APPENDIX A

RIDERSHIP DEVELOPMENT

Appendix A -
Ridership Development

This section documents the data collection effort, methodology, and analysis results of the SR 85 BRT service ridership development.

A.1 Data Collection

Data was collected to determine the number of work-related trips in station areas, the mode of transportation to work, as well as travel patterns within the corridor.

A.1.1 US Census LEHD Trips Data

The US Census Longitudinal Employer-Household Dynamics (LEHD) OnTheMap online portal was utilized to collect the daily work-related trips around station areas. The LEHD program provides origin-destination employment information at the Census block level. The total daily inflow and outflow trips in the station catchment areas were collected. These data represent 2017 work-related trips, the most recent available.

Inflow represents the number of trips generated by commuters employed in the selected area and living elsewhere. Outflow represents the number of trips generated by commuters living in the selected area and employed outside. Therefore, Inflow trips represent "attraction" trips in the AM peak period while Outflow trips represent "production" trips in the AM peak period. These trips are reversed during the PM peak period. A sample snapshot of LEHD trips from the database using the OnTheMap online portal is shown in **Figure A-1**.

Figure A-1 OnTheMap Queried Trips

A.1.2 American Community Survey

American Community Survey (ACS) 2017 means of transportation to work (ID: B08301) 5-year estimate data were used to calculate the potential transit mode share of trips that could use the SR 85 service once it is built.

ACS is an ongoing survey providing socio-demographic information at multiple geographical levels. The Means of Transportation to Work data provides estimates of the number of commuters using different modes of transportation to work (e.g., private vehicle, carpool, taxi, and public transportation). The number of commuters using public transportation was gathered and compared to the total number of commuters to derive the percentage of public transportation use at the Census tract level.

A.1.3 StreetLight Data

StreetLight Data, Inc. obtains data from location-based services such as smartphone apps, global positioning system (GPS) enabled devices, and traditional data sources. StreetLight processes these data by transforming data points into contextualized, aggregated, and normalized travel patterns and evaluates the data using StreetLight Insight, a big data platform. StreetLight data was used to understand the O-D patterns in the study area.

The O-D trips during the AM (6-11 AM) and PM (2-8 PM) peak periods collected in the previous phase of this project were used to establish the O-D distribution of potential SR 85 trips in the study area.

A.2 Methodology

This section documents the scenarios being evaluated and processes and methods of using the data to estimate SR 85 BRT ridership.

A.2.1 Scenarios

Two routing options along with stations are being evaluated.

- Option 1 - Mountain View-Ohlone/Chynoweth with Freeway Stations: BRT buses travel between the Mountain View and Ohlone/Chynoweth terminal stations and stop at on-line freeway stations (BRT does not exit SR 85). The stations along SR 85 are as follows.
    - 1: Mountain View Transit Center
    - 2: El Camino Real
    - 3: Stevens Creek Blvd
    - 4: Saratoga Ave
    - 5: Bascom Ave
    - 6: Ohlone-Chynoweth LRT Station
- Option 2 - Mountain View-Ohlone/Chynoweth with Freeway and Offline Stations: BRT buses travel between the Mountain View and Ohlone/Chynoweth terminal stations and stop at freeway and offline stations. The stations along SR 85 are as follows.

- 1: Mountain View Transit Center
- 2: El Camino Real
- 3: De Anza College Transit Center
- 4: West Valley College Transit Center
- 5: Good Samaritan Hospital
- 6: Ohlone-Chynoweth LRT Station

The analysis periods are the AM and PM peak periods that correspond to the VTA Regional Travel Demand Model's peak periods. The assumed peak period duration is four hours.

A.2.2 Station Catchment Area

A station catchment area is defined as a third-mile buffer around each station. A third of a mile equates to approximately 7 to 8 minutes of walk time. The transit network around the study area was assessed, and it was determined that no connecting service should be considered due to the existing established transit network northeast of the study area (i.e., denser areas in San Jose and nearby cities) and limited frequent connecting service at the proposed stations along SR 85. Potential trips using SR 85 service are considered to be generated from these station catchment areas (both production and attraction).

The station catchment areas for Options 1 and 2 are shown in **Figures A-2 and A-3**.

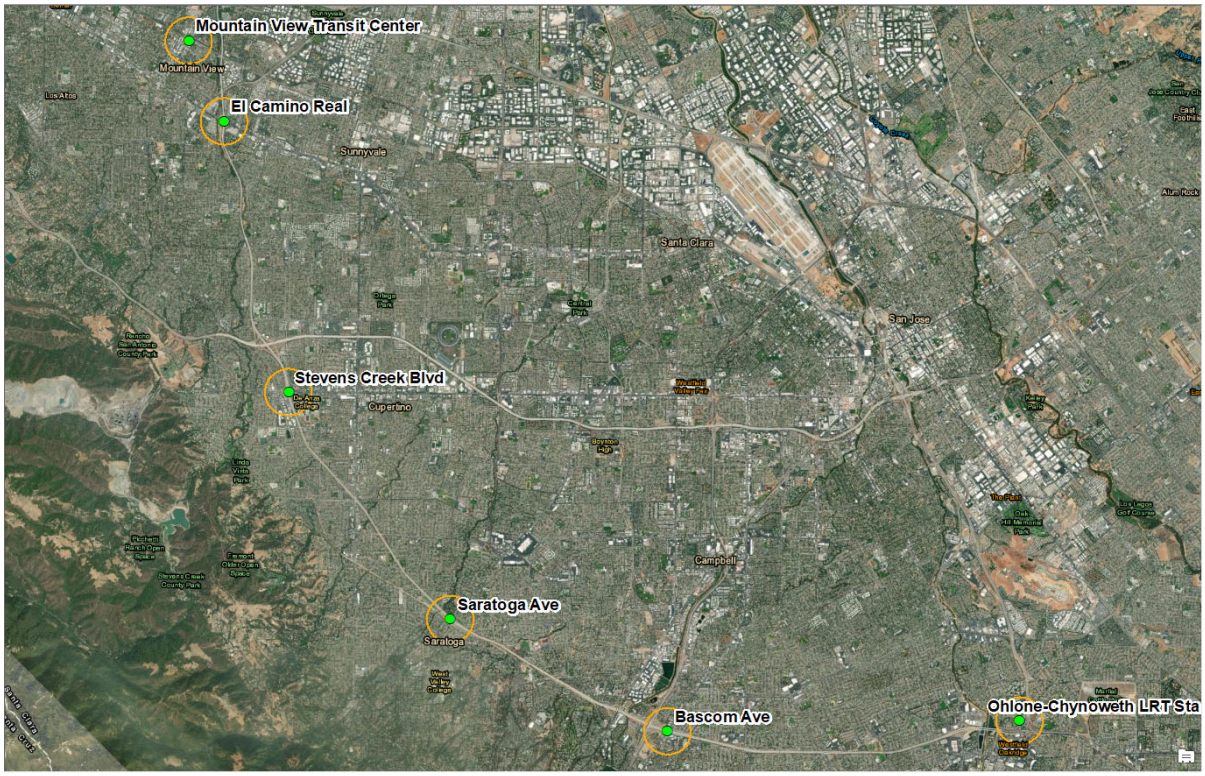

Figure A-2 Station Catchment Areas - Option 1

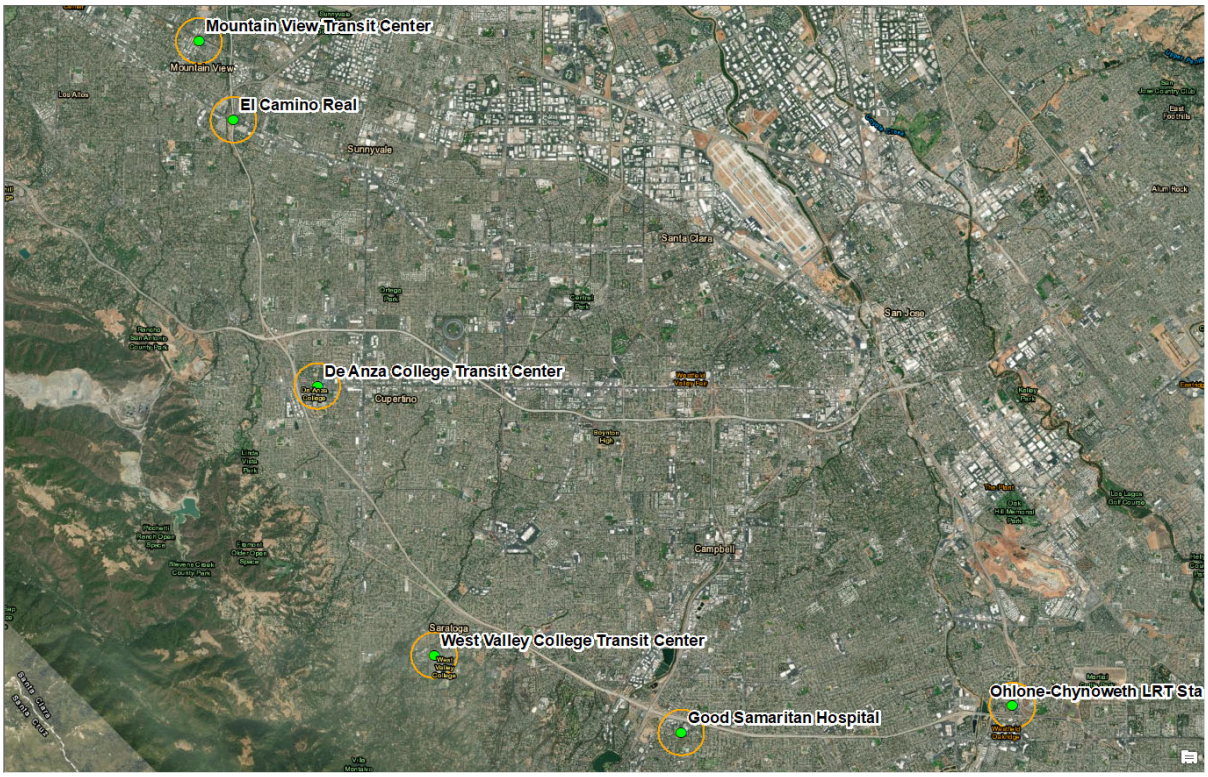

Figure A-3 Station Catchment Areas - Option 2

A.2.2 Trip Generation

A third-mile buffer was specified in the OnTheMap portal to collect 2017 daily inflow and outflow trips from the LEHD database. It is assumed that the Inflow trips are the "attraction" trips during the AM peak period and "production" trips during the PM peak period. On the contrary, the daily Outflow trips in an area are the "production" trips during the AM peak period and "attraction" trips during the PM peak period. The collected Inflow and Outflow trips for the two routing options are shown in **Tables A-1** and **A-2**.

Table A-1 LEHD Trips - Option 1

ID	Station	Census Blocks	Inflow	Outflow	Internal
1	Mountain View Transit Center	73	4,269	1,675	34
2	El Camino Real	41	1,430	2,170	20
3	Stevens Creek Blvd Stop	28	2,356	805	10
4	Saratoga Ave	29	102	835	0
5	Bascom Ave	57	3,844	693	13
6	Ohlone-Chynoweth LRT Station	10	545	951	15
		Total	**12,546**	**7,129**	**92**

Source: US Census, LEHD, 2017

Table A-2 LEHD Trips - Option 2

ID	Station	Census Blocks	Inflow	Outflow	Internal
1	Mountain View Transit Center	73	4,269	1,675	34
2	El Camino Real	41	1,430	2,170	20
3	De Anza College Transit Center	26	2,158	705	8
4	West Valley College Transit Center	18	744	226	0
5	Good Samaritan Hospital	34	3,823	1,084	24
6	Ohlone-Chynoweth LRT Station	10	545	951	15
		Total	**12,969**	**6,811**	**101**

Source: US Census, LEHD, 2017

The attraction and production trips during the AM and PM periods under Option 1 and Option 2 scenarios are shown in **Tables A-3** and **A-4**.

Table A-3 Trip Generation - Option 1

ID	Station	AM Peak Period		PM Peak Period	
		Attraction	Production	Attraction	Production
1	Mountain View Transit Center	218	85	85	218
2	El Camino Real	73	111	111	73
3	Stevens Creek Blvd	120	41	41	120
4	Saratoga Ave	5	43	43	5
5	Bascom Ave	196	35	35	196
6	Ohlone-Chynoweth LRT Station	28	49	49	28
	Total	**640**	**364**	**364**	**640**

Source: US Census, LEHD Data, 2017, Study team calculations

Table A-4 Trip Generation - Option 2

ID	Station	AM Peak Period		PM Peak Period	
		Attraction	Production	Attraction	Production
1	Mountain View Transit Center	218	85	85	218
2	El Camino Real	73	111	111	73
3	De Anza College Transit Center	110	36	36	110
4	West Valley College Transit Center	38	12	12	38
5	Good Samaritan Hospital	195	55	55	195
6	Ohlone-Chynoweth LRT Station	28	49	49	28
	Total	**661**	**347**	**347**	**661**

Source: US Census, LEHD Data, 2017, Study team calculations

Under Alternative 3-1 buses do not stop at the El Camino Real interchange (only passing by). There is no trip generation from the El Camino Real station area. The attraction and production trips for Alternative 3-1 under the Option 1 and Option 2 scenarios are shown in **Tables A-5** and **A-6**.

Table A-5 Trip Production - Option 1, Alternative 3-1

ID	Station	AM Peak Period		PM Peak Period	
		Attraction	Production	Attraction	Production
1	Mountain View Transit Center	218	85	85	218
3	Stevens Creek Blvd Stop	120	41	41	120
4	Saratoga Ave	5	43	43	5
5	Bascom Ave	196	35	35	196
6	Ohlone-Chynoweth LRT Station	28	49	49	28
	Total	**567**	**253**	**253**	**567**

Source: US Census, LEHD Data, 2017, Study team calculations

Table A-6 Trip Production - Option 2, Alternative 3-1

ID	Station	AM Peak Period		PM Peak Period	
		Attraction	Production	Attraction	Production
1	Mountain View Transit Center	218	85	85	218
3	De Anza College Transit Center	110	36	36	110
4	West Valley College Transit Center	38	12	12	38
5	Good Samaritan Hospital	195	55	55	195
6	Ohlone-Chynoweth LRT Station	28	49	49	28
	Total	**588**	**237**	**237**	**588**

Source: US Census, LEHD Data, 2017, Study team calculations

A.2.3 Mode Split

Because the SR 85 service is not yet built, existing mode share for the area around the proposed stations along SR 85 does not reflect the true potential for commuters to take the BRT bus. To develop a mode share assumption, the Santa Clara countywide Census tract level data from the ACS Means of Transportation to Work dataset was collected and plotted.

The plotted mode shares in the total of 372 Census tracts are shown in **Figure A-4**. Transit service exists or is accessible in the Census Tracts with higher mode shares. The average mode share of 5.1 percent from the top 300 Census Tracts was selected to represent the potential share of commuters in the station areas that would use the SR 85 BRT service when it is implemented, based on the observation that the proposed transit service levels on the SR 85 corridor under each of the build alternatives represents a relatively high level of service.

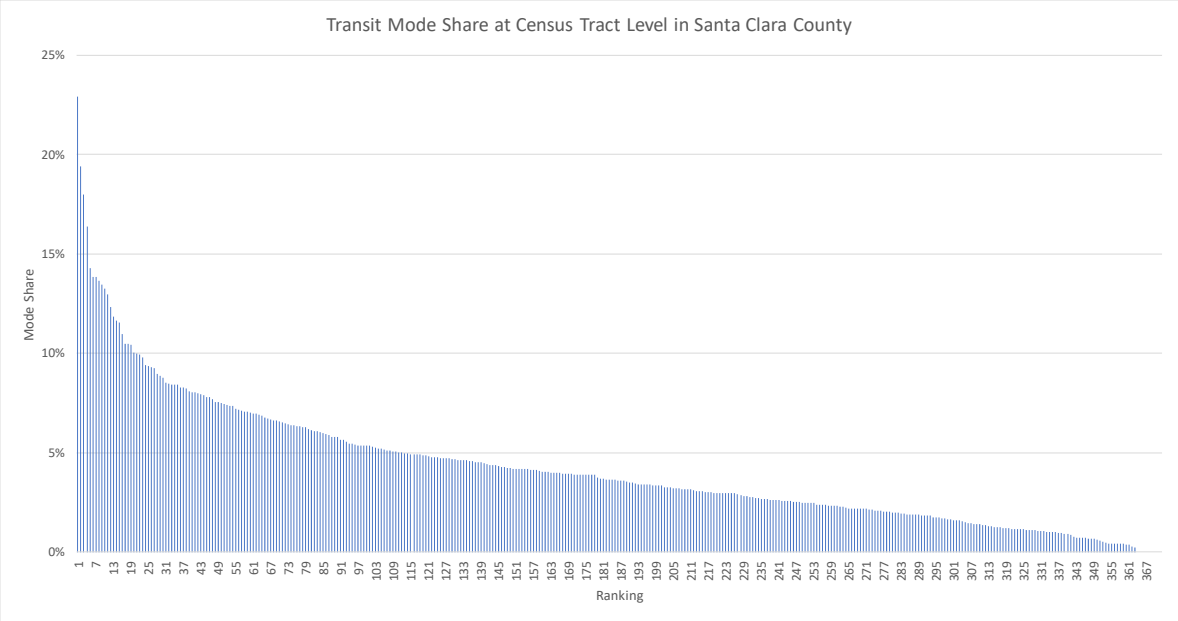

Figure A-4 ACS Transit Mode Share

Source: US Census, ACS 5-Year Estimate Data, 2017, Study team calculations

The attraction and production trips estimated in the Trip Generation phase were multiplied by the 5.1 percent mode share to estimate the potential trips that would use the SR 85 BRT service once it is implemented.

A.2.4 Trip Distribution

The StreetLight O-D trips during the AM and PM peak periods were collected during the previous phase of this project. The O-D trip percentages based on origin were calculated. Each station catchment area encompasses multiple StreetLight zones. Therefore, StreetLight zone ID numbers were assigned to each station catchment area. Land area and the relative percentages within each station catchment area were calculated, in order to assign trips generated in each station catchment area proportionally to each assigned StreetLight Zone.

An O-D matrix documenting the assigned StreetLight zones and percentages based on origin was developed. Then the SR 85 BRT production trips between stations were derived based on potential BRT production trips calculated under Section A.2.3, StreetLight zone area percentages in each station, and StreetLight OD percentages based on origin. An example of the trip distribution based on StreetLight origin trip patterns between the Mountain View Transit Center and El Camino Real is shown in **Figure A-5**.

Origin ID	Station	Destination ID			1				2					
		StreetLight Zone	Area (sq mi)	Area %	4	7	12	9	4	7	8	9	12	13
1	Mountain View Transit Center	4	0.300	88%						2%	0%	5%	6%	1%
		7	0.042	12%					16%		1%	8%	13%	2%
2	El Camino Real	4	0.001	0%		2%	6%	5%						
		7	0.151	44%	16%		13%	8%						
		8	0.149	44%	7%	2%	8%	13%						
		9	0.018	5%	9%	2%	4%							
		12	0.021	6%	7%	3%		3%						
		13	0.002	1%	2%	1%	14%	3%						

Figure A-5 Example - StreetLight O-D Patterns

Similarly, in order to derive the SR 85 BRT attraction trips, the O-D trip percentages based on destination were calculated. An O-D matrix documenting the assigned StreetLight zones and percentages based on destination was developed. The SR 85 BRT attraction trips between stations were derived based on potential BRT attraction trips calculated under Section A.2.3 and, StreetLight zone area percentages in each station, and StreetLight OD percentages based on destination.

An O-D Fratar balancing spreadsheet was developed. The SR 85 BRT production O-D trips were plugged into this Fratar spreadsheet. Initially, the origin sums for all the stations matched the origin target sums. Then the destination sums for all the stations from the attraction trips were entered. A Fratar balancing process was conducted for ten iterations. It was observed that at iteration 10, further iterations would do little to improve the balancing. The final step was to derive the final O-D trips based on origin by multiplying the O-D trips developed in iteration 10 by a multiplying factor averaged from each row and column in order to minimize the relative difference of the developed O-D trips to the target total in each row and column. An example of the final AM O-D trips based on origin from the Fratar spreadsheet is shown in **Table A-6**.

Table A-6 Example - O-D Fratar Balancing Result (Option 2 PM)

	ID	Station	Destination						Origin Sum	Target Total	Difference
			1	2	3	4	5	6			
Origin	1	Mountain View Transit Center	0	48	4	0	3	0	**56**	**64**	1.1404
	2	El Camino Real	26	0	5	0	3	0	**35**	**40**	1.1404
	3	De Anza College Transit Center	8	25	0	1	5	0	**39**	**44**	1.1404
	4	West Valley College Transit Center	1	2	2	0	12	0	**17**	**20**	1.1404
	5	Good Samaritan Hospital	14	30	13	6	0	13	**76**	**86**	1.1404
	6	Ohlone-Chynoweth LRT Station	1	1	1	0	7	0	**10**	**11**	1.1404
Destination Sum			**49**	**106**	**25**	**8**	**30**	**15**			
Target Total			**42**	**91**	**21**	**6**	**26**	**12**			
Difference			0.8591	0.8595	0.8586	0.8563	0.8680	0.8562			

Source: Study team calculations

As with the production O-D trips, the SR 85 BRT attraction O-D trips were plugged into the Fratar spreadsheet. Initially, the destination sums for all the stations matched the destination target sums. Then the origin sums for all the stations from the production trips were put in. Fratar balancing process was conducted for ten iterations. Then the O-D trips developed in iteration 10 were multiplied by a multiplying factor averaged from each row and column to derive the final O-D trips based on destination.

The O-D trips based on origin and O-D trips based on destination, were averaged to derive the final O-D trips. The abovementioned processes were conducted for both AM and PM peak periods.

A.2.5 Other Factors

Other factors to consider that could affect the baseline O-D trips include existing transit service around the study area and BRT bus capacity.

Several light rail or bus service lines presently travel across or within the study corridor, including Light Rail Blue Line (Baypointe - Santa Teresa), Express Bus 102 (South San Jose - Stanford Research Park), Express Bus 185 (Gilroy/Morgan Hill - Mountain View), Express Bus 182 (Palo Alto - IBM & Bailey Avenue), Express Bus 168 (Gilroy/Morgan Hill - San Jose Diridon), and Local Bus 27 (Winchester Station - Kaiser San Jose via Downtown Los Gatos).

The trains and buses on these routes either stop at no more than one station in the study area or provide local service that serves a different purpose than the SR 85 BRT service. Therefore, none of the potential SR 85 O-D trips were assumed to replace trips made on the existing light rail and BRT service.

In terms of BRT bus capacity, a 60-foot articulated bus with a seating capacity of 57 passengers[21] was assumed as the bus type for the SR 85 BRT service. The number of riders needing to be served between each set of two adjacent stations along the study corridor was calculated. The home-to-work trips have a peak hour factor of 0.37 in the AM and 0.33 in the PM from the VTA Regional Travel Demand Model. These peak hour factors were used to convert the four-hour peak period ridership to one peak hour ridership in order to determine if bus (seating) capacity was adequate to cover the peak hour demand.

A 15-minute headway (translating to four buses per hour) is enough to cover the derived peak hour O-D trips both in the AM and PM under both Option 1 and Option 2 scenarios. Therefore, no O-D trips were taken out due to potential limited bus capacity. If the seating capacity is reached, there is standing capacity available. In the event that ridership is higher than projected, the transit agency can adjust the schedule to provide more frequent service during the peak hours to accommodate additional riders.

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[2] Information page – High Capacity Bus, Los Angeles County Metropolitan Transportation Authority; at https://www.metro.net/about/metro-service-changes/high-capacity-bus/

A.3 Results

A.3.1 Baseline Ridership

The O-D trips in Options 1 and 2 constitute the baseline ridership that is used as the basis to further develop SR 85 BRT ridership for the different alternatives. The baseline ridership for the AM and PM peak periods in Options 1 and 2 for all of the alternatives except Alternative 3-1 are shown in **Tables A-7** and **A-8**. The baseline ridership used as the basis for Alternative 3-1 are shown in **Tables A-9** and **A-10**.

Table A-7 Baseline AM and PM Peak Period Ridership - Option 1

	ID	Station	Destination					
			1	3	4	5	6	Total
	AM Peak Period							
Origin	1	Mountain View Transit Center	0	10	0	5	0	**39**
	3	Stevens Creek Blvd	8	0	1	6	0	**24**
	4	Saratoga Ave	4	12	0	26	0	**45**
	5	Bascom Ave	6	9	2	0	4	**25**
	6	Ohlone-Chynoweth LRT Station	2	3	0	25	0	**31**
	Total		**19**	**33**	**3**	**61**	**5**	**165**
	PM Peak Period							
	1	Mountain View Transit Center	0	6	1	3	0	**10**
	3	Stevens Creek Blvd	8	0	6	5	0	**19**
	4	Saratoga Ave	0	1	0	1	0	**3**
	5	Bascom Ave	10	13	27	0	12	**62**
	6	Ohlone-Chynoweth LRT Station	1	1	1	7	0	**9**
	Total		**19**	**21**	**35**	**16**	**13**	**103**

Source: Study team calculations

Table A-8 Baseline AM and PM Peak Period Ridership - Option 2

	ID	Station	Destination						
			1	2	3	4	5	6	Total
	AM Peak Period								
Origin	1	Mountain View Transit Center	0	26	9	1	7	0	**42**
	2	El Camino Real	62	0	22	1	15	1	**101**
	3	De Anza College Transit Center	7	8	0	2	8	0	**24**
	4	West Valley College Transit Center	0	0	1	0	8	0	**10**
	5	Good Samaritan Hospital	7	7	12	11	0	4	**41**
	6	Ohlone-Chynoweth LRT Station	1	1	2	1	28	0	**34**
	Total		**77**	**43**	**47**	**15**	**66**	**5**	**252**
	PM Peak Period								
	1	Mountain View Transit Center	0	48	4	0	3	0	**56**
	2	El Camino Real	26	0	5	0	3	0	**35**
	3	De Anza College Transit Center	8	25	0	1	5	0	**39**
	4	West Valley College Transit Center	1	2	2	0	12	0	**17**
	5	Good Samaritan Hospital	14	30	13	6	0	13	**76**
	6	Ohlone-Chynoweth LRT Station	1	1	1	0	7	0	**10**
	Total		**49**	**106**	**25**	**8**	**30**	**15**	**233**

Source: Study team calculations

Table A-9 Baseline AM and PM Peak Period Ridership - Option 1 (Alternative 3-1 Only)

	ID	Station	Destination					
			1	3	4	5	6	Total
	AM Peak Period							
Origin	1	Mountain View Transit Center	0	14	0	6	0	**20**
	3	Stevens Creek Blvd	13	0	1	5	0	**19**
	4	Saratoga Ave	8	13	0	25	1	**47**
	5	Bascom Ave	11	10	2	0	3	**26**
	6	Ohlone-Chynoweth LRT Station	4	4	0	26	0	**34**
	Total		**35**	**27**	**2**	**56**	**4**	**124**
	PM Peak Period							
	1	Mountain View Transit Center	0	12	3	7	1	**23**
	3	Stevens Creek Blvd	11	0	7	5	0	**24**
	4	Saratoga Ave	0	1	0	1	0	**2**
	5	Bascom Ave	13	11	28	0	12	**64**
	6	Ohlone-Chynoweth LRT Station	1	1	1	6	0	**9**
	Total		**25**	**12**	**36**	**13**	**13**	**99**

Source: Study team calculations

Table A-10 Baseline AM and PM Peak Period Ridership - Option 2 (Alternative 3-1 Only)

	ID	Station	Destination					
			1	3	4	5	6	Total
	AM Peak Period							
Origin	1	Mountain View Transit Center	0	14	0	6	0	**20**
	3	De Anza College Transit Center	13	0	1	5	0	**18**
	4	West Valley College Transit Center	8	13	0	25	1	**47**
	5	Good Samaritan Hospital	11	10	2	0	3	**26**
	6	Ohlone-Chynoweth LRT Station	4	4	0	26	0	**33**
	Total		**35**	**40**	**3**	**62**	**5**	**145**
	PM Peak Period							
	1	Mountain View Transit Center	0	12	3	7	1	**23**
	3	De Anza College Transit Center	11	0	7	5	0	**24**
	4	West Valley College Transit Center	0	1	0	1	0	**3**
	5	Good Samaritan Hospital	13	11	28	0	12	**64**
	6	Ohlone-Chynoweth LRT Station	1	1	1	6	0	**9**
	Total		**25**	**24**	**39**	**20**	**14**	**121**

Source: Study team calculations

A.4 Ridership by Alternative

The bus OD travel time from the traffic analysis differentiates the time buses travel between two stations during the AM and PM peak periods were used as the inputs to derive ridership for the different alternatives. The round-trip travel time based on origin (i.e., leaving for work during the AM period and coming home during the PM period) was calculated for each alternative. A base travel time OD pair was calculated based on the highest travel time among the alternatives in each OD pair.

Since the base travel time OD pairs are the highest possible travel times among the alternatives, the OD travel time for all the alternatives is either lower or the same as the base travel time pair. If a travel time OD pair from an alternative is lower than the base travel time OD pair, it is considered more attractive to transit riders and therefore results in higher ridership. Then, an elasticity of -0.6 was used to calculate the percent change in ridership as a result of percent change in travel time. The elasticity formula can be expressed as follows:

$$E = (\Delta Q/Q_0)/(\Delta TT/TT_0)$$

Where E: Elasticity, ΔQ: change in ridership, Q_0: baseline ridership, ΔTT: change in travel time, TT_0: base travel time

The ridership adjustment ratios (increase in ridership, expressed in percentage) were derived for all the OD pairs and converted to ridership adjustment factors. These factors were then applied to the baseline ridership to derive the ridership for the alternatives.

The developed ridership during the AM and PM peak periods in Options 1 and 2 for Alternatives 3-1 through 4-2 is shown in **Tables A-11** through **A-20**. The total ridership (sum of ridership for all OD pairs during the AM and PM peak periods) for all alternatives is summarized in **Table A-21**.

As shown in these tables, Alternative 3-1 has the lowest level of ridership compared to other alternatives due to the lack of service to the El Camino Real Station in both Options 1 and 2. Even though the calculated ridership adjustment factors for the OD pairs are the highest in Alternative 3-1, the increase in ridership as a result of travel time savings does not counteract the loss of ridership from lack of service to the El Camino Real Station.

In Option 1, the rank order of sum of total ridership during the AM and PM periods ranked from highest to lowest is Alternative 3-2, Alternative 3-3 and Alternative 4-1 (tied), Alternative 4-2, and Alternative 3-1. In Option 2, the order is Alternative 3-2, Alternative 4-1, Alternative 3-3, Alternative 4-2, and Alternative 3-1.

Table A-11 AM and PM Peak Period Ridership - Alternative 3-1, Option 1

	ID	Station	Destination					
			1	3	4	5	6	Total
	AM Peak Period							
Origin	1	Mountain View Transit Center	0	15	0	6	0	**21**
	3	Stevens Creek Blvd	15	0	1	6	0	**22**
	4	Saratoga Ave	10	16	0	28	1	**55**
	5	Bascom Ave	13	12	2	0	4	**31**
	6	Ohlone-Chynoweth LRT Station	5	4	0	30	0	**39**
	Total		**43**	**47**	**3**	**70**	**5**	**168**
	PM Peak Period							
	1	Mountain View Transit Center	0	14	3	7	1	**25**
	3	Stevens Creek Blvd	13	0	8	6	1	**28**
	4	Saratoga Ave	0	1	0	2	0	**3**
	5	Bascom Ave	15	14	35	0	13	**77**
	6	Ohlone-Chynoweth LRT Station	1	1	1	7	0	**10**
	Total		**29**	**30**	**47**	**22**	**15**	**143**

Source: Study team calculations

Table A-12 AM and PM Peak Period Ridership - Alternative 3-1, Option 2

	ID	Station	Destination					
			1	3	4	5	6	Total
	AM Peak Period							
Origin	1	Mountain View Transit Center	0	15	1	9	0	**25**
	3	De Anza College Transit Center	13	0	1	6	0	**20**
	4	West Valley College Transit Center	1	2	0	9	0	**12**
	5	Good Samaritan Hospital	20	15	11	0	4	**50**
	6	Ohlone-Chynoweth LRT Station	4	3	1	35	0	**43**
	Total		**38**	**35**	**14**	**59**	**4**	**150**
	PM Peak Period							
	1	Mountain View Transit Center	0	10	0	10	1	**21**
	3	De Anza College Transit Center	12	0	1	8	0	**21**
	4	West Valley College Transit Center	1	1	0	11	0	**13**
	5	Good Samaritan Hospital	21	14	8	0	16	**59**
	6	Ohlone-Chynoweth LRT Station	1	0	0	7	0	**8**
	Total		**35**	**25**	**9**	**36**	**17**	**122**

Source: Study team calculations

Table A-13 AM and PM Peak Period Ridership - Alternative 3-2, Option 1

	ID	Station	Destination						
			1	2	3	4	5	6	Total
	AM Peak Period								
Origin	1	Mountain View Transit Center	0	26	10	0	5	0	**41**
	2	El Camino Real	70	0	24	0	12	1	**107**
	3	Stevens Creek Blvd	9	11	0	1	7	0	**28**
	4	Saratoga Ave	5	5	14	0	29	1	**54**
	5	Bascom Ave	7	6	12	2	0	4	**31**
	6	Ohlone-Chynoweth LRT Station	2	2	3	0	28	0	**35**
	Total		**93**	**50**	**63**	**3**	**81**	**6**	**296**
	PM Peak Period								
	1	Mountain View Transit Center	0	53	7	1	3	0	**64**
	2	El Camino Real	30	0	7	1	3	1	**42**
	3	Stevens Creek Blvd	9	28	0	7	5	0	**49**
	4	Saratoga Ave	0	1	1	0	2	0	**4**
	5	Bascom Ave	13	27	16	34	0	12	**102**
	6	Ohlone-Chynoweth LRT Station	1	2	1	1	8	0	**13**
	Total		**53**	**111**	**32**	**44**	**21**	**13**	**274**

Source: Study team calculations

Table A-14 AM and PM Peak Period Ridership for Alternative 3-2, Option 2

	ID	Station	Destination						
			1	2	3	4	5	6	Total
	AM Peak Period								
Origin	1	Mountain View Transit Center	0	27	10	1	7	0	**45**
	2	El Camino Real	70	0	24	1	16	1	**112**
	3	De Anza College Transit Center	8	10	0	2	8	0	**28**
	4	West Valley College Transit Center	0	0	2	0	8	0	**10**
	5	Good Samaritan Hospital	8	8	13	12	0	4	**45**
	6	Ohlone-Chynoweth LRT Station	1	1	2	1	31	0	**36**
	Total		**87**	**46**	**51**	**17**	**70**	**5**	**276**
	PM Peak Period								
	1	Mountain View Transit Center	0	51	5	0	3	0	**59**
	2	El Camino Real	29	0	6	0	4	0	**39**
	3	De Anza College Transit Center	10	29	0	1	5	0	**45**
	4	West Valley College Transit Center	1	3	2	0	12	0	**18**
	5	Good Samaritan Hospital	16	33	14	7	0	13	**83**
	6	Ohlone-Chynoweth LRT Station	1	2	1	0	8	0	**12**
	Total		**57**	**118**	**28**	**8**	**32**	**13**	**256**

Source: Study team calculations

Table A-15 AM and PM Peak Period Ridership - Alternative 3-3, Option 1

	ID	Station	Destination						
			1	2	3	4	5	6	Total
	AM Peak Period								
Origin	1	Mountain View Transit Center	0	26	10	0	5	0	**41**
	2	El Camino Real	65	0	24	0	12	1	**102**
	3	Stevens Creek Blvd	9	11	0	1	7	0	**28**
	4	Saratoga Ave	4	5	14	0	29	1	**53**
	5	Bascom Ave	7	6	12	2	0	4	**31**
	6	Ohlone-Chynoweth LRT Station	2	2	3	0	29	0	**36**
	Total		**87**	**50**	**63**	**3**	**82**	**6**	**291**
	PM Peak Period								
	1	Mountain View Transit Center	0	52	7	1	3	0	**63**
	2	El Camino Real	28	0	7	1	3	1	**40**
	3	Stevens Creek Blvd	9	28	0	7	5	0	**49**
	4	Saratoga Ave	0	1	1	0	2	0	**4**
	5	Bascom Ave	12	27	16	34	0	12	**101**
	6	Ohlone-Chynoweth LRT Station	1	2	1	1	8	0	**13**
	Total		**50**	**110**	**32**	**44**	**21**	**13**	**270**

Source: Study team calculations

Table A-16 AM and PM Peak Period Ridership - Alternative 3-3, Option 2

	ID	Station	Destination						
			1	2	3	4	5	6	Total
	AM Peak Period								
Origin	1	Mountain View Transit Center	0	26	9	1	7	0	**43**
	2	El Camino Real	63	0	24	1	16	1	**105**
	3	De Anza College Transit Center	7	9	0	2	8	0	**26**
	4	West Valley College Transit Center	0	0	1	0	8	0	**9**
	5	Good Samaritan Hospital	8	7	12	12	0	4	**43**
	6	Ohlone-Chynoweth LRT Station	1	1	2	1	31	0	**36**
	Total		**79**	**43**	**48**	**17**	**70**	**5**	**262**
	PM Peak Period								
	1	Mountain View Transit Center	0	48	5	0	3	0	**56**
	2	El Camino Real	26	0	6	0	4	0	**36**
	3	De Anza College Transit Center	9	27	0	1	5	0	**42**
	4	West Valley College Transit Center	1	3	2	0	12	0	**18**
	5	Good Samaritan Hospital	15	32	13	7	0	13	**80**
	6	Ohlone-Chynoweth LRT Station	1	2	1	0	8	0	**12**
	Total		**52**	**112**	**27**	**8**	**32**	**13**	**244**

Source: Study team calculations

Table A-17 AM and PM Peak Period Ridership - Alternatives 4-1, Option 1

	ID	Station	Destination						
			1	2	3	4	5	6	Total
	AM Peak Period								
Origin	1	Mountain View Transit Center	0	26	10	0	5	0	**41**
	2	El Camino Real	70	0	24	0	12	1	**107**
	3	Stevens Creek Blvd	9	11	0	1	7	0	**28**
	4	Saratoga Ave	4	4	14	0	29	1	**52**
	5	Bascom Ave	7	6	11	2	0	4	**30**
	6	Ohlone-Chynoweth LRT Station	2	2	3	0	28	0	**35**
	Total		**92**	**49**	**62**	**3**	**81**	**6**	**293**
	PM Peak Period								
	1	Mountain View Transit Center	0	54	7	1	3	0	**65**
	2	El Camino Real	30	0	7	1	3	1	**42**
	3	Stevens Creek Blvd	9	27	0	7	5	0	**48**
	4	Saratoga Ave	0	1	1	0	2	0	**4**
	5	Bascom Ave	12	26	16	33	0	12	**99**
	6	Ohlone-Chynoweth LRT Station	1	2	1	1	8	0	**13**
	Total		**52**	**110**	**32**	**43**	**21**	**13**	**271**

Source: Study team calculations

Table A-18 AM and PM Peak Period Ridership - Alternative 4-1, Option 2

	ID	Station	Destination						
			1	2	3	4	5	6	Total
	AM Peak Period								
Origin	1	Mountain View Transit Center	0	28	10	1	7	0	**46**
	2	El Camino Real	71	0	25	1	16	1	**114**
	3	De Anza College Transit Center	8	10	0	2	8	0	**28**
	4	West Valley College Transit Center	0	0	1	0	8	0	**9**
	5	Good Samaritan Hospital	8	8	13	11	0	4	**44**
	6	Ohlone-Chynoweth LRT Station	1	1	2	1	30	0	**35**
	Total		**88**	**47**	**51**	**16**	**69**	**5**	**276**
	PM Peak Period								
	1	Mountain View Transit Center	0	52	5	0	3	0	**60**
	2	El Camino Real	29	0	6	0	4	0	**39**
	3	De Anza College Transit Center	9	29	0	1	5	0	**44**
	4	West Valley College Transit Center	1	3	2	0	12	0	**18**
	5	Good Samaritan Hospital	15	33	14	7	0	13	**82**
	6	Ohlone-Chynoweth LRT Station	1	2	1	0	8	0	**12**
	Total		**55**	**119**	**28**	**8**	**32**	**13**	**255**

Source: Study team calculations

Table A-19 AM and PM Peak Period Ridership - Alternatives 4-2, Option 1

	ID	Station	Destination						
			1	2	3	4	5	6	Total
	AM Peak Period								
Origin	1	Mountain View Transit Center	0	25	10	0	5	0	**40**
	2	El Camino Real	61	0	22	0	10	1	**94**
	3	Stevens Creek Blvd	8	9	0	1	6	0	**24**
	4	Saratoga Ave	4	4	12	0	26	0	**46**
	5	Bascom Ave	6	5	9	2	0	4	**26**
	6	Ohlone-Chynoweth LRT Station	2	2	3	0	25	0	**32**
	Total		**81**	**45**	**56**	**3**	**72**	**5**	**262**
	PM Peak Period								
	1	Mountain View Transit Center	0	50	6	1	3	0	**60**
	2	El Camino Real	26	0	7	1	3	1	**38**
	3	Stevens Creek Blvd	8	23	0	6	5	0	**42**
	4	Saratoga Ave	0	1	1	0	1	0	**3**
	5	Bascom Ave	10	22	13	27	0	12	**84**
	6	Ohlone-Chynoweth LRT Station	1	2	1	1	7	0	**12**
	Total		**45**	**98**	**28**	**36**	**19**	**13**	**239**

Source: Study team calculations

Table A-20 AM and PM Peak Period Ridership - Alternative 4-2, Option 2

	ID	Station	Destination						
			1	2	3	4	5	6	Total
	AM Peak Period								
Origin	1	Mountain View Transit Center	0	26	9	1	7	0	**43**
	2	El Camino Real	62	0	22	1	15	1	**101**
	3	De Anza College Transit Center	7	8	0	2	8	0	**25**
	4	West Valley College Transit Center	0	0	1	0	8	0	**9**
	5	Good Samaritan Hospital	7	7	12	11	0	4	**41**
	6	Ohlone-Chynoweth LRT Station	1	1	2	1	28	0	**33**
	Total		**77**	**42**	**46**	**16**	**66**	**5**	**252**
	PM Peak Period								
	1	Mountain View Transit Center	0	48	4	0	3	0	**55**
	2	El Camino Real	26	0	5	0	3	0	**34**
	3	De Anza College Transit Center	8	25	0	1	5	0	**39**
	4	West Valley College Transit Center	1	2	2	0	12	0	**17**
	5	Good Samaritan Hospital	14	30	13	6	0	13	**76**
	6	Ohlone-Chynoweth LRT Station	1	1	1	0	7	0	**10**
	Total		**50**	**106**	**25**	**7**	**30**	**13**	**231**

Source: Study team calculations

Table A-21 AM and PM Peak Period Ridership Summary

Routing Scenario	Time Period	Alternative				
		3-1	3-2	3-3	4-1	4-2
Option 1	AM Peak Period	168	296	291	293	262
	PM Peak Period	143	274	270	271	239
	Sum of AM and PM Peak Periods	**311**	**570**	**561**	**564**	**501**
Option 2	AM Peak Period	150	276	262	276	252
	PM Peak Period	122	256	244	255	231
	Sum of AM and PM Peak Periods	**272**	**532**	**506**	**531**	**483**

Source: Study team calculations

A.5 Additional Factors

In this study, bus travel times between the stations are a key factor used to differentiate potential SR 85 BRT ridership among the alternatives based on the travel time savings elasticity. However, several other factors that may affect ridership were not incorporated into quantitative calculations. Some of these potential factors are:

- Availability and capacity of park-and-ride lots

  Park-and-ride lots allow people living outside of the station catchment areas to access the station by private vehicle. Park-and-ride lots currently exist in the terminal stations - Mountain View Transit Center and Ohlone-Chynoweth LRT Station and are utilized by light rail transit riders. If parking is available at the proposed way stations, the SR 85 BRT transit service could potentially attract additional transit riders. However, if providing park-and-ride lots requires taking the existing commercial or residential properties, the trip generation from employment and population could be reduced. Parking lots may also have a negative impact on the perceived quality of the built environment.

  Apart from availability, capacity makes a difference. The park-and-ride lot would be more attractive to transit riders if it is easy for them to find parking spaces.

- Population/employment growth

  The current ridership development is based on the current observed work-related trips. In the future, there could be more potential transit riders utilizing the SR 85 BRT service coming from the population and employment growths along the SR 85 BRT corridor.

- Service frequency

  If the service is more frequent, it would reduce the wait time at the stations and therefore be more attractive to transit riders. A 2011 study published by the Victoria Transport

Policy Institute[3] found that the time spent walking to and waiting for transit vehicles generally has unit costs (in terms of travelers' perception of delay) averaging two to five times higher than in-vehicle time. Therefore, reducing the wait time by the same amount as in-vehicle travel time could result in higher ridership gain per unit time reduction.

- Service reliability

  Service reliability affects potential wait time and in-vehicle travel time spent by transit riders. Higher service reliability could potentially lead to higher ridership. The same Victoria Transport Policy Institute's study suggests that improvements in reliability should be valued at a higher rate, reflecting the higher unit costs of unexpected delay. Each minute of delay beyond the published schedule should be valued at three to five times the standard in-vehicle travel time.

[3] Todd Litman (2011), Valuing Transit Service Quality Improvements: Considering Comfort and Convenience in Transport Project Evaluation, Victoria Transport Policy Institute (www.vtpi.org); at http://www.trpa.org/documents/rseis/New%20References%20for%20Final%20EIS/Victoria%20Transport%20Policy%20Institute%202011.pdf