Working Paper #7
Operation and Performance of the SolanoExpress System

7.1 Performance by Route

SolanoExpress routes have experienced significant restructuring across the last four years. Effective July 1, 2018, Solano Transportation Authority (STA) and FAST consolidated SolanoExpress Routes 20, 30, 40, and portions of 90 into the Blue Line. Certain peak Route 90 trips were retained as the Green Express "GX" (GX) Line. STA and SolTrans converted SolanoExpress Route 78 into the Yellow Line on July 1, 2018, while Routes 80 and 85 merged to become the Red Line on June 20, 2019.

The restructuring of the SolanoExpress routes resulted from the I-80/I-680/I-780/SR 12 Transit Corridor Study, completed in December 2014. The Implementation Plan arising from the Study called for the consolidation of seven routes into three routes. The Implementation Plan called for a two-step implementation as follows:

- Phase 1 (July 1, 2018):
  - Consolidate Routes 20, 30, 40, and 90 into the Blue Line
  - Replace Route 78 with the Yellow Line
  - Routes 80 and 85 continue as before
- Phase 2 (July 1, 2019):
  - Combine Routes 80 and 85 into the Red Line

During the public engagement process prior to the Phase 1 service change, which included meetings with Route 90 riders, STA modified the service plan to maintain Route 90 as an express route (GX) between Suisun City and El Cerrito Del Norte BART via Fairfield Transportation Center.

Given the Blue Line and Red Line replaced multiple routes, data for the component routes will be discussed under the current route designation. Data from Routes 80 and 85 is presented as the Red Line across the four fiscal years evaluated. Data from Routes 20, 30, and 40 is presented as the Blue Line. Route 90 data is not included in the initial Blue Line analysis but is presented under the Green GX Line. However, since Route 90 was originally envisioned to be incorporated into the Blue Line, a separate section looks at the Blue and Green GX Lines together to analyze the service between Fairfield and BART.

There is reason to be skeptical of the accuracy of the operator-supplied counts and allocated fare box revenues throughout all the analyses in this report. Revenue hours appear to be consistent and accurate. Total costs are a combination of operator-supplied data and imposed cost control limits that make analysis challenging. Therefore, one should consider this analysis to be using the best data available within the constraints of those data sources.

Blue Line/Routes 20, 30, 40[1]

Prior to July 1, 2018, the specific route currently known as the Blue Line was originally three distinct routes. Route 20 traveled from the Vacaville Transportation Center to the Fairfield Transportation Center. Route 30 offered primarily peak service from Fairfield, Vacaville, and Dixon to UC Davis and Sacramento. Route 40 offered primarily peak service between the Vacaville Transportation Center and BART stations in Pleasant Hill and Walnut Creek, via Fairfield and Benicia. The Blue Line incorporates elements of all these three routes plus portions of Route 90, with service extending from Pleasant Hill BART to Sacramento via Benicia, Fairfield, Vacaville, Dixon, and Davis. For this analysis, only Routes 20, 30, and 40 are analyzed as the Blue Route. Further analysis of the Blue Line in combination with the GX/Route 90 is provided later in this document.

Route Performance

In FY 2015/16, each of the three routes that now comprise the Blue Line had roughly equal ridership. Route 40, with its connectivity with BART, saw the most growth over time, increasing nearly 14 percent between FY 2015/16 and FY 2017/18. Routes 20 and 30 saw nearly equal declines (approximately 15 percent) across the same period. When ridership for the three routes is combined, there was an overall five percent decline between FY 2015/16 and FY 2017/18.

Blue Line ridership in FY 2018/19, however, represents a nearly 17 percent increase over the combined ridership for FY 2017/18, and a 10 percent increase over combined ridership in FY 2015/16. It is likely part of the ridership increase on the Blue Line is comprised of riders from the former Route 90 as this was the planned outcome.

In FY 2018/19, the 16.7 percent increase in Blue Line ridership is countered by a 4.2 percent decrease in fare revenue. This is unlikely to be accurate, as a ridership increases are typically accompanied by an increase in fare revenue.

In FY 2018/19, two separate operating cost figures were provided for the Blue Line. Depending on which figure is used, operating cost increased 44.9 percent[2] or 52.3 percent[3] over the prior year. (The higher figure was used for calculations within this section.) However, farebox revenue declined 4.2 percent over the prior year. This decline, combined with the significant increase in operating cost, resulted in a 38 percent drop in the farebox recovery ratio (Blue Line in FY 2018/19 compared to the average of the three routes in FY 2017/18).

While technically the operating cost per hour declined, this is only because the operating cost increased at a lower rate than the vehicle revenue hours.

Finally, passengers per revenue hour declined (30.5 percent), despite the increase in ridership. This indicator is well below the standard of 15 passengers per trip established for this route.

[1] Blue Line data sources: FAST FY 15-16 Operating Summary by Route; FAST Cost Allocation Model FY 2015-16 Reconciled (May 2017); FAST FY 16-17 Operating Summary by Route; FAST Cost Allocation Model FY 2016-17 Reconciled (May 2018); FAST FY 17-18 Operating Summary by Route; FAST FY 18-19 Operating Summary by Route; SolanoExpress FY 18-19 Quarterly Monitoring Report – End of Year (August 2019). Additional FY 18-19 route-specific financial data provided by FAST as part of Working Paper #3 edits (January 2020).
[2] Cost data included in SolanoExpress Quarterly Monitoring Report to the Consortium, year-end report, August 27, 2019.
[3] Cost data as provided by FAST in its edits to Working Paper #3 on January 4, 2020 (via Basecamp).

In order to address the efficiency, effectiveness, and farebox recovery ratio issues on the Blue Line, FAST must identify the root cause of the dramatic increases in normalized operating cost. The second goal should be increasing ridership and fare revenue without increasing cost per revenue hour.

Exhibit 7.1.1 Blue Line Ridership, FY 2016 – FY 2019

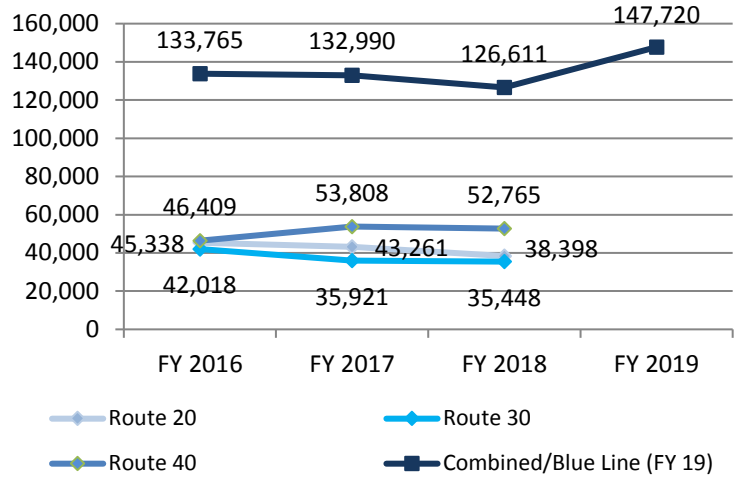


Exhibit 7.1.2 Blue Line Vehicle Revenue Hours, FY 2016 – FY 2019

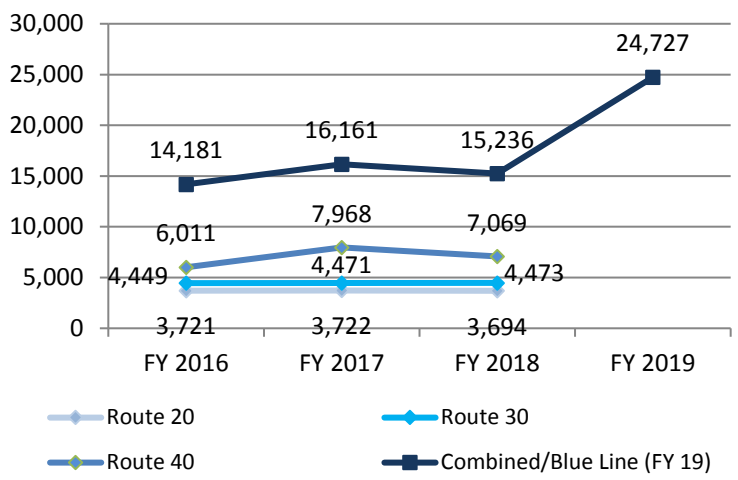


Exhibit 7.1.3 Blue Line Operating Cost, FY 2016 – FY 2019

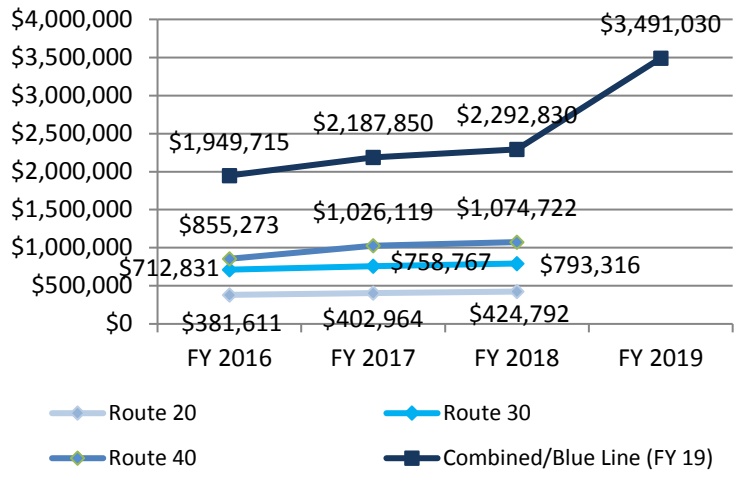


Exhibit 7.1.4 Blue Line Fare Revenue, FY 2016 – FY 2019

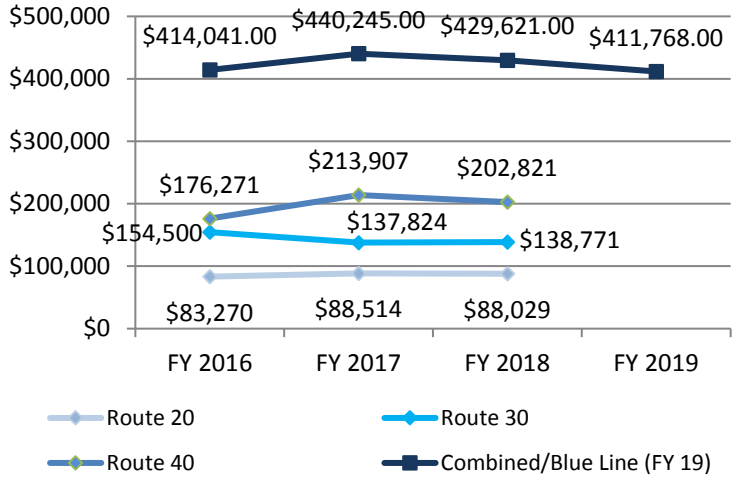


Exhibit 7.1.5 Blue Line Farebox Recovery Ratio, FY 2016 – FY 2019

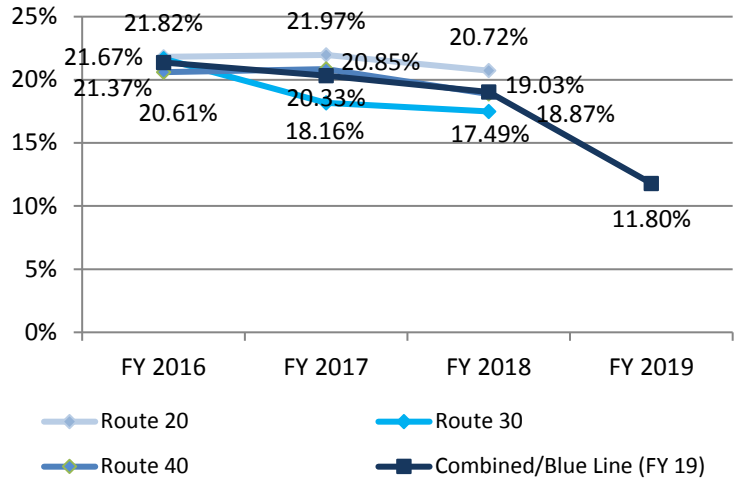


Exhibit 7.1.6 Blue Line Cost per VRH, FY 2016 – FY 2019

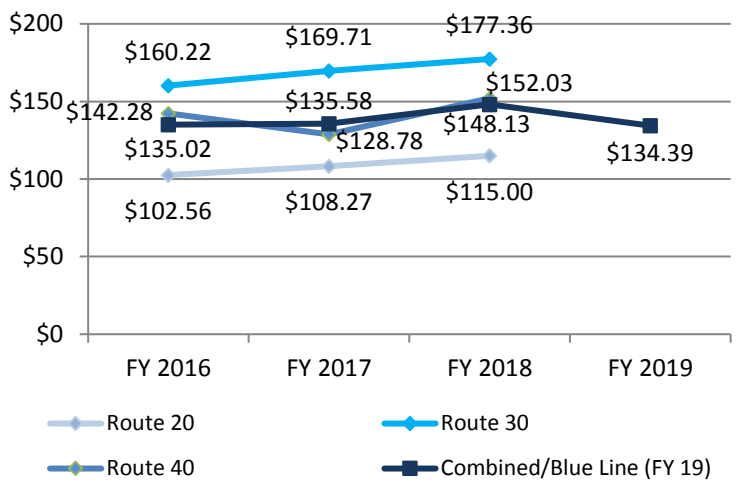
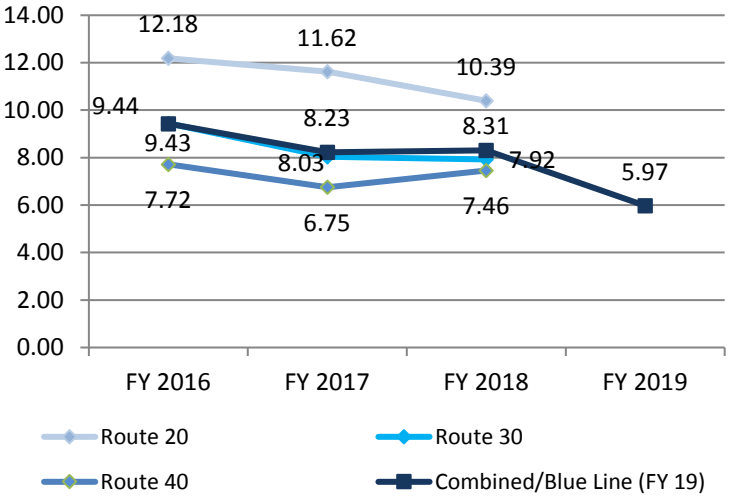


Exhibit 7.1.7 Blue Line Passengers per VRH, FY 2016 – FY 2019



Green "GX" Line/Route 90[4]

Prior to July 1, 2018, the route currently known as the GX Line existed as FAST Route 90.[5] The GX was not originally intended to be a part of the SolanoExpress consolidation plan. Instead, the original routing concept called for three permanent routes. Route 90 would be incorporated into the consolidated Blue Line. Route 90 riders objected to the consolidation of the route into the Blue Line, and a limited Route 90 service retitled as the Green GX Line was implemented.[6] Therefore, a separate analysis of the Blue and GX Lines as a combined service is provided in a subsequent section.

The Green Line is an express route, featuring three service points: Suisun City Amtrak station, Fairfield Transportation Center, and the El Cerrito de Norte BART station. The majority of trips operate between Fairfield and El Cerrito, with peak morning and afternoon trips extending to Suisun City. The Green Line operates Monday through Friday only. (The Red Line also serves the El Cerrito Del Norte BART station, providing hourly service between the Fairfield Transportation Center and El Cerrito Del Norte BART.)

Route Performance

Between FY 2015/16 and FY 2017/18, Route 90 ridership remained reasonably consistent. Ridership experienced a net increase of less than one percent, while vehicle revenue hours saw net increases of 4.8 percent and 2.9 percent, respectively. Operating cost increased at a much greater rate, rising 19.4 percent across the three-year period. Fare revenue kept pace with increases in ridership (experiencing a net increase of 3.3 percent), but was outpaced by the increase in operating cost.

In FY 2018/19, at the time Route 90 became the GX Line, significant declines were noted in ridership (21.7 percent), vehicle revenue hours (29.9 percent), cost (28.9 percent), and fares (19.6 percent) compared with the prior year. This is due at least in part to the elimination of weekday service between approximately 9:30 a.m. and 2:00 p.m. as well as the elimination of weekend service.

Despite the reductions in service implemented in FY 2018/19, operating cost per revenue hour increased from year to year, ultimately resulting in an overall 15.5 percent increase between FY 2015/16 and FY 2018/19. This is generally due to increases in operating cost that are greater than increases in revenue hours. In FY 2018/19, operating costs were proportionally higher than revenue hours, despite decreases in both.

Passengers per revenue hour, which had generally been trending down between FY 2015/16 and FY 2017/18, increased in FY 2018/19 due to the reduction in revenue hours. While it met the performance standard for all four years, in FY 2018/19 it increased from 17.22 to 19.24.

Farebox recovery ratio suffered a significant drop in FY 2017/18, decreasing 12 percent. Taken on its own, this is explained by an 8.4 percent increase in operating cost against a 4.6 percent decrease in fare

[4] Green Line data sources: FAST FY 15-16 Operating Summary by Route; FAST Cost Allocation Model FY 2015-16 Reconciled (May 2017); FAST FY 16-17 Operating Summary by Route; FAST Cost Allocation Model FY 2016-17 Reconciled (May 2018); FAST FY 17-18 Operating Summary by Route; FAST FY 18-19 Operating Summary by Route; SolanoExpress FY 18-19 Quarterly Monitoring Report – End of Year (August 2019). Additional FY 18-19 route-specific financial data provided by FAST as part of Working Paper #3 edits (January 2020).

[5] Per https://fasttransit.org/new-solanoexpress-fast-service-and-fare-changes-effective-july-1-2018/: "The Route 90 name is changed to the Green Express "GX" Line. Direct service continues from the Suisun City Amtrak/Fairfield Transportation Center to El Cerrito del Norte BART."

[6] Staff Report, SolanoExpress Implementation Update, as presented to Transit Consortium, December 10, 2017.

revenue. However, this decline is amplified by the dramatic increase in farebox recovery ratio the following year, as it rebounds to just below the FY 2016/17 level. In reality, the significant changes to the service that took place in FY 2018/19 (reduction of service hours due to the elimination of service, resulting in a 28.9 percent decline in operating cost) simply brought fare revenue and operating cost back to the same balanced level they were in FY 2016/17. The service change reversed the pattern of increasing operating cost and decreasing fare revenue; without that change, it is likely farebox recovery ratio would have continued to drop.

Diagnosing issues is more difficult for the GX Line, as FY 2018/19 is significantly different from the prior years and there is less basis for comparison. Changes in most performance indicators are generally positive, though the route's cost per revenue hour remains high compared to other routes. In FY 2018/19 the Green Line had the highest cost per revenue hour in the SolanoExpress system. The City of Fairfield should strive to keep its operating costs to a reasonable cost per revenue hour and strive to increase ridership without increasing revenue hours.

Exhibit 7.1.8 Green Line Ridership, FY 2016 – FY 2019

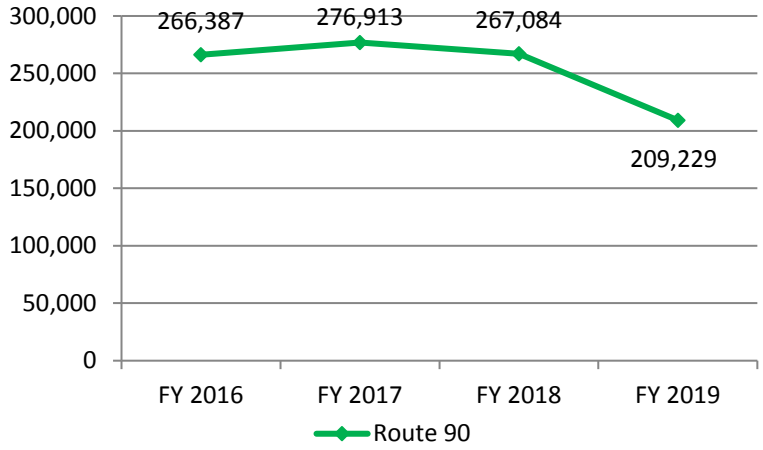


Exhibit 7.1.9 Green Line Vehicle Revenue Hours, FY 2016 – FY 2019

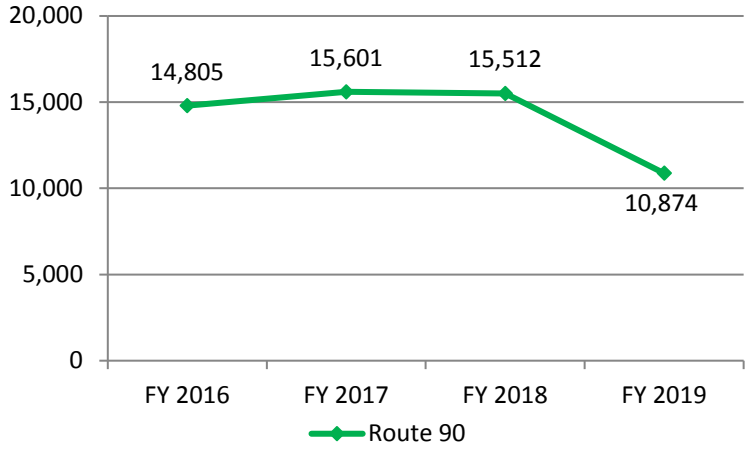


Exhibit 7.1.10 Green Line Operating Cost, FY 2016 – FY 2019

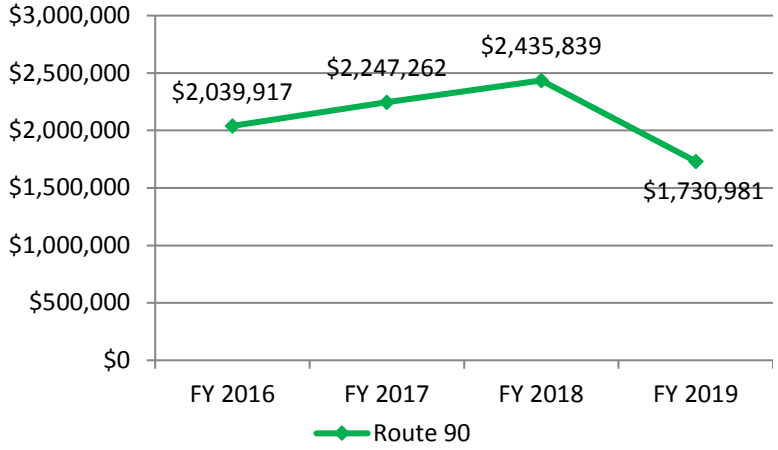


Exhibit 7.1.11 Green Line Fare Revenue, FY 2016 – FY 2019

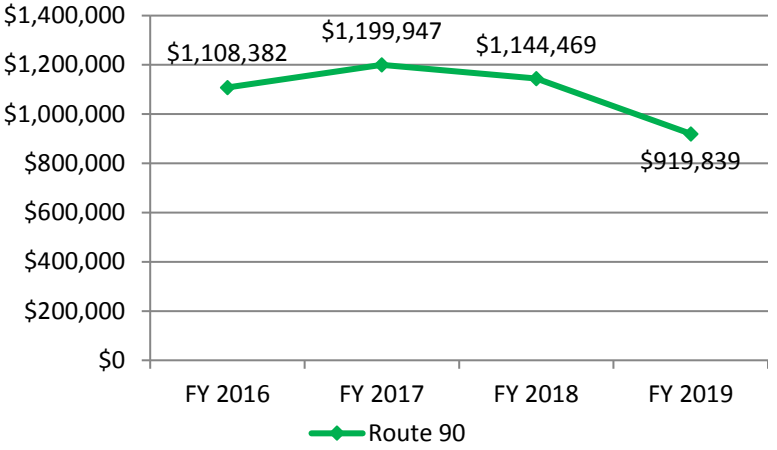


Exhibit 7.1.12 Green Line Farebox Recovery Ratio, FY 2016 – FY 2019

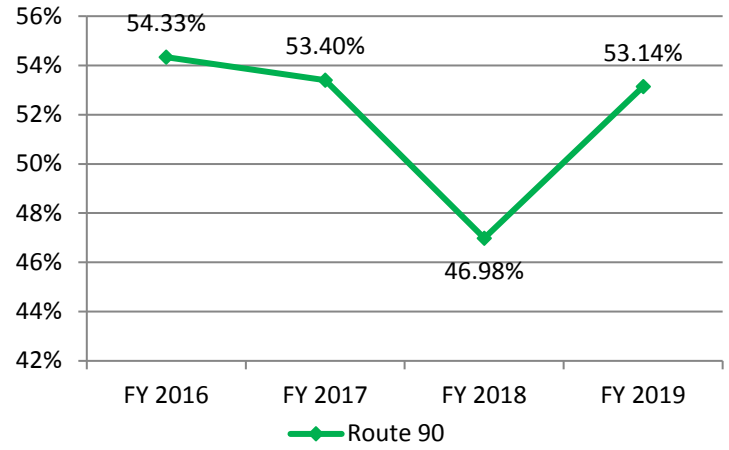


Exhibit 7.1.13 Green Line Cost per VRH, FY 2016 – FY 2019

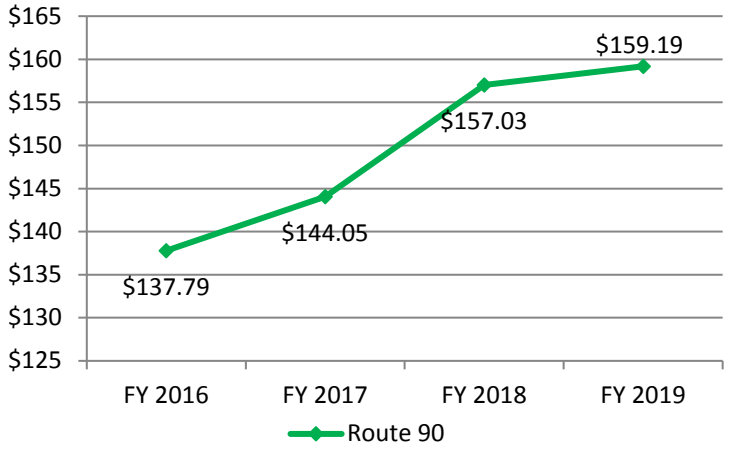
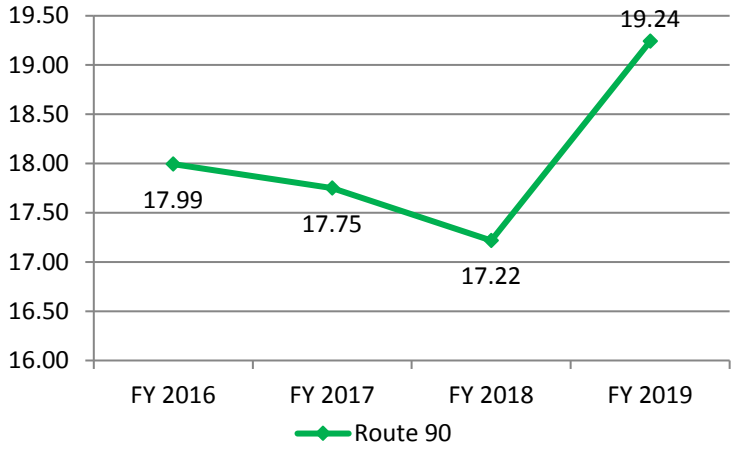


Exhibit 7.1.14 Green Line Passengers per VRH, FY 2016 – FY 2019



Blue and Green GX Line Combined Ridership

While the Green Express "GX" Line was marketed as the new FAST Route 90, the route's role within the new system is less clear-cut. The original intent of the consolidation would offer connectivity with BART from Fairfield to Walnut Creek via the Blue Line. Connections to BART at El Cerrito Del Norte would be from Vallejo via the Red Line. As such, the Green GX Line claims riders that were originally envisioned to be using the Blue Line following consolidation. Therefore, in addition to analyzing the Green GX Line and Blue Line separately, they are also evaluated together in this section.

As a side note, the past analysis structure is driving the current analysis structure. For example, one could argue that the GX line should be analyzed in combination with both the Red Line and Route 82 as all these routes operate in the same corridor. Unfortunately, this is beyond the scope of this engagement but should be considered as a potential change for future analysis.

Route Performance

During FY 2018/19, Blue Line ridership increased over the combined Routes 20, 30, and 40 in prior years, while GX Line ridership decreased compared to Route 90 in prior years. Between the Blue Line and Green Line, overall ridership in FY 2018/19 decreased by 9.3 percent. While some riders may have transitioned from the GX Line to the Blue Line, the elimination of the midday service on the GX Line likely contributed to the majority of the ridership decrease.

Overall, performance on the two lines is quite different. The overall cost per vehicle revenue hour to operate the GX Line ($159.19) is higher than the cost per hour to operate the Blue Line ($141.18). However, the GX Line also carries a higher number of passengers per vehicle revenue hour (19.24) than the Blue Line (5.97). The GX Line, which charges an out-of-county fare, has a significantly higher farebox recovery ratio (53.1 percent) than the Blue Line (11.8 percent).

While the Green Line offers a somewhat faster trip by making fewer stops, its travel time of 40 to 43 minutes between the Fairfield Transportation Center and the El Cerrito Del Norte BART station is not significantly different than the Blue Line's travel between the Fairfield Transportation Center and the Pleasant Hill BART station (typically 40 minutes during peak hours). Though the Blue Line's midday trips may take up to 60 minutes, there is no corresponding service on the GX. Trips on the Red Line from the Fairfield Transportation Center to the El Cerrito Del Norte BART station take 60 minutes due to the route traveling through Vallejo.

Unless a rider is traveling to Berkeley, the only clear advantage to traveling to San Francisco out of El Cerrito Del Norte is a six-minute shorter BART commute. There is a higher level of service to San Francisco at Pleasant Hill, as BART's Yellow Line offers six trips per hour. At El Cerrito Del Norte, the Orange and Red Lines offer just four trips per hour, with only the Red Line traveling to San Francisco.

According to the 2018 Onboard Transit Survey, 34.2 percent of riders cited BART as their means of access to the GX Line, while 51.6 percent cited BART as their means of accessing their destination from the GX Line. This represents nearly 86 percent of riders traveling either to or from BART on their GX Line trip. Such data suggests the majority of GX Line riders could be served through Blue Line service at the Pleasant Hill BART station rather than the El Cerrito del Norte BART station.

If the ridership from both the GX Line and the Blue Line were consolidated into the existing Blue Line, this would improve performance without increasing operating cost. In fact, operating cost would decrease significantly due to the reduction in vehicle revenue hours resulting from the elimination of the GX Line.

It is very likely some riders would not make the switch to the Blue Line if the Green Line were eliminated, especially those traveling to/from Berkeley. The best option for those riders may be to switch to the Red Line, though it offers a longer trip. Even if only two-thirds of GX Line riders shifted to the Blue Line, resulting in an overall fare decrease, the cost per vehicle revenue hour would decrease while passengers per vehicle revenue hour and farebox recovery ratio would both increase. The potential impact of such a consolidation is shown in Exhibit 7.1.15.

Exhibit 7.1.15 Impact of Green Line Elimination on Blue Line

	Operating Cost	Fare Revenue	Ridership	Vehicle Revenue Hours	Cost per Vehicle Revenue Hour	Passengers per Vehicle Revenue Hour	Farebox Recovery Ratio
Blue Line only (Green Line would be consolidated into Blue Line)	$3,491,030	$1,025,537*	287,213+	24,727	$141.18	11.6	29.38%
Existing Blue and Green Lines (combined performance data)	$5,333,022	$1,331,607	356,949	35,601	$146.68	10.0	24.97%

**Existing Blue Line riders are expected to generate an average fare of $2.79 per ride. Transitioning Green Line riders are expected to generate an average fare of $4.40 per ride.*
+Assumes two-thirds of Green Line riders would transition to the Blue Line if Green Line is eliminated.

Exhibit 7.1.16 Blue/Green Line Ridership, FY 2016 – FY 2019

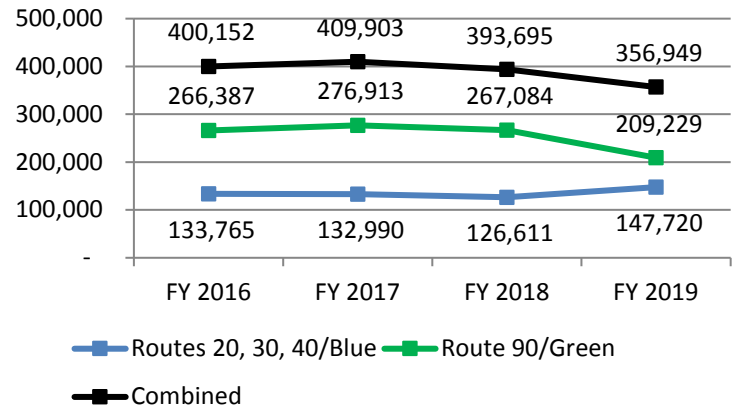


Exhibit 7.1.17 Blue/Green Line Vehicle Revenue Hours, FY 2016 – FY 2019

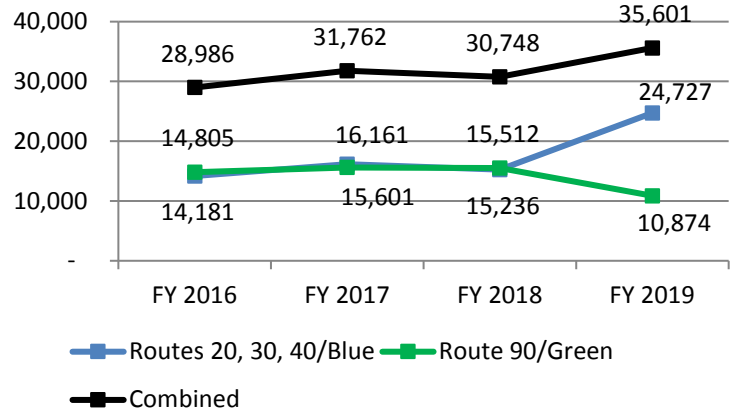


Exhibit 7.1.18 Blue/Green Line Operating Cost, FY 2016 – FY 2019

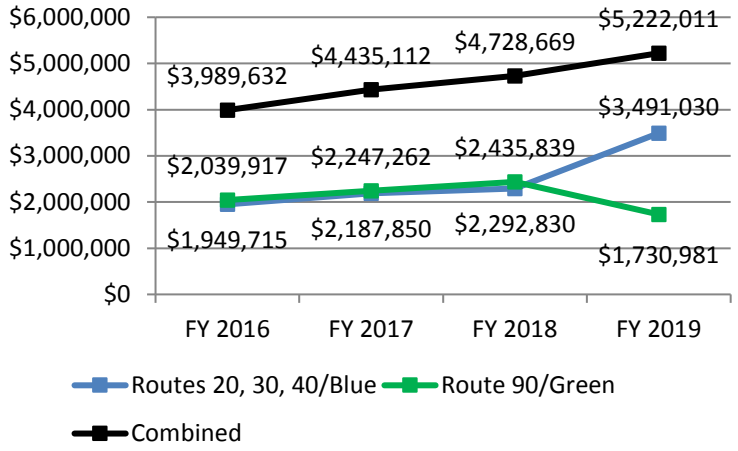


Exhibit 7.1.19 Blue/Green Line Fare Revenue, FY 2016 – FY 2019

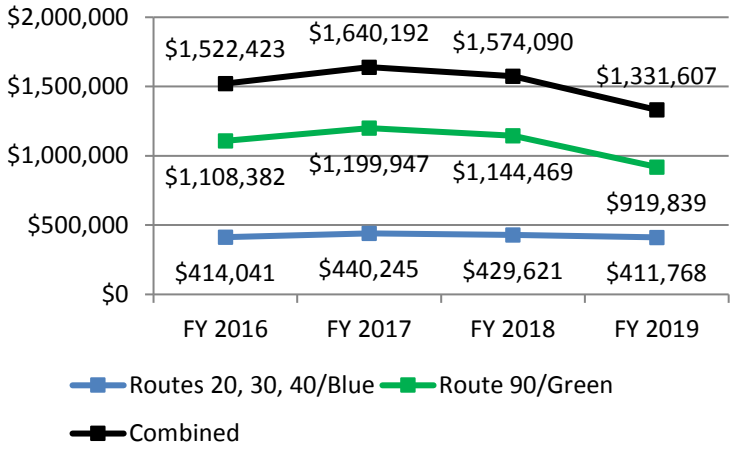


Exhibit 7.1.20 Blue/Green Line Farebox Recovery Ratio, FY 2016 – FY 2019

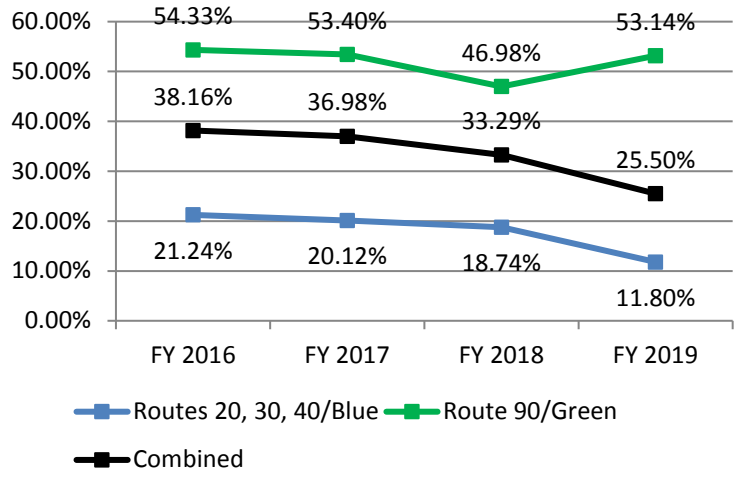


Exhibit 7.1.21 Blue/Green Line Cost per VRH, FY 2016 – FY 2019

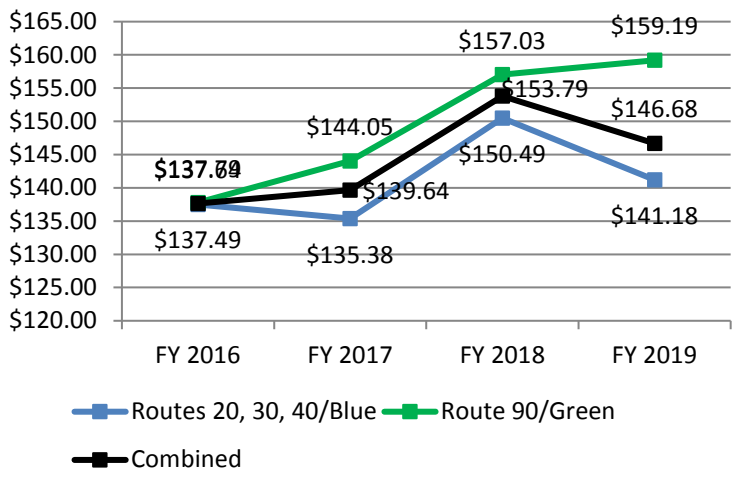
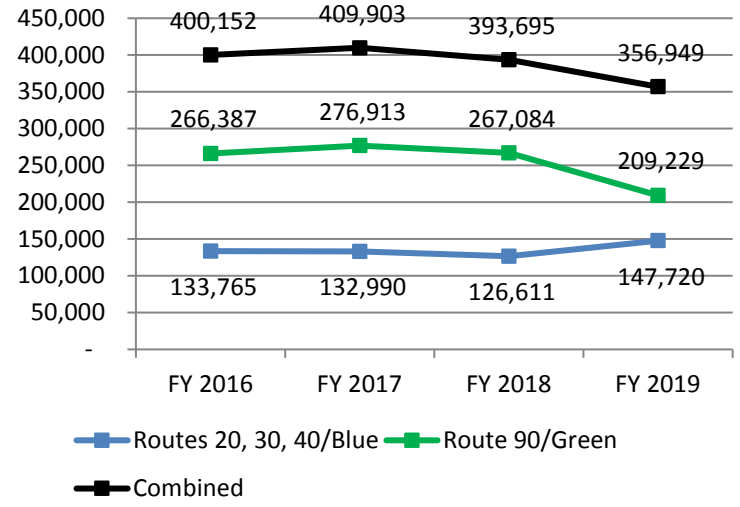


Exhibit 7.1.22 Blue/Green Line Passengers per VRH, FY 2016 – FY 2019



Yellow Line/Route 78[7]

Prior to July 1, 2018, the route currently known as the Yellow Line existed as SolTrans Route 78. The Yellow Line operates between the Vallejo Transit Center and BART stations in Pleasant Hill and Walnut Creek. Additional stops include the Vallejo Ferry Terminal, Curtola Park & Ride, Benicia, and the Sunvalley Shopping Center in Concord.

Transition to the Yellow Line resulted in modifications to streamline the route at its southern end (including the elimination of direct service to Diablo Valley College), but retained most of the features of Route 78. Currently, the service operates between 5:27 a.m. and 10:17 p.m. on weekdays, 6:20 a.m. and 9:53 p.m. on Saturday, and 8:00 a.m. and 9:58 p.m. on Sunday.

Route Performance

Ridership on the Yellow Line has steadily increased across the past four years, resulting in a total increase of 13.5 percent. Vehicle revenue hours also increased, but at a higher rate (24.4 percent overall).

Operating cost increased steadily across the four-year period, for a total increase of 34 percent. Fare revenue, however, increased steadily through FY 2017/18 before declining 8.4 percent in FY 2018/19. The fare adjustment on July 1, 2018 did not significantly affect fares on the Yellow Line (though within-county trips increased from $1.75 to $2.75), so the cause of the decrease in fare revenue despite a ridership increase of 3.6 percent during FY 2018/19 is unclear. One potential cause might be a significant increase of in-county riders and decline in out-of-county riders, although it is unlikely there has been a large enough shift to be the sole cause of this. Another potential cause could be an error in how revenues are allocated between routes. It is also possible the error lies with the fare revenue reported in FY 2017/18, which shows a 14.7 percent increase over the prior year. An over-allocation of fare revenue during that year could also cause an apparent decrease in fare revenue in FY 2018/19.

The decrease in fare revenue (8.4 percent) and increase in operating cost (6.8 percent) in FY 2018/19 resulted in a notable decrease in the farebox recovery ratio, dropping it to below 20 percent for the first time in four years.

Passengers per revenue hour fluctuated significantly between FY 2015/16 and FY 2017/18 but stabilized in FY 2018/19 (despite remaining below the standard all four years).

Cost per revenue hour increased dramatically between FY 2016/17 and FY 2017/18 and continued this increase in FY 2018/19. This indicates the operating cost is increasing at a much greater rate than vehicle revenue hours, which exhibits a much lower rate of change. The cost per revenue hour exceeds the reimbursable rate allowed by the intercity funding agreement.

The cause of the apparent imbalance between ridership and fare revenue in FY 2018/19 must be addressed, as there is no logical reason a 3.6 percent increase in ridership should result in an 8.4 percent decrease in fare revenue. Both FY 2017/18 and FY 2018/19 should be reviewed for fare revenue allocation or other errors. The second goal should be increasing ridership at a higher rate than increasing vehicle

[7] Yellow Line data sources: SolTrans – Cost Allocation Model – FY 15-16 Actuals through 6-30-16_Final; SolTrans – Cost Allocation Model – FY 16-17 Actuals through 6-30-17_Final; SolTrans – Cost Allocation Model – FY 17-18 Actuals through 6-30-18_Final; SolTrans – Cost Allocation Model – FY 18-19 Actuals through 6-30-19_Final; SolanoExpress FY 18-19 Quarterly Monitoring Report – End of Year (August 2019).

service hours, so as to enable the Yellow Line to meet the passengers per revenue hour performance metric. This should also increase the fare revenue, contributing to a higher farebox recovery ratio.

Exhibit 7.1.23 Yellow Line Ridership, FY 2016 – FY 2019

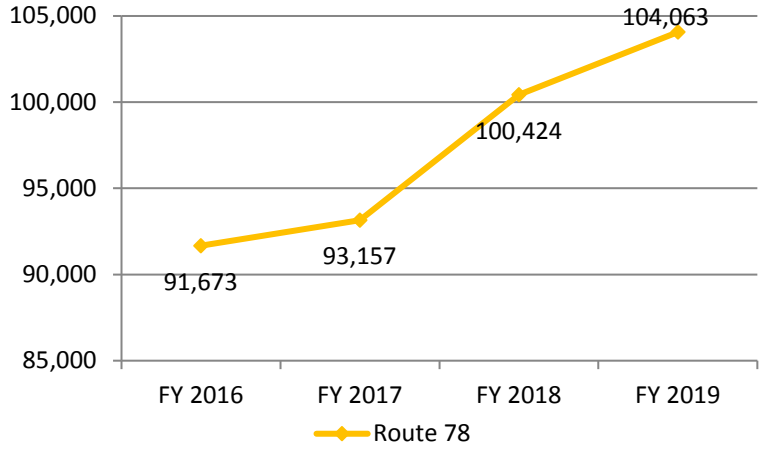


Exhibit 7.1.24 Yellow Line Vehicle Revenue Hours, FY 2016 – FY 2019

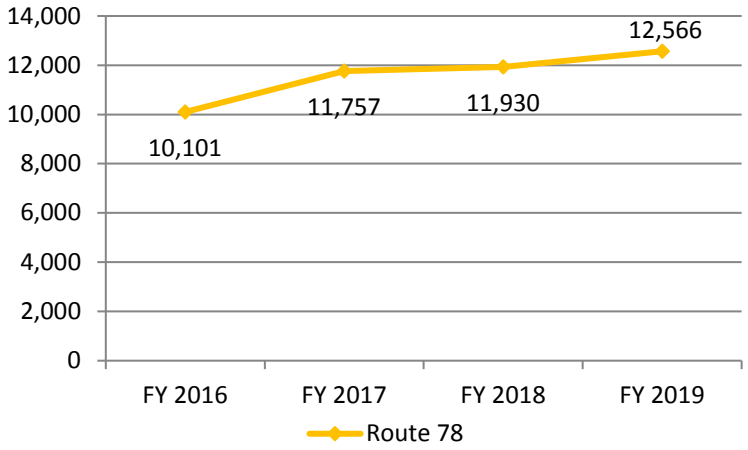


Exhibit 7.1.25 Yellow Line Operating Cost, FY 2016 – FY 2019

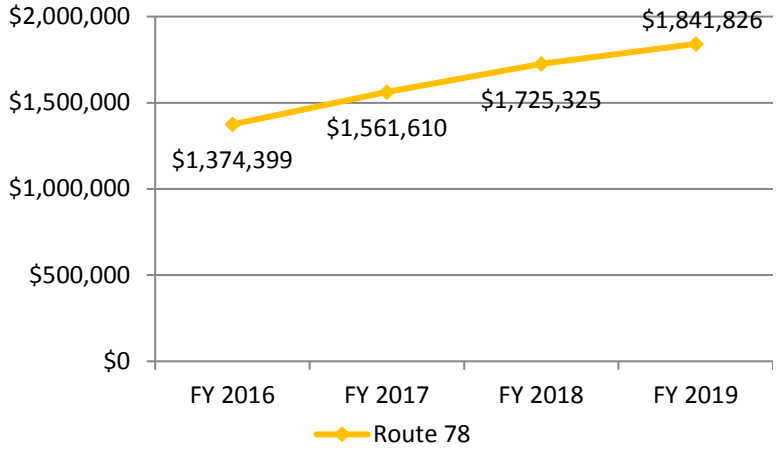


Exhibit 7.1.26 Yellow Line Fare Revenue, FY 2016 – FY 2019

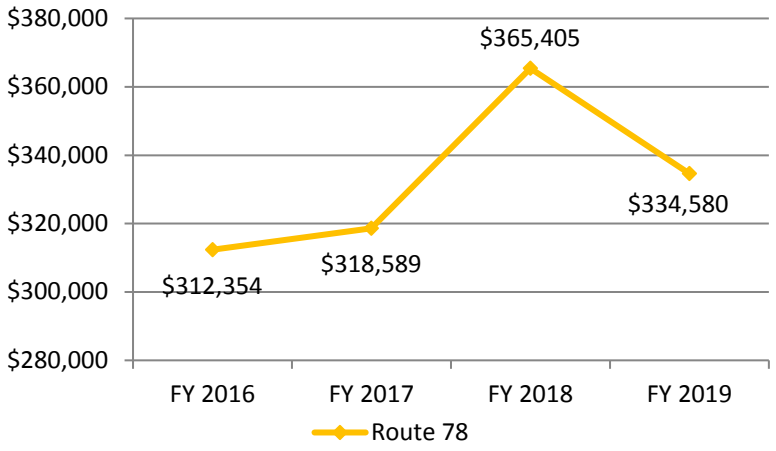


Exhibit 7.1.27 Yellow Line Farebox Recovery Ratio, FY 2016 – FY 2019

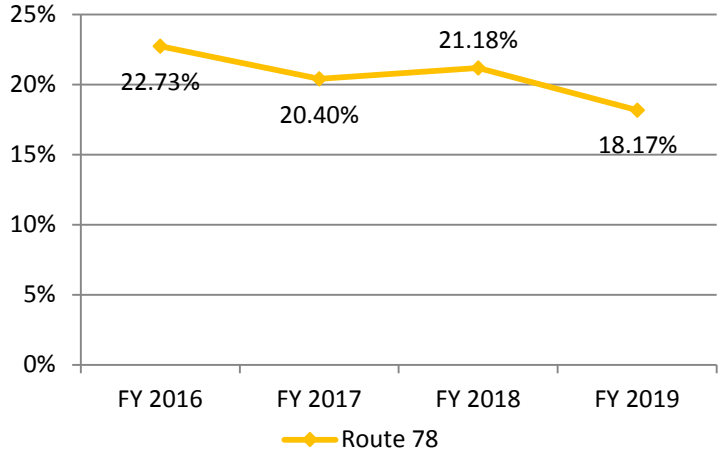


Exhibit 7.1.28 Yellow Line Cost per VRH, FY 2016 – FY 2019

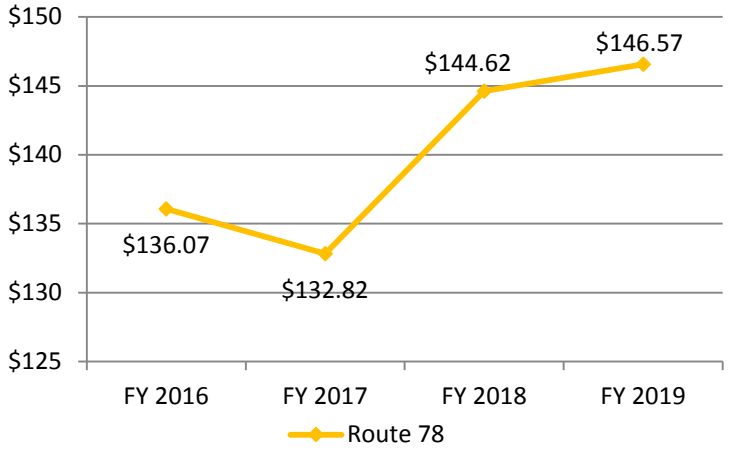
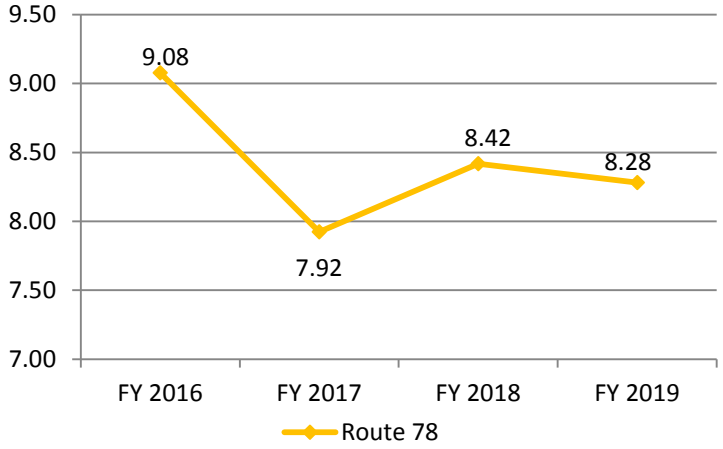


Exhibit 7.1.29 Yellow Line Passengers per VRH, FY 2016 – FY 2019



Red Line/Routes 80, 82, 85[8]

Prior to July 1, 2019, the route currently known as the Red Line was separated into two primary routes. Route 80 traveled south from Vallejo, between the Vallejo Transit Center and El Cerrito Del Norte BART station in Contra Costa County, with service to the Vallejo Ferry Terminal, Sereno Transit Center, and Curtola Park & Ride. Route 82, essentially a permutation of Route 80, only operated two trips per day and extended south to the San Francisco Transbay Terminal. Route 85 traveled north, from the Vallejo Transit Center to Solano Town Center in Fairfield, with stops at the Vallejo Ferry Terminal, Six Flags Discovery Kingdom, and Solano College.

The Red Line combined elements of Routes 80 and 85, with service extending from the El Cerrito del Norte BART station to Fairfield. Service to San Francisco was not incorporated into the Red Line, but Route 82 continued to operate one trip per day. (As such, Route 82 is not included within this analysis.) Essentially, the Red Line combined service north of Vallejo and service south of Vallejo into a single route, but retaining a higher frequency to El Cerrito del North BART station from Vallejo.

Route Performance

Route 80 has traditionally exhibited a higher level of service – along with a higher ridership – than Route 85. Proportionally, Route 85 had greater ridership growth during the past four years; it experienced a 27 percent net ridership increase, compared to 12.5 percent with Route 80.

Operating cost increased steadily across the past four years, though Route 80 saw a slight decrease between FY 2017/18 and FY 2018/19. This resulted in a net increase of 24.8 percent for Route 80 and 27.4 percent for Route 85. This is not consistent with such a modest change in revenue hours. Consequently, cost per revenue hour also increased significantly. Route 80 had a significantly higher cost per hour than Route 85. The only route with a higher cost per revenue hour in FY 2018/19 was the Green Line. The cause of the high cost per revenue hour is unknown. Such differences in cost per revenue hour across similar service types are unlikely.

The overall increase in fare revenue (13.8 percent) for Route 80 was consistent with the increase in ridership (12.5 percent). However, in FY 2017/18, ridership increased 3.6 percent yet fare revenue decreased 2.7 percent.

Overall, Route 85 saw a 10.6 percent decrease in fare revenue despite a 27.1 percent increase in ridership. This occurred primarily in FY 2018/19, where ridership increased 23.4 percent while fare revenue decreased by 9.8 percent. In FY 2018/19, the Route 85 fare went from $5.00 to $2.50 as part of the unified fare structure which included an intracounty fare of $2.50. In addition, college passes began offering unlimited rides. Both of these are likely to be significant contributing factors to the fare revenue decline.

Finally, passengers per revenue hour increased during the four-year period, indicative of ridership increasing at a greater rate than revenue hours. Route 80 was above the standard during FY 2017/18 and FY 2018/19, while Route 85 did not meet the standard during any year.

[8] Red Line data sources: SolTrans – Cost Allocation Model – FY 15-16 Actuals through 6-30-16_Final; SolTrans – Cost Allocation Model – FY 16-17 Actuals through 6-30-17_Final; SolTrans – Cost Allocation Model – FY 17-18 Actuals through 6-30-18_Final; SolTrans – Cost Allocation Model – FY 18-19 Actuals through 6-30-19_Final; SolanoExpress FY 18-19 Quarterly Monitoring Report – End of Year (August 2019).

In order to address the efficiency, effectiveness, and farebox recovery ratio issues on the Red Line, SolTrans' goal should be increasing ridership and fare revenue at a higher rate than increasing operating costs.

Exhibit 7.1.30 Red Line Ridership, FY 2016 – FY 2019

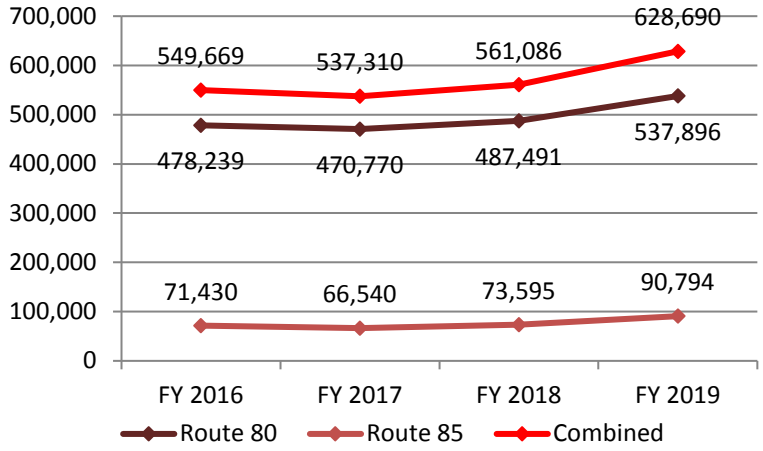


Exhibit 7.1.31 Red Line Vehicle Revenue Hours, FY 2016 – FY 2019

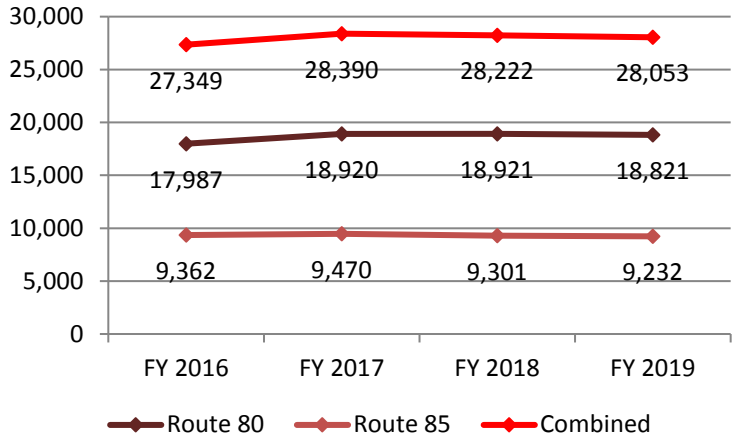


Exhibit 7.1.32 Red Line Operating Cost, FY 2016 – FY 2019

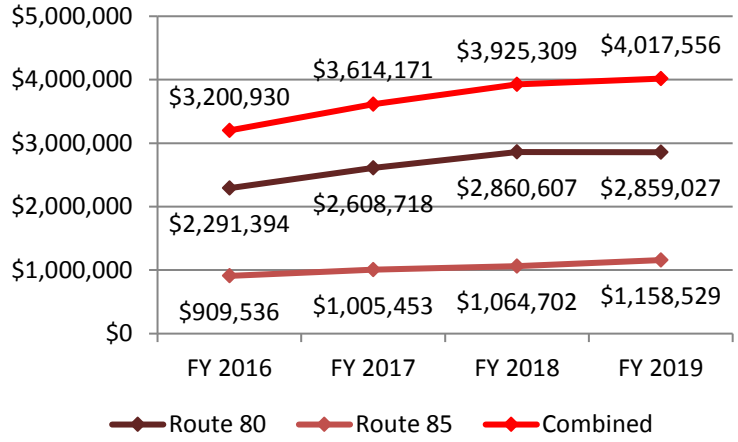


Exhibit 7.1.33 Red Line Fare Revenue, FY 2016 – FY 2019

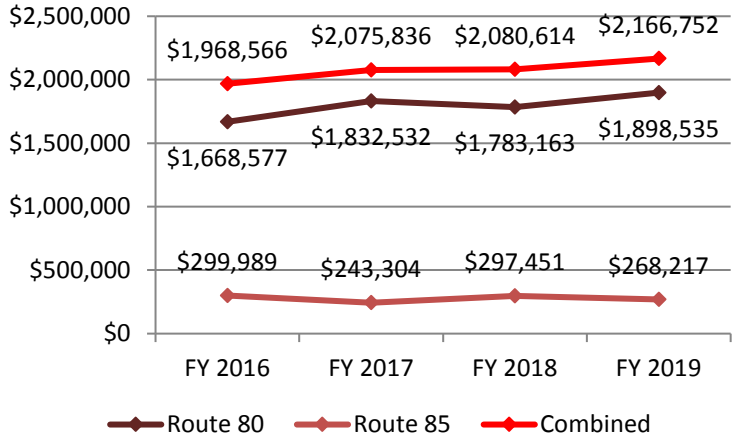


Exhibit 7.1.34 Red Line Farebox Recovery Ratio, FY 2016 – FY 2019

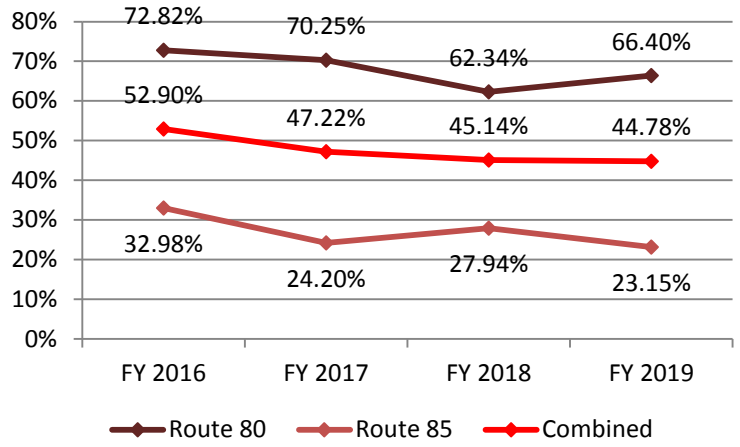


Exhibit 7.1.35 Red Line Cost per VRH, FY 2016 – FY 2019

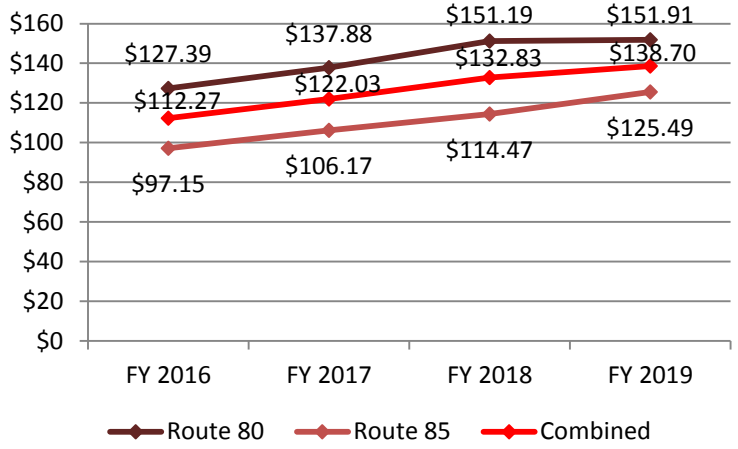
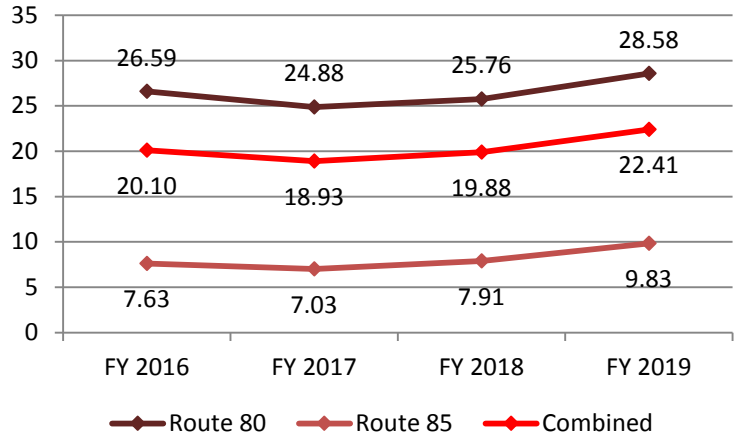


Exhibit 7.1.36 Red Line Passengers per VRH, FY 2016 – FY 2019



7.2 System Performance

The "system performance" section combines all SolanoExpress route configurations in operation each year to evaluate the service at-large across the past four years.

Ridership experienced a net increase of 4.8 percent between FY 2015/16 and FY 2018/19, due primarily to small increases from year to year. This rate of increase exceeded the estimated population growth of Solano County for FY 2017/18 and FY 2018/19.[9] Ridership growth was observed in both years wherein the consolidated routes were implemented, with full implementation (FY 2018/19) resulting in the highest ridership increase of any of the four years. While this is a step in the right direction, the STA and their partner agencies should strive to increase ridership so as to improve productivity metrics as well as the farebox recovery ratio.

The total operating cost of the system increased by 27.8 percent, or nearly $2.4 million, during the four-year period. The greatest change occurred in FY 2016/17 (which saw an increase of 12.4 percent). In subsequent years, route consolidation activities resulted in a slowing rate of increase. By FY 2018/19, the annual increase in operating cost had dropped to 5.0 percent, with growth restrictions imposed by STA. This is a positive trend, but only time will tell whether FAST and SolTrans can effectively control their operating costs.

Increasing fare revenues is easier said than done. System-wide, fare revenues did not respond favorably to the route consolidation. The only year with measurable growth in fare revenues was FY 2016/17; the following exhibited little change (although it was positive). In FY 2018/19, fare revenues declined, for a four-year net change of just 1.1 percent. The fare change implemented in July 2018 reduced some fares. While this brought FAST and SolTrans fares in line with one another (and made them consistent throughout the system), it likely also contributed to the decline in fare revenue in FY 2018/19.

System-wide, the farebox recovery ratio decreased by 20.9 percent across the four-year period, dropping from 44.4 percent in FY 2015/16 to 35.1 percent in FY 2018/19. While this remains high, the route-specific analysis showed some routes dropping below 20 percent. This is due to rising operating costs combined with decreasing fare revenues.

Cost per revenue hour experienced a net 11 percent increase between FY 2015/16 and FY 2018/19, considering a slight improvement in FY 2018/19. In the first three years, the calculated cost per revenue hour rose from $128.73 to $146.21, or 13.6 percent. The 2.3 percent decrease in FY 2018/19 was due to a cost per hour cap imposed on the operators by STA. Passengers per revenue hour saw a net decrease of 9.0 percent.

Finally, system-wide fare revenue per revenue hour decreased 12.2 percent across the last four years. The bulk of this change took place in FY 2018/19, heavily impacted by a decrease in fare revenue and increase in revenue hours.

Exhibit 7.2.1 System-wide Performance

[9] State of California Department of Finance, Table E-4, Population Estimates for Cities, Counties, and the State 2011-2020 with 2010 Census Benchmark, http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-4/2010-20/..

Performance Metrics	FY 2016	FY 2017	FY 2018	FY 2019	Overall Change
Ridership	1,044,028	1,042,031	1,059,671	1,094,386	+50,358
Annual change (percent)		*-0.2%*	*1.7%*	*3.3%*	*4.8%*
Vehicle Revenue Hours	66,676	72,190	71,456	76,769	+10,093
Annual change (percent)		*8.3%*	*-1.0%*	*7.4%*	*15.1%*
Operating Cost	$8,583,148	$9,650,537	$10,447,713	$10,965,219	+$2,382,071
Annual change (percent)		*12.4%*	*8.3%*	*5.0%*	*27.8%*
Fare Revenue	$3,812,583	$4,042,302	$4,043,081	$3,853,919	+$41,336
Annual change (percent)		*6.0%*	*0.0%*	*-4.7%*	*1.1%*
Performance Indicators					
Farebox Recovery Ratio	44.4%	41.9%	38.7%	35.1%	-9.27%
Annual change (percent)		*-5.7%*	*-7.6%*	*-9.2%*	*-20.9%*
Cost per Revenue Hour	$128.73	$133.68	$146.21	$142.83	$14.10
Annual change (percent)		*3.8%*	*9.4%*	*-2.3%*	*11.0%*
Passengers per Revenue Hour	15.66	14.43	14.83	14.26	-1.40
Annual change (percent)		*-7.8%*	*2.7%*	*-3.9%*	*-9.0%*
Fare Revenue/Revenue Hour	$57.18	$56.00	$56.58	$50.20	-$6.98
Annual change (percent)		*-2.1%*	*1.0%*	*-11.3%*	*-12.2%*

7.3 Key Corridor Segments

According to the 2017 Solano County Comprehensive Transportation Plan, key transit corridors specific to intercity travel in Solano County are Interstates 80, 680, and 780. The SolanoExpress service travels along these roadways both within Solano County and into neighboring counties.

Exhibit 7.3.1 Solano County Major Transit Corridors

To determine the percentage of trips currently being captured by SolanoExpress along each of these corridors, Moore & Associates utilized traffic volumes provided by Caltrans[10] for calendar year 2017. SolanoExpress data for FY 2017/18 was utilized in the analysis, as it not only covered the same period but provided ridership data broken down into greater detail than FY 2018/19 (as it was prior to the implementation of route consolidation). Therefore, Exhibit 7.3.2 provides a general idea of the number of trips being captured by SolanoExpress.

[10] https://dot.ca.gov/programs/traffic-operations/census/traffic-volumes/2017.

In calculating total trips, we assessed the Annual Average Daily Trips (AADT) in both directions for each route segment, then averaged the number of trips across the route segments for each individual highway. Given many travelers would likely be passing through multiple route segments, we did not add the AADTs together. We then multiplied the average AADT by 365 to get the estimated annual traffic volume along a given route.

In calculating the SolanoExpress relative share, we subtracted total annual truck volume from the total estimated traffic volume to determine the estimated number of vehicle trips for each corridor. We then divided the route ridership by the corridor total to determine the percentage.

When reviewing these figures, it is important to keep in mind that this is an imperfect analysis. In other words, the traffic and truck volume data are for a slightly different period (calendar year 2017) than the ridership data for SolanoExpress (fiscal year 2018). Bus trips are included in the total annual truck volume, as buses are considered Class 4 vehicles (as defined by the Federal Highway Administration) and vehicles in Classes 4-13 are counted as part of the truck volume.

In Exhibit 7.3.2, Route 80, during its travel on I-80, had the greatest share of trips (0.416 percent), followed by Route 78 on I-780 (0.264 percent) and Route 90 on I-80 (0.245 percent). Route 20 had the lowest share of trips on I-80 (0.027 percent), which is not surprising since Route 20 also travels along the shortest portion of I-80.

Historically, transit's mode-share for intercity travel has ranged from one to five percent (including long distance bus operators such as Greyhound). For this analysis we will use a two percent mode-share as a reference for purposes of analysis. The final column shows what the ridership on each route would need to be to meet that reference. This simply reveals that the SolanoExpress system, given the right set of responses, has an opportunity to capture more travel through the corridors served by the system. Analysis beyond the scope of this working paper is needed to set appropriate targets and responses.

Exhibit 7.3.2 Percentage of Trips Captured by SolanoExpress by Route

Highway Corridor	Total Annual Traffic Volume (2017)[1,4]	Total Annual Truck Volume (2017)[4]	Total Passenger Traffic Volume (2017)[2]	Total Annual SolanoExpress Ridership (FY 2018)	Percentage SolanoExpress Ridership[3]	2% Mode-Share Goal
	(A)	(B)	(A - B)	(C)	[C/(A-B)]	
I-80	148,296,182	7,963,692	140,332,490	38,398	0.027%	2,806,650
I-80	107,144,957	5,678,508	101,466,449	35,448	0.035%	2,029,329
I-80	148,296,182	7,963,692	140,332,490	52,765	0.038%	2,806,650
I-680	114,766,429	4,539,286	110,227,143	52,765	0.048%	2,204,543
I-80	113,856,681	4,786,082	109,070,599	267,084	0.245%	2,181,412
I-680	134,454,594	6,061,677	128,392,917	100,424	0.078%	2,567,858
I-780	39,724,167	1,633,375	38,090,792	100,424	0.264%	761,816
I-80	121,200,857	4,122,797	117,078,060	487,491	0.416%	2,341,561
I-80	106,683,885	7,206,651	99,477,233	73,595	0.074%	1,989,545

Notes:

1. *It is assumed buses are included within the total annual traffic volume and not counted as part of the total annual truck volume.*
2. *"Total passenger traffic volume" subtracts the measured truck volume from the total annual traffic volume.*
3. *The percentage of SolanoExpress Ridership is shown as the number of riders carried by SolanoExpress as a percentage of the total traffic volume.*
4. *The total annual traffic volume and total annual truck volume represent the total portion of the corridor served by all routes.*

When the data is segregated by corridor, I-80 had the greatest percentage of transit ridership share (0.903 percent). It also represents the longest corridor. The final column shows what the transit mode-share for each corridor would need to be to meet the two percent threshold.

Exhibit 7.3.3 Percentage of Trips Captured by SolanoExpress by Corridor

SolanoExpress Routes	Total Annual Traffic Volume (2017)[1,4]	Total Annual Truck Volume (2017)[4]	Total Passenger Traffic Volume (2017)[2]	Total Annual SolanoExpress Ridership (FY 2018)	Percentage SolanoExpress Ridership[3]	2% Mode-Share Goal
	(A)	(B)	(A - B)	(C)	[C/(A-B)]	
20, 30, 40, 80, 85, 90	110,939,427	5,165,897	105,773,530	954,781	0.903%	2,115,471
40, 78	114,766,429	4,539,286	110,227,143	153,189	0.139%	2,204,543
78	39,724,167	1,633,375	38,090,792	100,424	0.264%	761,816

Notes:

1. *It is assumed buses are included within the total annual traffic volume and not counted as part of the total annual truck volume.*
2. *"Total passenger traffic volume" subtracts the measured truck volume from the total annual traffic volume.*
3. *The percentage of SolanoExpress Ridership is shown as the number of riders carried by SolanoExpress as a percentage of the total traffic volume.*
4. *The total annual traffic volume and total annual truck volume represent the portion of the corridor served by each route.*

Absent additional passenger data segregating transit ridership by route segment within each route, no further corridor analysis can be offered. However, it is apparent there is significant opportunity for SolanoExpress to capture a greater share of trips made within each of the corridors it serves. Potential mode-share for SolanoExpress will be limited by the capacity available on each route within each corridor, and will depend on the amount of seat turnover on each route.

7.4 Potential Opportunities for Bus Rapid Transit (BRT)

Per the FTA, "Bus Rapid Transit (BRT) is a high-quality bus-based transit system that delivers fast and efficient service that may include dedicated lanes, busways, traffic signal priority, off-board fare collection, elevated platforms and enhanced stations. Because BRT contains features similar to a light rail or subway system, it is often considered more reliable, convenient and faster than regular bus services."[11] BRT can be especially appealing from the operator's perspective as it provides many of the benefits and features of light rail service with limited up-front and ongoing infrastructure costs. BRT is often attractive to commuters because it is a cost-effective alternative to traditional bus and rail service.

Before determining opportunities for BRT, it is important to define what BRT is. There are five key elements that traditionally constitute formal BRT service:

1. Physically separated bus lanes to allow buses to avoid congestion (e.g., bus-only lanes);
2. Stations and bus lanes aligned in the center of the street (to avoid delays arising from turning and stopped vehicles);
3. Off-vehicle fare collection;
4. Level-platform boarding; and
5. Turn restrictions and bus priority at intersections.[12]

Individual elements of a formal BRT service can often be implemented to create a "BRT-lite" service (sometimes called Rapid Bus) using existing infrastructure and/or vehicles. These may include:

1. Full or partial access to bus-only lanes;
2. Queue jumps (where a short bus lane allows buses to advance through a signalized intersection ahead of other traffic with an early green light);
3. Off-vehicle fare collection; and
4. Signal priority.

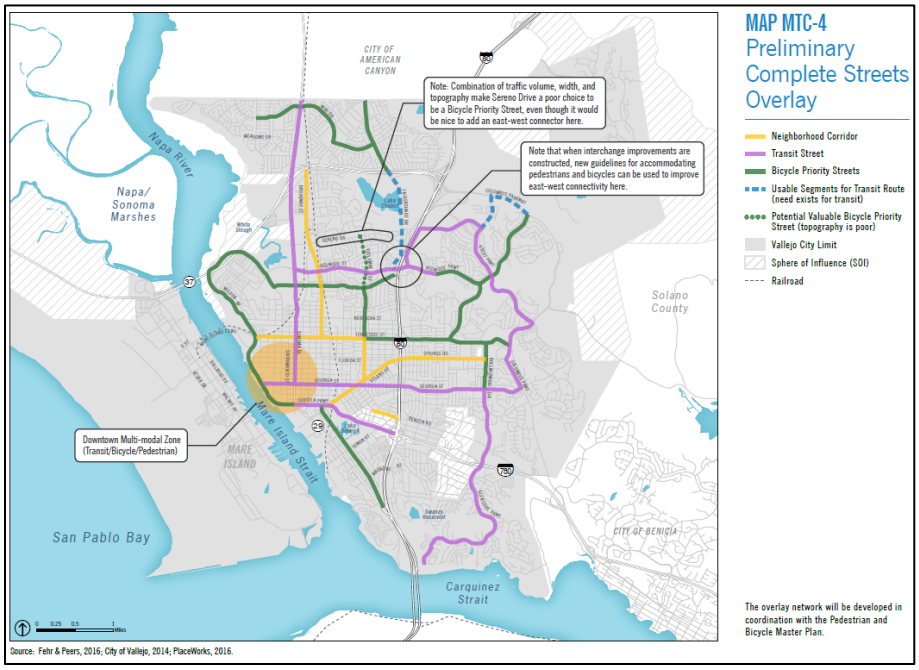
BRT is a typically faster, more efficient service because it eliminates many of the factors of a traditional bus service that require extra time. Some of these things are handled at the boarding point, while others pertain to the path and manner of travel. By collecting fares electronically or on the boarding platform (and eliminating cash fares), riders do not need to place their fares into a farebox, resulting in faster boarding. Level-platform boarding eliminates the need for riders to climb steps or for mobility-impaired individuals to wait for a ramp or lift to be lowered, also resulting in faster boarding. Placement of stops and stations, signal priority, and dedicated lanes allow the bus to travel faster by reducing the time spent navigating an exit from the roadway to access stops, increasing the average speed by allowing the bus to bypass congestion, and reducing the time spent waiting at intersections.

Identifying realistic opportunities for BRT or BRT-lite service first requires identifying key corridors. However, since SolanoExpress already operates within these corridors, it is recommended STA look at

[11] FTA website, Bus Rapid Transit, https://www.transit.dot.gov/research-innovation/bus-rapid-transit
[12] *The BRT Planning Guide*, 4th edition. Institute for Transportation and Development Policy, New York, NY, 2017. www.brtguide.itdp.org.

how to move toward a BRT-lite or Rapid Bus model within its existing routes rather than looking to identify specific BRT corridors. (These recommendations will be presented in Section 7.5.)

Exhibit 7.4.1 Solano County Major Transit Corridors



Source: Vallejo General Plan 2040. Mobility, Transportation, & Connectivity. Accessed January 2020.

While some Solano communities have already identified local transit corridors that could support future BRT service, only Vallejo has included BRT-specific improvements as part of its "Transit Street" concept.

Fairfield

According to the Circulation Element of the City of Fairfield's General Plan (adopted in 2002), the City will "integrate regional transit with local transit to make the entire system more user-friendly." This includes SolanoExpress as well as rail service. The City has also created a policy to develop well-defined transit corridors to link the various parts of the city. Other BRT-supportive policies include working with Caltrans to implement high-occupancy vehicle (HOV) lanes on I-80 through Fairfield and improving Level of Service conditions at key intersections.

Benicia

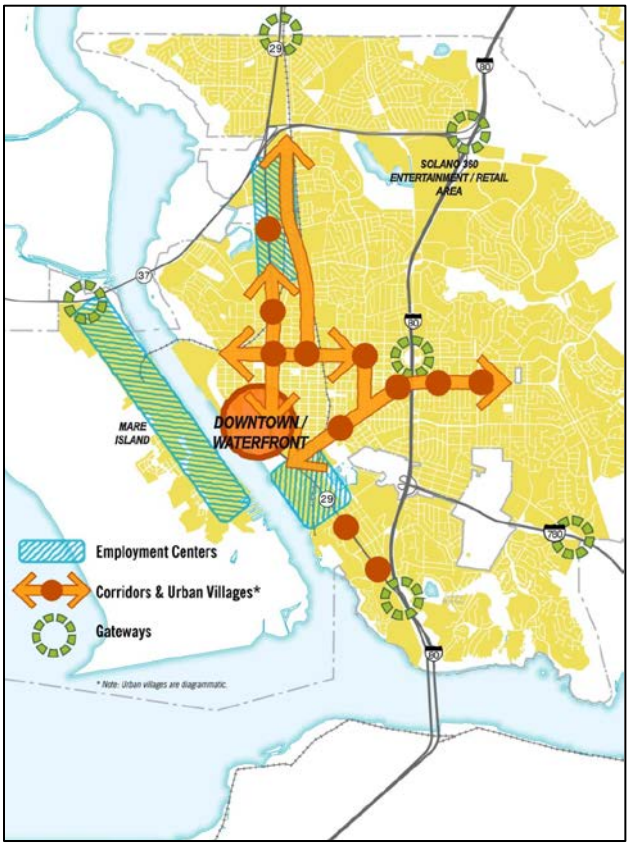
Military Street bisects the city of Benicia and is where SolanoExpress provides service via the Yellow Line. It is the most likely corridor where bus rapid transit or enhanced bus service/amenities could be introduced.

Vallejo

According to the 2040 City of Vallejo General Plan, a "Transit Street" primarily serves public transit routes. Amenities include signal pre-emption, high quality bus stops, and bus-only lanes as appropriate. With the exception of pedestrians, public transit has the highest priority with respect to conflicts between modes. Transit Streets illustrated in Exhibit 7.4.1 which overlap with Corridors shown in Exhibit 7.4.2 would be candidates for future BRT/enhanced bus service.

State Route 29/Sonoma Boulevard through Vallejo is where Solano Express provides service via the Red Line. This corridor has been studied by Caltrans District 4, STA, and the City of Vallejo as a complete streets corridor through Vallejo and programmed for improvements in the State Highway Operations and Protection Program (SHOPP). STA will be working with Caltrans, City of Vallejo and SolTrans to design these improvements to benefit Solano Express and local transit provided by SolTrans and improved pedestrian and bicycle access. MTC's Plan Bay Area 2050 proposes service between Napa and Vallejo via SR29.

Exhibit 7.4.2 Vallejo Physical City Structure Elements Map



Source: Vallejo General Plan 2040. Planning Framework. Accessed January 2020.

Outside Solano County

In Davis, the 2013 Circulation Element of the City's General Plan includes several actions supporting potential BRT service in the Public Transportation section. While many of the actions identified in this section pertain primarily to local transit, some of the items that are specifically relevant to current SolanoExpress service as well as potential BRT service include:

1. Expand, improve, and publicize the multi-modal transportation center at the train depot in the Core Area.
2. Work proactively to coordinate and cross-promote transit service between the Yolo County Transportation District, Unitrans, Davis Community Transit, and other transit service providers.
3. Study installing transit signal priority systems at selected intersections and corridors to extend green time for approaching buses.

In the City of Sacramento's 2018 Central City Specific Plan, the Mobility section addresses challenges and opportunities related to transit use in the city's urban core. One of the proposed improvements includes the use of dedicated transit lanes, which would be created by reducing the number of traffic or parking lanes. Depending on where these lanes are placed, they could be used by SolanoExpress with or without BRT.

In 2017, the Western Contra Costa Transportation Advisory Committee completed its West County High-Capacity Transit Study. The study included several BRT and Rapid Bus improvements. While several of these would not apply to SolanoExpress service given their proposed location, of note is the potential introduction of bus-only lanes in the vicinity of the El Cerrito del Norte BART station. There is also discussion of extending BART service north to Hercules, which could mitigate the need for SolanoExpress to travel all the way to the El Cerrito del Norte station in the future. While transit priority improvements might take place within five years of the study, the other improvements discussed herein are at least 15 years into the future.

7.5 Recommendations to Improve Performance and Implement BRT

SolanoExpress Performance Recommendations

In reviewing the performance of the SolanoExpress service, four key issues were noted:

1. Decreases in farebox recovery ratio.
2. Changes in fare revenue not consistent with changes in ridership.
3. Not meeting established performance standards.
4. Not capturing enough of the travel within each route's service corridor.

Issue #1: Significant decrease in farebox recovery ratio.

The services in the Blue Line corridor experienced a 52 percent increase in operating costs between FY 2017/18 (the combined operating costs of Routes 20, 30, and 40) and FY 2018/19 (Blue Line). While this reflects a significant increase (62 percent) in vehicle revenue hours, it was not supported by a corresponding increase in fare revenue, even though there was a nearly 17 percent increase in ridership. As a result, the farebox recovery ratio dropped from 18.7 percent (combined Routes 20, 30, and 40) in FY 2017/18 to 11.8 percent in FY 2018/19. While there may have been additional revenues that could be counted as fare revenue supplementation for compliance purposes, this dramatic drop in the raw figures indicates either a performance or accounting issue. The STA and its partners will need to pay close attention to ensure its farebox recovery ratio for this route does not erode further, either by minimizing future operating cost increases or by increasing fare revenues through ridership growth.

Issue #2: Changes in fare revenue not consistent with changes in ridership.

On the Blue, Yellow, and Red Lines, changes in fare revenue were not consistent with changes in ridership during certain periods across the past four years. (This was discussed briefly under Issue #1 with respect to the Blue Line.) For the Blue Line, as the primary issue occurred between FY 2017/18 and FY 2018/19, it is easiest to look at the combined Routes 20, 30, and 40 in FY 2017/18 versus the Blue Line in FY 2018/19. In FY 2018/19, Blue Line ridership increased by 16.7 percent over the combined ridership from the previously year. However, fare revenue decreased by 4.2 percent. This resulted in a 17.9 percent decrease in the average fare per passenger.

As discussed in Section 7.1, a potential reason for fare revenue not changing at the same rate as ridership is the fare adjustment put into place in July 2018. This adjusted some of the SolanoExpress fares charged by FAST (especially intracounty fares) downward, resulting in a consistent fare schedule systemwide. It is likely this impacted the fare revenues collected on the Blue Line, especially if a high volume of the ridership travels within Solano County.

Exhibit 7.5.3 Blue Line Ridership vs. Fare Revenue

Blue Line Performance Metrics	FY 2016	FY 2017	FY 2018	FY 2019	Overall Change
Ridership	133,765	132,990	126,611	147,720	13,955
Annual change (percent)		*-0.6%*	*-4.8%*	*16.7%*	*10.4%*
Fare Revenue	$414,041	$440,245	$429,621	$411,768	-$2,273
Annual change (percent)		*6.3%*	*-2.4%*	*-4.2%*	*-0.5%*
Performance Indicators					
Average fare per passenger	$3.10	$3.31	$3.39	$2.79	-$0.31
Annual change (percent)		*6.9%*	*2.5%*	*-17.9%*	*-9.9%*

The Yellow Line (Route 78) also experienced a similar fare revenue decrease in response to a ridership increase. While not as extreme as that observed with respect to the Blue Line, FY 2018/19 saw an 8.4 percent decrease in fare revenue while there was a 3.6 percent increase in ridership. This resulted in an 11.6 percent decrease in the average fare per passenger. As with the Blue Line, the July 2018 fare adjustment resulted in a fare decrease for trips within Solano County, which could have had some impact on fares received from riders traveling between Vallejo and Benicia. Another consideration is the 14.7 percent fare revenue increase in FY 2017/18. If that year's fare revenue was overstated, then the issue may lie in FY 2017/18, not FY 2018/19.

Exhibit 7.5.4 Yellow Line Ridership vs. Fare Revenue

Yellow Line Performance Metrics	FY 2016	FY 2017	FY 2018	FY 2019	Overall Change
Ridership	91,673	93,157	100,424	104,063	12,390
Annual change (percent)		*1.6%*	*7.8%*	*3.6%*	*13.5%*
Fare Revenue	$312,354	$318,589	$365,405	$334,580	$22,226
Annual change (percent)		*2.0%*	*14.7%*	*-8.4%*	*7.1%*
Performance Indicators					
Average fare per passenger	$3.41	$3.42	$3.64	$3.22	-$0.19
Annual change (percent)		*0.4%*	*6.4%*	*-11.6%*	*-5.6%*

A similar issue was noted with respect to Route 80 in FY 2017/18 and Route 85 in FY 2018/19. In FY 2017/18, Route 80 ridership increased 3.6 percent while fare revenue decreased 2.7 percent. In FY 2018/19, Route 85 ridership increased 23.4 percent while fare revenue decreased 9.8 percent. For Route 80, consideration should be given to the 9.8 percent fare revenue increase in FY 2016/17 that accompanied a ridership decline. For Route 85, there was a 22.2 percent fare revenue increase in FY 2017/18 accompanying a 10.8 percent ridership increase. If the earlier year's fare revenue was overstated, then the issue may lie with that year, not the year exhibiting the fare revenue decrease.

Exhibit 7.5.5 Route 80 Ridership vs. Fare Revenue

Route 80 Performance Metrics	FY 2016	FY 2017	FY 2018	FY 2019	Overall Change
Ridership	478,239	470,770	487,491	537,896	59,657
Annual change (percent)		*-1.6%*	*3.6%*	*10.3%*	*12.5%*
Fare Revenue	$1,668,577	$1,832,532	$1,783,163	$1,898,535	$229,958
Annual change (percent)		*9.8%*	*-2.7%*	*6.1%*	*13.8%*
Performance Indicators					
Average fare per passenger	$3.49	$3.89	$3.67	$3.53	$0.04
Annual change (percent)		*11.5%*	*-5.7%*	*-3.8%*	*1.1%*

Exhibit 7.5.6 Route 85 Ridership vs. Fare Revenue

Route 85 Performance Metrics	FY 2016	FY 2017	FY 2018	FY 2019	Overall Change
Ridership	71,430	66,540	73,595	90,794	19,364
Annual change (percent)		*-6.9%*	*10.6%*	*23.4%*	*27.1%*
Fare Revenue	$299,989	$243,304	$297,451	$268,217	-$31,772
Annual change (percent)		*-18.9%*	*22.2%*	*-9.8%*	*-10.6%*
Performance Indicators					
Average fare per passenger	$4.20	$3.66	$4.04	$2.95	-$1.25
Annual change (percent)		*-12.9%*	*10.4%*	*-30.0%*	*-29.8%*

Issue #3: Failure to meet established performance standards.

One of the measures of productivity used by STA is performance standards with respect to passengers per vehicle revenue hour. The standard is 25.0 passengers per revenue hour for each of the SolanoExpress individual routes.

Exhibit 7.5.7 Performance Standard: Passengers per Revenue Hour

Route	Standard	FY 2016	FY 2017	FY 2018	FY 2019
Blue Line	25.0	9.4	8.2	8.3	6.0
Green Line		18.0	17.7	17.2	19.2
Red Line	25.0	20.1	18.9	19.9	22.4
Yellow Line		9.1	7.9	8.4	8.3

None of the current routes as currently structured for review against the performance standard meet the performance standard. The Blue Line and the Yellow Line are particularly challenged.

Given the oft-times large gaps between actual performance and established performance standards, it is possible the standards need to be re-evaluated. An important question is, would the current capacity of each route (assuming there are no increases to VRH) be able to absorb a ridership increase of 45 to 151 percent, thereby achieving the service standard? (Bear in mind that adding capacity by adding more buses/trips would also increase VRH, and therefore not improve productivity.) If not, then the standard for that route may warrant rethinking.

Alternately, consider whether it would be possible to reduce VRH (by reducing the number of trips) without significantly reducing ridership. The elimination of low-productivity trips (especially those during non-peak hours) may offer some reduction in VRH without a significant decrease in ridership. Another

alternative would be to utilize different standards for peak service versus non-peak service. By defining what constitutes peak-hour service and assessing productivity differently for those trips, some routes may come closer to meeting the established standards. In effect, this is what occurs by analyzing the GX as a separate route though it only operates during periods of peak potential usage.

If a route has the capacity to absorb an increase in ridership sufficient to meet the service standard, then efforts should be made to increase ridership. Recommendations for increasing ridership include:

- Ensure on-time performance (reliability) is consistently high.
- Increase marketing to target "choice riders" who do not currently use the service (focusing on the benefits of commuting via SolanoExpress).
- Add amenities such as onboard Wi-Fi, outlets, etc. to enhance SolanoExpress' attractiveness as a commuter option.
- Offer a free 10-day pass to prospective (qualified) riders to foster confidence in the service. Conduct follow-up with rider prospects during the trial period to assess "conversion" factor.

Issue #4: Not capturing enough of the travel within each route's service corridor.

The three recommendations detailed above look at how to improve ridership and performance within the current structure of the SolanoExpress program and routes. Despite the recent route consolidation, there is little expectation the current system would ever reach the ridership thresholds needed to even approach the two percent goal for mode-share in each of the major interstate highway corridors. For this to happen, major system-wide changes need to occur. The role of SolanoExpress needs to be redefined to confront competition with the automobile, provide more convenience, increase capacity, and offer faster service.

To reach the two percent mode-share threshold, annual SolanoExpress ridership would need to increase significantly. Along I-80, ridership would need to increase from 954,781 to 2,115,471, an increase of 122 percent. On the I-680 corridor, ridership would need to increase from 153,189 to 2,204,543, an increase of 1,339 percent. On the I-780 corridor, ridership would need to increase from 100,424 to 761,816, an increase of 659 percent. Without a complete system overhaul, not even the most aggressive marketing and promotion would result in ridership increases of this magnitude.

This may mean focusing on the intercity portions of the route (with less service within individual jurisdictions), looking at more of a Bus Rapid Transit-style service, relying more on effective "feeder" linkages (including Park and Ride lots and local bus services), and providing onboard amenities such as Wi-Fi and electrical outlets.

With a local service, it is often necessary to offer more geographic coverage, thereby bringing the service to the customer. For an intercity service, this can become counterproductive. By bringing the service to the customer, it becomes less convenient and the trips become longer. Compare this to BART. As a fixed-guideway service, it cannot move closer to the customer. Instead, the customer must come to BART. But once the customer reaches BART, it offers things the customer values – speed, convenience, and the opportunity to do other things during the commute.

The Red Line portion between Vallejo and El Cerrito del Norte BART and the Green Line are the two routes that fits this more streamlined concept of intercity transit while meeting most, if not all, key performance indicators. This is certainly something to consider when redefining a vision for SolanoExpress.

We recommend STA and the Consortium address the following questions in evaluating the future vision for SolanoExpress.

1. What does the customer want? Not in terms of "how should the current SolanoExpress service change to fit your needs," but without imposing any artificial limits. This will help STA and the Consortium identify a service model to emulate. For instance, if many customers want SolanoExpress to be more like BART, that provides insight into features and benefits customers would value with SolanoExpress.
2. How can SolanoExpress be more effective as a regional carrier in the corridors served? If the primary goal is to provide service between jurisdictions, including connections to BART and into Sacramento, then including multiple service locations within each community – or even traveling very far off the primary route path – does not support that goal.
3. What can be used as a model? While Solano County may be unique in many ways, its overall intercity transit needs are not uncommon. Look for another location with similar features: An outlying county adjacent to one or more major metropolitan areas, multiple local systems operating within the county, intercity bus service that connects to an urban core and/or provides a bridge to commuter rail service, etc. Preparing a case study of that location may offer insight into how various services could be delivered in Solano County. Ventura County is one example (albeit on a somewhat smaller scale), as is Georgia's Xpress commuter bus program, operated by the State Road and Tollway Authority.

Bus Rapid Transit Recommendations

While full implementation of a formal/traditional BRT service may be difficult, given the multi-jurisdictional nature of the SolanoExpress service, BRT-lite or Rapid Bus service is certainly a viable alternative. Rather than focusing on improvements to specific corridors, the following recommendations are designed to move SolanoExpress closer to the efficiencies of BRT or Rapid Bus service on all routes.

1. Eliminate on-board fare collection. The use of mobile ticketing and platform-based ticket vending machines would reduce the time needed for boarding.
2. Reduce the number of stops served in each community. Limiting the number of stops will result in faster service due to less dwell time at boarding locations.
3. Minimize the distance of stops from the main route. Where possible, avoiding significant diversions from the main route can result in faster service as there is less time spent navigating surface streets.
4. Work with the jurisdictions in which SolanoExpress operates (within as well as outside of Solano County) regarding the implementation of BRT-supportive projects such as signal priority and queue jumping.
5. Adjust off-highway routing to take advantage of bus-only lanes, signal priority, etc., where these features are available (or become available in the future).
6. Consider purchasing future vehicles that offer the opportunity for level-platform boarding. The primary challenge to this recommendation is the use of over-the-road coaches on the existing SolanoExpress service. These are vehicles designed for highway travel (higher speeds and longer

distances). These vehicles also feature a single door, which can impact boarding speed, and require the use of a wheelchair lift. Level-platform boarding through two or more doors (such as with an articulated bus) can dramatically reduce the dwell time at stops. However, articulated vehicles may not be well-suited to highway travel or navigating existing transit stations. If STA is committed to providing a BRT-like experience with SolanoExpress, the use of a different vehicle should be considered.