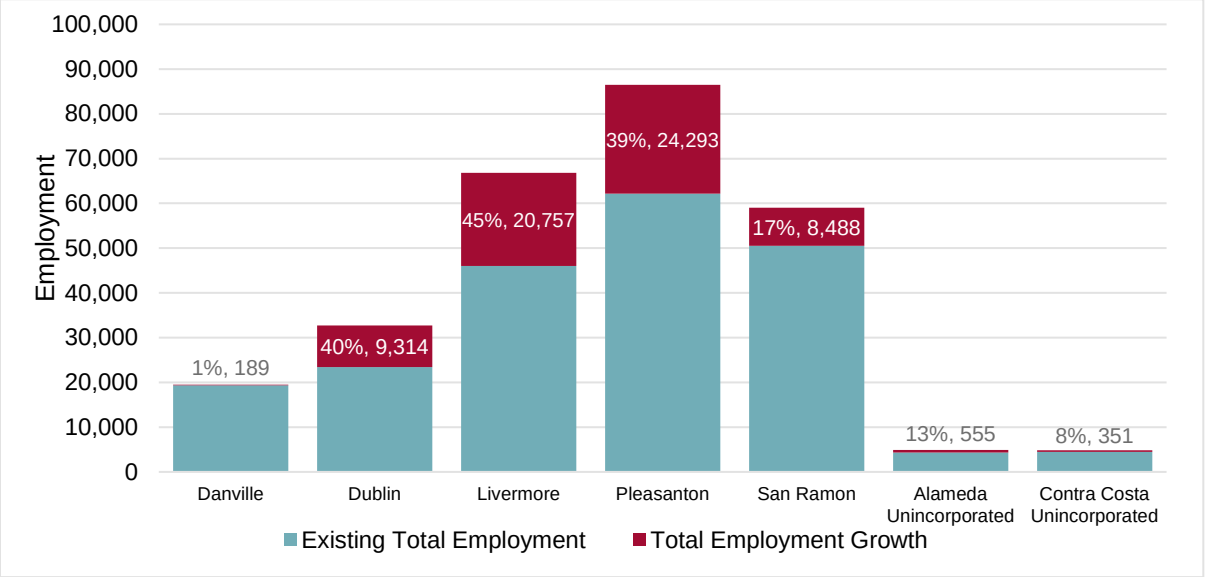


Table 6 presents the estimate growth between the base year of 2020 and the 2040 horizon year by employment type. Manufacturing, Service, and Other-type employment are forecasted to have the highest growth with a 60%, 33%, and 31% change, respectively. Retail and Trade/Wholesale-type employment are forecasted to have the smaller growth with a 20% and 19% change respectively. Agricultural-type employee is expected to have very little change. **Figure 5** through **Figure 10** summarizes the growth for each employment type by agency.

Table 6: Total Employment Forecasts by Employment Type

Employment Type	2020	2040	2020-2040 Growth	Percent Change	Annual Growth Rate
Retail	50,168	60,403	10,235	20%	0.93%
Service	69,029	91,685	22,656	33%	1.43%
Other	67,621	88,356	20,735	31%	1.35%
Agricultural	1,225	1,224	-1	0%	0.00%
Manufacturing	14,942	23,842	8,900	60%	2.36%
Trade/Wholesale	7,338	8,760	1,422	19%	0.89%
Total Employment	**210,323**	**274,270**	**63,947**	**30%**	**1.34%**

Note:
Service employment includes professional services/offices, public administration, health services, educational services, hotel, etc.
Other employment includes car washes, repair-maintenance services, personal care services, civic and social organization etc.

Figure 5: Retail Employment Forecasts by Agency

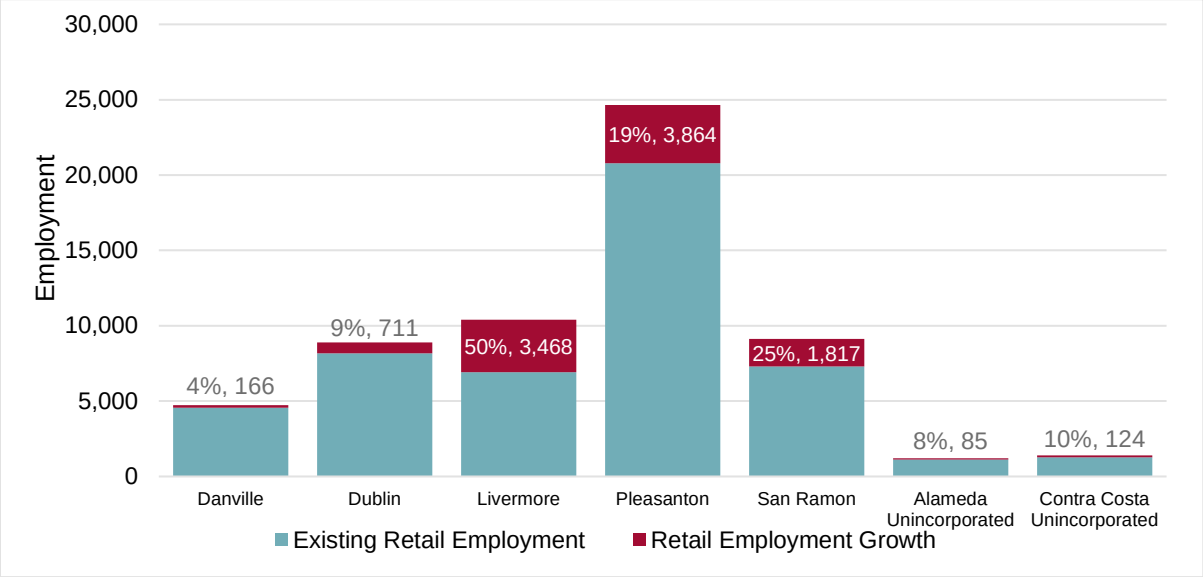


Figure 6: Service Employment Forecasts by Agency

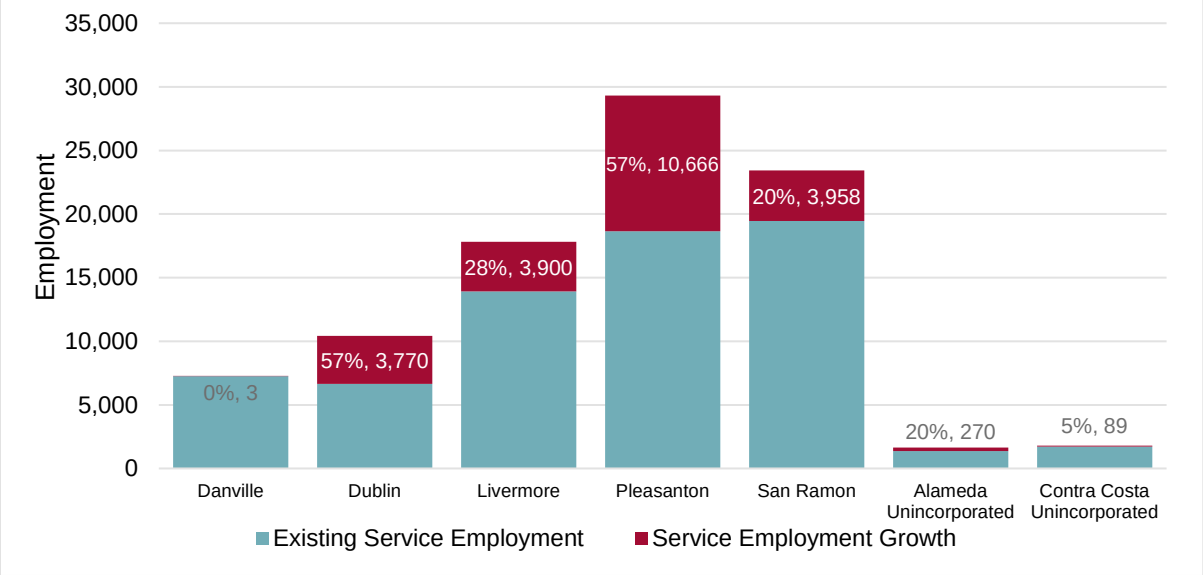
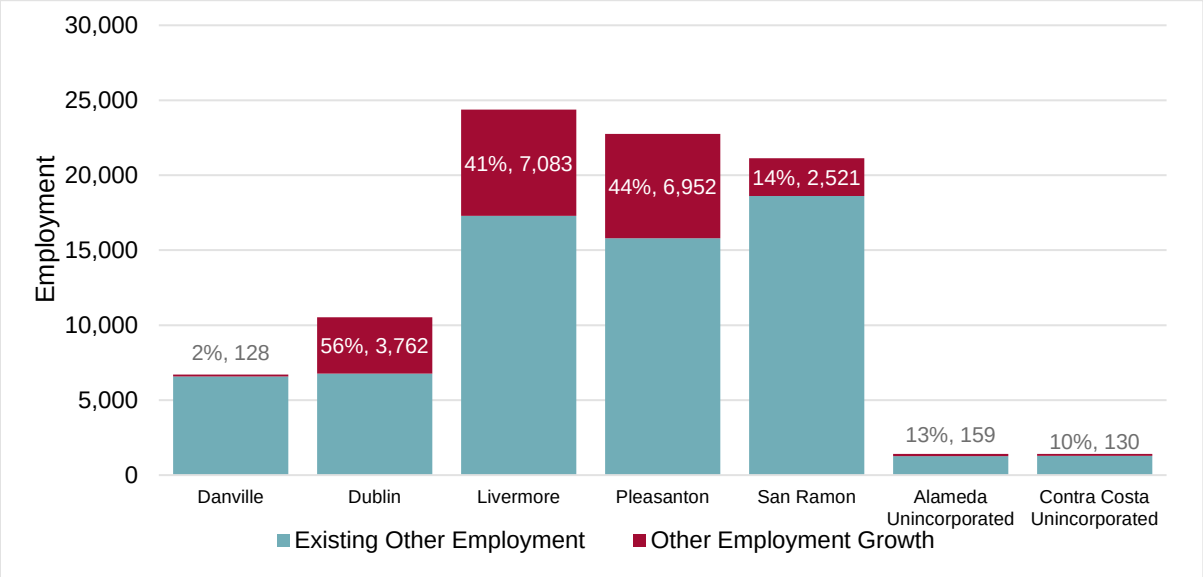


Figure 7: Other Employment Forecasts by Agency



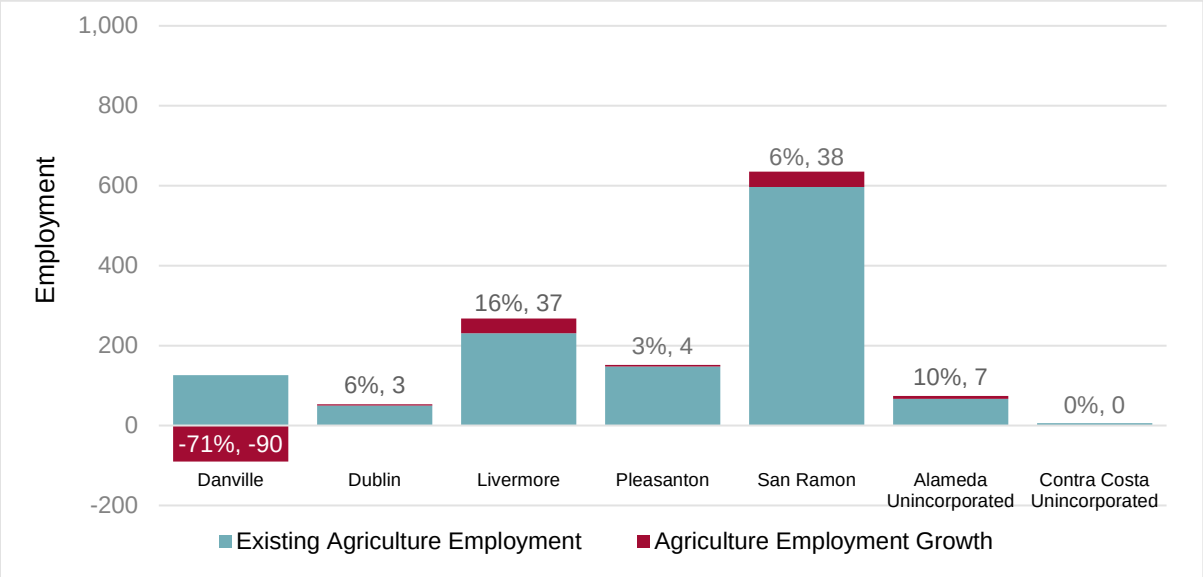


Figure 8: Manufacturing Employment Forecasts by Agency

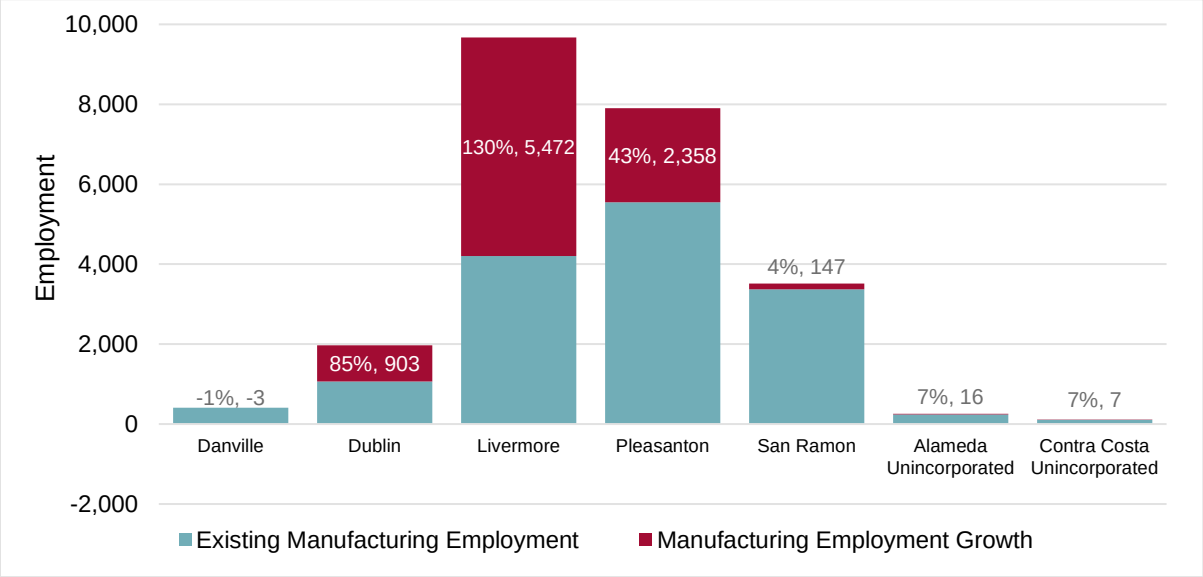


Figure 9: Trade/Wholesale Employment Forecasts

Employment growth was converted to square feet of commercial building space based on employee density assumed from the 2008 Nexus Study. These conversions are shown in **Table 7** below.

Table 7: Employment Growth Converted to Square Commercial Building Space

Land Use Type	Employee Growth 2020-2040	Employee Density (SF/Employee)	In Building Square Footage 2020-2040
Retail	10,235	500	5,117,572
Office/Service	22,656	300	6,796,911
Industrial[1]	10,321	900	9,289,204
Other	20,735	600	12,440,969
Total	**63,947**	**-**	**33,644,656**

[1] Industrial includes agriculture, manufacturing, and trading employment-types.

2.2.3 COMPARISON WITH 2008 NEXUS STUDY

A comparison of the total growth (base year to horizon year) and the annual growth rates between the 2008 Nexus Study and the 2020 Nexus Study forecast is presented in **Table 8**. The household growth estimated in the current 2020 Nexus Study is approximately half as much as estimated in the 2008 Nexus Study. The employment growth is estimated to be slightly lower than the 2008 Nexus Study. A slower build-out results in smaller amount of development being available to pay towards improvement projects.

Table 8: Overall Growth Comparison

	Total Growth		Annual Growth	
	Household	Employment	Household	Employment
2008 Nexus Study (2007 to 2030 Growth)	51%	42%	1.81%	1.54%
2020 Nexus Study (2020 to 2040 Growth)	24%	30%	1.09%	1.34%

Detailed comparison household and employment are discussed in the following sections.

2.2.3.1 Household

Table 9, Table 10 and **Figure 11** presents a comparison of the household growth between 2008 Nexus Study and the 2020 refined growth forecast. Single family housing experienced 4% less growth than anticipated in the 2008 Nexus Study. Multifamily housing experienced 10% less growth than anticipated in the 2008 Nexus Study. The multifamily growth trend is similar between the 2008 and 2020 Nexus Study.

Figure 10: 2008 Nexus and 2020 Refined Dwelling Unit Forecast

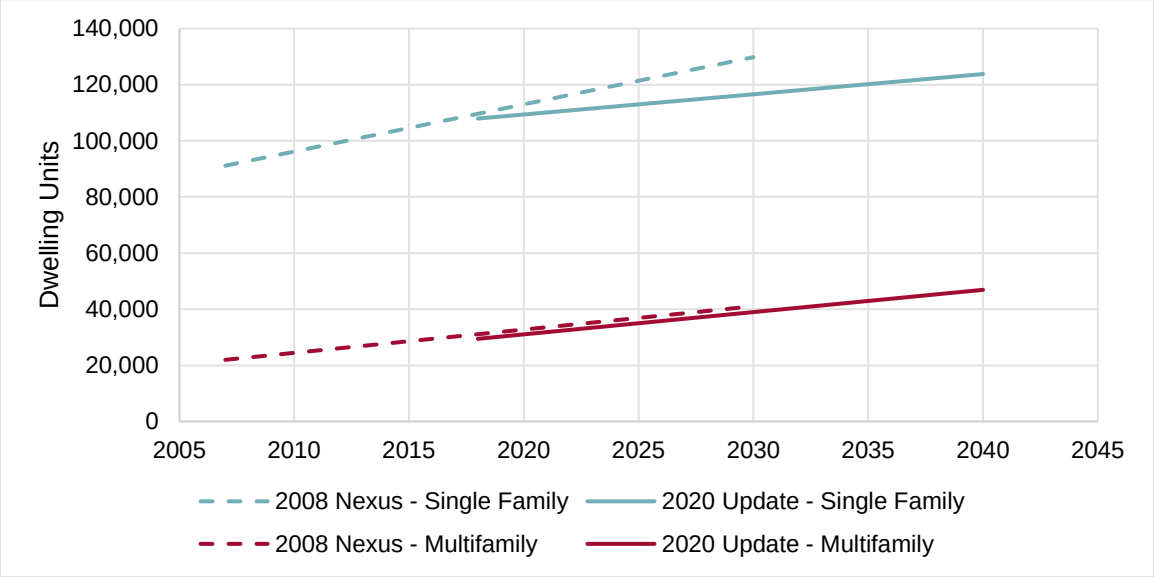


Table 9: Household Growth Comparison

Dwelling Type	2008 Nexus Study					2020 Nexus Study				
	2007	2030	2007-2030 Growth	Percent Change	Annual Growth	2018	2040	2020-2040 Growth	Percent Change	Annual Growth
Single Family	91,136	129,818	38,682	42%	1.55%	107,944	123,800	15,856	15%	0.69%
Multifamily	21,959	41,042	19,083	87%	2.76%	29,449	46,905	17,456	59%	2.35%
Total	**113,095**	**170,860**	**57,765**	**51%**	**1.81%**	**137,393**	**170,705**	**33,312**	**24%**	**1.09%**

Table 10: Actual Versus Projected 2020 Household Values

Dwelling Type	2020 Projected	2020 Actual	Difference	Percent Difference
Single Family	113,000	107,944	-5,056	-4%
Multifamily	32,745	29,449	-3,296	-10%
Total	**145,745**	**137,393**	**-8,352**	**-6%**

Note: 2020 Projected assumes linear growth based on 2007-2030 growth assumed in 2008 Nexus Study

2.2.3.2 Employment

Table 11, Table 12, **Figure 12,** and **Figure 13** presents a comparison of the employment growth between 2008 Nexus Study and the 2020 Nexus Study. All employment types except for Other are forecast to experience less growth than anticipated in the 2008 Nexus Study. Retail and Other employment experience higher growth at 15% and 8% more than 2020 estimate. For Agriculture employment, there was a -7% difference. Service, manufacturing, and trading employment experienced the greatest difference, ranging from -37% to -43% compared to employment numbers anticipated for 2020 in 2008 Nexus Study. While the actual numbers differ from the anticipated growth assumed in 2008 Nexus Study, the 2020 Nexus Study is anticipating similar growth trends as the previous study for all employment types.

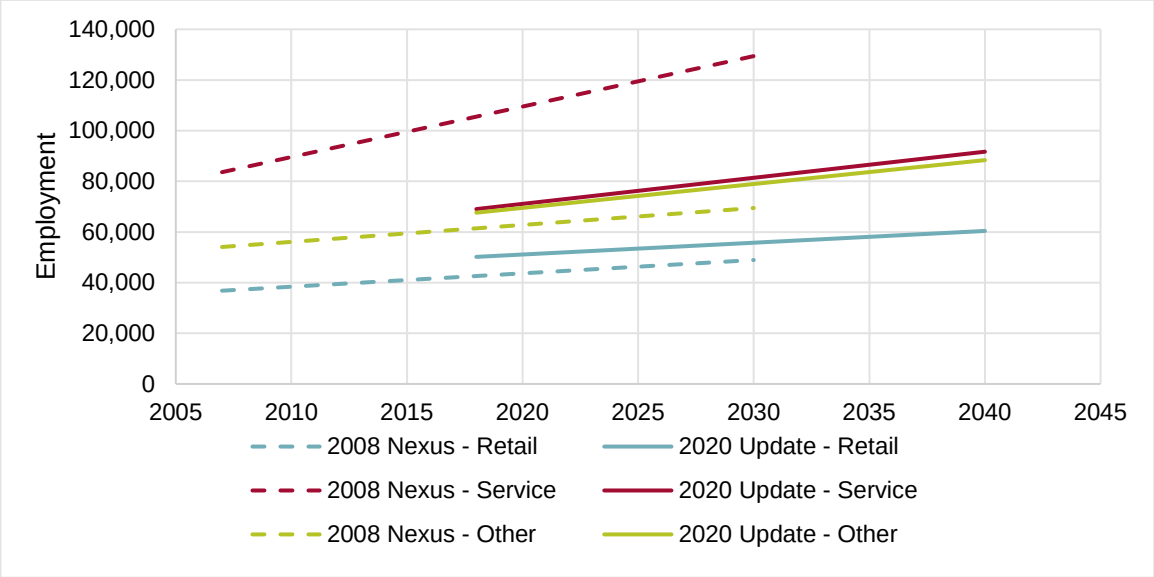


Figure 11: 2008 Nexus Study and 2020 Nexus Study Employment Forecast (Retail, Service, Other)

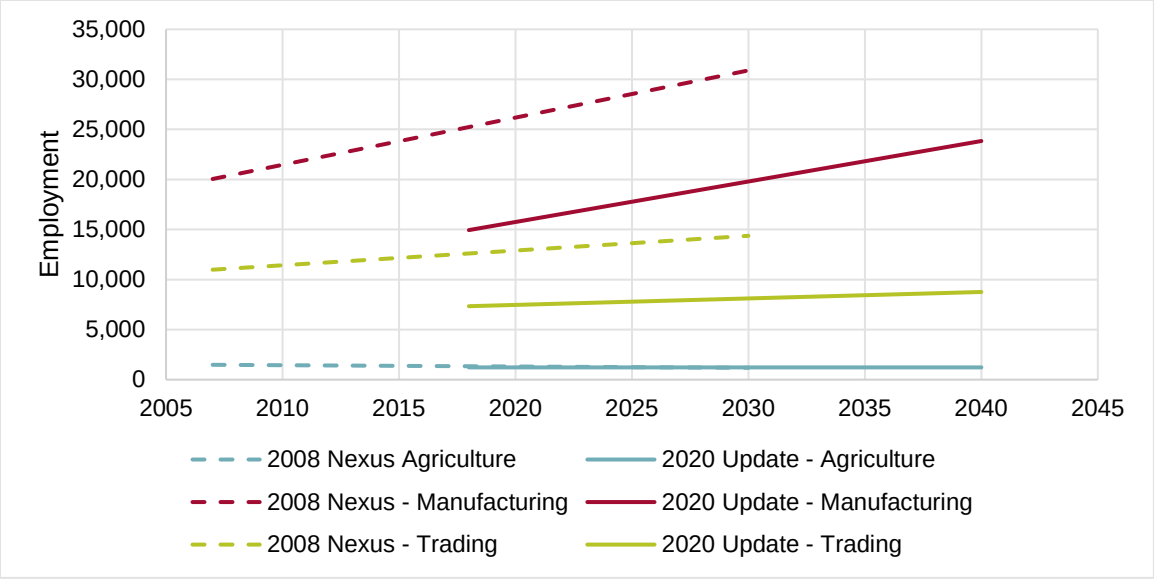


Figure 12: 2008 Nexus Study and 2020 Nexus Study Employment Forecast (Agriculture, Manufacturing, Trading)

Table 11: Employment Growth Comparison

Employment Type	2008 Nexus Study					2020 Nexus Study				
	2007	2030	2007-2030 Growth	Percent Change	Annual Growth	2020	2040	2020-2040 Growth	Percent Change	Annual Growth
Retail	36,806	48,927	12,121	33%	1.25%	50,168	60,403	10,235	20%	0.93%
Service	83,608	129,427	45,819	55%	1.92%	69,029	91,685	22,656	33%	1.43%
Other	54,076	69,459	15,383	28%	1.09%	67,621	88,356	20,735	31%	1.35%
Agriculture	1,483	1,182	-301	-20%	-0.98%	1,225	1,224	-1	0%	0.00%
Manufacturing	20,048	30,895	10,847	54%	1.90%	14,942	23,842	8,900	60%	2.36%
Trading	10,986	14,371	3,385	31%	1.17%	7,338	8,760	1,422	19%	0.89%
Total	**207,007**	**294,261**	**87,254**	**42%**	**1.54%**	**210,323**	**274,270**	**63,947**	**30%**	**1.34%**

Table 12: Actual Versus Projected 2020 Employment Values

Employment Type	2020 Projected	2020 Actual	Difference	Percent Difference
Retail	42,603	42,603	7,565	15%
Service	105,521	105,521	-36,492	-37%
Other	61,433	61,433	6,188	8%
Agriculture	1,339	1,339	-114	-7%
Manufacturing	25,236	25,236	-10,294	-43%
Trading	12,605	12,605	-5,267	-43%
Total	**248,737**	**248,737**	**-38,414**	**-18%**

Note: 2020 Projected assumes linear growth based on 2007-2030 growth assumed in 2008 Nexus Study

3 IMPROVEMENT PROJECTS AND COST ESTIMATES

This chapter presents the 38 improvement projects included as part of the 2020 Nexus Updates.

3.1 IMPROVEMENT PROJECTS

There are 38 improvement projects that the TVTC has included in the Tri-Valley Transportation Development Fee (TVTDF) for the 2020 Nexus Study. Of those projects, 15 projects exist in the current TVTDF and 23 that are to be considered as part of this nexus update study.

3.1.1 CURRENT PROJECT LIST

Current projects are divided into two lists. The first list, List A, includes 7 projects that were included in the original program adopted in 1995. The second list, List B, includes 8 projects that were included in the 2008 Nexus Study.

Out of the 27 existing projects, 10 projects have been completed and are no longer considered for further funding. In addition, two projects (B-9 Danville Boulevard/Stone Valley Road I-680 Intersection and B-11a I-680 HOV Direct Access Ramps) have been removed from the project list and are no longer being considered for funding (for a total of 12 projects removed from the prior lists). The remaining projects have not been fully completed. **Table 13** summaries the projects in List A and B along with their total project costs and their remaining unfunded cost. Detailed description of projects in Lists A and B are provided in **Appendix A**.

3.1.2 NEW SELECTED PROJECT LIST

With almost half of the current project list completed and no longer receiving funding, TVTC reviewed and selected additional projects to be considered for receiving funding from the TVTDF. This selection process involved a comprehensive planning process to develop a project list that mitigates the impacts of new development based on feasibility and stakeholder support. From this process, 23 additional projects (List C) were identified to receive funding from the TVTDF. List C projects, along with their total project costs and their remaining unfunded costs are listed in **Table 14**. Detailed descriptions of projects in List C are provided in **Appendix B**.

3.2 UNFUNDED COST

Tables 13 and **14** presents total project cost and their remaining unfunded cost. The total investment for projects eligible to receive TVTDF funding is estimated to be $4.470 billion, where $3.677 billion is unfunded. An additional reduction was applied to account for external “cut-though” trips on roadway congestion projects. Future development within the Tri-Valley area is not responsible to pay for these trips since these trips are caused by growth outside of the Tri-Valley area. This reduces the total unfunded cost to be covered by the maximum TVTDF to $2.928 billion. Note that this does not change the overall project costs.

The funded amount includes the current TVTDF amount currently allocated toward projects as well as additional federal, state, regional, or local funding sources. Based on input received from member

jurisdictions, it is anticipated that approximately $793.24 million of funding has been identified for the current project list. **Appendices A** and **B** include a cost estimate and a portfolio of likely funding sources.

Table 13: Existing Projects – List A& B

	Project	Total Cost (2021 $Millions)	Unfunded Cost (2021 $Millions)
A-1	Interstate 580 (I-580)/Interstate 680 (I-680) Interchange (southbound to eastbound)	-	-
A-2a	State Route 84 (SR 84) Expressway (I-580 to I-680)	$325.4	-
A-2b	SR 84/I-580 Interchange	$22.7	$6.42
A-3	I-680 Auxiliary Lanes (Segment 2)	-	-
A-4	West Dublin/Pleasanton Bay Area Rapid Transit (BART) Station	-	-
A-5a	I-580 Eastbound Auxiliary Lane	-	-
A-5b	I-580 High Occupancy Vehicle (HOV) Lane Westbound	-	-
A-6	I-680 HOV Lanes, SR 84 to Top of Sunol Grade	-	-
A-7	I-580/Foothill Road/San Ramon Road Interchange Modifications	-	-
A-8	I-680/Alcosta Boulevard Interchange	-	-
A-9a	Crow Canyon Road Improvements Phase 1	$10.87	$8.42
A-9b	Crow Canyon Road Improvements Phase 2	$58.77	$57.08
A-10a	Vasco Road Safety Improvements Phase 1	$40.57	$11.14
A-10b	Vasco Road Safety Improvements Phase 2	$31.20	$28.62
A-11	Express Bus/Bus Rapid Transit (BRT) – Phase 2	$22.35	$21.21
B-1	I-580/I-680 Interchange (westbound to southbound)	$1,785.65	$1,746.65
B-2	Fifth Eastbound Lane on I-580 from Santa Rita Road to Vasco Road	-	-
B-3	I-580/First Street Interchange Modification	$61.00	$7.93
B-4	I-580/Vasco Road Interchange Modification	$85.65	$16.61
B-5	I-580/Greenville Road Interchange Modification	$86.00	$18.92
B-6	Jack London Boulevard Extension	$28.16	$10.08
B-7	El Charro Road Extension (Stoneridge Drive/Jack London Boulevard to Stanley Boulevard)	$72.48	$72.48
B-8	Camino Tassajara/Tassajara Road Widening Project (East of Blackhawk Drive to North Dublin Ranch Drive)	$88.08	$54.55
B-9	Danville Boulevard/Stone Valley Road I-680 Interchange Improvements	-	-
B-10	I-680 Southbound HOV Lane Gap Closure (North Main Street to Rudgear Road)	-	-
B-11a	I-680 HOV Direct Access Ramps	-	-
B-11b	I-680 Transit Corridor Improvements	$277.85	$274.85

Note: Completed or removed projects that are no longer considered for further funding are shaded.

Table 14: New Selected Projects – List C

	Project	Total Cost (Millions)	Unfunded Cost (Millions)
C-1	Tesla Road Safety Improvements	$13.19	$13.19
C-2	Norris Canyon Road Safety Improvement	$24.49	$18.49
C-3	Dublin Boulevard – North Canyons Parkway Extensions	$160.39	$134.91
C-4	Vasco Road at Dalton Avenue Intersection Improvements	$3.39	$3.39
C-5	El Charro Road Widening	$68.09	$38.09
C-6	Sunol/680 Interchange Improvements	$16.60	$7.60
C-7	I-680 Express Lanes – Hwy 84 to Alcosta	$527.57	$507.57
C-8	Santa Rita/I-580 Interchange	$10.33	$2.63
C-9	Stoneridge/I-680 Interchange	$11.98	$4.08
C-10	Innovate 680	$57.21	$54.66
C-11a	Iron Horse Trail Bicycle-Pedestrian Overcrossing – Bollinger Canyon Road	$22.88	$8.58
C-11b	Iron Horse Trail Bicycle-Pedestrian Overcrossing – Crow Canyon Road	$19.69	$19.69
C-11c	Iron Horse Trail – Dublin	$11.60	-
C-11d	Iron Horse Trail – Livermore	$26.99	$26.99
C-11e	Iron Horse Trail to Shadow Cliffs	$1.65	$0.30
C-11f	Iron House Trail Connection Improvements at Santa Rita Road	$0.87	$0.48
C-11g	Iron Horse Trail Bicycle/Pedestrian Overcrossing – Sycamore Valley Road	$19.78	$19.78
C-11h	Iron Horse Trail Safety Improvements	$85.60	$85.60
C-12	Hacienda/I-580 Interchange Improvements	$39.13	$34.50
C-13	Fallon/El Charro Interchange Improvements	$34.51	$19.96
C-14	Valley Link Rail (Phase 1)	$258.25	$258.25
C-15	Technology Enhancements	$0.33	$0.33
C-16	I-680 Express Bus Service	$59.35	$59.35

4 NEXUS FINDINGS

This chapter presents the relationship of between the increase travel demand from new development, the cost of improvements needed to accommodate that growth, and the impact fee to fund those investments.

4.1 OVERALL METHODOLOGY

Impact fees may be calculated using a purely technical method that would fund the cost of facilities required to accommodate growth. The four steps followed in any development impact fee study include the following:

1. Prepare growth projections;
2. Identify facility standards;
3. Determine the amount and cost of facilities required to accommodate new development based on facility standards and growth projections; and
4. Calculate the public facilities fee by allocating the total cost of facilities per unit of development.

This nexus study results in a calculation of the maximum fee based on the list of projects identified in Chapter 3 (and described in Appendices A and B) to the greatest extent technically defensible under the Mitigation Fee Act. Consistent with the TVTC's directions, the full cost of funding these improvements is used to calculate the maximum fee rates the TVTC could apply to all new residential and non-residential development in the Tri-Valley between 2020 and 2040.

4.2 MITIGATION FEE ACT FINDINGS

Development impact fees are one-time fees typically paid when a building permit is issued and imposed on development projects by local agencies responsible for regulating land use (cities and counties). To guide the widespread imposition of public facilities fees, the State Legislature adopted the Mitigation Fee Act (Act) with Assembly Bill 1600 in 1987 and subsequent amendments. The Act, contained in California Government Code Sections 66000 through 66025, establishes requirements on local agencies for the imposition and administration of fee programs. The Act requires local agencies to document five findings when adopting a fee.

The five statutory findings required for adoption of the TVTC updated impact fee were adopted when the first TVTC fee was adopted in 1995 and subsequently again when the Nexus Study was updated in 2008 and 2017. They are presented here and supported by the Nexus Analysis section (Chapter 2) of this report. All statutory references below are to the Act. This sample framework for the Mitigation Fee Act findings is only to provide local agencies with guidance and is not a substitute for legal advice. Local agencies will customize the findings for their jurisdiction and consult with their legal counsel prior to adoption of the updated TVTDF.

4.2.1 PURPOSE OF FEE

For the first finding, the local agency must identify the purpose of the fee (Section 66001(a)(1)). The TVTC policy, as expressed through the TVTC Action Plan, is that new development shall contribute for mitigation of their impacts on the Routes of Regional Significance, and that the cost sharing of recommended improvements will be implemented through the TVTDF regional impact fee program. This is administered by the seven jurisdictions of Alameda County, Contra Costa County, Dublin, Pleasanton, Livermore, Danville, and San Ramon, which all signed a joint powers authority (JPA). The fee advances a legitimate

public interest by enabling the TVTC to fund improvements to transportation infrastructure required to accommodate new development.

4.2.2 USE OF FEE REVENUES

For the second finding, the local agency must identify the use to which the fee is to be put. If the use is financing public facilities, the facilities shall be identified. That identification may, but need not, be made by reference to a capital improvement plan, as specified in Section 65403 or 66002, may be made in applicable general or specific plan requirements, or may be made in other public documents that identify the public facilities for which the fee is charged (Section 66001(a)(2)). The TVTDF will fund expanded facilities on the Routes of Regional Significance to serve new development. These facilities include the following:

- Roadway widening;
- Roadway extension;
- Traffic signal coordination and other traffic improvements;
- Freeway interchanges and related freeway improvements;
- Active transportation (pedestrian/bicycle) improvements;
- Safety improvements needed to mitigate the higher volume of traffic generated by new development on a major arterial or other regional facility; and
- Improvements required for regional express bus and rail transit.

4.3 BENEFIT RELATIONSHIP

The nexus must show a reasonable benefit relationship between the fee's use and the type of development project upon which the fee is imposed. In other words, the nexus must demonstrate that the improvement projects will mitigate the impacts of new development upon which the fee is imposed. This section describes the methodology and results for establishing the benefit relationship.

4.3.1 METHODOLOGY

The previous 2008 Nexus Study used a model-based delay methodology to determine how List A and List B would mitigate the impacts of new development by comparing vehicle hours of delay (VHD) from the 2005 base year with the Future 2030 No-build and Future 2030 Build scenarios. Given that some of the new recommended projects cannot be effectively analyzed using this same methodology, additional methodologies are being introduced as part of this update to appropriately assess the benefits of some select projects.

To facilitate this approach, projects were aggregated into different improvement categories. These categories include roadway capacity, transit, safety, pedestrian/bicycle, intersection, and technology. If the project's benefit could not be sufficiently analyzed based on model-delay, either because the project could not be reflected in the model or that the model is insensitive to the benefits associated with a specific project, the project was categorized as a safety, pedestrian/bicycle, intersection, or technology improvement and accordingly analyzed using off-model techniques. Since these improvement categories improve different aspects of the transportation system, differing methodologies and measures of effectiveness (MOEs) are necessary to appropriately evaluate their anticipated benefit to the transportation system. It should be noted some projects could be categorized into multiple improvement types; however, projects were limited to the category which best reflects their primary benefit for the purposes of supporting this Nexus Study. **Table**

15 summarizes the different methodology and MOEs that are proposed for this evaluation. A full list of how each project was categorized is included in **Appendix C**.

Table 15: Methodology and Improvements

Improvement Type	Methodology	MOE/Benefit
Roadway Capacity	Model-based Delay	• AM and PM Peak Hour Delay (combined with Transit and Pedestrian/Bicycle Improvement Categories)
Transit	Model-based Delay	• AM and PM Peak Hour Delay (combined with Capacity and Pedestrian/Bicycle Improvement Categories)
Safety	Crash Reduction Factors	• Crash Reduction Estimates • Qualitative Assessment of Resultant Delay Reduction
Pedestrian/ Bicycle	Planning-level Assessment Based on NCHRP 552	• Delay Based on the Conversion of Estimated Commuter Usage of Proposed Facilities (combined with Capacity • and Transit Improvement Categories) • Crash Reduction Estimates
Intersection	Planning-level Assessment	• Qualitative Assessment of Resultant Delay Reduction
Technology	Planning-level Assessment	• Qualitative Assessment of Resultant Delay Reduction

4.3.2 ROADWAY CAPACITY AND TRANSIT IMPROVEMENTS

Roadway capacity projects include improvements that involve increasing capacity such as widening a roadway to add additional through lanes or extending existing roadways. Transit projects include improvements that upgrade or expand existing transit service or assist with the implementation of new transit routes and services. Both roadway capacity and transit improvement projects were evaluated based on region wide delay derived using the CCTA travel demand model. Morning and evening region wide peak hours of delay from the two future scenarios, 2040 No-Build (without improvement projects) and 2040 Build (with improvement projects), were compared to the 2020 base year conditions.

The 2040 No-Build scenario is based on a year 2040 transportation network that will carry all of the locally produced or attracted new trips, but that only includes improvements that are expected to be funded under the financially-constrained RTP without the proposed Tri-Valley Transportation Development Fee projects (List A, B, and C). The 2040 Build scenario is based on a year 2040 transportation network that includes all the additional improvements that are expected to be funded with the updated Tri-Valley Transportation Development Fee. Both the 2040 No-Build and 2040 Build project scenarios include all of the travel associated with new development within the Tri-Valley. Under both scenarios, travel associated with through trips was excluded from the resultant delay summary (i.e., trips that have origins and destinations outside the Tri-Valley). Excluding through trips is common practice for this analysis given that the impact of this travel is not generated by land uses within the Tri-Valley area and therefor assessing a fee is impractical.

The improvement projects were evaluated using the aggregate regional peak-hour average weekday VHD delay on all the significant roadways (includes freeways, expressways arterials, and major collectors) in the

Tri-Valley on the 2020 Base Year networks and the 2040 No-Build and Build networks. The aggregate VHD provide a reasonable system wide measure of the impact of new development on congestion and mobility.

According to the CCTA travel demand model, between 2020 and 2040, if no projects are undertaken, the number of AM peak hours of delay is expected to increase 60 percent from 24,718 to 39,570 hours, while the number of PM peak hours of delay is expected to escalate 88 percent from 15,613 to 29,376 hours. If the projects are undertaken, the number of AM peak hours of delay would decrease 15 percent compared to the 2040 No-Build scenario, whereas, the number of PM peak hour of delay would decrease 23 percent. This modest improvement demonstrates that the proposed improvement projects only partially mitigate future congestion by new development. **Table 16** and **Figure 14** show the comparison between the Future 2040 Build and Future 2040 No-Build scenarios.

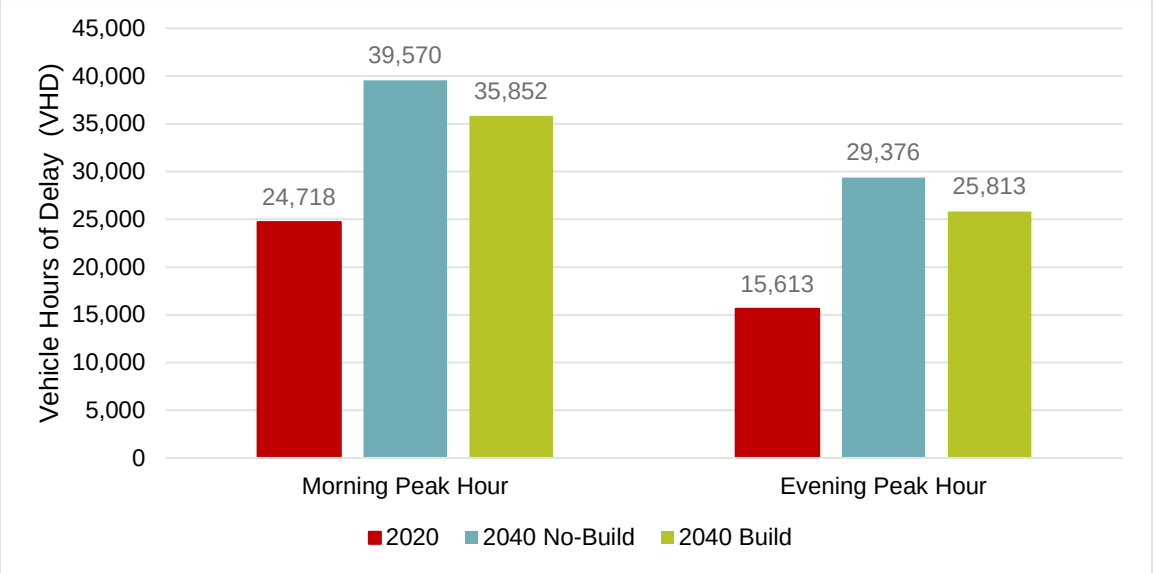
In the aggregate, the comparison between the three scenarios showed that: 1) the 2020 Base Year conditions are better than the Future 2040 No-Build conditions; 2) the Future 2040 Build conditions are better than the Future 2040 No-Build; and 3) the Future 2040 Build conditions are not better than the 2020 Base Year conditions. These comparisons demonstrated that, in the aggregate, new development does not fund infrastructure needed to address existing deficiency caused by existing development.

Table 16: Future Build vs No Build Scenario Vehicle Hours of Delay (VHD)

Peak Period	2020 Base Year	Future 2040		Difference	
		No-Build	Build	No-Build	Build
AM Peak Hour	24,718	39,570	35,852	60%	45%
PM Peak Hour	15,613	29,376	25,813	88%	65%

Note: Hours of delay are based on trips with origin or destination in the TVTC region.

Figure 13: Future Build vs No Build Scenario Vehicle Hours of Delay (VHD)



Note: Hours of delay are based on trips with origin or destination in the TVTC region.

In addition to reducing VHD, many roadway capacity and transit projects include additional secondary benefits to the transportation system. Many of these projects will result in safety benefits, as congestion can often exacerbate unsafe motoring conditions. Additionally, specific project attributes such as modifying interchanges or widening roadways to provide additional lanes so vehicles can safely maneuver along the roadway or provide space for slower moving vehicles during peak times can also improve safety. Other common project benefits may include pedestrian and bicycle improvements either directly or indirectly. For example, interchange can often be barriers for bicycles and pedestrian, however several of the interchange projects (e.g. C-12: Hacienda/I-580 Interchange Improvements and C-13: Fallon/El Charro Interchange Improvements) include bicycle and pedestrian improvements which close existing gaps and encourage more pedestrian and bicycle activity.

Based on this analysis it is determined that the planned projects identified in this report will expand the capacity of the Routes of Regional Significance to accommodate the increased trips generated by new development and thus, there is a reasonable relationship between the use of the fee for these projects and the new development on which the fee will be imposed.

4.3.3 SAFETY IMPROVEMENTS

Safety projects involves safety-related improvements such as shoulder widening, installing guardrail, installing median barriers, or realigning roadway. For these projects, a crash reduction factor was calculated based on each safety improvements being implemented. The crash reductions were subsequently applied to crash forecasts for the purpose of identifying future benefits. The safety improvements considered in the evaluation are listed below:

- California Highway Patrol (CHP) Enforcement Area
- Guard Rail Update
- Guardrails
- High Friction Pavement
- Additional Turn Lanes
- Intersection Improvement
- Roadway Median Barrier
- Roadway Realignment
- Retaining Walls
- Shoulder Widening
- Signal Timing Optimization
- Speed Feedback Signs
- Increased Super elevation

Each of the safety elements for the proposed improvements were converted to a total number of annual crash savings in the region based on the Caltrans' Local Roadway Safety Manual (LRSM) and Federal Highway Authority's (FHWA) Crash Modification Factors (CMF) Clearing House guide. CMFs are based on before and after research of safety improvement implementations. They indicate the proportion of future crashes that may be prevented by implementing a given countermeasure, reducing the crash frequency for an intersection or roadway segment. In other words, a CMF is a multiplicative factor used to compute the expected number of crashes after implementing a given countermeasure at a specific site.

The CMF was applied to a crash forecast which was based on 5-years of historical crash data which resulted in fatality or injury. The reduction in crashes was then then converted to annual crash saving based on Highway Safety Improvement Program (HSIP) crash saving dollar amounts shown in **Table 17**.

Table 17: HSIP Crash Saving Dollar Amounts

Severity	Crash Savings (per crash)
Fatal	$2,190,000
Serious	$2,190,000
Moderate	$142,300
Minor	$80,900

Table 18 shows the overall annual crashes saving from traffic injuries that were potentially eliminated. Note that this analysis excludes property costs and as such should be conservative. Also note that the forecast only considers the effect of new traffic impacts and excludes the effect of existing conditions for the purposes of establishing Nexus.

Table 18: Future Safety Benefits with Project Improvements

Safety Benefits	Total	Fatal	Serious	Moderate	Minor
5-Years Reduction in Crashes	153.0	2.5	14.1	45.3	91.0
1-Year Reduction in Crashes	30.6	0.5	2.8	9.1	18.2
Value per Annum (2019 Dollars)	$10,048,590	$1,092,810	$6,192,599	$1,290,003	$1,473,178

As shown in **Table 19**, there is a direct cost benefit to the investments made for roadway safety improvements in the region. While it is difficult to estimate an absolute percentage in reduced peak hour delays, the expected reductions in crashes will also enhance system reliability and resilience.

4.3.4 PEDESTRIAN/BICYCLE IMPROVEMENTS

While projects may include pedestrian and/or bicycle improvements, out of the 38 projects, project C-11 Iron Horse Trail Improvements is the only project that predominantly focuses on pedestrian and bicycle improvements. Project C-11 consists of various improvements to the Iron Horse Trail within the TVTC boundaries including overcrossing construction, closing existing gaps, and adding safety improvements through the trail system. Pedestrian and bicycle improvement were evaluated based on *NCHRP 552 Guidelines for Analysis of Investments in Bicycle Facilities.* This approach relies on spatial analysis techniques to determine the likely number of new active transportation users resulting from the introduction of a new pedestrian/bicycle improvement. **Table 19** shows the comparison between the Future 2040 Build and Future 2040 No-Build scenarios.

Table 19: Future Project Induced Daily Bicycle Demand

Total Induced Demand	2020 Base Year	Future 2040 No- Build	Future 2040 Build
Adult Bicyclists	1,275	1,778	3,338
Child Bicyclists	731	1,038	2,077
Total Facility Users	**2,006**	**2,817**	**5,415**

As shown in **Table 19**, Project C-11 could add over 2,500 bicycle trips per day on the Iron Horse Trail by 2040 which will provide an alternative to congested vehicular travel as well as significant health and recreational value. Closing existing gaps in the trail will also encourage bicycle trips for other trip purposes beyond just commute trips, including school, commercial and recreational trips.

Project C-11 improvements will result in additional secondary operational and safety benefits. Currently many at-grade crossings are located at intersections with high vehicular, pedestrian, and bicycle volumes which are regularly disrupted by conflicting at-grade operations given required traffic signal phasing. These improvements will help improve vehicular traffic operations by relocating pedestrian and bicycle traffic away from vehicular traffic helping to offset the transportation impacts associated with future development. These improvements will also provide safety benefits by reducing the potential for vehicle-bicycle and vehicle-pedestrian conflicts. Using the same methodology described in the previous section, a separate safety analysis was conducted to quantify the safety benefits of all the C-11 project. **Table 20** summarizes the safety benefit for Project C-11.

Table 20: Safety Benefits with Project C-11

Safety Benefits	Total	Fatal	Serious	Moderate	Minor
Annual Reduction in Crashes	7	2	1	4	0
Value per Annum (2019 Dollars)	$7,166,200	$4,380,000	$2,190,000	$596,200	-

4.3.5 INTERSECTION IMPROVEMENTS

There are two projects in List C with intersection improvements. Project C-4: Vasco Road & Dalton Avenue intersection Improvements, includes the addition of a traffic lane, signal optimization, and other improvements such as shoulder widening and roadway alignment to improve safety. Vasco Road is a major commute corridor connecting the City of Livermore and City of Brentwood. The intersection at Dalton Avenue provides access to the communities in the San Ramon Valley. With the planned and anticipated residential and industrial development along the corridor, this intersection is expected to have significant delays during the peak hours of commute.

Project C-8: Santa Rita and I-580 Interchange, will construct a second southbound left turn lane from Santa Rita onto Pimilico Drive. The City of Pleasanton General Plan has identified this intersection to have a reduced Level of Service under build out conditions.

4.3.6 TECHNOLOGY IMPROVEMENTS

There are two technology projects in List C. While Project C-10: Innovate 680 consist of multiple components including transit infrastructure and service improvements, roadway improvements, and technology enhancement, this project has been categorized as a technology improvement because TVTDF funding is being requested only for the Advance Technology component of the project. Other project components are expected to be funded through alternative sources. The Advance Technology component consist of implementing three technology-related strategies to improve operation along the I-680 corridor. Strategies include providing an enhanced 511 mobile app and implementing a shared autonomous vehicles (SAV) program to shift travel away from single occupant vehicles by providing travelers with better information about mode choice opportunities, resultant travel time, cost per trip, and the availability of

transit. Other technology strategies include integrating adaptive ramp metering and/or corridor/incident management systems which can help improve the efficiency and safety of the transportation system.

Project C-15: Technology Enhancements proposes to provide connectivity for transit and vehicles between local arterials and regional facilities. The project is expected to be completed in three phases - Feasibility, Design, and Construction. The TVTDF will help fund the feasibility study phase of the study, since the details of the design and construction phase are unknown at this time. The feasibility study will focus on the first and last mile connectivity opportunities at key transit hubs and along major transit routes in the Tri-Valley area. Leveraging existing and emerging technology, such as connected and autonomous vehicles, may help increase safety and mobility for all modes. These technologies may also help with increasing transit ridership or expanding transit service to less-served areas, especially for communities that currently lack service. Given that the resultant projects are intended to offset the impacts of future development, the feasibility study is appropriate to include in the TVTC project list.

4.4 BURDEN RELATIONSHIP

The need for the TVTDF is based on the forecasted increase in congestion on routes of regional significance as well as other transportation impacts resulting from new development. Consistent with the methodology from the 2008, the contribution by each land use was based on the proportion of average AM/PM trips generated by each land use. As demonstrated in this Study, there is a reasonable relationship between the need for the planned projects and the types of development upon which the fee is imposed because the planned projects will mitigate the transportation impacts of said new development.

4.4.1 TRIP RATE

The 2008 Nexus Study used the 7th Edition of Institute of Transportation Engineers (ITE)'s Trip Generation Handbook to develop the trip rates for each land use category. Since then, three additional editions of the Trip Generation Handbook have been published for use, ending with the most recent 10th Edition. It was determined that for all categories except the 'Other' category, the trip rates would be developed using the 10th Edition rather than the 7th Edition for this update. In addition, consistent with the 2008 Nexus Study, the trip rates were developed based on adjacent street traffic rather than peak-hour of generator. A 30-percent reduction was also taken for retail trips to account for pass-by trips, consistent with the 2008 Nexus Study. **Table 21** below summarizes the comparison in average AM and PM peak-hour trip rates by land use type. As shown in **Table 21**, every land use category results in a lower trip rate using the 10th Edition when compared to the 7th Edition.

Table 21: AM/PM Peak-Hour Average Trip Rate Comparison Between 7th Edition and 10th Edition

Land Use Type	7th Edition Average Trip Rate	10th Edition Average Trip Rate	Difference
Single-Family Residential	0.90	0.87	-0.03
Multi-Family Residential	0.62	0.51	-0.11
Retail	1.67	1.66	-0.01
Office	1.53	1.16	-0.37
Industrial	0.89	0.67	-0.22
Other	1.00	1.00	0.00

4.4.2 TOTAL TRIPS BY LAND USE

The total number of trips generated by the growth in either dwelling units or square-feet for each land use category are shown in **Table 22**. As shown in **Table 22**, a total of 57,596 trip ends are generated by the land use growth between 2020 and 2040. The growth attributable to single-family residential units generates the largest number of trips, 13,716, or almost 25-percent of the total trips. The growth attributable to industrial employment or industrial buildings generates the fewest number of trips, 6,178, or just over 10-percent of the total trips.

Table 22: Total Trip Ends by Land Use Category

Land Use Type	Growth (HH or Sq. Ft)	Trip Rate	Forecast Trips
Single-Family Residential	15,857	0.87	13,716
Multi-Family Residential	17,456	0.51	8,903
Retail	5,117,500	1.66	8,508
Office	6,796,800	1.16	7,850
Industrial	9,289,800	0.67	6,178
Other	12,441,000	1.00	12,441

4.5 FEE ESTIMATION

As required by the Mitigation Fee Act, the following section outlines the methodology for calculating the proposed fee and demonstrates how there is a reasonable relationship between the amount of the proposed fee and the cost of the public facility or portion of the public facility attributable to the development on which the fees will be imposed.

The following steps were taken to determine the fee for each land use type:

1. Determine total unfunded cost.
2. Determine average AM/PM forecast peak-hour trips generated
3. Determine Fee per Land Use Category
4. Determine Maximum Fee

4.5.1 TOTAL UNFUNDED COST

The total investment for projects eligible to receive TVTDF funding is estimated to be $4.470 billion, where $3.677 billion is unfunded. An additional reduction was applied to account for external “cut-though” trips on roadway congestion projects. Future development within the Tri-Valley area is not responsible to pay for these trips since these trips are caused by growth outside of the Tri-Valley area. This reduces the total unfunded cost to be covered by the maximum TVTDF to $2.928 billion. Note that this not change the overall project costs.

4.5.2 PEAK-HOUR TRIP FORECAST

Section 4.4.2. describes how the peak hour forecast was determined. Based on **Table 22**, an average of 57,596 AM/PM peak hour trips are generated by the land use growth between 2020 and 2040.

4.5.3 FEE PER LAND USE CATEGORY

To determine the total project cost by category, each land use category's share of the total trips generated by land use growth was multiplied by the total cost. An example calculation is shown below:

$$Single\ Family\ Residential = \$XXX\ Million \times \frac{13{,}716\ Single\ Family\ Residentail\ Trips}{57{,}596\ Total\ Averate\ Trips} = \$XXX\ Million$$

The total cost by land use category is shown in **Table 23**. As shown in **Table 23**, the total cost ranges from $396.27 million for industrial uses to $879.78 million for single-family residential uses.

Table 23: Total Fee by Land Use Category

Land Use Type	Forecast Trips*	Total Fee by Land Use (Millions)
Single-Family Residential	13,716	$697.31
Multi-Family Residential	8,903	$452.62
Retail	8,508	$432.54
Office	7,850	$399.09
Industrial	6,178	$314.08
Other	12,441	$632.49

* Average AM/PM trip

4.5.4 MAXIMUM FEE

To determine the maximum fee per dwelling unit, square-foot, or trip depending on the land use category, the total cost per category was divided by the total number of units, square-feet, or trips that occur between 2020 and 2040. An example calculation is shown below

$$Single\ Family\ Residential = \frac{\$XXX\ Million}{15{,}857\ Dwelling\ Unit} = \$XXX\ per\ dwelling\ unit$$

The maximum fees are summarized in **Table 24**. As shown in **Table 24**, the maximum fee for a single-family residential unit is $43,397 while the maximum fee for one square-foot of retail use is $84.52.

Historically the TVTC has not applied the maximum fee schedule. For both the 1995 and 2008 nexus studies, the TVTC jurisdiction set rates at approximate one-third of the maximum fee calculated in the 1995 and 2008 Nexus studies to help foster growth within the Tri-Valley area, while providing a regional funding source that could be used to match and help compete for Federal and State transportation grants and funding programs.

Table 24: Total Cost and Maximum Fee by Land Use Category

Land Use Type	Growth	Maximum Fee
Single-Family Residential	15,857 DU	$43,976 per DU
Multi-Family Residential	17,456 DU	$25,928 per DU
Retail	5,117,500 SF	$84.52 per SF
Office	6,796,800 SF	$58.72 per SF
Industrial	9,289,800 SF	$33.81 per SF
Other	12,441 trips*	$50,839 per trip*

Note: Reduction cost is only provided for comparison purposes and should not be seen as the preferred fees. Average AM/PM trip*

5 NEXT STEPS

This report documents the findings needed to adopt a fee schedule to fund the improvements projects elected to receive funding from the TVTDF. Below are next steps needed for the TVTC to adopt a fee schedule that is most appreciate for their needs.

5.1 ADJUSTMENT TO MAXIMUM FEE CALCULATION

As previously discussed, the maximum fee would generate sufficient revenues to fund the total unfunded cost of all selected projects. However, if the TVTC adopts fee schedule below the maximum, this would result in revenue shortfall and TVTC would need to take one or both of the following actions:

- Increase funding from other sources
- Fund selected projects or project phases

5.1.1 INCREASE FUNDING FROM OTHER SOURCES

TVTC could reduce the funding shortfall for specific projects by increasing funding form other federal, state, regional, and local fund sources. Some potential funding sources as listed below:

- Federal
  - One Bay Area Grant Program (OBAG)
- State
  - State Transportation Improvement Program (STIP)
  - Senate Bill 1 (SB 1)
  - Office of Traffic Safety (OTS) Grant
  - Active Transportation Program (ATP)
- Regional
  - Transportation Fund for Clean Air (TFCA) County Program Manager (CPM) Fund Local
  - Measure B & Measure BB
  - Measure J
- Local
  - Traffic Impact/Mitigation Fees
  - Development Fees
  - General Purpose Funds

5.1.2 FUND SELECTED PROJECTS OR PROJECT PHASES

TVTC could determine to fund the full amount for selected projects or fund certain phases of the project such as the planning or design phase of a project.

5.2 UPDATE STRATEGIC EXPENDITURE PLAN (SEP)

Once the final fee schedule has been adopted TVTC should update the SEP to set priority for which projects should be funded first.

APPENDIX

A – Existing TVTC Projects

B – Additional TVTC Projects

C – Project Improvement Category

APPENDIX A – EXISTING TVTC PROJECTS

A-1. I-580/I-680 INTERCHANGE (SOUTHBOUND TO EASTBOUND)

TVTC Project Sponsor: Alameda County

Lead Agency: Caltrans

Project Description: Project A-1 was located at the I-580 and I-680 interchange. The project constructed the southbound to eastbound flyover, northbound to eastbound direct connector, southbound on- and off-loop ramps, and a northbound on-ramp.

The project was needed to improve safety and reduce congestion on southbound and northbound I-680 near I-580, and mitigate the impacts of local and regional growth in housing and employment. This project was approved by the voters of Alameda County, as a portion of the Measure B sales tax program.

Status: This project has been completed.

A-2A. SR 84 EXPRESSWAY (I-580 TO I-680)

TVTC Project Sponsor: City of Livermore, City of Pleasanton

Lead Agency: Alameda County Transportation Commission (ACTC)

Project Description: Project A-2a is located along SR 84 between I-580 and I-680 in Livermore and Pleasanton. The project will widen and reconstruct SR 84 to expressway standards. The ultimate configuration is expected to consist of six lanes from I-580 to Stanley Boulevard and four lanes from Stanley Boulevard to I-680.

The project has been segmented into five primary sections:

- Segment 1 (I-580 to Jack London Boulevard) – widening and Phase I of the I-580/SR 84 Interchange project (Project A-2b).
- Segment 2 (Jack London Boulevard to a point roughly halfway between Concannon Boulevard and Stanley Boulevard) – widening existing configuration from two lanes to four lanes and from four lanes to six lanes.
- Segment 3 (Halfway between Concannon Boulevard and Stanley Boulevard to Ruby Hill Drive) – widening from two lanes to four lanes.
- Segment 4 (Ruby Hill Drive to Pigeon Pass) – straightening the roadway alignments and adding truck climbing lanes.
- Segment 5 (Pigeon Pass to I-680) – widening the roadway from two lanes to four lanes and improvements at the SR 84/I-680 interchange.

Status: Below is the status of the project.

- Final design and right-of-way acquisition was completed in September 2020.
- Construction began in May 2021.
- Completion of construction is anticipated in spring 2024.

Cost Estimate and Funding Sources

Segment 3:

Cost (Millions)	**$105.40**
Funding (Millions)	
Measure B	$34.87
Measure BB	$10.00
State	$47.03
Local (CMA-TIP)	$2.00
Local (City)	$1.50
TVTDF	$10.00
Total Funding (Millions)	**$105.40**
Total Funding Shortfall (Millions)	**$0.00**

Segment 5:

Cost (Millions)	**$244.10**
Funding (Millions)	
Measure B	$1.05
Measure BB	$123.40
State (SB 1 LPP)	$8.60
Regional Improvement Program (RIP)	$11.11
Regional Measure 3 (RM 3)	$85.00
TVTDF	$14.94
Total Funding (Millions)	**$244.10**
Total Funding Shortfall (Millions)	**$0.00**

A-2B. SR 84/I-580 INTERCHANGE

TVTC Project Sponsor: City of Livermore

Lead Agency: Caltrans and City of Livermore

Project Description: Project A-2b is located in Livermore, at the intersection of I-580 and Isabel Avenue including Portal Avenue.

The project consists of two phases:

- Phase 1 – The Isabel Avenue Interchange project which included replacing the I-580/Portola Avenue interchange with the I-580/Isabel Avenue-SR 84 interchange. Phase I also included realignment of Isabel Avenue and the realignment and extension of Portola Avenue from East Airway Boulevard to Isabel Avenue.
- Phase 2 – The ultimate improvements at the I-580/Isabel Avenue-SR 84 Interchange are to provide six lanes over I-580 at the Isabel Avenue-SR 84 Interchange and four lanes over I-580 at the Portola Avenue overcrossing.

Status: A programmatic environmental assessment and right-of-way acquisition is complete.

- Phase 1 – Construction of Phase I of the project was completed in March 2012.
- Phase 2 – Conceptual design is approved. Project development activities are anticipated to begin in 2023.

Cost Estimate and Funding Sources

Phase 2:

Cost (Millions)	**$22.00**
Funding (Millions)	
Livermore Traffic Impact Fee (TIF)	$16.28
TVTDF	$5.15
Total Funding (Millions)	**$21.43**
Total Funding Shortfall (Millions)	**$0.57**

A-3. I-680 AUXILIARY LANES (SEGMENT 2)

TVTC Project Sponsor: Town of Danville

Lead Agency: Contra Costa Transportation Authority (CCTA)

Project Description: Project A-3 was located along I-680 in Danville and constructed auxiliary lanes in both directions between Crow Canyon Road in San Ramon and Sycamore Valley Road in Danville. The project was the last segment of auxiliary lanes in both directions of I-680 between Bollinger Canyon Road in San Ramon and Diablo Road in Danville.

Status: This project has been completed.

A-4. WEST DUBLIN/PLEASANTON BART STATION

TVTC Project Sponsor: City of Dublin, City of Pleasanton

Lead Agency: BART

Project Description: Project A-4 was located in Dublin and Pleasanton and constructed the West Dublin/Pleasanton BART station and related transit improvements. The project was a joint public and private venture to build a station on the active BART line in the median of I-580. The related transit improvements were located on both the north (Dublin) and south (Pleasanton) sides of the freeway on property owned by BART and included patron parking garages, passenger pick-up and drop-offs, and bus drop-offs.

Status: This project has been completed.

A-5A. I-580 EASTBOUND AUXILIARY LANE

TVTC Project Sponsor: City of Pleasanton

Lead Agency: Alameda CTC

Project Description: Project A-5a was located along eastbound I-580 from Hacienda Drive in Pleasanton and Greenville Road in Livermore. The project constructed eastbound auxiliary lanes between Isabel Avenue and North Livermore Avenue and between North Livermore Avenue and First Street in Livermore. In addition, the project included widening two eastbound bridges at Arroyo-Los Positas Road and adding final asphalt concrete pavement across all lanes in the eastbound direction from Hacienda Drive to Greenville Road.

Status: This project has been completed.

A-5B. I-580 HOV LANE WESTBOUND

TVTC Project Sponsor: City of Pleasanton

Lead Agency: Alameda CTC

Project Description: Project A-5b was located along westbound I-580 from Greenville Road in Livermore to Foothill Road overcrossing in Dublin and Pleasanton. The project constructed westbound HOV lanes and rehabilitated existing pavement.

The project increased capacity, safety, and efficiency for commuters and freight along the primary trade corridor connecting the Bay Area with the Central Valley.

The project was completed in two segments:

- East Segment – Greenville Road overcrossing to Isabel Avenue in Livermore
- West Segment – Isabel Avenue to Foothill Road overcrossing

Status: This project has been completed.

A-6. I-680 HOV LANES, SR 84 TO TOP OF SUNOL GRADE

TVTC Project Sponsor: City of Pleasanton

Lead Agency: Caltrans and Alameda CTC

Project Description: Project A-6 was located along southbound I-680 between SR-84 and the top of the Sunol Grade. The project constructed HOV lanes along approximately a 3.5-mile segment of I-680.

Status: This project has been completed.

A-7. I-580/FOOTHILL ROAD/SAN RAMON ROAD INTERCHANGE MODIFICATIONS

TVTC Project Sponsor: City of Pleasanton

Lead Agency: Caltrans

Project Description: Project A-7 was located at the intersection of the I-580 ramps and Foothill Road in Pleasanton. The project constructed improvements to improve intersection operations and safety. The project modified the intersection to remove the direct eastbound to southbound connection and eastbound to northbound loop connection so that it terminates into a "T" style signalized intersection at Foothill Road just south of the Foothill Road Bridge.

Status: This project has been completed.

A-8. I-680/ALCOSTA BOULEVARD INTERCHANGE

TVTC Project Sponsor: City of San Ramon

Lead Agency: Caltrans

Project Description: Project A-8 was located at the I-680/Alcosta Boulevard interchange in San Ramon. The project reconstructed the southbound off-ramp and added a new on-ramp to improve operations at the interchange. This project closed the southbound off-ramp and built new on- and off-ramps north of Alcosta Boulevard.

Status: This project has been completed.

A-9A. CROW CANYON ROAD IMPROVEMENTS PHASE 1

TVTC Project Sponsor: Alameda County

Lead Agency: Alameda County

Project Description: Project A-9a is located along Crow Canyon Road between E. Castro Valley Boulevard and the Alameda/Contra Costa County line.

Project A-9a is Phase 1 of a two-phase safety improvement project along Crow Canyon Road. Please refer to Project A-9b for details on Phase 2.

Phase 1 safety improvements include speed feedback signs, shoulder widening, California Highway Patrol (CHP) enforcement areas, and guard rail modifications.

Overall, the short-term safety improvements will facilitate traffic safety and operations, while reducing congestion for residents traveling between Alameda and Contra Costa Counties.

Status: The project is currently in the Preliminary Engineering/Environmental Studies stage. Construction of Phase 1 is to be determined.

Cost and Funding Source

Cost (Millions)	**$18.87**
Funding (Millions)	
CMA TIP	$0.45
Local Alameda County	$0.45
TVTDF	$1.55
Total Funding (Millions)	**$2.45**
Total Funding Shortfall (Millions)	**$8.42**

A-9B. CROW CANYON ROAD IMPROVEMENTS PHASE 2

TVTC Project Sponsor: Alameda County

Lead Agency: Alameda County

Project Description: Project A-9b is located along Crow Canyon Road between E. Castro Valley Boulevard and the Alameda/Contra Costa County Line.

Project A-9b is Phase 2 of the two-phase safety improvement project along Crow Canyon Road. Please refer to Project A-9a for details on Phase 1.

Phase 2 safety improvements include roadway realignment, shoulder widening, roundabouts, two-way left turn lanes (as needed), and tunnels at post mile (PM) 2.15.

This project will increase safety for motorists traveling along this major arterial roadway between Castro Valley in Alameda County and San Ramon in Contra Costa County. The realignment of various curves, shoulder widening, and tunnels at PM 2.15 will facilitate improved traffic operations and reduce congestion for residents traveling between Alameda and Contra Costa Counties.

Status: This project is in the scoping stage. Construction is expected to begin after completion of Phase 1 (Project A-9a). Phasing and schedule have not yet been determined.

Cost and Funding Source

Cost (Millions)	**$58.77**
Funding (Millions)	
TVTDF	$1.69
Total Funding (Millions)	**$1.69**
Total Funding Shortfall (Millions, 2015)	**$57.08**

A-10A. VASCO ROAD SAFETY IMPROVEMENTS PHASE 1

TVTC Project Sponsor: Alameda County

Lead Agency: Alameda County

Project Description: Project A-10a is located along Vasco Road in Alameda County.

Project A-10a is Phase 1 of the Vasco Road Safety Improvements, a two-phase safety improvement project along Vasco Road. The project includes roadway realignment, shoulder widening, and installment of median barriers along Vasco Road. Please refer to Project A-10b for details on Phase 2.

Roadway realignments have been completed and consisted of straightening the alignment of Vasco Road at about 1.8-miles north of the Livermore city limits to the Alameda/Contra Costa county line. A median barrier has been installed between the Contra Costa County line and about 1.8-miles north of the Livermore city limits. The installation of median barriers eliminates crossover-type collisions that resulted in fatalities in the past. The realignment of tight curves facilitates Tri Delta bus services between Alameda and Contra Costa Counties.

The remaining components of Phase 1 includes sub-standard shoulder modifications.

Status: The utility relocation phase of this project has been completed. Construction of the realignment project was completed in November 2009. Installation of the median barriers was also completed. The Vasco Road Safety Improvement Project is scheduled to be constructed in two stages. Shoulder improvements for Phase 1 are expected to be completed by 2020.

Cost and Funding Sources

Cost (Millions)	**$40.57**
Funding (Millions)	
Measure B	$1.50
STIP	$4.60
TCRP	$6.50
Local Alameda County	$2.81
STP/CMAQ	$3.90
Prop 1-B	$6.00
Fed demo	$0.80
TVTDF	$3.32
Total Funding (Millions)	**$29.43**
Total Funding Shortfall (Millions, 2015)	**$11.14**

A-10B. VASCO ROAD SAFETY IMPROVEMENTS PHASE 2

TVTC Project Sponsor: Alameda County

Lead Agency: Alameda County

Project Description: Project A-10b is located along Vasco Road in Alameda County. Project A-10b is Phase 2 of the Vasco Road Safety Improvements, a two-phase safety improvement project along Vasco Road. Please refer to Project A-10a for details on Phase 1.

Phase 2 includes roadway realignment, shoulder widening, and installation of median barriers. This phase of the project will install median barriers along Vasco Road within Alameda County on portions of the roadway not covered by Phase 1. In addition, this phase will include shoulder widening and curve modifications, as needed. Phase 2 of Vasco Road will provide continuous median barrier protection

between Contra Costa County and the City of Livermore. The installation of median barriers will eliminate crossover-type collisions that resulted in fatalities in the past.

Status: The Phase 2 project is in the scoping stage. The Phase 2 project includes the PSR to be done by Alameda County.

Cost and Funding Sources

Cost (Millions)	**$31.20**
Funding (Millions)	
TVTDF	$2.58
Total Funding (Millions)	**$2.58**
Total Funding Shortfall (Millions, 2015)	**$28.62**

A-11. EXPRESS BUS/BUS RAPID TRANSIT (BRT) – PHASE 2

TVTC Project Sponsor: City of Dublin

Lead Agency: Livermore Amador Valley Transit Authority (LAVTA)

Project Description: Project A-11 is Phase 2 of the Express Bus/BRT, which consists of two phases. The express bus route associated with Phase 1 of the project has been operating since January 2011.

Phase 2 includes upgrades to and expansion of the initial Rapid Project, as well as some project refinements, updates, and maintenance/replacement of original project elements and equipment based on evaluation of the existing components and conditions at the time of funding. The transit system priorities include the following elements:

- A technologically advanced transit system
- A multi-modal transportation system that supports the local economy
- Prioritized regional transfers and connections
- Reliability and efficiency that maximizes value to taxpayers and the community

Phase 2 will consist of five key potential elements (based upon conditions at time of funding):

1. **Advanced Technology** – Design and installation of advanced technologies and road features allowing rapid transit to operate quickly and efficiently, and help to mitigate delay in dwell times, boardings, and travel times. Some of the advanced technologies and road features that LAVTA is considering for Phase 2 are: transit signal priority (TSP), enhanced stations, queue jumps, environmentally friendly coaches and advanced onboard technology, advanced fare collection systems, level boarding, dedicated travel lanes, and better integrated park and ride facilities and transit centers. Element 1 is currently budgeted at $2 Million.
2. **North/South Express Bus/Rapid Service** – In keeping with the Alameda Countywide Transit Plan, and in order to provide a strong foundation for LAVTA's System, I-680 service expansion, North/South Express Bus/BRT service, and other Express/Rapid service options, will be explored and considered. Element 2 is currently budgeted at $6.5 Million.
3. **Dublin Extension** – Continued study and planning will be done on how best to integrate the planned extension of Dublin Boulevard and the planned Livermore BART Extension into LAVTA's Express Bus/BRT service. Element 3 is currently budgeted at $6.5 Million.

4. **Pleasanton Alignment** – Complete "Rapidization," of the Livermore to Pleasanton alignment will be evaluated, with advanced technology and improved service elements planned for the south side of I-580, and possible connection to the existing Rapid service. Element 4 is currently budgeted at $1.5 Million.
5. **Park and Ride Lots** – In working with local cities and Alameda County, LAVTA will consider improved park and ride elements to support bus, biking, and walking access in the Tri-Valley, and to improve the accessibility of transportation alternatives that would ease congestion on I-580. These options might include: construction of new lots, smart signage, improved bicycle storage, increased pedestrian accessibility and safety, enhanced multi-modal elements on coaches, and increased or revised bus service to rail stations and regional transit connections. Element 5 is currently budgeted at $2 Million.

Status: Phase 1 is fully completed and operational, as of January 2011. Phase 2 is in the research, design, and planning stage. In August 2016, LAVTA realigned the Express Bus/BRT Route (Route 30R) to serve Las Positas College, and transformed existing Route 10 into an Express Bus/BRT (Route 10R) operating through Pleasanton to BART. The transformation of Route 10 into Route 10R was the first step in implementation of the Phase 2 Pleasanton Alignment. LAVTA intends to implement additional items from Phase 2 (Advanced Technology) to both Routes 10R and 30R in 2017, which includes upgrading the traffic signal priority onboard the buses and at key intersections along both Rapid routes. Costs for Phase 2 have been updated to reflect current pricing for the project elements listed above. Phase 2 Scope of work, schedule, and full funding parameters are not known at this time.

Cost and Funding Sources

Phase 2:

Cost (Millions)	**$22.35**
Funding (Millions)	
TVTDF	$1.14
Total Funding (Millions)	**$1.14**
Total Funding Shortfall (Millions)	**$21.21**

B-1. I-580/I-680 INTERCHANGE (WESTBOUND TO SOUTHBOUND)

TVTC Project Sponsor: City of Dublin

Lead Agency: Alameda CTC

Project Description: Project B-1 is located at the I-580/I-680 Interchange in Alameda County. The proposed project limits are from 1,700 feet east of the Hacienda Drive Overcrossing to 2,000 feet west of the San Ramon Road Overcrossing along I-580, and from the Amador Valley Boulevard Undercrossing to 3,400 feet south of the Stoneridge Drive Overcrossing along I-680.

Status: A Project Study Report-Project Development Support (PSR-PDS) was completed and approved by Caltrans in 2009.

The next steps in project development will be to:

- Review the existing PSR-PDS to validate the information

- Identify the need for updates/revisions to identify financially feasible improvements to address the latest safety, operational, and congestion issues

The Alameda CTC's 2014 Transportation Expenditure Plan (TEP), approved as part of Measure BB, includes $20 Million in funding for I-580/I-680 Interchange improvements. Further project development is being explored. Alameda CTC is working with local, regional, and state agencies in identifying funding.

The Alameda CTC's 2020 Countywide Transportation Plan (CTP) split this project into two phases. Phase 1 is part of the County's 10-year priory project list, while Phase 2 is listed under 30-Year project list.

Cost and Funding Sources

Cost (Millions, 2015)	**$1,785.65**
Funding (Millions, 2015)	
Measure BB	$20.00
TVTDF	$1.00
Total Funding (Millions, 2015)	**$21.00**
Total Funding Shortfall (Millions, 2015)	**$1,764.65**

B-2. FIFTH EASTBOUND LANE ON I-580 (SANTA RITA ROAD TO VASCO ROAD)

TVTC Project Sponsor: City of Pleasanton, City of Livermore

Lead Agency: Alameda CTC

Project Description: Project B-2 is located along eastbound I-580 between Santa Rita Road and Vasco Road. The project would construct a fifth eastbound mixed flow lane and would eliminate the lane drop at Santa Rita Road.

Status: This project has been completed.

B-3. I-580/FIRST STREET INTERCHANGE MODIFICATION

TVTC Project Sponsor: City of Livermore

Lead Agency: Caltrans

Project Description: Project B-3 is located at the I-580/First Street interchange in Livermore. The project would modify the interchange by widening the overcrossing to six lanes and reconstructing the ramps to achieve a partial cloverleaf interchange design.

Status: A PSR has been completed. The project schedule and phasing are not available at this time.

Cost and Funding Sources

Cost (Millions)	**$61.00**
Funding (Millions)	
Livermore TIF	$53.07
Total Funding (Millions)	**$53.07**
Total Funding Shortfall (Millions)	**$7.93**

B-4. I-580/VASCO ROAD INTERCHANGE MODIFICATION

TVTC Project Sponsor: City of Livermore

Lead Agency: Caltrans

Project Description: Project B-4 is located at the I-580/Vasco Road interchange in Livermore. The project would modify the interchange by widening the overcrossing to eight lanes and reconstructing the ramps to achieve a modified partial cloverleaf interchange design.

Status: A PSR and programmatic Environmental Impact Report (EIR) for right-of-way protection has been completed. Right-of-way acquisition is underway. Environmental assessment, project development activities, and design are anticipated to begin in 2018.

Cost and Funding Sources

Cost (Millions)	**$85.65**
Funding (Millions)	
Livermore TIF	$67.66
Measure BB	$1.38
TVTDF	$6.80
Total Funding (Millions)	**$75.84**
Total Funding Shortfall (Millions)	**$9.81**

B-5. I-580/GREENVILLE ROAD INTERCHANGE MODIFICATION

TVTC Project Sponsor: City of Livermore

Lead Agency: Caltrans

Project Description: Project B-5 is located at the I-580/Greenville Road interchange in Livermore. The project would modify the interchange by widening the undercrossing to six lanes and reconstructing the ramps to achieve a modified partial cloverleaf interchange design. The project would also construct segments of auxiliary lanes in the vicinity of the interchange.

Status: A PSR and programmatic EIR for right-of-way protection has been completed. Right-of-way acquisition is underway. The project phasing and schedule is unavailable.

Cost and Funding Sources

Cost (Millions)	**$86.00**
Funding (Millions)	
Livermore TIF	$67.08
Total Funding (Millions)	**$67.08**
Total Funding Shortfall (Millions)	**$18.92**

B-6. JACK LONDON BOULEVARD EXTENSION

TVTC Project Sponsor: City of Livermore

Lead Agency: City of Livermore

Project Description: Project B-6 is located along Jack London Boulevard in Livermore. The project would widen Jack London Boulevard to El Charro Road as a four-lane arterial roadway.

The project will be constructed in two phases.

- Phase 1 - two lane extension
- Phase 2 – relocate a portion of the roadway south of the Livermore Airport to its ultimate alignment

Status: An EIR, design, right-of-way acquisition, and construction of the two-lane extension (Phase 1) has been completed.

The project is expected to be constructed in two phases.

- Phase 1 – Completed 2009.
- Phase 2 - Will not commence until after the quarries have completed mining operations.

Cost and Funding Sources

Phase 2:

Cost (Millions)	**$28.16**
Funding (Millions)	
Livermore TIF	$18.08
Total Funding (Millions)	**$18.08**
Total Funding Shortfall (Millions)	**$10.08**

B-7. EL CHARRO ROAD EXTENSION (STONERIDGE DRIVE/JACK LONDON BOULEVARD TO STANLEY BOULEVARD)

TVTC Project Sponsor: City of Pleasanton

Lead Agency: City of Pleasanton

Project Description: Project B-7 is located along El Charro Road in Pleasanton. The project would extend El Charro Road south from its current terminus at Stoneridge Drive/Jack London Boulevard to connect with Stanley Boulevard. Currently, this section of El Charro Road is a private roadway, but the El Charro extension will be open for public use.

The El Charro Road Extension project consists of two phases.

- Phase 1 – between I-580 and Stoneridge Drive-Jack London Boulevard
- Phase 2 – between Stoneridge Drive-Jack London Boulevard and Stanley Boulevard, approximately 1.7 miles

Status: Phase 1 was completed and open for public use in 2012 with the construction of the Livermore Outlets. Phase 2 is dependent on the status/development of the East Pleasanton Specific Plan. This plan will identify the land use and circulation along the future El Charro Road and will identify a timeline for opening of this roadway for public use. It is anticipated that the project will be constructed with the first stages of the East Side Specific Plan development. The City of Pleasanton began the East Pleasanton Specific Plan in 2013 and the Pleasanton City Council, in 2015, determined that the completion of the Plan would occur at a later date and the Plan adoption was placed on hold.

The project is expected to be constructed in several stages.

- Phase 1 – Completed and opened to traffic in 2012.
- Phase 2 – Schedule is undetermined at this time.

Cost and Funding Sources

Cost (Millions)	**$72.48**
Funding (Millions)	$0.00
Total Funding (Millions)	**$0.00**
Total Funding Shortfall (Millions)	**$72.48**

B-8. CAMINO TASSAJARA/TASSAJARA ROAD WIDENING PROJECT (EAST OF BLACKHAWK DRIVE TO NORTH DUBLIN RANCH DRIVE)

TVTC Project Sponsor: Contra Costa County, City of Dublin

Lead Agency: Contra Costa County, City of Dublin

Project Description: Project B-8 is located along Camino Tassajara-Tassajara Road. This project consists of two project phases:

Safety Improvement Project – Blackhawk Drive in Contra Costa County to Moller Ranch (Palisades Drive) in the City of Dublin

- The safety improvement project will widen Camino Tassajara from two to four lanes from East of Blackhawk Drive to Moller Ranch (Palisades Drive) in the City of Dublin. The project may also include realignment of various horizontal curves along the roadway. Interim improvements may include roadway widening to meet two-lane rural road standards with sufficient lane width and

shoulder width to improve safety and allow for future bike lanes. The project will improve safety for motorists and create bicycle facilities consistent with the Contra Costa Countywide Bicycle and Pedestrian Plan and the City of Dublin Bicycle and Pedestrian Master Plan. The ultimate improvements will increase capacity along Camino Tassajara to help mitigate the impacts of local and regional growth in housing and employment within the Tri-Valley.

Roadway Widening Project – Windemere Parkway to County Line (Contra Costa County) and Quarry Lane School/Wallis Ranch Drive to North Dublin Ranch Drive (City of Dublin)

- The roadway widening project consist of two segments:
  - Segment A – Windemere Parkway to County line
    - Segment A will widen and realign Camino Tassajara from two to four lanes. The horizontal curves at the Contra Costa/Alameda County Line will be realigned to increase safety along the roadway. Roadway shoulders will be widened to create bicycle facilities consistent with the Contra Costa Countywide Bicycle and Pedestrian Plan. The ultimate improvements will increase capacity along Camino Tassajara/Tassajara Road to help mitigate the impacts of local and regional growth in housing and employment within the Tri-Valley.
  - Segment B – Quarry Lane School/ Wallis Ranch Drive to North Dublin Ranch Drive
    - Segment B will widen Tassajara Road from two to four lanes and will improve safety for motorists, bicyclists, and pedestrians, by providing sidewalks, bike lanes, and widening from two to four lanes. Roadway improvements will be consistent with the City of Dublin Bicycle and Pedestrian Master Plan. The ultimate improvements will increase capacity along Tassajara Road to help mitigate the impacts of local and regional growth in housing and employment within the Tri-Valley.

The segment of Tassajara Road from the County line to North Dublin Ranch Drive in the City of Dublin is a RRS and was modeled in the 2008 Nexus Study. However, the segment was not included in previous TVTDF funding plans to receive funding. By identifying this segment of the project in the project description, this will enable the City of Dublin to utilize various revenue sources, including the 20% TVTDF return-to-source funds on this segment. This will not impact the projected revenue allocation or resulting benefit of the 2008 Nexus Study.

Status:

Safety Improvement Project: The PSR for the project has been completed. The City of Dublin and Contra Costa County are coordinating on various aspects of the Camino Tassajara/Tassajara Road safety improvements near the Contra Costa/Alameda County line. Contra Costa County and the City of Dublin are beginning design of Phase 1 improvements of the safety project limits from Windermere Parkway to Moller Ranch (Palisades Drive).

Roadway Widening Project: The PSR for the project has been completed. The City of Dublin and Contra Costa County are coordinating on various aspects of the Camino Tassajara/Tassajara Road widening phase. Contra Costa County and the City of Dublin are conducting initial preliminary engineering for the Segment A and B roadway widening project within their respective jurisdictions.

Cost and Funding Sources

Safety Improvement Project
Contra Costa County:

Cost (Millions)	**$20.54**
Funding (Millions)	
Contra Costa Traffic Mitigation Fees	$4.25
TVTDF	$3.70*
Total Funding (Millions)	**$7.95**
Total Funding Shortfall (Millions)	**$12.59**

City of Dublin:

Cost (Millions)	**$34.55**
Funding (Millions, 2015)	
Dublin EDTIF	$2.49
Dublin Dougherty Valley Contributions	$0.50
TVTD (City of Dublin 20% Local Funding)	$1.00
TVTDF	$0.00*
Total Funding (Millions)	**$3.99**
Total Funding Shortfall (Millions)	**$30.56**

*The City of Dublin and Contra Costa to share $2.0 Million from the 2017 SEP Update for project segment between Windermere Parkway and Moller Ranch (Palisades Drive). Remaining $1.70 Million to be used in Contra Costa County.

Roadway Widening Project
Segment A: County

Cost (Millions)	**$17.65**
Funding (Millions)	
Contra Costa Traffic Mitigation Fees	$14.48
TVTDF	$2.68**
Total Funding (Millions)	**$17.16**
Total Funding Shortfall (Millions, 2021)	**$0.49**

Segment B: City of Dublin

Cost (Millions)	**$15.34**
Funding (Millions)	
Dublin Transportation Improvement Fee (TIF) Program	$1.00
Dublin Dougherty Valley Contributions	$1.63
TVTD (City of Dublin 20% Local Funding)	$1.80
Total Funding (Millions)	**$4.43**
Total Funding Shortfall (Millions)	**$10.91**

**$2.68 Million to be used in Contra Costa County.

B-10. I-680 SOUTHBOUND HOV LANE GAP CLOSURE (NORTH MAIN STREET TO RUDGEAR ROAD)

TVTC Project Sponsor: City of San Ramon

Lead Agency: CCTA

Lead Agency: Project B-10 is located along southbound I-680 between North Main Street and Rudgear Road. The project would close the HOV lane gap along this segment of I-680 and provide a continuous HOV lane from the Benicia-Martinez Bridge to the Contra Costa/Alameda County line.

The project is necessary to encourage carpooling, vanpooling, and transit; while providing the necessary infrastructure for express buses in the corridor. When completed, the HOV lane is planned to be converted to an Express Lane as part of the I-680 Express Lanes Project.

Status: This project has been completed.

Cost and Funding Sources

Cost (Millions)	**$98.70**
Funding (Millions)	
RM2	$14.1
Measure J	$30.4
STIP/RP	$15.6
BAIFA	$15.1
TVTDF	$6.49
Total Funding (Millions)	**$81.69**
Total Funding Shortfall (Millions)	**$17.01**

B-11A. I-680 HOV DIRECT ACCESS RAMPS

TVTC Project Sponsor: City of San Ramon

Lead Agency: CCTA

Project Description: Project B-11a is located along I-680 in San Ramon. The project would construct dedicated HOV on- and off-ramps in the median of I-680, in both the northbound and southbound directions at Norris Canyon Road or at Executive Parkway in San Ramon. The project received a high level of community interest, with a number of local residents voicing strong oppositions about the direct HOV ramps at Norris Canyon. An alternative location for the direct ramps is also being evaluated at Executive Parkway.

Status: March 2016, a letter from the City of San Ramon to CCTA was submitted and stated that the City of San Ramon withdrew support for the project. Subsequently, the CCTA has suspended work on the project. The project has been removed from the project list and is no longer considered for funding.

B-11B. I-680 TRANSIT CORRIDOR IMPROVEMENTS

TVTC Project Sponsor: City of San Ramon

Lead Agency: CCTA

Other Involved Parties: Caltrans, Southwest Area Transportation (SWAT) Committee, Transportation Partnership and Cooperation (TRANSPAC)

Project Description: Project B.11b is located along I-680 in San Ramon Valley. The project would fund a corridor express lane and operational improvements to facilitate carpools, vanpools and increase transit use in the corridor as an alternative to single occupant vehicle travel. Funding may also be used to implement high capacity transit improvements along I-680. These improvements may include an express lane, relevant transit projects, advanced traffic management programs, and/or autonomous or connected vehicles.

Status: A Project Study "I-680 Transit Investment Congestion Relief Study" was completed in 2015 with Measure J funds. Specific details for this project will be further developed when additional funding is identified. Phasing and schedule are unavailable at this time.

Cost Estimate and Funding Sources:

Cost (Millions)	**$277.85**
Funding (Millions)	
Measure J	$1.00
TVTDF	$2.00
Total Funding (Millions)	**$3.00**
Total Funding Shortfall (Millions)	**$274.85**

APPENDIX B – ADDITIONAL TVTC PROJECTS

C-1 TESLA ROAD SAFETY IMPROVEMENT

TVTC Project Sponsor: Alameda County

Project Description: This project along Tesla Road from Greenville Road to South Livermore Avenue in rural Unincorporated Alameda County includes shoulder widening, turn lanes to access wineries and residences, pavement rehabilitation, and utilities undergrounding. This safety improvements project will address rear end type collisions, improve access to wineries, and improve goods movements as well as commute traffic issues. Proposed improvements will reduce queues along this congested rural roadway connecting Unincorporated areas of Alameda County to City of Livermore.

Status: This project is in the scoping phase and is expected to be completed by 2024.

Cost and Funding Sources:

Cost (Millions)	**$13.19**
Funding (Millions)	$0.00
Total Funding (Millions)	**$0.00**
Total Funding Shortfall (Millions)	**$13.19**

C- 2 NORRIS CANYON ROAD SAFETY IMPROVEMENT PROJECT

TVTC Project Sponsors: Contra Costa County, Department of Public Works & Alameda County, Department of Public Works

Project Description: The proposed project for Norris Canyon Road includes countermeasures that will increase safety on a regional route that connects San Ramon to Alameda County. The proposed project includes the following road segments:

- Segment 1 (Norris Canyon Road from San Ramon City Limits to 300 feet west of Ashbourne Drive) – this segment has experienced an increase in run off the road collisions and is slated for countermeasures such as guardrails and other safety countermeasures.
- Segment 2 (Norris Canyon Road from 300 feet west of Ashbourne Drive to Alameda County limits) – this segment currently has a 20’ pavement width and no road shoulders. This segment has also experienced an increase in run off the road collisions. Countermeasures include shoulder widening, installation of a retaining wall, and installation of a guardrail.
- Segment 3 (Norris Canyon Road from the Alameda County limit line to Crow Canyon Road) – the narrow rural road continues west into Alameda County where the road pavement continues to be narrow with approximately 20’ existing pavement width and no road shoulders. The proposed project would include shoulder widening and guardrail installation to reduce serious injury collisions.

For each phase of this project, there will be a project scope and cost estimate, environmental documentation, preparation of plans, specifications, and estimates (PS&E), Right of Way Acquisition, Construction, and Construction Inspection.

Status: The Project is in the preliminary engineering phase for Segments 1 and 2 as other funding is sought in order to continue planning studies and further design efforts.

Cost and Funding Sources:

Contra Costa County (Segment 1 & 2):

Cost (Millions)	**$8.00****
Funding (Millions)	$0.00
Total Funding (Millions)	**$0.00**
Total Funding Shortfall (Millions)	**$8.00**

****Segment 1: $2 million, Segment 2: $6 million**

Alameda County (Segment 3):

Cost (Millions)	**$16.49**
Funding (Millions)	$0.00
Total Funding (Millions)	**$0.00**
Total Funding Shortfall (Millions)	**$16.49**

C- 3 DUBLIN BOULEVARD – NORTH CANYONS PARKWAY EXTENSION

TVTC Project Sponsor: Dublin and Livermore

Project Description: This project will construct the street extension to connect Dublin Blvd at Fallon Road in Dublin with North Canyons Parkway in Livermore at Doolan Road. The preliminary phase (currently underway) of this planned project will update the project by incorporating multimodal travel, and the current State, regional, and local priorities.

Dublin Boulevard - North Canyons Parkway Extension project would extend Dublin Boulevard in Dublin at its current terminus at Fallon Road to North Canyons Parkway in Livermore. The new extended street is planned to have 4 to 6 travel lanes, bike lanes, sidewalks, curb and gutter, traffic signals/roundabouts, a raised median, bus stops, and all street utilities. This project will consider the provision of dedicated transit lanes in addition to the mixed flow travel lanes for higher level of transit service with 10 to 20-minute headways during appropriate peak demand periods. This project will also require enhanced multimodal connectivity to various land uses along its stretch and at its terminus, including connectivity to 5 PDAs. While addressing Sustainable Communities Strategies, circulation inside and outside the PDAs will be incorporated as part of the design. This project is currently in Preliminary Design Phase (funded by local monies) including the environmental analysis for the project. It will require design and construction funding.

Status: Environmental phase is complete. Currently in design phase. Anticipated to complete design in 2023. Subsequent milestones are TBD.

Cost and Funding Sources

Cost (Millions)	**$160.39**
Funding (Millions)	
Measure BB	$7.75
Federal	$0.54
Local	$17.20
Total Funding (Millions)	**$25.49**
Total Funding Shortfall (Millions)	**$134.91**

C-4 VASCO ROAD AT DALTON AVENUE INTERSECTION IMPROVEMENTS

TVTC Project Sponsor: Alameda County/City of Livermore

Project Description: The project along Vasco Road at Dalton Avenue includes the addition of a traffic lane, traffic signal modification, shoulder widening, and utility adjustments as needed.

This project is a continuation of the safety improvements project along Vasco Road that included a roadway realignment and other safety improvements north of the Livermore city limits to the Alameda/Contra Costa county line.

Status: This project is in the scoping phase and is expected to be completed by 2023.

Cost and Funding Sources:

Cost (Millions)	**$3.39**
Funding (Millions)	$0.00
Total Funding (Millions)	**$0.00**
Total Funding Shortfall (Millions)	**$3.39**

C-5 EL CHARRO ROAD WIDENING

TVTC Project Sponsor: Pleasanton

Project Description: Construct 1.7 miles of 4-lane divided road with Class I and Class IV bike facilities, including a bridge over the Arroyo Mocho and a grade separation.

Status: This project has not been started.

Cost and Funding Sources:

Cost (Millions)	**$68.09**
Funding (Millions)	
Pleasanton TIF	$30.00
Total Funding (Millions)	**$30.00**
Total Funding Shortfall (Millions)	**$38.09**

C-6 SUNOL/680 INTERCHANGE IMPROVEMENTS

TVTC Project Sponsor: Pleasanton

Project Description: This project will fund the design of the I-680 at Sunol Boulevard interchange improvement. This will include a Project Study Report (PSR) to establish a project scope and cost estimate, environmental documentation, and the preparation of plans, specifications, and estimates (PS&E).

Status: Currently in PSR-PDS, PA&ED Phase anticipated Spring/Summer 2019

Cost and Funding Sources

Cost (Millions)	**$16.60**
Funding (Millions)	
Pleasanton TIF	$2.00
Total Funding (Millions)	**$2.00**
Total Funding Shortfall (Millions)	**$14.60**

C-7 I-680 EXPRESS LANES – HWY 84 TO ALCOSTA

TVTC Project Sponsor: Pleasanton/ACTC

Project Description: This project will close the gap between existing and in-progress high-occupancy vehicle (HOV)/express lane projects to the north and south. The project extends for approximately nine miles on northbound I-680 through Sunol, Pleasanton, Dublin, and San Ramon.

Status: Design and construction of this project is being rolled out in two phases—southbound (Phase 1) and northbound (Phase 2). Environmental and preliminary engineering studies are complete. Phase 1 final design work was initiated in February 2020 and construction for Phase 1 is anticipated to start in 2022.

Cost and Funding Sources

Cost (Millions)	**$527.57**
Funding (Millions)	
Measures BB	$20.00
Total Funding (Millions)	**$20.00**
Total Funding Shortfall (Millions)	**$507.57**

C-8 SANTA RITA/I-580 INTERCHANGE

TVTC Project Sponsor: Pleasanton

Project Description: This project will construct a 2nd southbound left turn lane from Santa Rita onto Pimilico Drive. The left turn vehicle queue length exceeds the length of the left turn pocket and blocks the #1 southbound lane, thus reducing the Level of Service.

Status: This project has not been started.

Cost and Funding Sources

Cost (Millions)	**$10.33**
Funding (Millions)	
Pleasanton TIF	$7.70
Total Funding (Millions)	**$7.70**
Total Funding Shortfall (Millions)	**$2.63**

C-9 STONERIDGE/I-680 INTERCHANGE

TVTC Project Sponsor: Pleasanton

Project Description: This project will make modifications to the Stoneridge Drive Interchange to allow four westbound through lanes. This project will modify the northbound I-680 on ramp by one lane to provide two northbound ramp lanes. The widening will include the widening of the bridge structure as well as widening on Stoneridge Drive and safety improvements on the pedestrian and bicycle crossing.

Status: PS&E

Cost and Funding Sources

Cost (Millions)	**$11.98**
Funding (Millions)	
2014 MBB (TEPO – 26) from Alameda CTC	$5.20
Developer	$2.70
Total Funding (Millions)	**$7.70**
Total Funding Shortfall (Millions)	**$2.63**

C-10 INNOVATE 680

TVTC Project Sponsor: CCTA/Danville/San Ramon/CCC

Project Description: Implement the following strategies in the I-680 corridor:

Strategy No. 1: Complete HOV/Express Lanes
Eliminate the gap in existing carpool lanes in the NB direction and convert to an express lane to increase efficiency.

Strategy No. 2: Cool Corridor "Hot Spots"
Improve congestion "hot spots" caused by high-volume weaving areas around N. Main Street, Lawrence Way, Treat Blvd, and other locations south of SR 24 (Livorna Road, etc.). This strategy will be completed with Strategy 1 since they are interdependent.

Strategy No. 3: Increase Efficiency of Bus Service
Increase bus service efficiency by improving express bus service, implementing bus operations on shoulder (BOS), and increasing technology-based intermodal transit centers/managed park and ride lots.

Strategy No. 4: Enhance TDM Strategies

Provide enhanced 511 mobile app providing options to make informed decisions about mode choice, travel time, and cost per trip.

Strategy No. 5: Provide First Mile/Last Mile Connections
Implement Shared Autonomous Vehicles (SAVs) to improve transit connectivity and to shift travelers from Single Occupant Vehicles (SOVs).

Strategy No. 6: Innovative Operational Strategies
Deploy a suite of technology-based solutions to maximize the efficiency of the roadway system integrating adaptive ramp metering, integrated corridor management, incident management, and decision support systems.

Strategy No. 7: Prepare Corridor for the Future
Prepare corridor to accommodate the evolution of CV applications and AV technologies for improved traffic flow by building new and upgraded vehicle-to-infrastructure and vehicle-to-vehicle communications.

TVTDF would go towards Advance Technology portions of the project.

Status: Currently in Planning, PA&ED

Cost and Funding Sources:

Advance Technologies:

Cost (Millions)	**$57.21**
Funding (Millions)	
Measure J	$0.55
STMP	$2.00
Total Funding (Millions)	**$2.55**
Total Funding Shortfall (Millions)	**$54.66**

C-11A IRON HORSE TRAIL BICYCLE PEDESTRIAN OVERCROSSING – CITY OF SAN RAMON

TVTC Project Sponsor: CCTA/San Ramon/CCC

Project Description: The Iron Horse Trail (IHT) is an 18-mile regional non-motorized trail that runs north/south through the San Ramon Valley providing critical access to adjacent land uses. The construction of overcrossings at key locations will develop attractive travel alternatives for congestion relief for commute trips as well as enhanced facilities for school, shopping, and recreation trips. For the scope of this project, the proposed overcrossing location is Bollinger Canyon Road. At this location, the overcrossing will provide substantial benefits including:

1. Improve safety by eliminating conflicts between pedestrians, bicyclists and motorists;
2. Improve motor vehicle circulation by removing the at-grade crossings;
3. Reduce and eliminate unsafe crossing maneuvers by pedestrians and bicyclists;
4. Enhance safety by providing an environment that encourages walking and bicycling along the Iron Horse Regional Trail; and
5. Increase trail usage by improving the connectivity at the Bollinger Canyon Road and Crow Canyon Road crossings.

Status: Currently in PA&ED, CEQA Completed. Design Underway. Construction anticipated 2022.

Cost and Funding Sources

Cost (Millions)	**$22.88**
Funding (Millions)	
OBAG2	$4.80
Measure J (Transportation for Livable Communities)	$2.51
Measure J (TLC future year pre-commitment)	$4.98
San Ramon General Fund	$2.00
Total Funding (Millions)	**$14.30**
Total Funding Shortfall (Millions)	**$8.58**

C-11B IRON HORSE TRAIL BICYCLE PEDESTRIAN OVERCROSSING – CITY OF SAN RAMON

TVTC Project Sponsor: CCTA/San Ramon/CCC

Project Description: The Iron Horse Trail (IHT) is an 18-mile regional non-motorized trail that runs north/south through the San Ramon Valley providing critical access to adjacent land uses. The construction of overcrossings at key locations will develop attractive travel alternatives for congestion relief for commute trips as well as better facilities for school, shopping, and recreations trips. For the scope of this project, the proposed overcrossing location is Bollinger Canyon Road. At this location, the overcrossing will provide substantial benefits including:

1. Improve safety by eliminating conflicts between pedestrians, bicyclists, and motorists;
2. Improve motor vehicle circulation by removing the at-grade crossings;
3. Reduce and eliminate unsafe crossing maneuvers by pedestrians and bicyclists;
4. Enhance safety by providing an environment that encourages walking and bicycling along the Iron Horse Regional Trail; and
5. Increase trail usage by improving the connectivity at the Bollinger Canyon Road and Crow Canyon Road crossings.

Status: Currently in PA&ED, CEQA Completed

Cost and Funding Sources

Cost (Millions)	**$19.69**
Funding (Millions)	$0.00
Total Funding (Millions)	**$0.00**
Total Funding Shortfall (Millions)	**$19.69**

C-11C IRON HORSE TRAIL CROSSING AT DUBLIN BOULEVARD

TVTC Project Sponsor: Dublin

Project Description: This project will build a bicycle and pedestrian bridge over Dublin Boulevard in order to connect two segments of the Iron Horse Trail. This bridge will create a total separation between vehicles and bicyclists/pedestrians. This will eliminate the possibility of motorized vehicles and pedestrians having a collision, making this segment of the road safer for all users. Along with this, congestion will be reduced as cars will no longer have to wait for pedestrians. This reduction of congestion will also allow for the transit to operate more efficiently. Pedestrians and bicyclists will also not have to wait for a walk signal since they will be able to continue their walk or ride without stopping.

The bridge will follow ADA requirements so that disabled people will be able to use it as well. This bridge will also be aesthetically pleasing in order to attract users and improve the user's experience. The bridge will also connect BART to Dublin in a safe manner, encouraging recreational user of the Iron Horse Trail and the opening of local businesses. This safe and fast route of crossing the Iron Horse Trail will promote walking and bicycling for both recreational and commuting purposes in Dublin, this encouraging the shift from motorized vehicles to alternative forms of transportation.

Status: The project is currently in the final design phase. Additionally, Environmental Analysis of the project is currently in-progress.

Cost and Funding Sources

Cost (Millions)	**$11.60**
Funding (Millions)	
2014 MBB	$6.05
TFCA	$0.86
Local	$0.23
Private	$1.00
Total Funding (Millions)	**$11.60**
Total Funding Shortfall (Millions)	**-**

C-11D IRON HORSE TRAIL

TVTC Project Sponsor: Livermore

Project Description: This project will extend existing trail and provide gap closures.

Status: Feasibility Study/Environmental Complete

Cost and Funding Sources

Cost (Millions)	**$26.99**
Funding (Millions)	$0.00
Total Funding (Millions)	**$0.00**
Total Funding Shortfall (Millions)	**$26.99**

C-11E IRON HORSE TRAIL TO SHADOW CLIFFS CONNECTION

TVTC Project Sponsor: Pleasanton, Alameda County

Project Description: Currently, the Iron Horse Trail (IHT) ends as a narrow-paved path to the overcrossing bridge of the regional railway on the east side of Valley Avenue, where there is a flat, paved spaced under the railroad bridge that could accommodate the trail.

This project would construct a continuous Class I trail, at least 10 feet wide, and would include protected intersection improvements and additional crossing improvements of Valley/Bernal and Stanley to improve pedestrian and bicyclist safety.

Status: This project has not started.

Cost and Funding Sources

Cost (Millions)	**$1.65**
Funding (Millions)	
Pleasanton TIF	$0.60
Direct Developer Fee	$0.75
Total Funding (Millions)	**$1.35**
Total Funding Shortfall (Millions)	**$0.30**

C-11F IRON HORSE TRAIL CONNECTION IMPROVEMENTS AT SANTA RITA ROAD

TVTC Project Sponsor: Pleasanton

Project Description: The Iron Horse Trail (IHT) is a major north-south regional route for bicyclists and cyclists. The Arroyo Mocho Trail (AMT) is an important east-west route for bicyclists and pedestrians extending to Livermore that bypasses many busy streets.

This project would improve connections from the IHT on Santa Rita Road to the AMT. The AMT would receive an improved Class I Pathway. A new pedestrian bridge would be constructed over the Arroyo Mocho to connect the southern Arroyo Mocho Class I pathway to the IHT to the north. The IHT then connects to the north and provides access to the Dublin/Pleasanton BART station.

Status: This project has not started. TBD

Cost and Funding Sources

Cost (Millions)	**$0.87**
Funding (Millions)	
Pleasanton TIF	$0.40
Total Funding (Millions)	**$0.40**
Total Funding Shortfall (Millions)	**$0.48**

C-11G IRON HORSE TRAIL BICYCLE/PEDESTRIAN OVERCROSSING – TOWN OF DANVILLE

TVTC Project Sponsor: Danville/CCC/CCTA

Project Description: The Iron Horse Trail (IHT) is an 18-mile regional non-motorized trail that runs north/south through the San Ramon Valley providing critical access to adjacent land uses. The construction of overcrossings at key locations will develop attractive travel alternatives for congestion relief for commute trips as well as better facilities for school, shopping, and recreations trips. For the scope of this project, the proposed overcrossing location is Bollinger Canyon Road. At this location, the overcrossing will provide substantial benefits including:

1. Improve safety by eliminating conflicts between pedestrians, bicyclists, and motorists;
2. Improve motor vehicle circulation by removing the at-grade crossings;
3. Reduce and eliminate unsafe crossing maneuvers by pedestrians and bicyclists;
4. Enhance safety by providing an environment that encourages walking and bicycling along the Iron Horse Regional Trail; and
5. Increase trail usage by improving the connectivity at the Bollinger Canyon Road and Crow Canyon Road crossings.

Status: PSR (Feasibility Study) completed. Project will require coordination, permitting, and agreements with Contra Costa County. East Bay Regional Parks Direct and various utilities.

Cost and Funding Sources

Cost (Millions)	**$19.78**
Funding (Millions)	$0.00
Total Funding (Millions)	**$0.00**
Total Funding Shortfall (Millions)	**$19.78**

C-11H IRON HORSE TRAIL SYSTEM-WIDE IMPROVEMENTS

TVTC Project Sponsor: Contra Costa County, Town of Danville, City of San Ramon, Alameda County, City of Dublin, City of Livermore, and City of Pleasanton

Project Description: As the primary regional multi-modal corridor between Contra Costa and Alameda County, the Iron Horse Trail is the spine for active modes of travel in the East Bay. The proposed project for the Iron Horse Trail includes safety, operational, and capacity improvements within the TVTC boundary from Alamo to Livermore. The proposed project and associated cost estimate includes safety improvements at roadway crossings, a proposed parallel path to separate users according to speed, and a buffer between users traveling at high or low speed. The improvements would include features such as passive detection at road crossings, actuated flashers or warning signals at roadway crossings, high visibility markings, minor grading, construction of a new 10 foot wide parallel asphalt path with shoulders, and a buffer between high and low speed corridors which may include vegetation or fencing to maintain safe separation. Other safety improvements may be necessary to fit site conditions and as determined through additional study.

Separated grade crossings or bridges that have already been identified as critical for improved vehicle traffic flow at current at grade crossings and to improve safety for trail users are listed as separate projects

within the TVTC program. The cost and context for each bridge site warrants a specific project identification rather than to be included within the system-wide improvements under this project.

Status: A phasing plan has not yet been developed.

Cost and Funding Sources:

Cost (Millions)	**$85.60**
Funding (Millions)	$0.00
Total Funding (Millions)	**$0.00**
Total Funding Shortfall (Millions)	**$85.60**

C-12 I-680 INTERCHANGE IMPROVEMENTS AT HACIENDA DRIVE

TVTC Project Sponsor: Dublin and Pleasanton

Project Description: Implement I-580 Hacienda Drive Interchange Improvements, which includes reconstructing the overcrossing to add lanes.

I-580/Hacienda Drive interchange Improvements will include; reconstruction of overcrossing to provide additional northbound lane; widening of the eastbound off-ramp to include an additional lane to be used as a combined left and right turn lane; modifying signal and striping, modifying the westbound loop on-ramp; and widening of the westbound off-ramp to include a third left-turn lane.

Status: The project is currently in Preliminary Engineering phase and an EIR is currently underway.

Cost and Funding Sources

Cost (Millions)	**$39.13**
Funding (Millions)	
Dublin TIF	$4.95
Pleasanton TIF	$0.04
Total Funding (Millions)	**$4.63**
Total Funding Shortfall (Millions)	**$34.50**

C-13 FALLON/EL CHARRO INTERCHANGE

TVTC Project Sponsor: Pleasanton, Dublin, Livermore

Project Description: I-580/El Charro Road Interchange Improvements (Phase 2): reconstruction of overcrossing to provide four-lanes in each direction with bike lanes; reconstruction of the southbound to eastbound loop on-ramp; widening of the eastbound off-ramp to provide two exit lanes with two left turn and two right tum lanes; widening of the eastbound on-ramp; widening of the westbound off-ramp to provide two left tum and two right tum lanes; and widening of the westbound on-ramp.

Status: The project has not yet started.

Cost and Funding Sources

Cost (Millions)	**$34.51**
Funding (Millions)	
Dublin TIF	$4.05
Pleasanton TIF	$4.10
Livermore TIF	$6.40
Total Funding (Millions)	**$14.55**
Total Funding Shortfall (Millions)	**$19.96**

C-14 VALLEY LINK RAIL (PHASE 1)

TVTC Project Sponsor: Pleasanton, Dublin, Livermore, Alameda County

Project Description: This project will connect Northern San Joaquin County communities to the Tri-Valley and Bay Area Rapid Transit (BART) through 41 miles of rail and 7 stations. The project will extend from the planned ACE N. Lathrop Station in the San Joaquin Valley through the Altamont Pass, then readily connect with the Dublin/Pleasanton BART terminus. The TVTDF would go towards construction cost and access improvement for three stations in Tri-Valley Area (Dublin/Pleasanton, Isabel, and Greenville).

Status: 2018-2020 Design/Environmental, 2019-2023 Procurement, 2020-2026 Design/Construction.

Cost and Funding Sources:

Cost (Millions)	**$258.25**
Funding (Millions)	$0.00
Total Funding (Millions)	**$0.00**
Total Funding Shortfall (Millions)	**$258.25**

C-15 TECHNOLOGY ENHANCEMENTS

TVTC Project Sponsor: Pleasanton, Dublin, Livermore

Project Description: Provide connectivity for transit and vehicles between local arterials and regional facilities. This project will also focus on the first and last mile connectivity at key transit hubs and along major transit routes.

A. Support expansion and facilitate interoperability among partner agencies of existing and future intelligent transportation system deployments, including connected/autonomous vehicles, integrated corridor management, transit vehicle operations, and emergency vehicle operations, among other uses.
B. Plan and implement connected and autonomous vehicle access in a seamless manner across Tri-Valley jurisdictions' boundaries including arterial access to freeways. This requires a continued emphasis on sharing communication infrastructure, field equipment at jurisdictional boundaries, and data.
C. Update the existing communication links and enhance the existing connectivity of all Tri-Valley Traffic Operations Centers for on-going data and communication sharing.

D. Prepare corridors around transit centers and BART stations to implement Shared Autonomous Vehicles (SAVs) to improve transit connectivity to shift travelers from Single Occupancy Vehicles (SOVs) to transit.
E. Prepare intersections around transit center and ABRT stations to accommodate the evolution of Connected Vehicle applications and Autonomous Vehicle technologies for improved traffic flow by building new and upgraded vehicle-to-infrastructure and vehicle-to-vehicle communications.
F. Test and develop standard/protocol at the intersections, through existing and new Vehicle-to-Everything (V2X) and Vehicle-to-Infrastructure (V2I) technologies as a regional standard to be adopted by the local agencies among the Tri-Valley Jurisdictions. These technologies will allow a vehicle to communicate in real time with its surroundings.
G. Work with regional agencies in incorporating signal and vehicle communications in day to day operations. This would include sharing of equipment and data for seamless integration of connected and autonomous vehicle access across Tri-Valley Jurisdictions and freeway infrastructure including express lanes.

The project will be implemented in phases. Phase 1 of the proposed project will comprise of a feasibility study to identify potential locations, improvements, and develop cost estimates at key transit hubs, along major transit routes, and at freeway access locations in tri-valley area. Phase 2 of the project will further the development of the project with completion of design and Phase 3 will compete the construction/implementation and operation of the proposed project.

Status: The project is currently not yet started.

Cost and Funding Sources

Cost (Millions)	**$0.33**
Funding (Millions)	$0.00
Total Funding (Millions)	**$0.00**
Total Funding Shortfall (Millions)	**$0.33**

C-16 I-680 EXPRESS BUS SERVICE

TVTC Project Sponsor: Alameda CTC, in partnership with CCTA

Project Description: This project proposes to construct capital improvements and purchase buses in order to establish an express bus service on I-680. This project requires the construction of the I-680 Express Lane Gap Closure project, closing the gap in the express lanes between Alcosta Blvd and State Route 84, in order to utilize the express lanes to avoid congestion, reduce travel time, and improve reliably, as part of an express bus service between the Tri-Valley communities and Silicon Valley. This express bus service would likely be combined with and become part of similar efforts by Contra Costa Transportation Authority (CCTA) and their Innovate 680 program, with the intent to serve the entire I-680 corridor extending from Martinez to San Jose, utilizing buses to provide access to additional commute options, including BART, Amtrak, Caltrain, VTA light rail, local bus service, and Greyhound, for those living along the corridor.

The service would operate weekdays only, with proposed 20-minute headways during peak periods and one-hour headways during off-peak hours. The service would be bi-directional to avoid substantial deadhead time and to maintain a high level of service. New electric buses would be purchased as part of this project.

The project proposes to place express bus stops in the Tri-Valley area at the West Dublin/Pleasanton BART Station and at a future park and ride to be constructed at the Bernal Avenue interchange in Pleasanton. Understanding that the express buses must merge across all lanes of traffic to access the express lane, these stop locations are spaced to efficiently serve the Tri-Valley area while also maximizing the express lane distance the bus is able to utilize in-between bus stops.

The estimated costs below assume that at each bus stop location there would be construction of roadway and bus stop improvements, including installation of transit amenities such as shelters, bike lockers, lighting, and real time information signs.

Status: A project schedule has not yet been developed.

Cost and Funding Sources:

Cost (Millions)	**$59.35**
Funding (Millions)	$0.00
Total Funding (Millions)	**$0.00**
Total Funding Shortfall (Millions)	**$59.35**

APPENDIX C – PROJECT IMPROVEMENT CATEGORIES

	Project	Improvement Category*
A-2a	State Route 84 (SR 84) Expressway (I-580 to I-680)	Roadway Capacity
A-2b	SR 84/I-580 Interchange	Roadway Capacity
A-9a	Crow Canyon Road Improvements Phase 1	Safety
A-9b	Crow Canyon Road Improvements Phase 2	Safety
A-10a	Vasco Road Safety Improvements Phase 1	Safety
A-10b	Vasco Road Safety Improvements Phase 2	Safety
A-11	Express Bus/Bus Rapid Transit (BRT) – Phase 2	Safety
B-1	I-580/I-680 Interchange (westbound to southbound)	Roadway Capacity
B-3	I-580/First Street Interchange Modification	Roadway Capacity
B-4	I-580/Vasco Road Interchange Modification	Roadway Capacity
B-5	I-580/Greenville Road Interchange Modification	Roadway Capacity
B-6	Jack London Boulevard Extension	Roadway Capacity
B-7	El Charro Road Extension (Stoneridge Drive/Jack London Boulevard to Stanley Boulevard)	Roadway Capacity
B-8	Camino Tassajara/Tassajara Road Widening Project (East of Blackhawk Drive to North Dublin Ranch Drive)	Roadway Capacity Safety
B-10	I-680 Southbound HOV Lane Gap Closure (North Main Street to Rudgear Road)	Roadway Capacity
B-11b	I-680 Transit Corridor Improvements	Transit
C-1	Tesla Road Safety Improvements	Safety
C-2	Norris Canyon Road Safety Improvement	Safety
C-3	Dublin Boulevard – North Canyons Parkway Extensions	Roadway Capacity
C-4	Vasco Road at Dalton Avenue Intersection Improvements	Intersection
C-5	El Charro Road Widening	Roadway Capacity
C-6	Sunol/680 Interchange Improvements	Roadway Capacity
C-7	I-680 Express Lanes – Hwy 84 to Alcosta	Roadway Capacity
C-8	Santa Rita/I-580 Interchange	Intersection
C-9	Stoneridge/I-680 Interchange	Roadway Capacity
C-10	Innovate 680	Technology
C-11a	Iron Horse Trail Bicycle-Pedestrian Overcrossing – Bollinger Canyon Road	Pedestrian/Bicycle
C-11b	Iron Horse Trail Bicycle-Pedestrian Overcrossing – Crow Canyon Road	Pedestrian/Bicycle
C-11c	Iron Horse Trail – Dublin	Pedestrian/Bicycle
C-11d	Iron Horse Trail – Livermore	Pedestrian/Bicycle
C-11e	Iron Horse Trail to Shadow Cliffs	Pedestrian/Bicycle
C-11f	Iron House Trail Connection Improvements at Santa Rita Road	Pedestrian/Bicycle
C-11g	Iron Horse Trail Bicycle/Pedestrian Overcrossing – Sycamore Valley Road	Pedestrian/Bicycle

	Project	Improvement Category*
C-11h	Iron Horse Trail Safety Improvements	Pedestrian/Bicycle
C-12	Hacienda/I-580 Interchange Improvements	Roadway Capacity
C-13	Fallon/El Charro Interchange Improvements	Roadway Capacity
C-14	Valley Link Rail (Phase 1)	Transit
C-15	Technology Enhancements	Technology
C-16	I-680 Express Bus Service	Transit

Note: Table only includes projects that have not been fully completed.

* Improvement category used to determine project benefit for Nexus. Projects may also project additional benefits to the system.