Sacramento County

Short-Range Transit Plan 2023-2027 & Zero-Emission Bus Plan

Final Report

SACRAMENTO COUNTY
DEPARTMENT OF TRANSPORTATION

Stantec

aim consulting

Stantec

Sacramento County Short-Range Transit Plan & Zero-Emission Bus Plan

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Prepared for:

Sacramento County
Department of Transportation

Prepared by:

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Abbreviations

AHSC	Affordable Housing and Sustainable Communities
AHJ	Authorities having jurisdiction
AQMD	Air Quality Management District
ATP	Active Transportation Plan
AVL	Automatic vehicle locators
AVTA	Antelope Valley Transit Authority
BE	Battery-electric
BEB	Battery-electric bus
BRT	Bus rapid transit
BUILD	Better Utilizing Investments to Leverage Development
CalEPA	California Environmental Protection Agency
CAD	Computer aided dispatch
CARB	California Air Resources Board
CBO	Community-based organization
CMAQ	Congestion Mitigation and Air Quality
CPUC	California Public Utilities Commission
DAR	Dial-A-Ride
DRIVE	Drive-cycle Raid Investigation Visualization, and Evaluation
EJ	Environmental justice
EV	Electric vehicle
FAST Act	Fixing America's Surface Transportation Act
FCE	Hydrogen fuel cell-electric
FCEB	Hydrogen fuel cell-electric bus
FTA	Federal Transit Administration
FTE	Full-time equivalent
GHG	Greenhouse gas emissions
GSCE	Galt-Sacramento Commuter Express

GTFS	General Transit Feed Specification
HVIP	Hybrid and Zero-Emission Truck and Bus Voucher Incentive Program
ICT	Innovative Clean Transit
KPI	Key performance indicator
LCFS	Low Carbon Fuel Standard
LCTOP	Low Carbon Transit Operations Program
LEP	Limited English Proficiency
LIHM	Low Income High Minority
Low-No	Low or No Emission Program
LPG	Liquid petroleum gas
LPP	Local Partnership Program
LTF	Local Transportation Fund
MTP/SCS	Metropolitan Transportation Plan/Sustainable Communities Strategy
NREL	National Renewable Energy Laboratory
NTD	National Transit Database
OEHHA	Office of Environmental Health Hazard Assessment
OEM	Original equipment manufacturer
OTP	On-time performance
PCA	Personal care assistant
PPE	Personal Protective Equipment
PV	Photovoltaic
RTD	Regional Transit District
RUCS	Rural-Urban Connections Strategy
SacDOT	Sacramento Department of Transportation
SACOG	Sacramento Area Council of Governments
SCCP	Solutions for Congested Corridors
SCT Link	South County Transit Link
SECAT	Sacramento Emergency Clean Air Transportation

SGR	State of Good Repair
SMUD	Sacramento Municipal Utility District
SOC	State of charge
SRTP	Short Range Transit Plan
STEP	Sustainable Transportation Equity Project
STIP	State Transportation Improvement Program
SWOC	Strengths, weaknesses, opportunities, and challenges
TAM	Transit Asset Management
TDA	Transportation Development Act
TGIF	Targeted Green Infrastructure Fund
TIRCP	Transit and Intercity Rail Capital Program
TMA	Transportation Management Association
TTC	Toronto Transit Commission
VMT	Vehicle miles traveled
VOGO	Volunteers on the Go
ZE	Zero-emission
ZEB	Zero-emission bus

1 EXECUTIVE SUMMARY

The Sacramento County Department of Transportation (Sacramento County, the County) provides a variety of different transit services to the rural areas and unincorporated communities of south and east Sacramento County, including the City of Galt, Rancho Murieta, and the Delta communities.

As a recipient of Transportation Development Act funds, the County is required to develop a five-year transit plan. Under the Innovative Clean Transit (ICT) regulation from the California Air Resources Board (CARB), Sacramento County must develop and submit a zero-emission bus (ZEB) transition plan by July 1 2023, with the goal of beginning procurement of ZEBs in 2026. In addition, Sacramento County's current Short Range Transit Plan (SRTP) is for the planning period spanning 2017-2021 and needs to be updated to reflect the changing mobility landscape and evolving travel patterns and needs of the diverse communities the County serves.

Understanding the need to plan for the future to ensure these communities have access to the accessibility and mobility options that they need, Sacramento County is completed a combined SRTP and ZEB planning initiative. This will help to synergize planning efforts between short range strategic planning and ZEB planning to ensure the two plans are in alignment, and to ensure that the SRTP is geared towards and acknowledges the County's ZE future.

The SRTP/ZEB plan consists of the following tasks:

- Background data analysis for SRTP and ZEB
- Stakeholder engagement and community outreach
- Assessment of gaps and opportunities
- Service concept development
- Supporting recommendations
- Implementation plan
- ZEB modeling and route simulation
- ZEB rollout and implementation plan

Based on the analysis of existing services and multiple community engagement activities, the following four goals were developed to help guide the development of the service plan and supporting recommendations:

- Set SCT Link up for long-term success
- Enhance the customer experience
- Improve service and reliability
- Increase awareness of SCT Link
- Foster a transit-supportive built environment

The following tables present a summary of the recommended service plan and service concepts and a summary of all supporting recommendations. These were developed with the overarching intents:

- Stabilizing and recovering after the ridership losses caused by COVID-19 (pandemic). While the worst of the pandemic and the loss in ridership was experienced during 2020 and 2021, as of early

2022, ridership is still recovering and the goal of the early years of the service plan is to strategically add service to at least pre-pandemic levels, and expand where warranted.

- Focusing on enhancing services that draw the majority of SCT Link's ridership—i.e., dial-a-ride (DAR) and Hwy 99. This includes providing service later in the day as well as service on weekends to expand mobility options. Ridership may nonetheless be low initially on new services; therefore, SCT Link will need active marketing and education campaigns to make riders aware of these changes and their benefits to the community.

- Transitioning from a fixed-route model for the Delta route to a demand-response model, similar to the DAR service in Galt. As part of this approach, it is recommended that SCT Link invest in technology that will ultimately enable same-day ride requests on the demand-response services (effectively transitioning from a 'dial-a-ride' service to a 'microtransit' service where customer can either use an app or telephone line to reserve a trip). At the same time, vehicle tracking will enable live arrival information for trip planning purposes across modes and regional agencies. These enhancements will ultimately facilitate connectivity across all transit modes and providers helping to reduce barriers to transit use and making transit a more convenient option.

- Reallocating resources away from the extremely low ridership East County service to the workhorses of the SCT Link network—the DAR service and Hwy 99.

Table 1-1: Proposed service plan summary

Mode/Service	FY23-24	FY24-25	FY25-26	FY26-27	FY27-28
GSCE	• Restore service levels to pre-pandemic levels (addition of one midday round trip) • Promote TMA-operated emergency ride home program	• Continue to promote emergency ride home program • Conduct schedule review to design schedules reflective of actual operations due to traffic changes and improve on-time performance	• Add one additional round trip later in the afternoon (such as a 5:40 pm departure from Galt)	• Continue previous service	• Continue previous service
DAR	• Extend service span to 8 pm on weekdays • Pilot extended service for medical trips for all weekdays	• Extend service span to 7 pm on Saturdays • Pilot service to Herald on Thursdays	• Continue previous service	• Pilot Sunday service 8 am – 6 pm	• Continue previous service
Hwy 99	• Pilot Saturday service (60-minute headways, 8 am - 6 pm)	• Extend service span to 8:20 pm on weekdays • Conduct schedule review to design schedules reflective of actual operations due to traffic changes and improve on-time performance	• Continue previous service	• Increase frequency to 30 min service on weekdays between 9 am - 4 pm	• Pilot Sunday service (60-minute headways, 8 am - 6 pm)
Delta	• Use lead time to plan transition to demand-response service	• Transition to demand-response service in a DAR fashion (reservations required through a phone call)	• Pilot fixed-schedule service between the Delta and Sacramento	• Explore volunteer driver program for Delta communities	• Continue previous service
Amador Transit/East County	• Continue service as usual. Use lead time to plan for service reallocation (hearings, outreach, etc.)		• Reallocate service to South County services		

Table 1-2: Implementation plan and supporting recommendations

	1 FY23-24	2 FY24-25	3 FY25-26	4 FY26-27	5 FY27-28
GOAL A - Set SCT Link Up for Long-Term Success					
A1 **Develop agencywide mission statement to frame the design and delivery of mobility services**	Develop and adopt agencywide mission statement.				
A2 **Implement the ZEB Rollout Plan**	Submit ZEB Rollout Plan to CARB by July 1, 2023 and follow phasing and implementation plan for vehicles and infrastructure to achieve a full ZEB transition by 2040.			First ZEB vehicle purchase.	
A3 **Develop clear service guidelines**		Develop transit service guidelines. Adopt guidelines.	Use data to refine service guidelines.	Continuously measure service based on guidelines and adjust as needed. Identify priority routes/areas for more (or less) service when resources become available (or constrained).	
A4 **Modernize business processes and adopt new technology**	Design a data collection strategic plan to outline the data collection necessary for decision making, the technology needed for data collection, and plan to use the data. Deploy AVL on all vehicles.	Use data to refine data collection strategic plan and update plan or data collection needs accordingly.	Annually review data collection strategic plan, the state of data collection, technology used to collect data, and how data is used and adjust plan and data collection and analysis methods based on annual review.		
A5 **Achieve 1 FTE fully dedicated to SCT Link planning and oversight**			Achieve 1 full FTE dedicated to SCT Link planning, oversight, marketing and outreach, and to support the ZEB rollout.	Assess need to adjust FTE levels and adjust accordingly.	
GOAL B - Elevate the Customer Experience					
B1 **Develop a formal process for requests for service changes**			Develop a formal process for receiving requests for service changes that is shared with all of SCT Link's partners (City of Galt, etc.). Develop process for evaluating and prioritizing implementation of service requests.		
B2 **Invest in technology to improve trip planning and riding**	Acquire AVL on all vehicles to enable real-time arrival information for customers. Coordinate with third-party apps like Transit to provide improved trip-planning and real-time arrival information to customers.	Transition to "on-demand" model for DAR in Galt and the Delta using an app-based reservation system that enables more same-day trips.			
B3 **Launch fare study review and ensure coordination with regional partners as outlined in Next Gen Transit Study**	Continue to promote use of Connect Card	Launch fare study review and ensure coordination with regional partners.	Implement recommendations from the fare study review and continue coordination with regional partners.	Continued coordination with regional partners.	
B4 **Partner with local nonprofits to provide mobility and travel training**	Identify list of local nonprofits and groups (like 50 Corridor TMA) that can provide mobility and travel training in South Sacramento County and develop travel training guidelines.	Continuously promote travel training options on website, social media outlets, and in other SCT Link materials. Continue to develop partnerships with other organizations and nonprofits to provide more travel training options.			
B5 **Improve content management of SCT Link website**	Improve content management of the SCT Link website, including more timely website updates.	Continue to monitor website content management performance to ensure website is maintained with current and up-to-date information.			
GOAL C - Improve Service and Reliability					
C1 **Implement the service plan recommendations**	Prepare and implement service plan recommendations.				
C2 **Study the need for school trippers**		Conduct study and implement recommendations.			
C3 **Adjust no-show and late cancellation policy**	Develop new policy and educate the public and riders.	Adopt new policy.			
C4 **Update on-time performance metrics and monitor performance accordingly**	Develop and adopt revised on-time performance metrics.	Use AVL technology to capture actual on-time performance. Use on-time performance reports to adjust schedules to better reflect actual operations.	Use on-time performance reports to adjust schedules to better reflect actual operations.		
GOAL D - Increase Awareness of SCT Link and Foster Transit Supportive Communities					
D1 **Develop marketing and branding plan**	Identify and implement quick wins for improved brand visibility, marketing, and community partnerships.	Develop a branding and marketing strategy.		Refresh the SCT Link brand.	
D2 **Improve coordination with municipal and regional partners to promote service and engagement for service requests**	Ensure continued regional coordination with SACOG, the City of Galt, and other partners on scheduling, fares, service requests, and marketing.				
D3 **Work with municipal and county partners to improve the built environment & bus stops**	Ensure SCT Link participates in land use planning with AHJs.	Collaborate with partners on active transportation campaigns and projects. Initiate bus stop study.	Install more bus shelters and accessible benches.		Implement bus stop signage refresh.

The following tables outline the ZEB procurement schedule and infrastructure implementation schedule through 2040 to satisfy the ICT mandate and fully transition to a ZEB fleet by 2040.

Table 1-3: Fleet forecast through 2040

FLEET FORECAST		Useful life	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Cutaways	Replace		3	3	3	4	3	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-
	Expansion		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Retire	4 yrs.	(3)	(3)	(3)	(4)	(3)	(3)	(3)	(4)	(3)	(3)	(3)	(4)	-	-	-	-	-	-	-	-
Total Gasoline Cutaways			16	16	16	16	16	16	15	13	10	7	4	-	-	-	-	-	-	-	-	-
ZEB Cutaways	Replace		-	-	-	-	-	-	1	2	3	3	3	4	1	2	2	3	3	3	4	1
	Expansion		-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Retire	7 yrs.	-	-	-	-	-	-	-	-	-	-	-	-	(1)	(2)	(2)	(3)	(3)	(3)	(4)	(1)
Total ZEB Cutaways			-	-	-	-	-	1	3	5	8	11	14	18	18	18	18	18	18	18	18	18
Motorcoaches	Replace		-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
	Expansion		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Retire	9 yrs.	-	-	-	(1)	-	-	-	(1)	-	(1)	-	-	(1)	-	-	-	(1)	-	-	-
Total Diesel Motorcoaches			3	3	3	3	3	3	3	3	3	2	2	2	1	1	1	1	-	-	-	-
ZEB Motorcoaches	Replace		-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	1	-	-	-
	Expansion		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Retire	12 yrs.	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Total ZEB Motorcoaches			-	-	-	-	-	-	-	-	-	1	1	1	2	2	2	2	3	3	3	3
Total ZEB vehicles	Total		-	-	-	-	-	1	3	5	8	12	15	19	20	20	20	20	21	21	21	21
Total ZEB Percentage	%ZEB		0%	0%	0%	0%	0%	5%	14%	24%	38%	57%	71%	90%	95%	95%	95%	95%	100%	100%	100%	100%
CARB Regulation	%ZEB		-	-	-	-	-	25%	25%	25%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
ZEB purchase percentage	%ZEB		**0%**	**0%**	**0%**	**0%**	**0%**	**25%**	**50%**	**40%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 1-4: Infrastructure implementation through 2040

	Infrastructure						
	2025	2027	2028	2029	2030	…	2040
60 kW chargers with 1:3 plugs	1	1	1	1	1		-
Cumulative 60 kW Chargers	1	2	3	4	5		5
No. of Plugs for Cutaways	3	3	3	3	3		-
Cumulative plugs for Cutaways	3	6	9	12	15		15
120 kW chargers with 1:3 plugs	-	-	-	1	-		-
Cumulative 120 kW Chargers	-	-	-	1	1		1
No. of Plugs for Coaches	-	-	-	3	-		-
Cumulative plugs for Coaches	-	-	-	3	3		3

2 PROJECT BACKGROUND

The Sacramento County Department of Transportation (Sacramento County, the County) provides a variety of different transit services to the rural areas and unincorporated communities of south and east Sacramento County, including the City of Galt, Rancho Murieta, and the Delta communities.

As a recipient of Transportation Development Act funds, the County is required to develop a five-year transit plan. Under the Innovative Clean Transit (ICT) regulation from the California Air Resources Board (CARB), Sacramento County must develop and submit a zero-emission bus (ZEB) transition plan by July 1 2023, with the goal of beginning procurement of ZEBs in 2026. In addition, Sacramento County's current Short Range Transit Plan (SRTP) is for the planning period spanning 2017-2021 and needs to be updated to reflect the changing mobility landscape and evolving travel patterns and needs of the diverse communities the County serves.

Understanding the need to plan for the future to ensure these communities have access to the accessibility and mobility options that they need, Sacramento County is undergoing a combined SRTP and ZEB planning initiative. This will help to synergize planning efforts between short range strategic planning and ZEB planning to ensure the two plans are in alignment, and to ensure that the SRTP is geared towards and acknowledges the County's ZE future. This report provides an overview of existing conditions for both the SRTP and ZEB planning portions of the project.

2.1 About Sacramento County & SCT Link

Sacramento County provides dial-a-ride (DAR) and fixed-route services throughout the eastern and southern portions of Sacramento County, providing lifeline transportation services and connections to economic and job centers in the City of Sacramento. Sacramento County, in partnership with the City of Galt, manage these transportation services which are operated by Storer Transit. These services are known as South County Link (SCT Link). Sacramento County is the lead agency and works closely with Galt to ensure transit needs are being met. While the County currently provides oversight over SCT Link, in the future, oversight may transfer to another public agency. These services include:

- DAR: curb-to-curb service within the City of Galt for local residents with expanded service to the Clay Station area of Herald on Tuesdays and service to some medical facilities in Sacramento and Elk Grove on Thursdays and Fridays to seniors and passengers with disabilities. Service operates on weekdays and on Saturdays.
- Delta Route: fixed-route service between Galt and the Delta communities of Locke, Walnut Grove, and Isleton (an incorporated city). The service operates on weekdays only with cutaway vehicles, and riders are able to request service deviations in advance.
- Highway 99 Express: provides service operating on hourly headways through Lodi in San Joaquin County, Galt, Elk Grove, and key destinations in south Sacramento. This service is operated with cutaways vehicles on weekdays only.
- Galt-Sacramento Commuter Express (GSCE): provides weekday service between Galt and downtown Sacramento, operating during peak AM and PM commuting times using motorcoach vehicles. The service also offers reverse-commute trips between Sacramento and Galt.

Sacramento County also contracts with Amador Transit to provide one commuter route to Sacramento for those living in Rancho Murieta in east Sacramento County. Galt is the largest population center in the service area, with a population of 26,536.[1] The service area is largely characterized by dispersed populations and land uses typical of rural areas, and also includes the unincorporated community of Rancho Murieta in the eastern portion of the county and the city of Isleton and the Delta communities to the south.

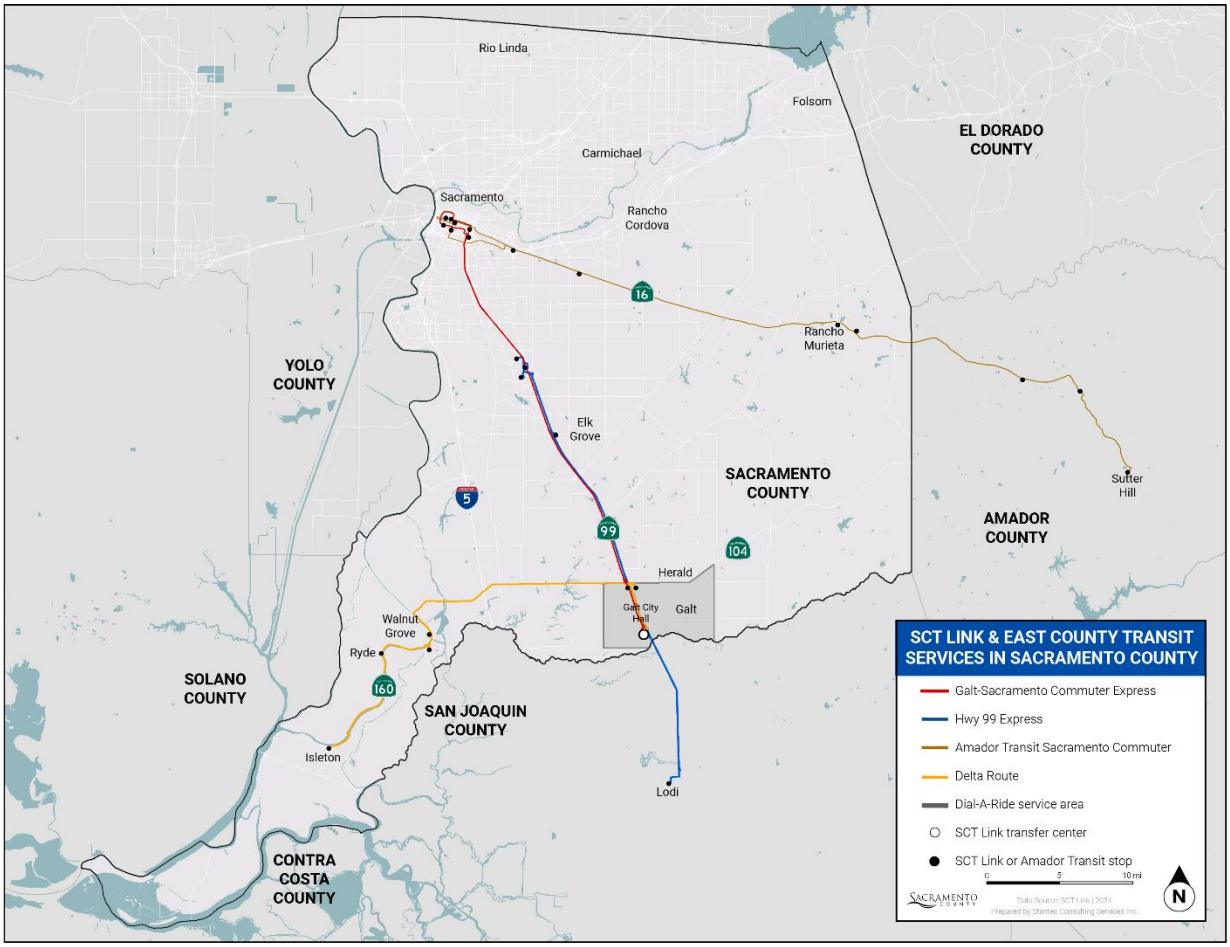


Figure 2-1: SCT Link and East County Transit services

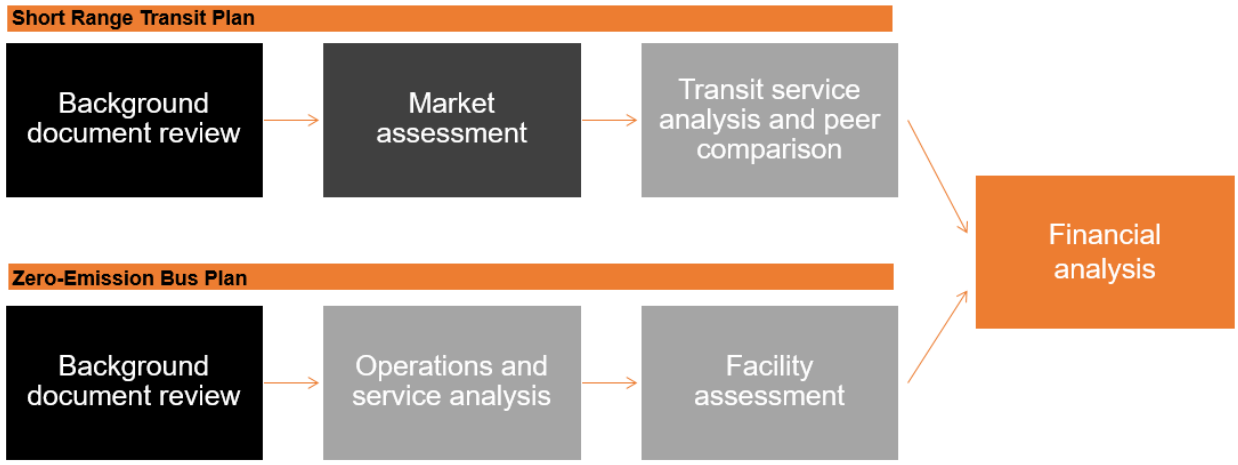
SCT Link's service area is located in the Sacramento Metro Air Quality Management District (AQMD) and the Sacramento Valley Air Basin. SCT Link's maintenance and operations facility is located in the Sacramento Municipal Utility District (SMUD) area.

[1] https://en.wikipedia.org/wiki/Galt,_California

3 EXISTING CONDITIONS REVIEW – SRTP

To establish the existing conditions for both the SRTP and ZEB portions of the project, the analysis of existing has been divided into two chapters outlined in the flowchart below. Chapter 1 encompasses a background document review of pertinent regional planning documents, market demographic assessment, transit service analysis and peer agency comparison.

Chapter 1 includes a review of documents and plans that could affect SCT Link's ZEB transition, an operations and service analysis, and assessment of SCT Link's operations and maintenance facility. Chapter 1 also includes a financial analysis that serves to lay the groundwork for both the SRTP and ZEB plans.



3.1 Background Document Review

The following document and plan review provides a broader portrait of the Sacramento County region, precedent plans, and helps to inform needs and strategies of the present planning study. Understanding how the region is evolving, its goals and visions, will help align SCT Link's planning priorities. While the documents reviewed below pertain mainly to transit planning aspects, there is some overlap with ZEB interests; however, documents with content more germane to ZEBs are reviewed in Volume II.

3.1.1 Sacramento County SRTP 2017-2021

The Sacramento Area Council of Governments (SACOG) prepared SCT Link's previous SRTP for 2017-2021. The SRTP assessed current conditions, uncovered transit shortcomings, and proposed policies and financial recommendations to steer SCT Link's service for the 5-year period.

For the previous five years (2011/12-2016/17), ridership had been increasing across all services. At the time of the SRTP, the County had a surplus budget, with over 70% of the operating costs covered by the Transportation Development Act (TDA) funds, with the remainder covered by FTA funding, County and State funding, and fare revenue.

Customer surveys revealed that overall, customers were generally satisfied with SCT Link's services.

Hwy 99:

- Commuters going mainly to work and the Cosumnes College
- Mainly Hispanic/Latino
- 66% don't have a driver's license (DL)
- 65% get on at Galt City Hall; 52% get off at Cosumnes Rail
- Most either drive or walk to the first stop; most then either walk or take another bus after alighting
- Customers desired better on-time performance

Delta Route:

- In 2013, the route alignment was reconfigured—the direct segment between Lodi and Isleton of the Delta Route was eliminated to increase service. If customers from the Delta wish to travel to Lodi, they now use the Delta Route, connect to the Highway 99 southbound at the Galt City Hall and travel to Lodi.
- Most riders get on at Isleton City Hall; 60% get off at Galt City Hall, and 27% through route deviations.
- Most access and egress is by walking.
- Mainly Hispanic; Latino and older, without DL.
- Acts as a 'coverage' route, i.e., the goal is not to maximize ridership or productivity, as measured as boardings per revenue hour.
- Riders mainly satisfied, but trip length, on-time performance, and connections are areas for improvement. No service changes were recommended by the 2017-2021 SRTP.

Galt-Sacramento Commuter Express:

- Debuted in 2012, SCT Link began operating an express service between Galt and Downtown Sacramento.
- Ridership had been steadily growing and service was expanded.
- No service recommendations by the 2017-2021 SRTP, although it was recommended to monitor the service for potential expansion.

Dial-A-Ride (DAR):

- Instituted in 2009 to replace four unproductive fixed-route services.
- Tuesday provides service in an extended service area.

- Thursday/Friday service for medical trippers.
- Typically need to reserve at least one day in advance.
- Ridership is very diverse, including students using for school transportation, mainly Hispanic/Latino and White, and lower income. While the service is not dedicated to ADA paratransit customers (i.e., it's a general DAR service), about 6% of customers use a mobility device of some sort. The DAR vehicles are all ADA accessible.
- Multiple and diverse trip purposes, including work and school, shopping, and healthcare.
- While DAR is more expensive per passenger and/or per operating hour than fixed-route services in general, SACOG's review of regional operating costs found that SCT Link's cost per passenger for demand-response service is lowest in the region. Operating cost per hour was coming down and was comparable to fixed-route service.
- Overall service is productive, but a reduction of no-shows could increase productivity further. The 2017-2021 SRTP recommended examining revising the 30-minute window for trip cancellation as one way to reduce no-shows.
- Another recommendation suggested reducing early Saturday morning service since ridership was so low.
- Another recommendation suggested examining the need to prolonging the service window for the medical trippers.

Beyond the service recommendations for each mode described above, the following are highlights of recommendations emanating from the 2017-2021 SRTP:

- Examining fleet replacement opportunities. The need to transition to ZEB makes this an opportune time.
- Improve oversight of contractor and dedicate more staff to planning, marketing, and oversight, and consider updating or modernizing performance standards for contracting, as well as enforcing them.
- Assess potential fare increase.
- Develop a 3-year marketing strategy.

3.1.2 Sacramento County Title VI Civil Rights Program

This document, among other things, notes SCT Link's Title VI policy as mandated by the FTA. It provides a procedure for informing riders of their Title VI/Civil Rights and procedures for lodging complaints.

The service area's Limited-English Proficiency (LEP) plan requires that materials and engagement consider Spanish-speakers; other spoken languages fall below the minimum threshold.

Furthermore, the document provides systemwide service standards and policies:

- Vehicle load – should not exceed 1.0, that is, seated capacity
- Vehicle headway – Hwy 99, 1 hour; Galt-Sacramento Commuter and the Delta route, 2 morning trips, one midday trip, and 2 afternoon trips.
- On-time performance – 95% of all runs to be on-time. Late trip is more than 10 minutes late of scheduled departure time; for Dial-a-Ride, it is a pick-up 15 minutes past scheduled pick-up time.[2] An early trip is a trip that leaves a schedule departure time point more than one minute early.
- Service availability – depends on the service type, for instance, Hwy 99 and the Delta route look to have at least one stop in the communities they serve, while the Galt-Sacramento Commuter stipulates 0.5-mile distance in downtown Sacramento from employment areas, Amtrak and light rail, and 5-mile distance from the park-and-ride lot in Galt.
- Distribution of amenities – as SacDOT does not have jurisdiction over siting of amenities within the incorporated cities. SCT Link should consider partnerships with decision-making bodies in the communities it operates to make sure customers have waiting areas that inspire safety, dignity, and that elevate the customer experience.
- Vehicle assignments – based on service type, demand, and state of repair.

These standards are good starting points for evaluating how well SCT Link's services currently perform; nevertheless, for operator tracking, as well as for customer accountability, SCT Link needs to development other metrics and indicators as well, such as those in the SRTP and other documents and that will be refined in this study.

Importantly, this document specifies the thresholds that constitutes a major service change that would trigger a Title VI-Service Equity analysis:

- Reduction in total system vehicle service hours of 10% or more.
- Elimination of service in an area with population of 2,000 or more.
- Elimination of service on one or more days of the week.
- Changing the type of transit service in an area with population of 2,000 or more.

And for fares:

- Increase in single ride fare for any transit service including other fare categories.
- Decrease in the discounts offered for fare categories.

[2] Storer provides on-time reports that segment time periods as 10 minutes early and 20 minutes late.

3.1.3 2019 Triennial Audit

The TDA triennial performance audit was conducted for FY15-16 through FY17-18 to ensure SCT Link's compliance with TDA requirements, status of prior audit recommendations, uncover performance trends, and perform a detailed functional review.

The robust audit found that SCT Link complied with all TDA requirements that are applicable (farebox recovery ratios for exclusive services are not included). Of prior recommendations, the first recommendation of reviewing service alternatives to the costly dial-a-ride was deemed no longer relevant because productivity increased in the analysis period; however, as a result of this present study, SCT Link and Stantec will examine alternatives or innovations such as microtransit or on-demand flexible routing to augment productivity. The second recommendation concerned safety issues and were addressed. The third recommendation was to implement a performance monitoring system based on goals and objectives, and the recommendation was partly implemented. A strategic marketing plan was recommended but not implemented. Finally, 2.5 FTE for operator oversight was recommended but not implemented.

Some key observations from the audit include:

- Operating costs increased systemwide, as did cost per passenger (as a measure of system cost effectiveness) from FY15 to FY18.
- Operating cost per hour—a measure of cost efficiency—decreased slightly systemwide from FY15 to FY18.
- Overall ridership dropped, as did productivity (boardings per revenue hour), as service hours and miles were increased from FY15 to FY18 (except for dial-a-ride). Interestingly, passenger trips increased by 7.6% on the fixed-route and commuter services, whereas dial-a-ride ridership decreased 13.3%. The rate of ridership growth on the commuter services is attributed to interline passengers from San Joaquin RTD and Elk Grove e-tran services.
- The regional farebox recovery ratio was met, and SCT Link's increased from 11.37% to 12.10% from FY15 to FY18.

The resultant recommendations of the triennial audit include:

- Holding monthly management meetings with the operators (Storer and Amador) that includes performance metric reviews and tracking, since monthly meetings did not include this activity.
- Increasing staffing at the County to better manage the transit contract and planning activities.
- Preparing a 3-year strategic marketing plan for both East and South County.

3.1.4 2019 and 2020 Unmet Transit Needs

Stantec reviewed 2019-2020 and 2020-2021 Unmet Transit Needs Findings to understand whether any reasonable unmet needs exist in SCT Link's service area.

For the 2019-2020 Unmet Needs, no comments were received pertaining to the unincorporated portions of Sacramento County (outside of SacRT's area). Further, two comments received pertaining to Galt did not meet the criteria for unmet needs. One comment that was unreasonable to meet at that time related to

connecting Galt to Elk Grove through a demand-response service for medical appointments; the response noted that connections to Elk Grove can be made with Hwy 99 Express with a transfer to e-van (Elk Grove paratransit) or Galt dial-a-ride.

Similarly, in the 2020-2021 Unmet Needs, no comments were received pertaining to the unincorporated portions of Sacramento County (outside of SacRT's area). Seven comments received pertaining to Galt did not meet the criteria for unmet needs. Nevertheless, a few comments to consider in the short-range transit planning effort include:

- Expanding services to medical facilities beyond service on Thursdays and Fridays.
- Creating a direct service on Hwy 99 between Lodi Amtrak, Galt, Elk Grove and Sacramento Airport—the report noted that this trip is possible through transferring.
- Expanding Hwy 99 services to weekends (current service is weekday only). The response was that demand is very low for this service on weekends.
- Removing transfer fares between Hwy 99 and SacRT services at the Cosumnes River College in Elk Grove.

3.1.5 2020 SACOG MTP/SCS

The latest iteration of the SACOG Metropolitan Transportation Plan/Sustainable Communities Strategy MTP/SCS provides recommendations for long-range transportation projects to improve mobility at a regional scale, specifies where development should occur to foster sustainable and multimodal transportation options, and provides financial forecasts for proposed projects over the next 20 years.

Major goals of the MTP/SCS include reducing GHGs, improving air quality, and reducing traffic congestion by focusing development in key areas, and trying to reduce the dispersal of land uses to drive down VMT. Inevitably, densification would also support more robust transit, and in turn, this would further drive down GHGs if transit service is provided by ZEBs. Figure 3-1 provides an overview of the SACOG study area with different community types throughout the region.

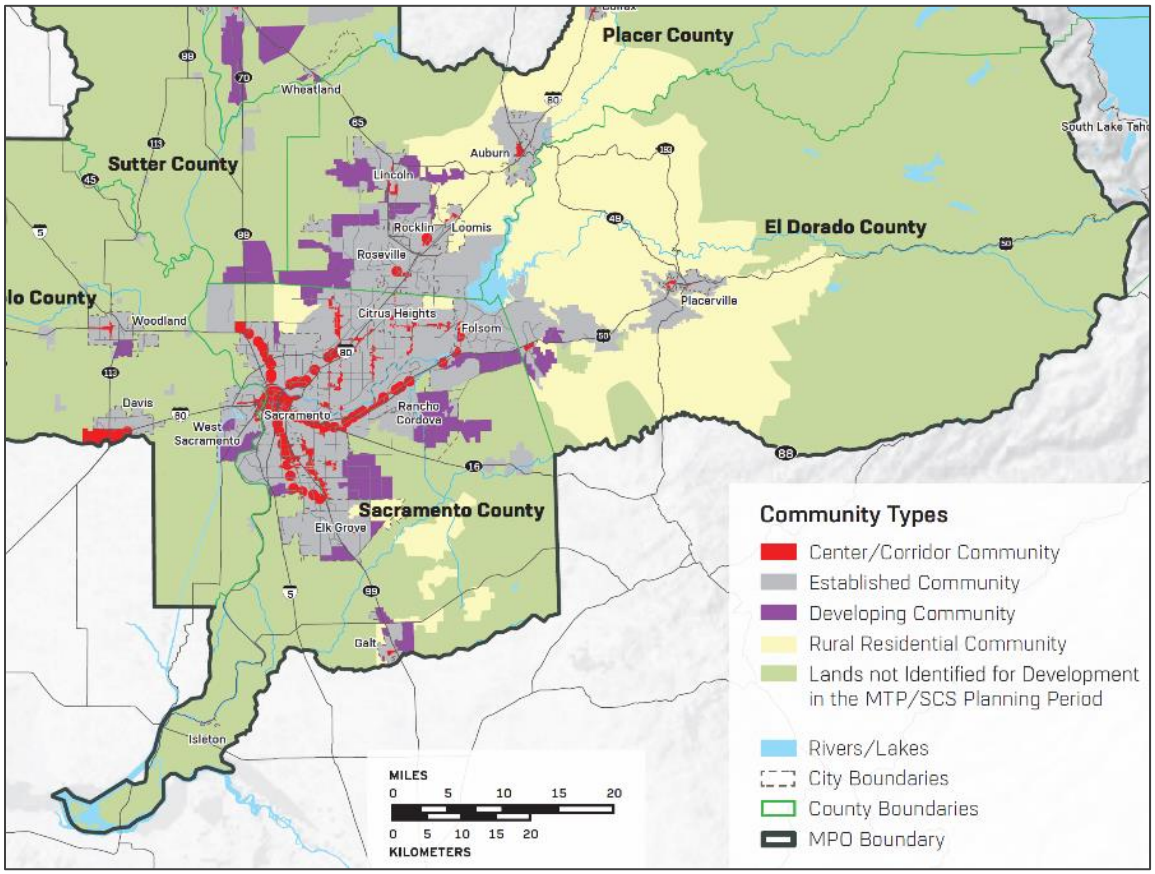


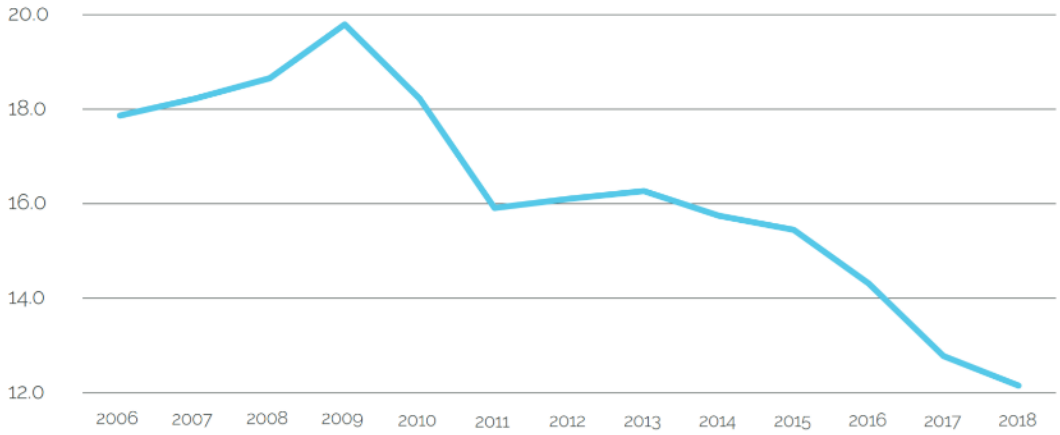
Figure 3-1: Overview of the SACOG study area and community types throughout the region. Source: SACOG MTP/SCS

A recent (2021) Regional Progress Report highlighted how the County continued to diversify in terms of demographics, and interestingly, grow in population compared to several other mid-sized US metros through the pandemic. While the pandemic dramatically impacted employment opportunities and commute patterns, traffic is returning but it is too soon to know whether this trend will continue, particularly given work from home capabilities and opportunities. However, the region continues to underdeliver new housing, particularly housing that favors lower VMT.

The Progress Report highlights the need to deliver impactful transit adapted to new commuting patterns, as will be developed through SACOG's Next Gen Transit study. Even prior to the impacts of the COVID-19 pandemic, ridership regionwide had been decreasing since 2009 (Figure 3-2), even though revenue hours had been increasing.

Connected Communities Figure 13. Transit Passenger Boardings Per Capita, 2006 to 2018

All Operators in Sacramento Region



Source: SACOG, December 2020. Transit vehicle hours based on operator TDA Triennial Performance Audits and the National Transit Database. Transit service includes fixed route, commuter, and demand responsive. Population from California Department of Finance.

Figure 3-2: SACOG boardings per capita have nosedived since 2009. Source: SACOG

Unsurprisingly, lower income, persons of color, with low-skill jobs relied most on transit for travel needs.

3.1.6 SacRT 2021-2025 Strategic Plan

The SacRT 2021-2025 Strategic Plan sets a vision for SacRT—"A leader in providing mobility options for our community". The Strategic Plan is more about organizational and business goals that will inform the execution and development of service plans and other recommendations for RT and the region.

The desired outcomes are to establish a baseline of customer satisfaction, deliver operational excellence across the business, establish RT as a community partner, and improve employee engagement. To work toward these outcomes, RT has described performance metrics it intends to measure and monitor quarterly. Some interesting metrics/strategies that SCT Link could adopt to monitor its service and contracts could include:

- Customer satisfaction through regular surveying
- Increasing on-time performance
- Reducing cancellations
- Improve technology sources
- Communications plan and marketing campaigns
- Employee engagement and retention

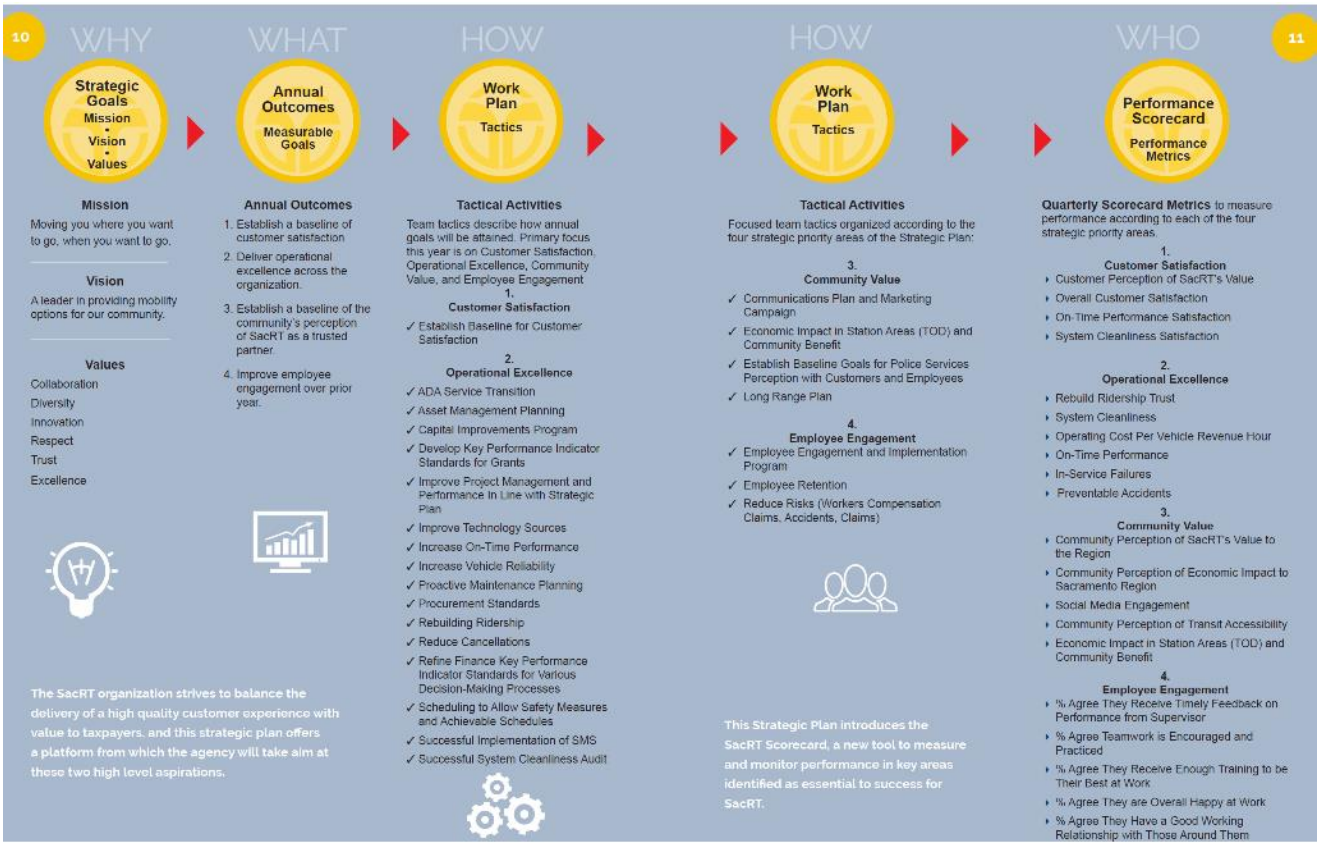


Figure 3-3: SacRT's Strategic Plan summary. Source: SacRT

3.1.7 SACOG Public Transit and Human Services Coordinated Plan (2019)

The FTA, under the Fixing America's Surface Transportation Act (FAST Act) of December 2015, mandates that recipients of 5310 funding undertake periodic studies to enhance mobility options for seniors, persons with disabilities, and low-income households. In the SACOG region, the persons aged 65 and older will increase by 34% (294,000) between 2010 and 2040.

This plan is designed to understand the travel needs of these key demographics, and how human service agencies can work together to provide mobility options.

The plan first documents fixed-route and paratransit service providers in the region, such as SacRT, e-tran, SCT Link and so on. Supplemental/human services transportation in Sacramento County include:

- American Cancer Society's Road to Recovery program
- ACC Rides Transportation Services provides door-to-door transportation using volunteer drivers. ACC Rides also transports seniors from the Delta region, which includes parts of Hood, Franklin, Courtland, Locke, and Walnut Grove. Trip purposes can range from dialysis, to shopping, to church service, and so on.
- Easterseals also provides services for adults with disabilities.

- PRIDE Industries provides worksite and day program transportation for program participants for adults with disabilities.
- Sacramento County offers a Seniors Companions Program, where volunteers drive frail seniors and adults with disabilities to programs.
- Society for the Blind offers transportation for class attendance at its midtown Sacramento location.
- Stanford Settlement offers transportation to and from the Sister Jeanne Felion Senior Center for individuals living in specific ZIP codes—these do not include South Sacramento County.
- Sutter SeniorCare PACE provides transportation to eligible participants who are 55 years of age or older or meet the requirements of skilled nursing home case as determined by the PAC organization's interdisciplinary team assessment and certified by the California Department of Healthcare. Availability is limited to specific ZIP codes—these do not include South Sacramento County.
- United Cerebral Palsy offers weekday fixed route, door-to-door service for people with developmental disabilities throughout the Greater Sacramento area.

Unmet needs identified by this Study included:

- Non-emergency medical transportation. Getting to appointments was a chief concern, especially for longer distance trips across jurisdictions. With demand-response services, the biggest challenge remains return trips since the end times of appointments are difficult to predict beforehand. While TNCs can be an alternative, many of the vehicles in these fleets are non-accessible. With fixed-route services, in some cases connectivity and transfers may be an issue as well, resulting in very long travel times, and waits in unsheltered locations.
- Demand-responsive services. Common issues arose, like trouble with bookings, the limitations imposed by having to schedule trips in advance, long pick-up waits, intercity connectivity challenges, and that curb-to-curb is challenge for individuals who need additional support accessing certain destinations.
- Fixed-route transit. Common issues arose as well, like low frequencies, low/no service during weekends or evenings, lack of bus stops/access near homes or destinations, fare prices, poor accessible infrastructure (if any) at stops and waiting areas, concern about operator training, and lack of regional integration which makes trip planning and execution challenging.

Some pertinent concerns that arose for Sacramento County included:

- Long waits between bus transfers, especially if a transfer is missed.
- Safety concerns at bus stops, and fear of getting lost.
- Bus operators unable to enforce seating priority.

- No system or Transportation Management Association is available to help organize accessible taxi services or shuttles in neighborhoods.
- Lack of information on stop relocation or detours.
- Consider a payroll-based fee to support public transportation services.
- Specialized services need to be available on demand and offer door-to-door assistance without the need for advanced scheduling.
- Increase space on transit vehicles for mobility devices.
- Low cost/free transit during low usage times to increase ridership and offer incentive for potential riders; consider reinstating the senior lifetime transit pass for seniors 75 years of age and older.

Finally, key strategies aimed at addressing the gaps and challenges included:

- Continue implementing strategies for regional coordination and integration, like the Connect Card fare payment system on demand-response services.
- Encourage and fund volunteer transportation programs.
- Incorporating issues and recommendations from the Study into local SRTPs, like this one.
- Encourage transit agencies to provide schedule updates, service change updates, etc. more frequently to alert riders of changes.
- Develop local shuttle services and seek funding.
- Develop volunteer bus stop audit teams (of seniors and persons with disabilities) to evaluate bus stops from a customer perspective.
- Improve coordination of cross-boundary services for both fixed-route services and demand-response.
- Seek funding to offer door-to-door services.
- Work with local governments and facilities to obtain priority parking for DAR vehicles.
- Encourage agencies and organizations to pilot microtransit and other innovative service delivery strategies.
- Work with local governments on policies requiring developers to pay for bus shelters and transit stop amenities.
- Collaborate on a program of “transit scrip” to enable seniors and low-income persons with disabilities to reach fixed-route transit services via a connection by taxi, volunteer driver, community organization, or TNC.

- Encourage TNCs to make ADA accessible vehicles part of their fleet.
- Establish a community-coordinated volunteer driver program.
- Focus transit funds on more frequent midday, evening, weekend, and microtransit service.
- Improve bus stop amenities such as shelters and benches.
- Increase low-floor buses.
- Undertake upgrades to wheelchair restraints and expand number of wheelchair tiedown locations.

3.1.8 San Joaquin Regional Transit District (RTD) FY18-19 SRTP

Just south of Galt is San Joaquin County, and SCT Link provides weekday service (Highway 99 Express) to Lodi, where San Joaquin RTD provides local service and connections, as well as the City of Lodi's Grapevine transit service. Transferring requires a transfer slip and paying the fare difference (except on Grapevine).

RTD's FY18-19 provides a short-term strategy for transit services, and includes planning for a bus rapid transit (BRT) corridor expansion, improvements of its dial-a-ride and ADA services, improving midday, weekend and off-peak frequencies, improving Hopper deviated fixed-route service levels, coordinating with local jurisdictions to better align land use with transit investments while also improving customer amenities, and examining regional transit coordination.

A few considerations for SCT Link related to RTD include:

- Continuing to ensure smooth connectivity in Lodi.
- Learning from RTD's Van Go! microtransit pilot[3] (and perhaps more pertinent locally, SacRT's microtransit pilot, SmaRT[4]).
- Exploring opportunities for coordination of commuter services along Hwy 99.

3.1.9 Sacramento County General Plan Circulation Element

The County's General Plan Circulation Element was updated in 2017 and touches upon the need for a healthy balance of mobility modes to improve safety and quality of life throughout Sacramento County. This balanced approach calls for strategies like addressing pedestrian and cycling facilities, develop land in a manner that helps transit succeed, promote transit services in the appropriate corridors and land uses, coordinate with local jurisdictions to provide the necessary infrastructure and amenities to support transit, collaborate with local transit providers to identify funding sources and pursue funding, and several others.

A few policies stand out as particularly relevant for more suburban and rural fabrics:

[3] https://sanjoaquinrtd.com/services/#tab-9db1704fbe005f015c7
[4] https://www.sacrt.com/apps/smart-ride/

- Establishing and implementing guidelines to support development and redevelopment in a transit-friendly manner. Interestingly, this policy calls on creating nodes (or centers) and linear corridors that can help transit be successful.
- Collaborating with transit providers to promote the phased implementation of transit services to all growth areas as redevelopment occurs.
- Encouraging multimodal, active transportation trips, such as through cycling and transit (and rail) connectivity and infrastructure.

3.1.10 SACOG Rural-Urban Connections Strategy and Delta Case Study

Acknowledging the diversity in land uses and the importance that rural and agricultural functions play in Sacramento County, the Rural-Urban Connections Strategy (RUCS) examined how to enhance rural economies—indeed 85% of the County is rural lands. Interestingly, the RUCS Toolkit enables modeling of potential outcomes (like water demand, total costs, etc.) based on different scenarios such as switching to a different crop, or relocating food distribution locations.

For the Delta Communities, RUCS modeling and analysis tools were employed to help answer questions about how to stimulate agricultural-based economic development in the Delta's rural communities in a manner that aligns with a shared vision of the Delta: "the ideal synthesis of cultural, ecological, and agricultural values in a sustainable, healthy, and celebrated way of life." The Delta Case study modeled potential outcomes based on scenarios like making the Delta a more robust food hub (for Sacramento and San Francisco), or supporting agritourism such as by focusing on things like wine grape growing and farm-to-fork interest and tourism. While not explicitly linked to public transportation, this case study demonstrates: 1) the need to ensure workers in the Delta can access not only farms, but related industries, and 2) if tourism does indeed become more substantial, then alternatives to single-occupancy vehicles should be explored for visitors to reduce possible congestion on local roads and corridors.

3.1.11 Ongoing Initiatives

SACOG is currently undertaking a regional transit study called Next Generation (or Next Gen) Transit study. Next Gen is aimed at taking a visionary look at transit services across the SACOG service area and trying to understand how to better deliver services across the region and to adapt to changing travel behavior.

The project will analyze six key issue areas: Transit Service, Interagency Collaboration, User Experience, Travelers, Land Use, and Emerging Mobility. The project work will be guided by a Policy Advisory Committee of business and economic development leaders as well as regional advocates, and a Technical Advisory Committee with a broader range of stakeholders, including transit service providers and experts for specific topic areas.

SCT Link is participating in the Next Gen Transit study and initial work activities include looking at the future of Connect Card and fare payment schemes.

Finally, at the time of this writing, e-tran in the City of Elk Grove is undergoing a process of annexation from SacRT. What the final outcome will look like is currently unknown, but it is interesting to note that as a result of the annexation, SCT Link will be the only non-SacRT transit provider based in Sacramento County.

3.2 Market Assessment

3.2.1 Successful Transit – How and Where?

Transit services are most successful, that is, carry many passengers resulting in high utilization and low per passenger costs, when transit has a large pool of potential riders, serves useful destinations in an efficient manner, and the land use provides a variety of opportunities which creates riders who use transit for different purposes throughout the day. Typically, having population- and job-rich areas will provide many potential riders who use transit from or to their homes and employment locations; however, transit is also important for connecting people to other useful destinations (apart from work) and the opportunities at these destinations, like education, shopping, food, healthcare, recreation, and many others. As such, ensuring that service not only travels to *where* people engage with opportunities, but *when*, meaning beyond the traditional commute peak hours, can generate broader ridership.

In communities like those of the Delta, Galt, and many rural California towns, transit typically needs to provide service to sparsely populated areas with destinations that are distributed away from residential developments which results in long, meandering bus routes because destinations aren't located along a direct path of travel. Furthermore, SCT Link, like its peers, also provides service geared to commuters who travel to major areas, like Sacramento, for work. In other words, SCT Link and peers across California offer a variety of services tailored to its community and their diverse travel needs. Oftentimes, fixed-route, fixed-scheduled services are appropriate and/or productive for a very small segment of the service area and population. However, the traditional ingredients that make transit successful are typically limited, so while it's important to consider the characteristics discussed below, it's also important to understand the goals of transit service SCT Link is trying to provide—are we trying to design service to carry lots of people most of the time—which may mean sacrificing serving places with fewer people—or are we trying to provide a basic level of mobility with reasonable ridership? What's the balance of these two competing priorities?

Understanding the context that SCT Link operates within helps understand who's using the service, where they're going, and for what purpose which ultimately helps SCT Link design service responsive to community goals. Finally, the review below helps locate where our key markets for transit service are—that is, seniors, low-income households, students, and households without vehicles.

3.2.2 Points of Interest and Useful Destinations

The map in Figure 3-4 displays major destinations, points of interest, and connectivity to transit provides in South Sacramento County and surroundings. All demographic maps have been made at the county-level to understand countywide trends in comparison to the SCT Link service area.

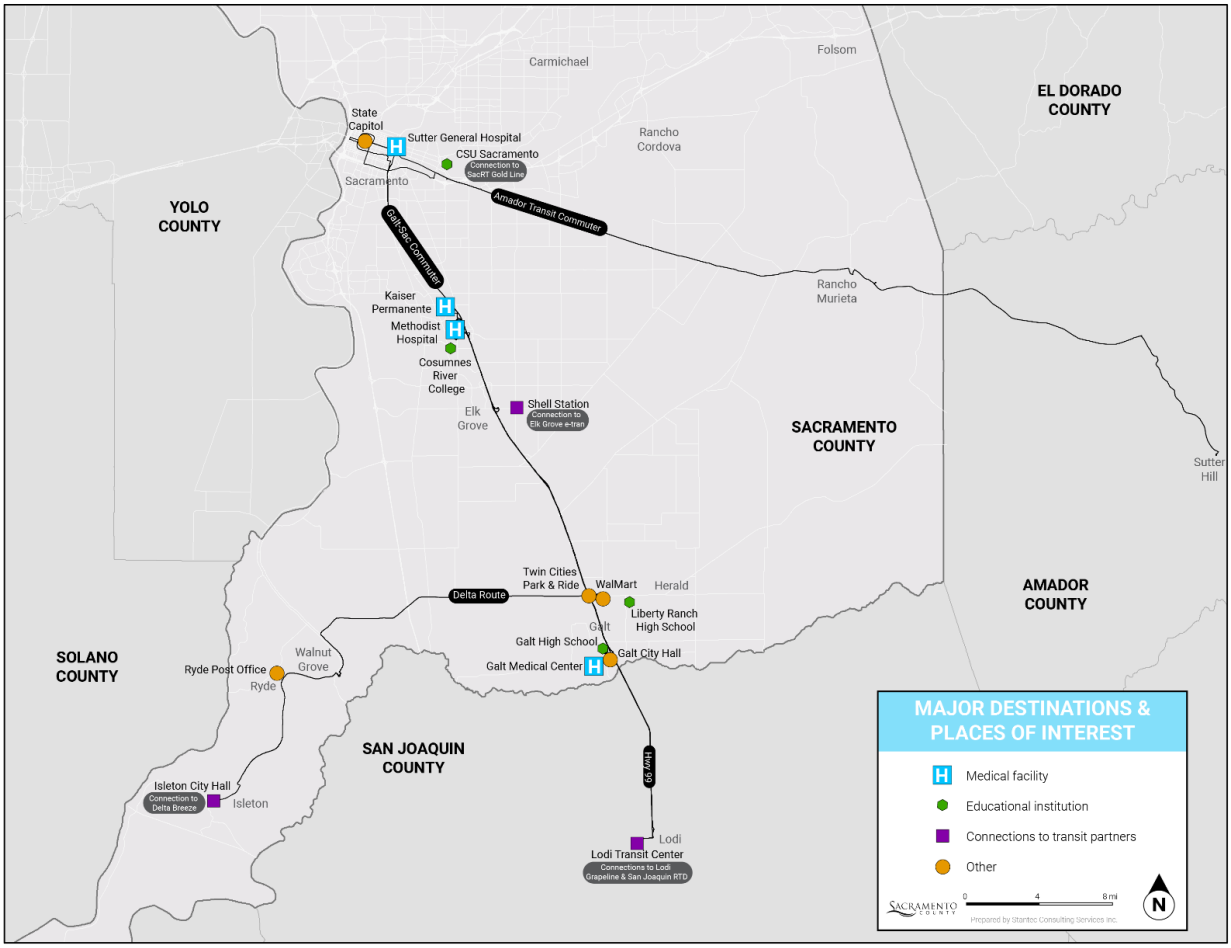


Figure 3-4: Points of interest and major destinations

While routes like Hwy 99 and the Galt-Sacramento Commuter Express provide freeway-based service—fewer stops and geared to serve specific destinations—the dispersed nature of trip attractors in Galt and the Delta communities suggests that fixed-route service would be a challenge to operate. That is, fewer destinations along a linear path means that a bus will need to meander through different streets, looping around to string together non-linear destinations. As a result, this service:

- Is less attractive to potential riders, since the service and route alignment is different to learn and remember
- Is less attractive to potential riders, since winding alignments prolong travel time and may introduce indirect travel paths for some riders
- Increases the unproductive portions of route mileage and hours devoted to winding alignments
- Reduces the ability to provide frequent and attractive service

Taken together, the land use of South Sacramento County form supports the use of flexible, dial-a-ride or demand-response service since journeys can be planned and arranged in a way to minimize travel time by

serving only places that customers want to go to. Nonetheless, this does have drawbacks particularly for spontaneous travel. Another possibility is to focus, like the Hwy 99 and Galt-Sacramento Commuter service, on key demographics who are traveling to a common destination at a similar time, when designing a fixed-route service.

3.2.3 Population Density

Population density is a strong predictor of transit productivity—a large pool of potential riders in close proximity means that more people are likely to use the service. The map in Figure 3-5 reveals that most of the service area has very low population density, except for some pockets of Galt.

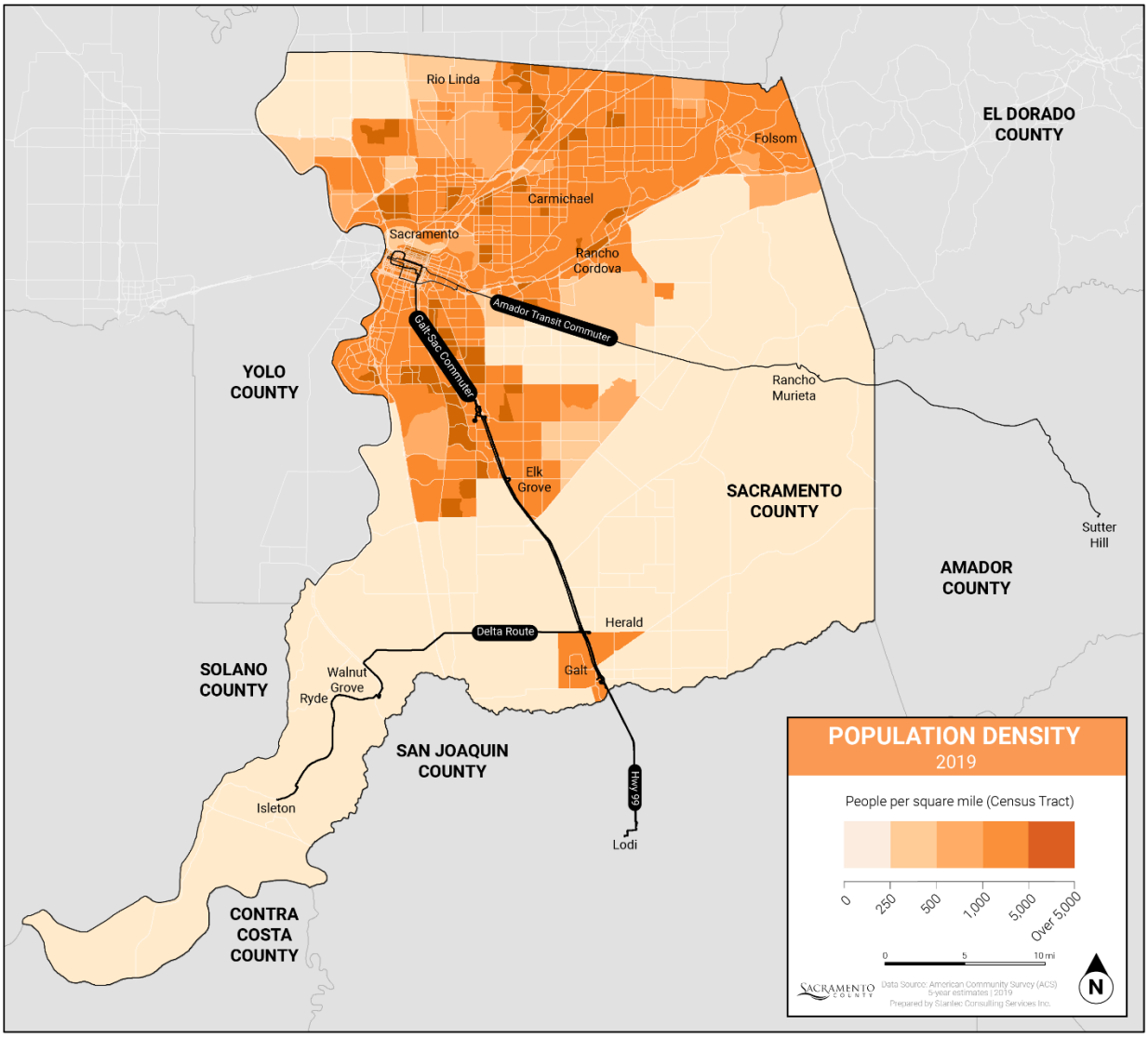


Figure 3-5: Population density

The density in Galt is still low compared to parts of Elk Grove and Sacramento. Nonetheless, the concentration of the population in Galt means that a substantial amount of people can access fixed-route

services like Hwy 99 and the Galt-Sacramento Commuter Express, as well as dial-a-ride service. Looking at communities in the Delta, population densities are so low that operating fixed-scheduled services like the Delta Route with trips every couple of hours is unlikely to generate significant ridership traveling at the same time to common destinations.

3.2.4 Job Density

Where SCT Link's fixed-route services are successful is by connecting riders to destination-rich areas, like downtown Sacramento with its many jobs (particularly for state employees) and services, and Elk Grove and other destinations. The employment density map in Figure 3-6 shows the centralized density of jobs in Sacramento.

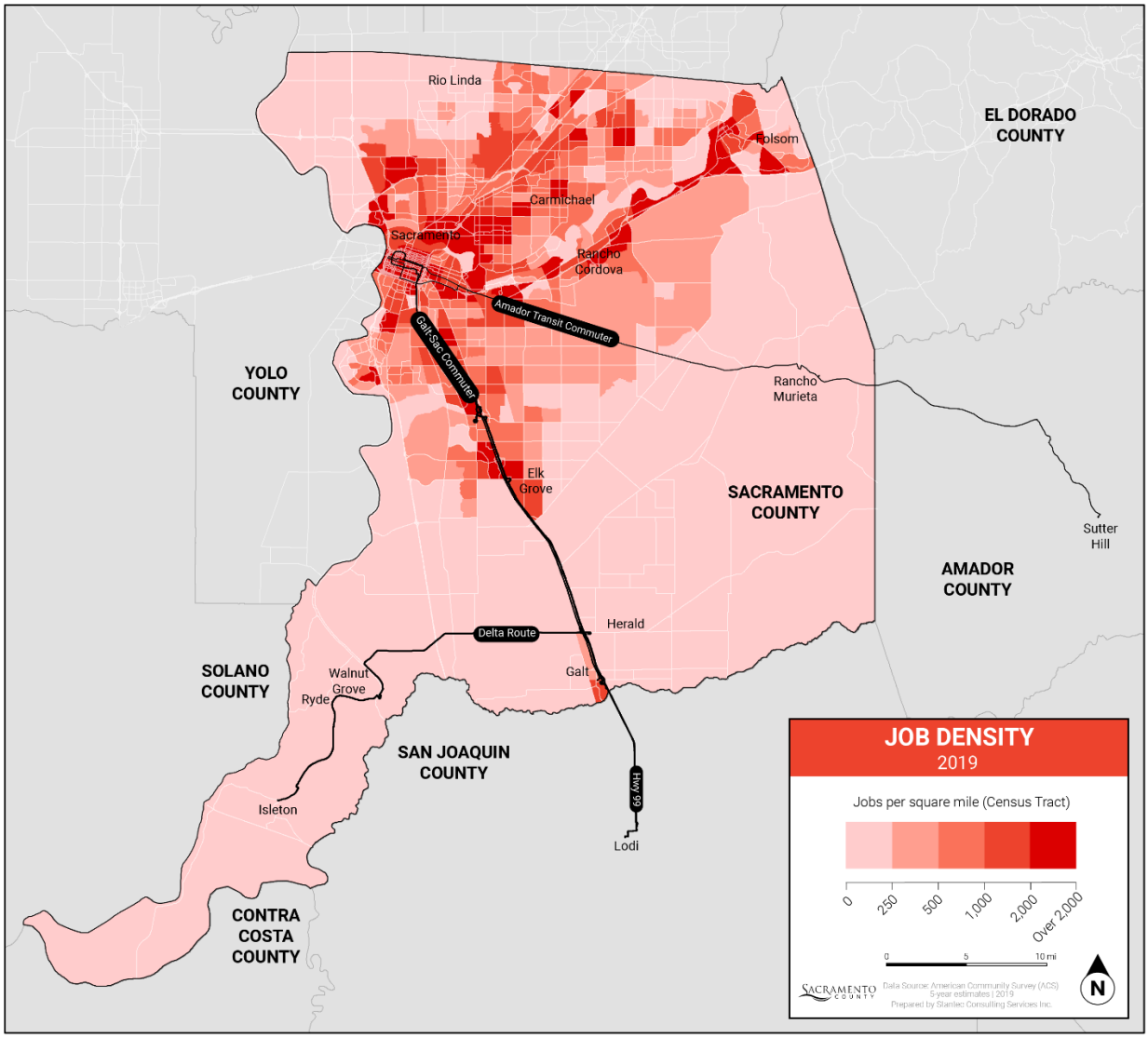


Figure 3-6: Employment density

This map helps explain the popularity of Hwy 99 and Galt-Sacramento Commuter service—these routes are direct connections between residences in Galt and jobs, retail, services, and other opportunities along SR-99 and in Sacramento. However, because job density is low in Galt and in communities in the Delta, as well as the potential misalignment of bus schedules with shift times, the Delta route may be unviable as a service for potential commuters.

The next series of maps look beyond the number of potential customers and examine demographic characteristics that are significant predictors of transit use and/or propensity to use transit.

3.2.5 Environmental Justice Communities

In 2016, the California State Legislature passed SB 1000 which requires cities and counties with disadvantaged communities to incorporate environmental justice (EJ) policies into their general plans to address public health risks and EJ concerns of those living in disadvantaged communities, many of which are the results of geographic or procedural inequities. EJ seeks to minimize and equalize effects of environmental hazards among the entire community regardless of income, ethnicity, or race.

Sacramento County's EJ Element covers the topics of pollution exposure and air quality, access to public facilities, food access, safe and sanitary homes, promotion of physical activity and civic engagement, and crime prevention. The county determined the location of EJ communities by looking at two sources: CalEPA's CalEnviroScreen tool (discussed late in Volume II, as this tool relates to the ICT mandate as well) and SACOG's Low Income High Minority (LIHM) areas, determined as part of the analysis in preparing the region's RTP/SCS. EJ communities in Sacramento County are shown in Figure 3-7.

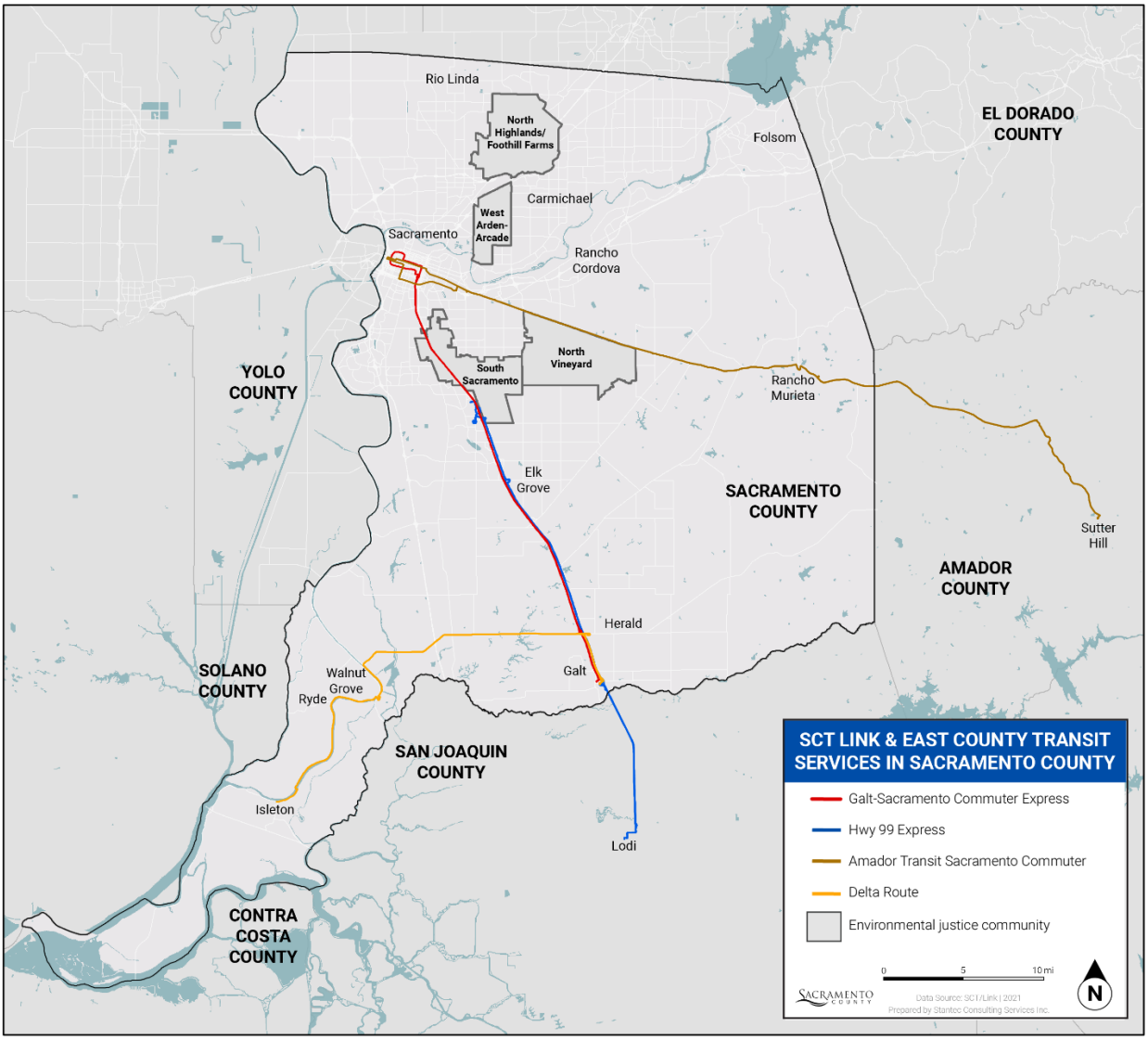


Figure 3-7: Sacramento County environmental justice communities

The four EJ communities are North Highlands/Foothill Farms, North Vineyard, South Sacramento, and West Arden-Arcade. Though none of these are in SCT Link's local service area, SCT Link Hwy 99 and GSCE routes travel through the South Sacramento EJ community. As discussed in greater detail in Chapter 4, the deployment of ZEBs through these communities will help to lessen the pollution burden and improve air quality to the people living in and traveling through these communities.

3.2.6 Title VI Demographics

As a recipient of federal funds, SCT Link must respect Title VI policies which stipulate that service changes shall not disproportionately or disparately impact on low-income communities or minorities, respectively, or both. While Figure 3-16 shows median household income by census tract, Figure 3-8 shows the percentage of households whose income is below the poverty level according to the U.S. Department of Health and

Human Services poverty guidelines. This low-income definition was chosen to align with SacRT's low-income definition for its Title VI reporting.

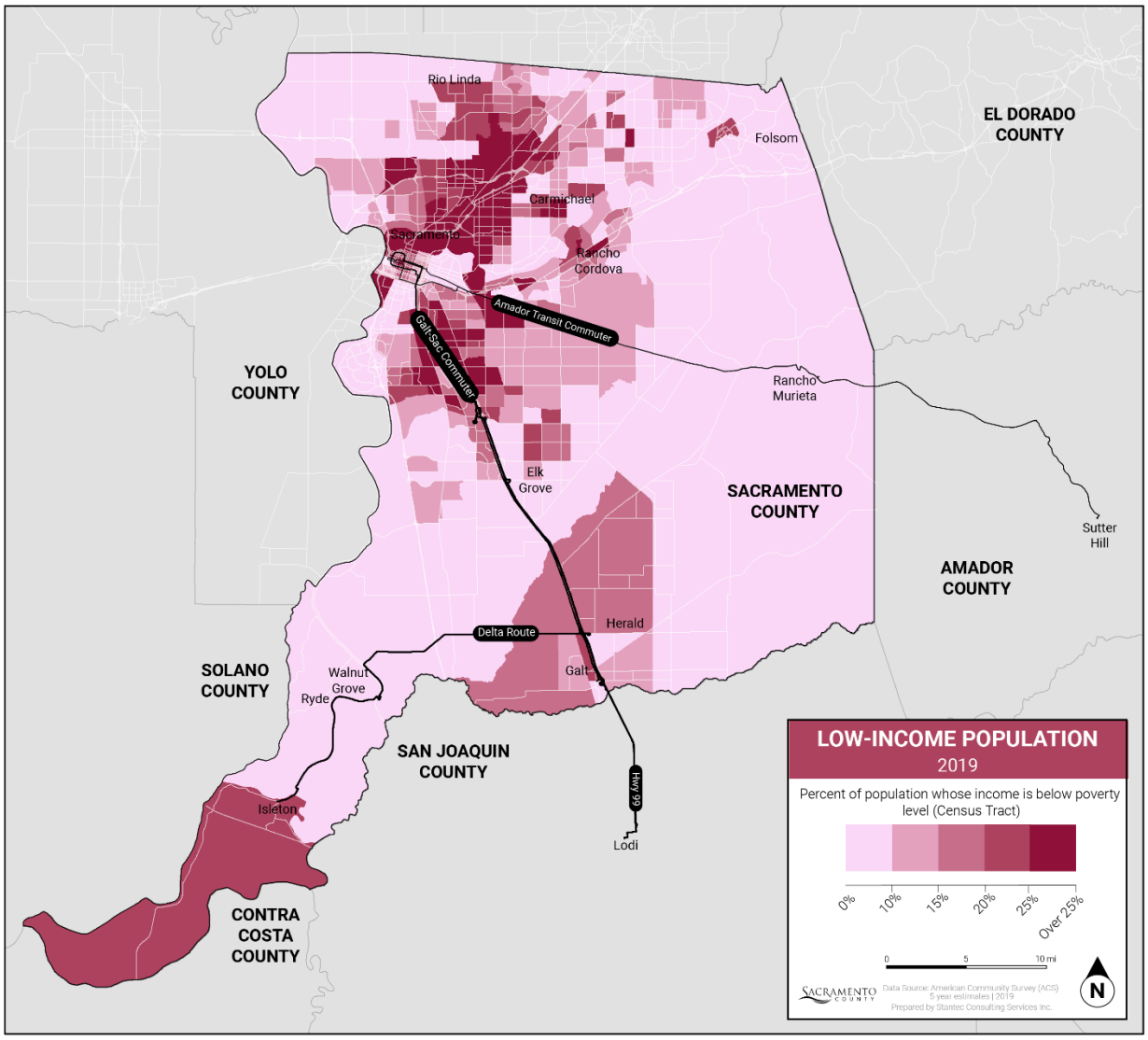


Figure 3-8: Low-income populations

The area of Galt directly west of SR 99 and the census tract containing Isleton at the southern tip of the service area show the highest poverty levels, with just over 20% of households reporting a household income below the federal poverty level. Poverty levels between 15% and 20% are seen in the areas surrounding Galt, and the northern Delta region and eastern Sacramento County show low poverty levels. Overall, low-income households are less prevalent in the SCT Link local service area than in other areas of Sacramento County such as Elk Grove and Sacramento.

In addition, we examined the proportion of non-White residents in each census tract (Figure 3-9). While much of Galt and Isleton have relatively low levels of minority residents, communities in Walnut Grove, Ryde, and their surroundings have larger proportions of minority residents.

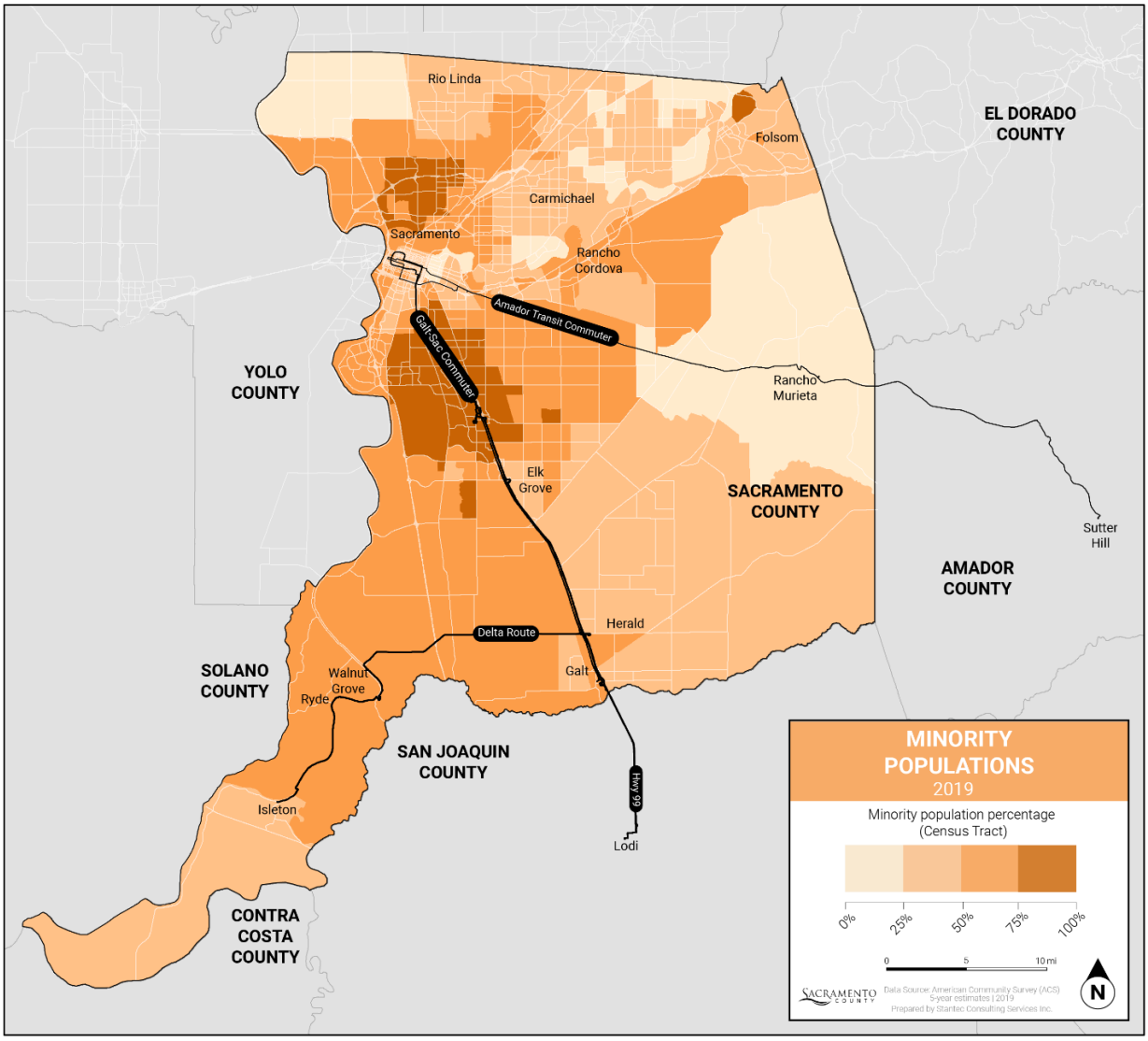


Figure 3-9: Minority populations

To get a clearer understanding of minority residents and their distributions, we mapped the density of each race or origin by census tract in the maps in Figure 3-10 and Figure 3-11. Each dot represents 25 people, and the dots are randomly distributed throughout the census tract (i.e., dots are not actual locations of people).

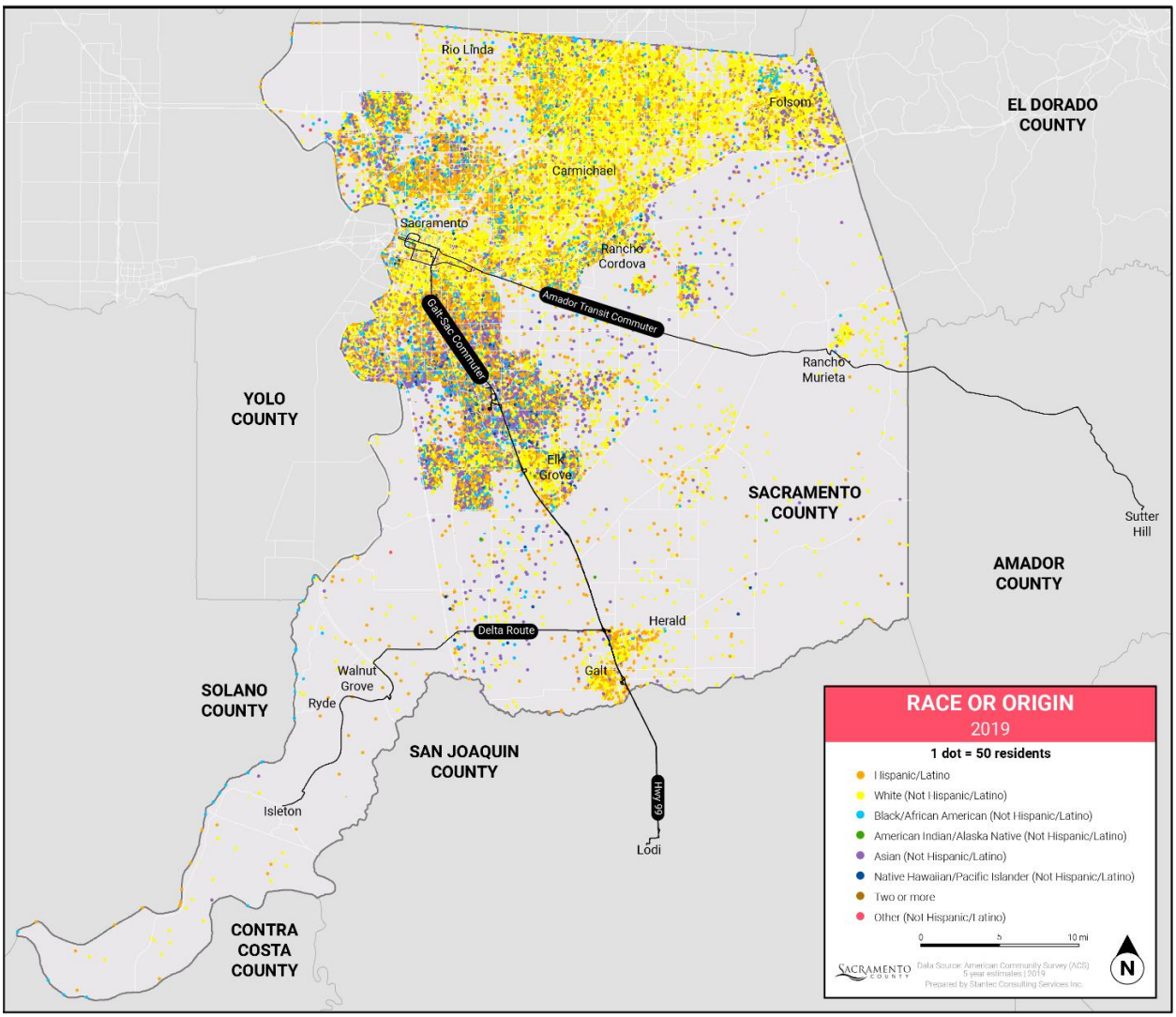


Figure 3-10: Density of minority populations

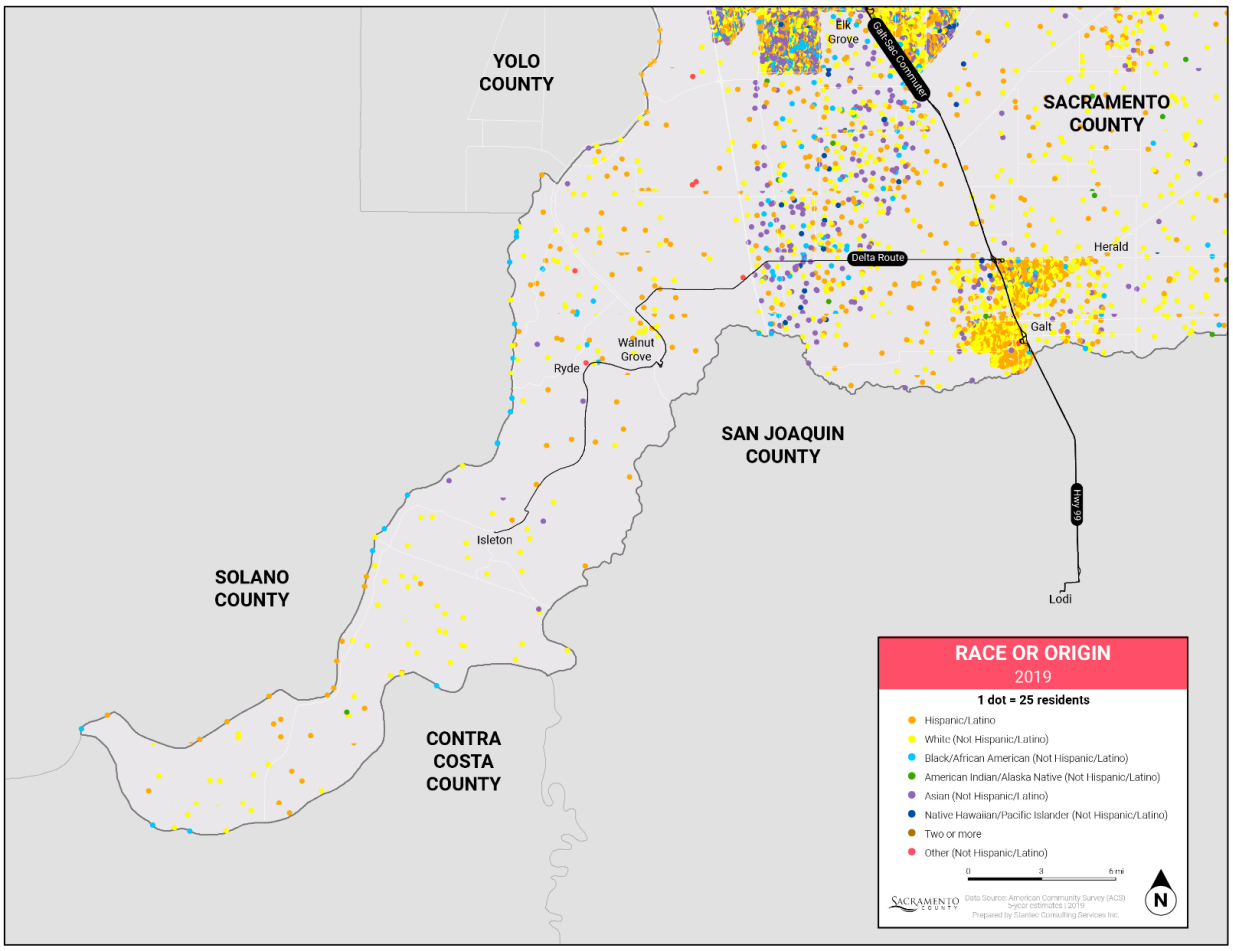


Figure 3-11: Density of minority populations—Delta communities

The maps demonstrate two interesting things. First, because each dot represents 25 people, we can get a sense of the population density in Galt that rapidly decrease as we move away from Galt, reiterating the findings in Figure 3-5. Second, it demonstrates the distribution of different minorities mainly Hispanic/Latino in Galt, Walnut Grove and Isleton, and Asian and African-American between Galt and Walnut Grove.

As an agency operating fewer than 50 vehicles in peak service, SCT Link is not required to develop a methodology to identify and provide demographic mapping of their Title VI communities. Because there is no approved methodology for identifying and mapping these communities, we adopted the same methodology used by SacRT in their Title VI plan.[5] This methodology involves the following steps:

- Identify the percentage of low-income and minority populations in each census tract of the service area (Figure 3-12 and Figure 3-13, respectively)
- Determine the average percentage of low-income and minority populations for the service area

[5] http://www.sacrt.com/documents/titleVI/TitleVIReport/2020/Appendix%20G%20-%20Service%20Monitoring%20Report_2020.04.13.pdf

- Census tracts that have a higher percentage of households living below the poverty level than the service area average are considered low income. Census tracts that have a higher percentage of minority households than the service area average are considered minority census tracts

For SCT Link's service area, the low-income average was 11.2%; on average, for census tracts in the service area, 11.2% of households reported incomes below the poverty level. These low-income census tracts are shown in Figure 3-12.

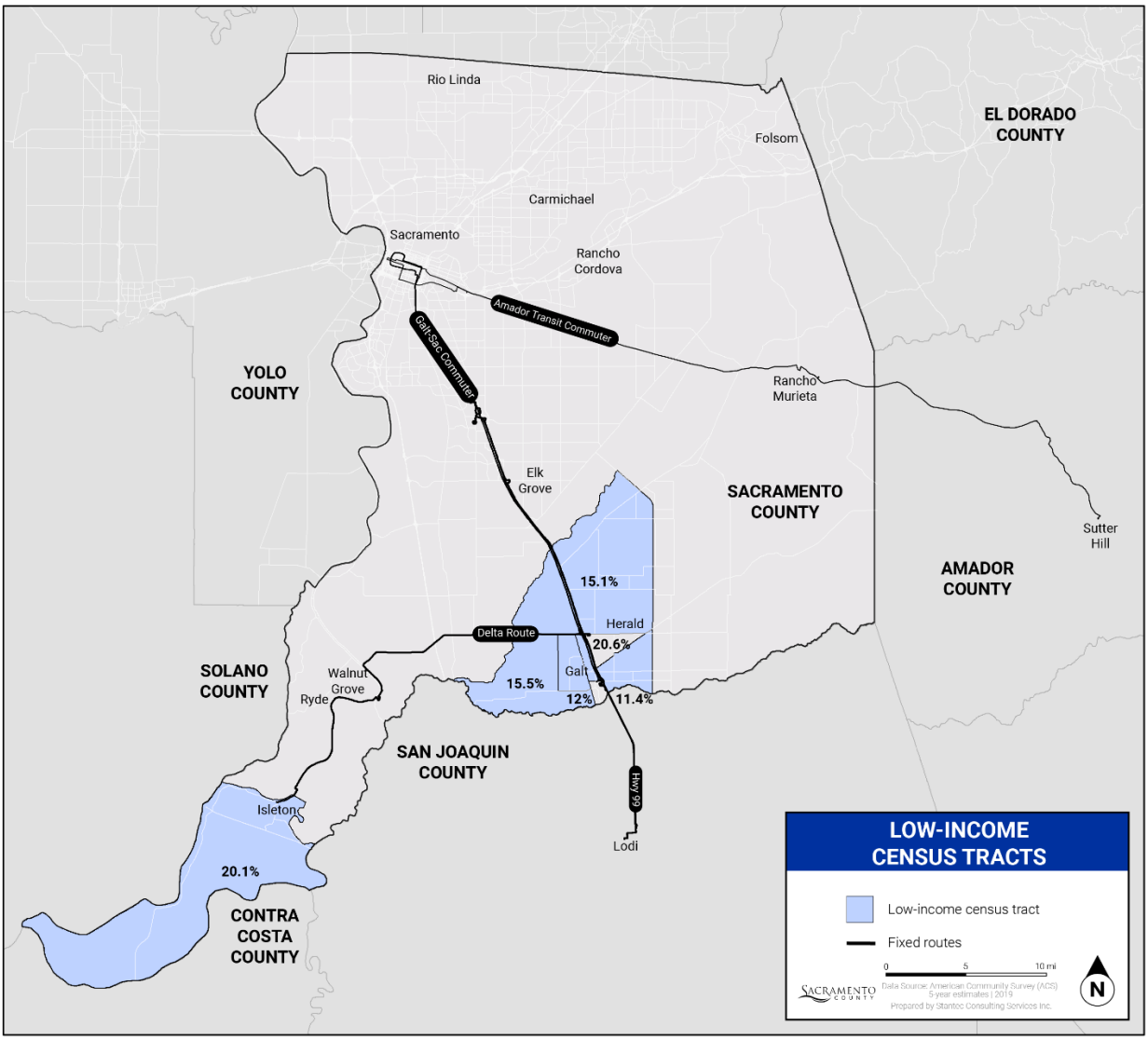


Figure 3-12: Title VI low-income census tracts

Minority census tracts are defined as tracts where minority populations exceed 49.7%, which is the service area average. The tracts exceeding the average are shown in Figure 3-13.

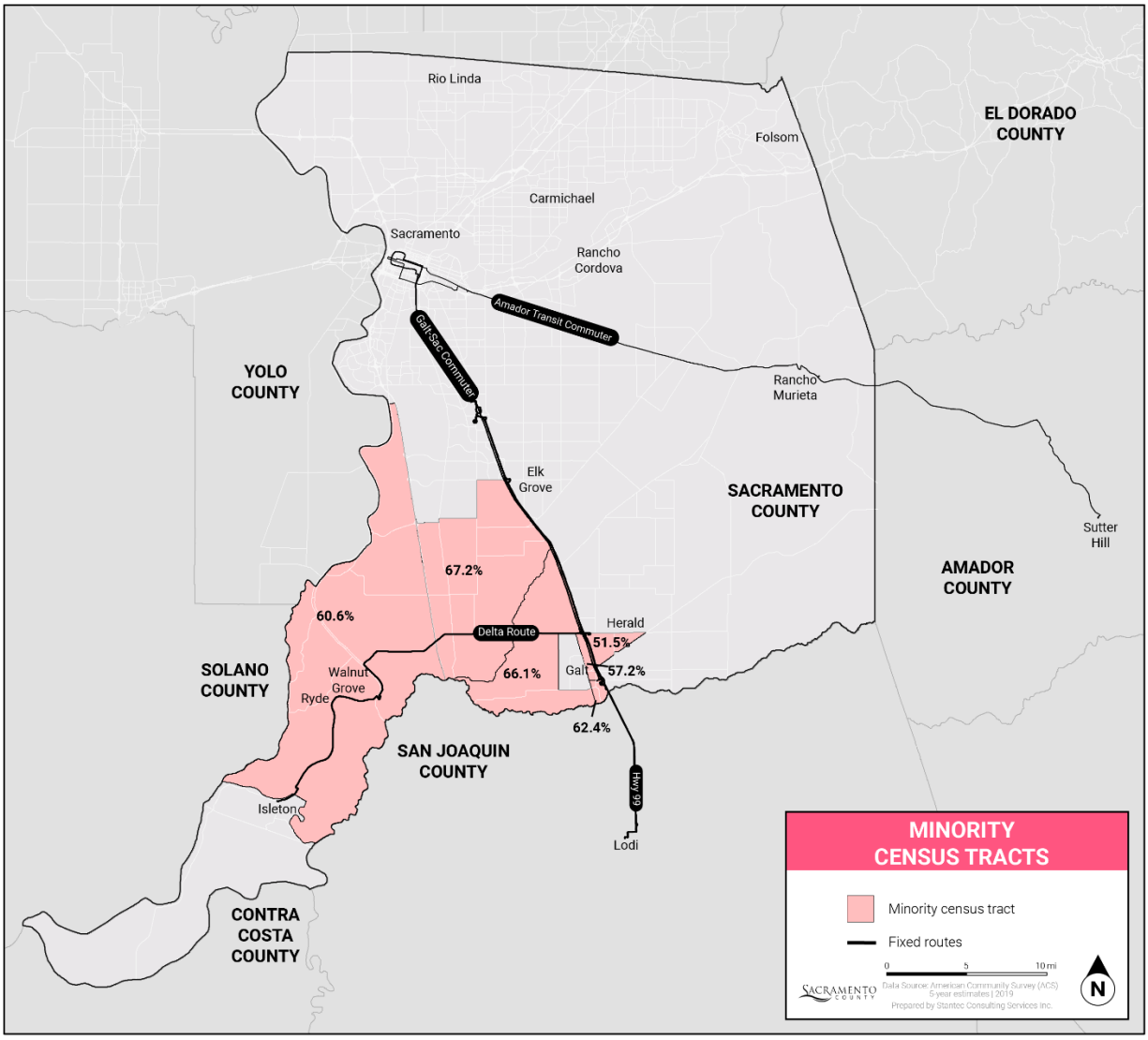


Figure 3-13: Title VI minority census tracts

Census tracts that are considered both low-income and minority are shown in Figure 3-14.

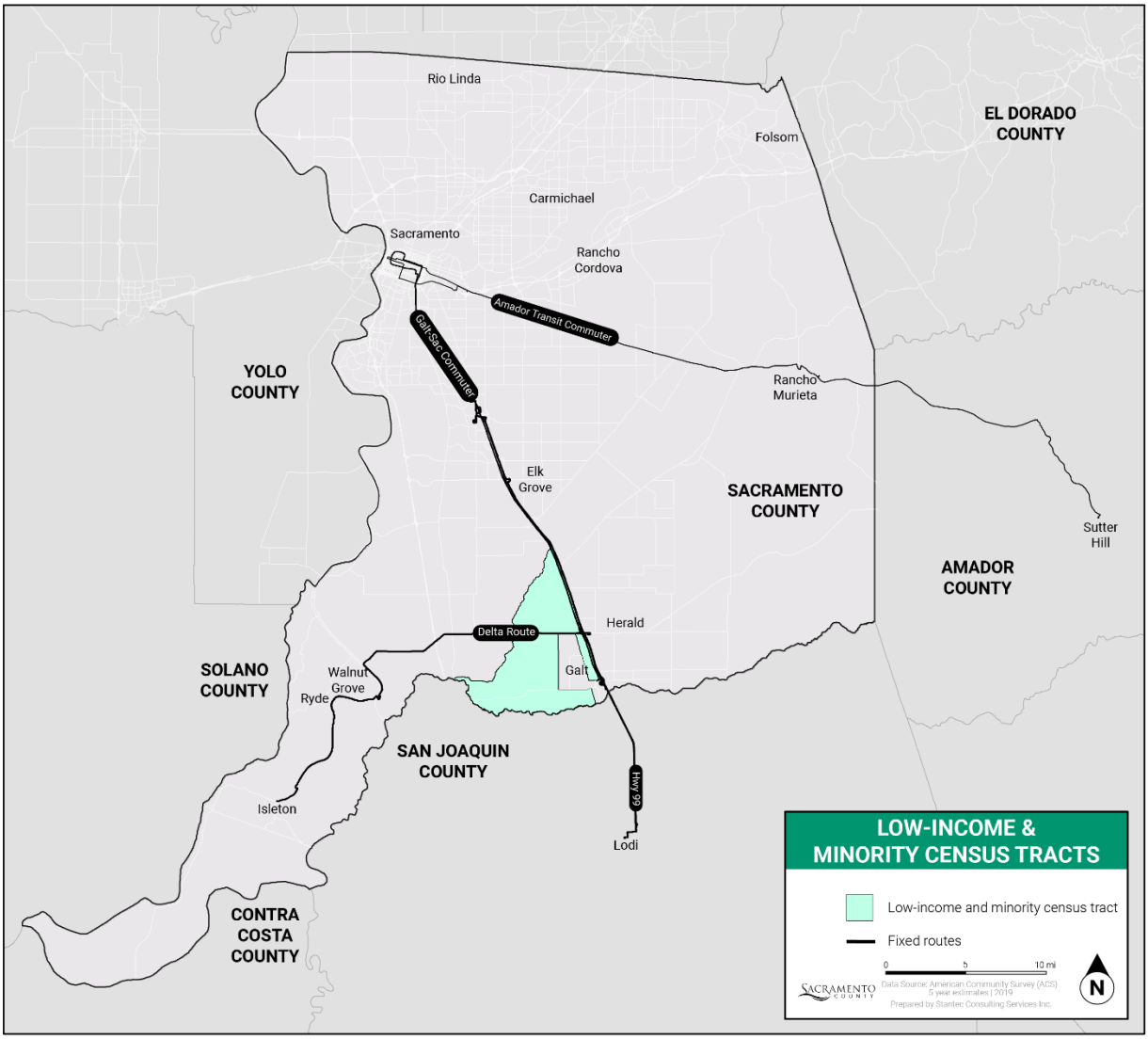


Figure 3-14: Title VI low-income and minority census tracts in South Sacramento County.

Figure 3-14 shows that there are only two (large) census tracts that are above average for low-income households and minority populations in the SCT Link service area, and they are both located in the Galt area.

Finally, we also examined the distribution of limited-English proficiency. The communities surrounding Galt and Walnut Grove have the largest proportions of persons with limited English proficiency when compared to Galt itself and Isleton (Figure 3-15). As specified in SCT Link's Title VI program, communicating service changes, policies, and customer rights in English and Spanish is important given the proportion of riders and households with limited-English proficiency.

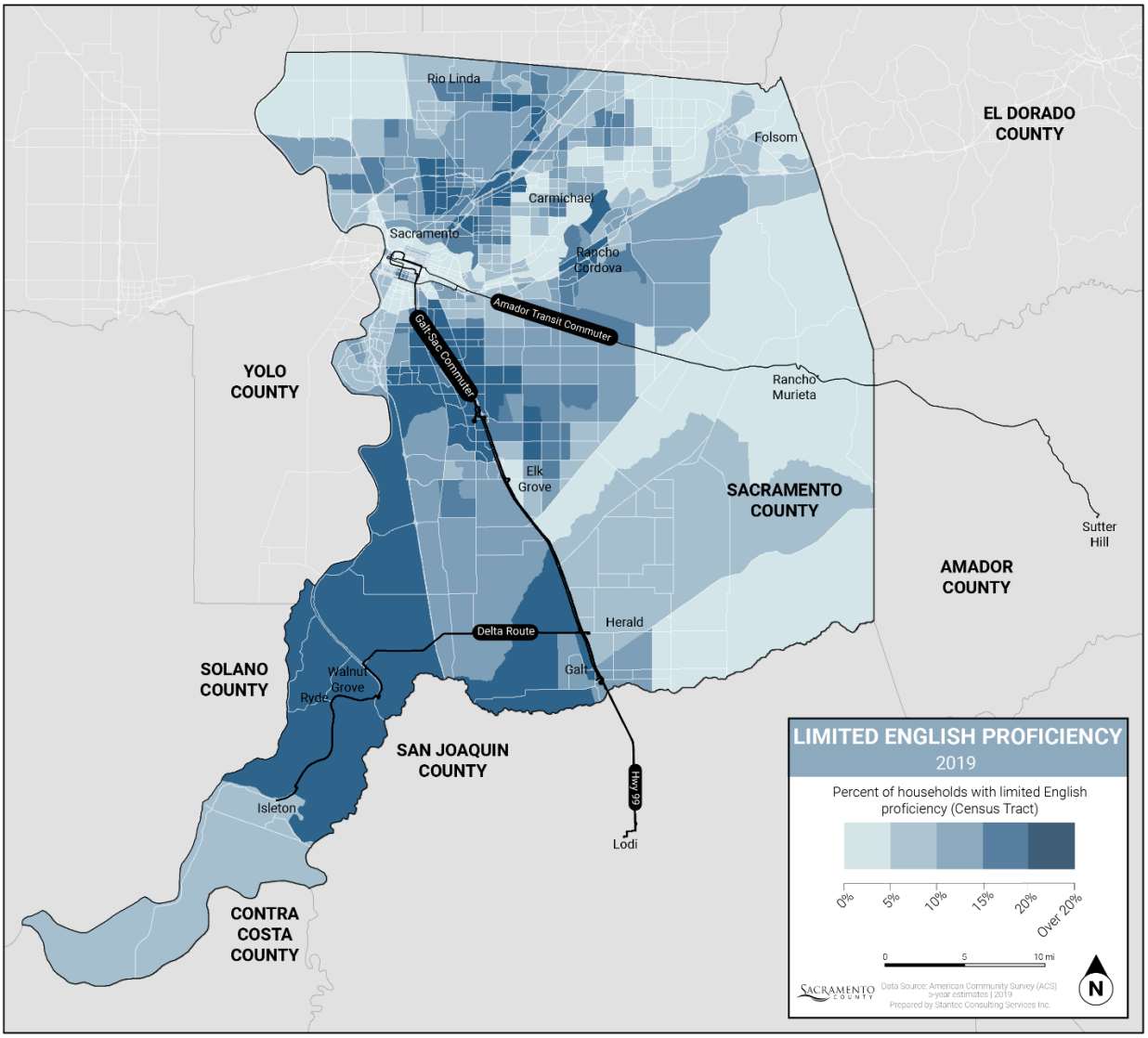


Figure 3-15: Households with limited English proficiency

3.2.7 Household Income

Household income is a strong, yet not perfect, predictor of transit use. Typically, lower income households may struggle to own and maintain one or more vehicles, and as such would rely on transit or other non-vehicle modes. However, research has shown that even for lower income groups, vehicle ownership is sometimes attainable, and other research has demonstrated that as a household's income grows, they are more prone to buy a vehicle. As well, higher income households may look to reduce car usage to reduce costs or for other reasons, and as such use transit or other modes like cycling for certain journeys. Nonetheless, income is an important variable to examine because federal law requires that low-income households avoid bearing disproportionate burdens when it comes to transit service changes.

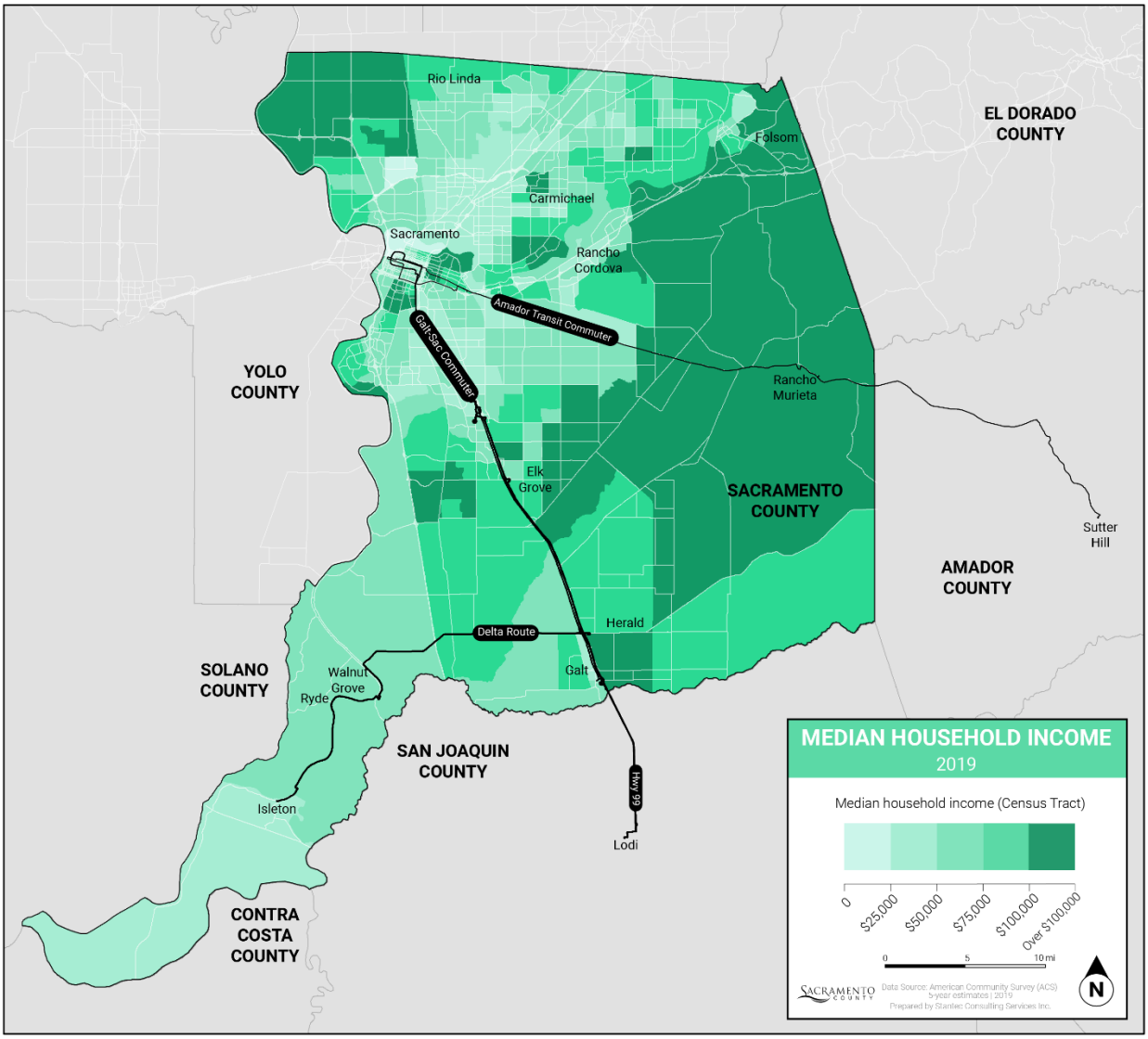


Figure 3-16: Median household income

Household incomes are lowest in the center of the Sacramento region, progressively increasing in an outwardly manner. However, examining the map in Figure 3-16 more closely reveals lower income households located in Galt just west of SR-99, as well as in the Delta communities. Together with rider data from the past SRTP, it is clear that residents of households with lower incomes rely on SCT Link for transportation needs. Overall, however, much of the communities in South Sacramento County are not low income. Continuing to provide service and improving travel options is required.

3.2.8 Car-Free Households

The lack of a household vehicle is one of the strongest predictors of transit use. Comparing the map in Figure 3-16 with the map in Figure 3-17 reveals some interesting trends.

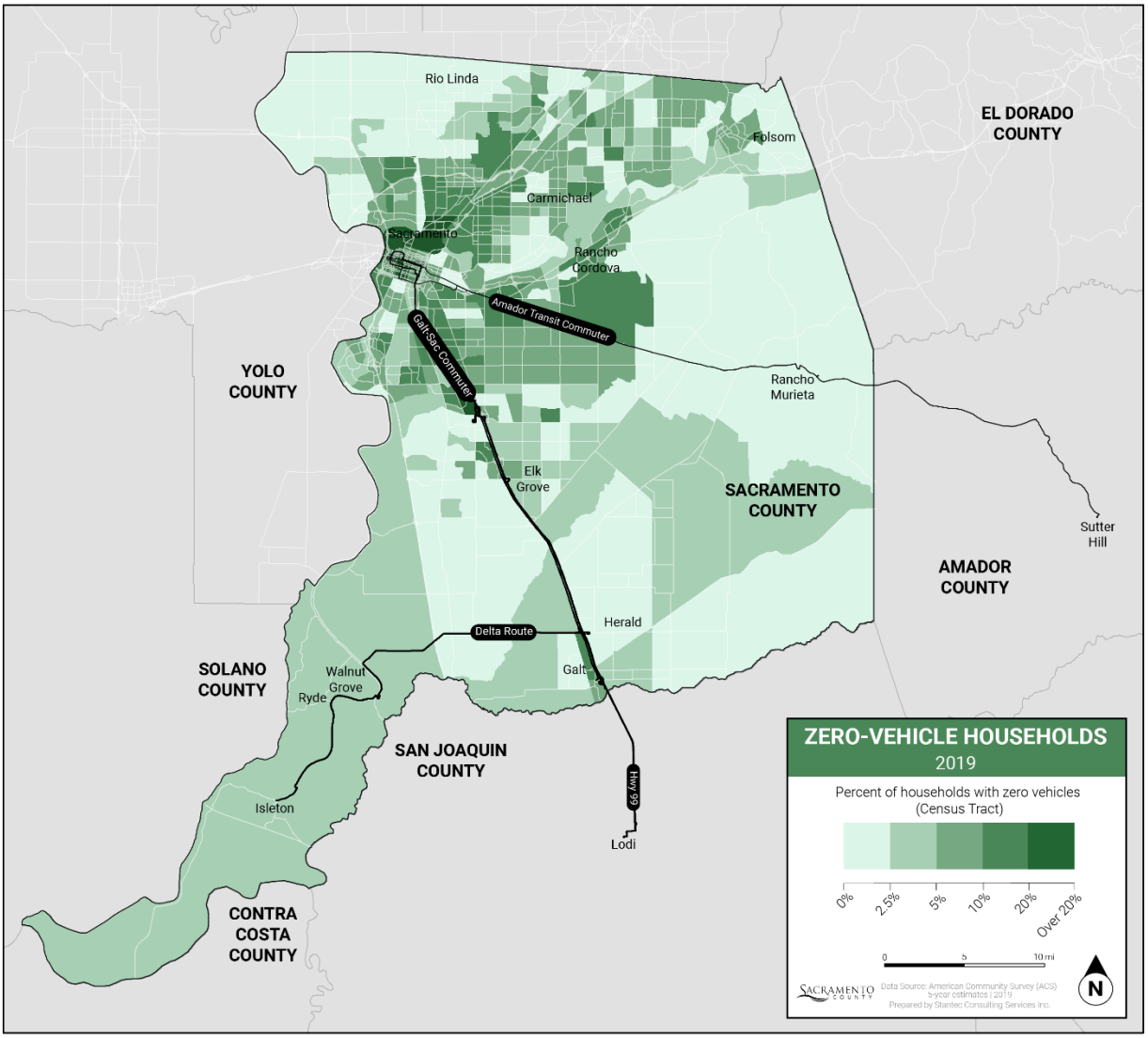


Figure 3-17: Households with zero vehicles

While some areas of low-income households in central Sacramento also have higher rates of lack of household vehicles, parts of Galt and the Delta, while low-income, have relatively low rates of households without a vehicle. This finding suggests that households are likely spending more on vehicles out of necessity for driving from a limited household income. Simply put, not having a car, even on a limited income, is not an option.

3.2.9 Senior Population

For several reasons—income, inability to drive due to a disability or other reason, lifestyle choices—elderly populations are more disposed to riding public transportation. Seniors represent significant portions of the population in Galt and in the Delta, particularly in Isleton and Rancho Murieta (Figure 3-18). As our population grows older and lives longer, mobility needs for seniors will continue to drive demand for public

transportation and ensuring that service is accessible—low-floor vehicles, universally accessible infrastructure and other amenities—will be crucial.

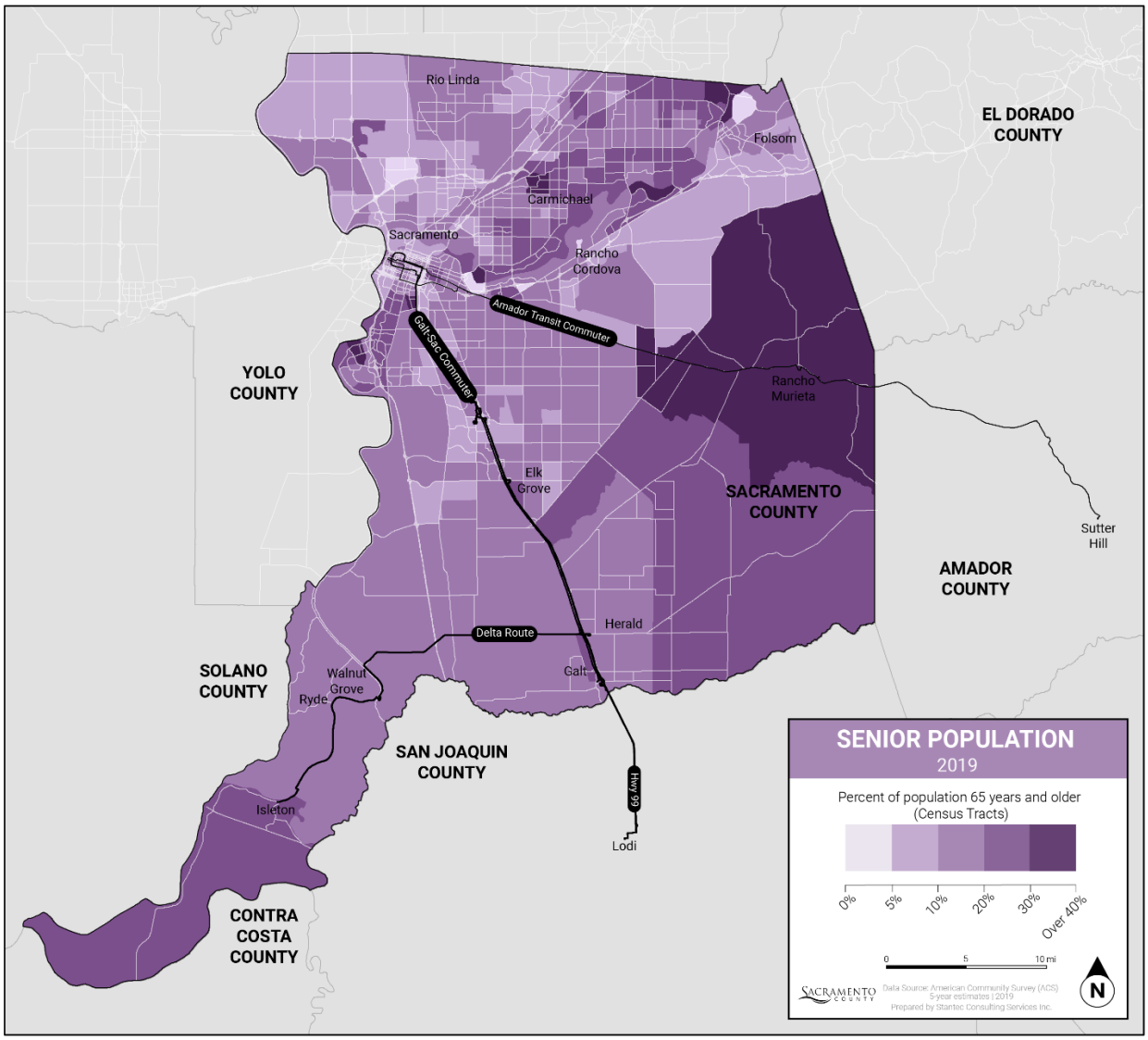


Figure 3-18: Distribution of persons over 65 years of age

3.2.10 Youth Population

Similarly, residents who are younger than 18 years old are likely disposed to riding transit, not only for school-based trips, but also for other journeys as well because they may not have a driver license or lack access to a car. Interestingly, research on transit loyalty and usage indicates that introducing transit to riders at a younger generally translates to continued ridership into adulthood. So providing attractive transit service can help maintain riders as they age into car-owning age cohorts.

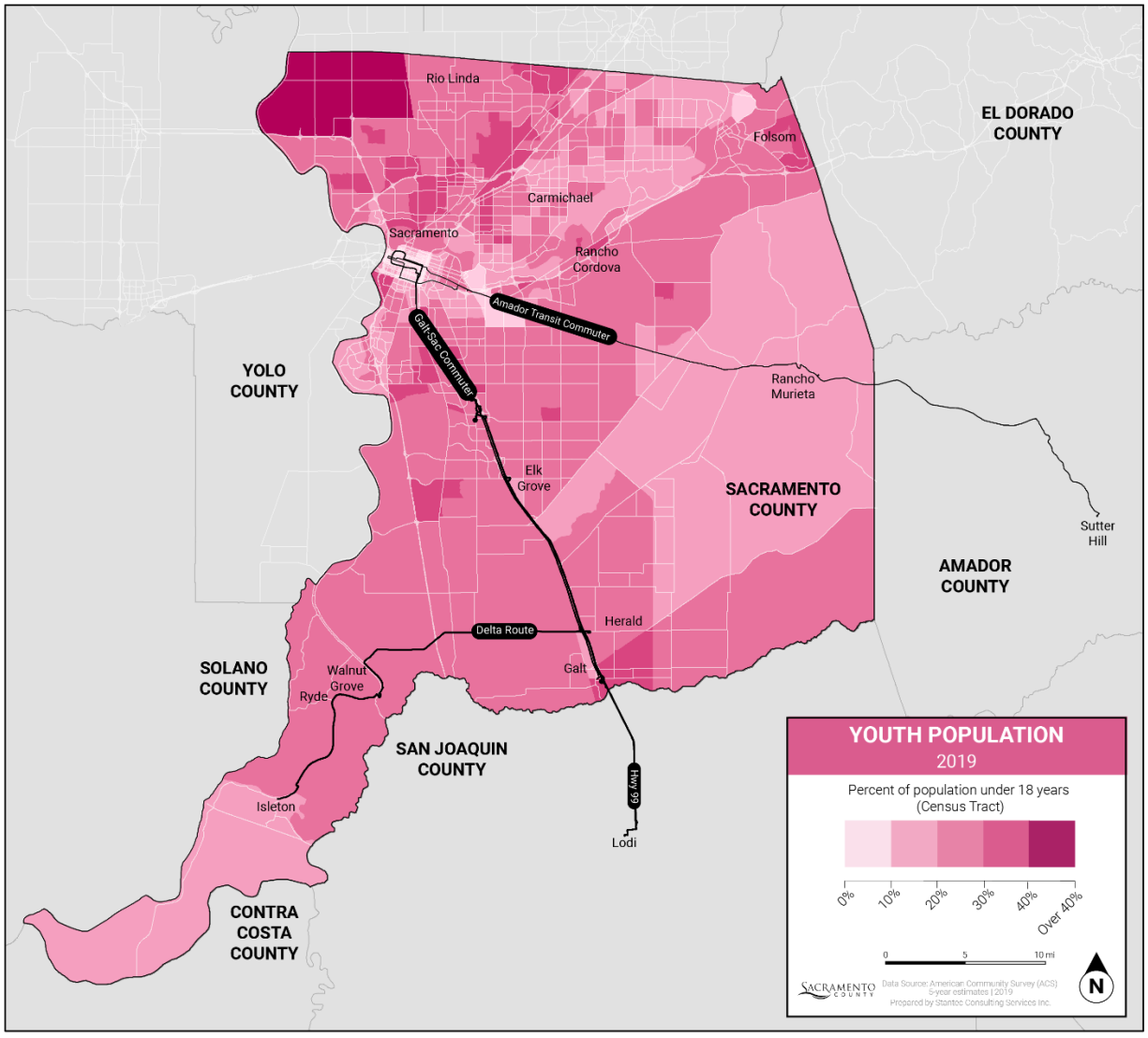


Figure 3-19: Distribution of persons younger than 18 years of age

The proportion of youth in South Sacramento County is relatively modest compared to the rest of the county (Figure 3-19). About 20-30% of the population in Galt and Walnut Grove and younger than 18, while Isleton's population is about 10-20% younger than 18 years old.

3.2.11 Commuting Mode Share

The culmination or result of the demographics described above, the character of land use and street design, and the quality of transit service is transit mode share. The map in Figure 3-20 displays the percentage of commuters who regularly use transit to get to work by census tract.

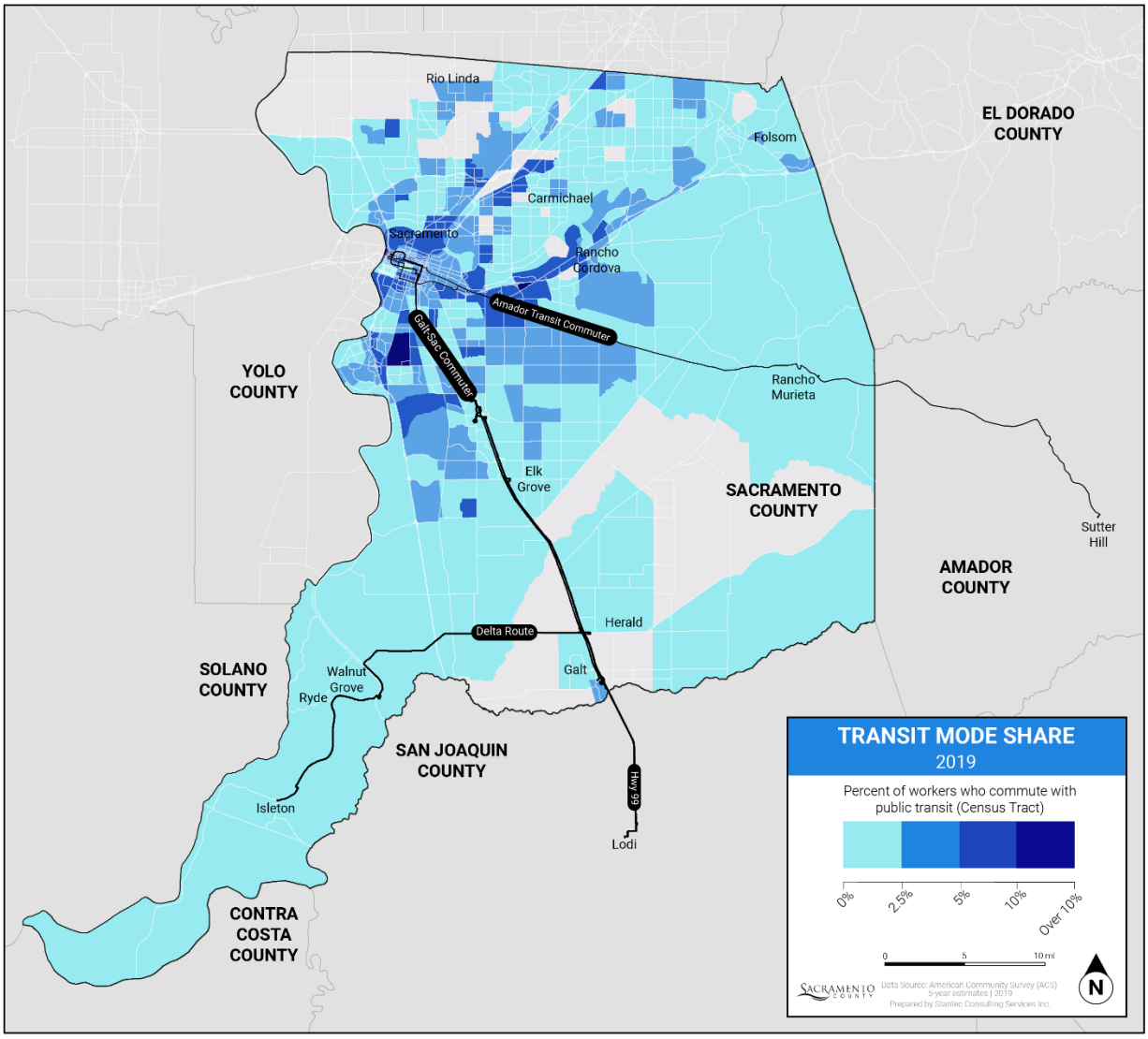


Figure 3-20: Transit commuting mode share

While people use transit and travel generally for purposes other than work, work trips are typically well suited for transit, or rather transit service tends to align with commuting purposes. The County average is 2.7% (76% drive alone), and only a small portion of Galt has a significant portion commuting by transit—we can assume the majority of these residents are riders of the Galt-Sacramento Commuter Express. Low rates are observed in the Delta. While this indicates few people are using SCT Link for commuting purposes compared to the general population, it does not provide an indication of people who ride for other purposes. Nevertheless, this analysis points to potential ability to grow commuting ridership on the Galt-Sacramento service; whether telecommuting continues to erode ridership and travel demand is one issue to consider throughout this planning process.

3.2.12 Walkability and Active Transportation Connections

A transit system's ridership depends largely on the ability of riders are easily able to access transit stops, which is largely dictated by how walkable a community is and the quality of pedestrian and active transportation infrastructure. Though Galt is a small community, there are areas of central Galt that are fairly compact and walkable (Figure 3-21), with gridded street design and intersecting streets, while much of the surrounding residential neighborhoods do not display features of a walkable community (Figure 3-22), that is, streets that dead-end, have long blocks, and incomplete networks.

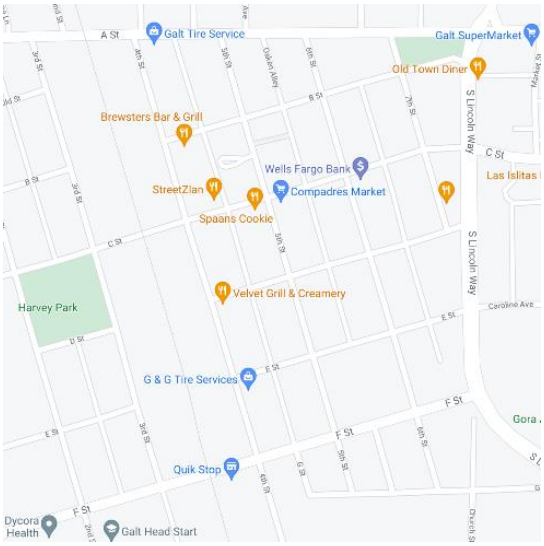


Figure 3-21: Example of walkable Galt

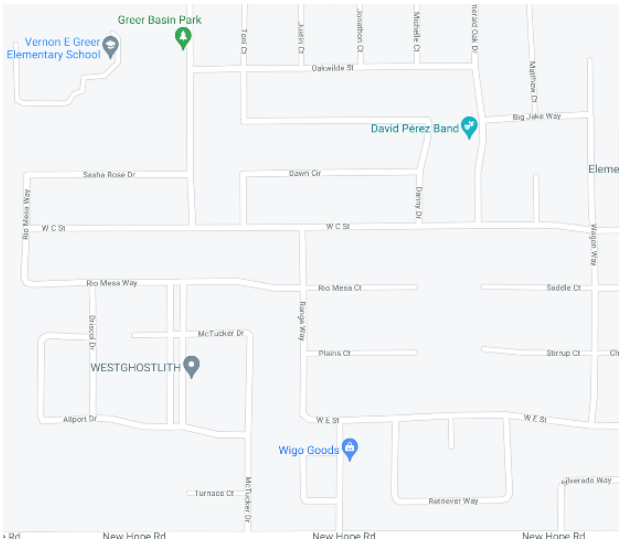


Figure 3-22: Example of non-walkable Galt

Overall, Galt is a car-centric community, which may present barriers to accessing fixed-route bus stops. For example, while there are high-quality amenities at the Galt City Hall stop (bus shelters), the sidewalk is rather narrow and the stop is located on a busy road with heavy car traffic, and there is no dedicated place for the bus to stop for safe passenger ingress and egress (Figure 3-23). Many residential communities were built for and around cars, making it difficult to provide efficient fixed-route service and prolonging DAR trips by forcing DAR vehicles to take long, meandering routes through insular neighborhoods that do not have convenient access to major arterial roads (Figure 3-24).

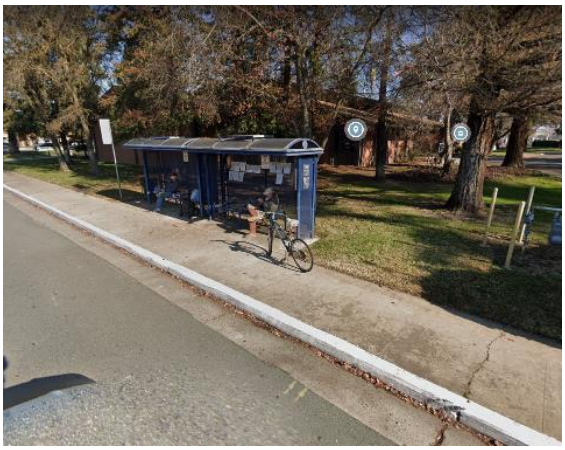


Figure 3-23: Galt City Hall bus stop

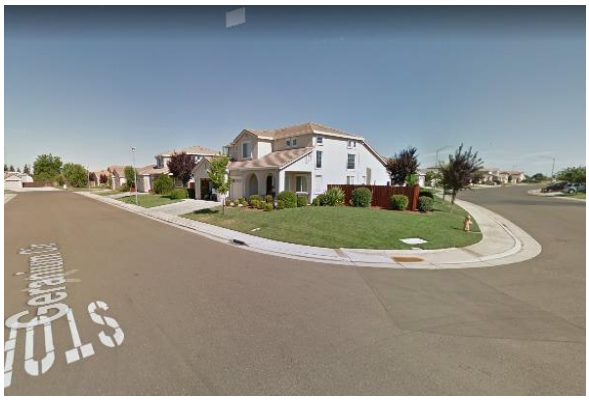


Figure 3-24: Galt neighborhood design

The Delta Communities including Walnut Grove and Isleton are remote and rural. While they are compact, the small and low-density nature of these communities means that residents likely need to travel outside of their community to access more specialized amenities, such as for medical purposes. Like Galt, these communities display car-centric design and while there are sidewalks and pedestrian amenities present, they main not be in the best state of repair and may be difficult to navigate for those with mobility devices or mobility challenges (Figure 3-25 and Figure 3-26).

Figure 3-25: Car-centric design in Isleton

Figure 3-26: Poor pedestrian/sidewalk connectivity in Walnut Grove

3.2.13 Summary

Based on the above assessment, the market for public transit in South Sacramento County:

- Is limited with respect to population and job density, resulting in a small market for potential all-day, all-purpose riders that are needed to make fixed-route services successful.
- Is dispersed across a large area, challenged the ability of fixed-route service to deliver attractive and useful service due to the low-density of distributed points of interest.
- Limited to a few communities with low-income households and low car ownership, whereas most of the population in South Sacramento County are not low-income and own, on average, two vehicles.
- Includes a significant proportion of Hispanic/Latino residents, as well as seniors.
- Lives in communities with limited walkability with cul-de-sac street designs making transit access non-trivial. That most riders access bus stops in the Delta by walking (based on the prior SRTP findings), suggests fixed-route service may not be the ideal service delivery method for these communities.

3.3 Transit Services Analysis

This section provides an audit of SCT Link's services through a historical and performance-based evaluation. We first review key metrics at the systemwide and service type levels, and then delve into each route/service operated by SCT Link. The purpose here is to understand trending as well as located areas for targeted improvement.

The pandemic has dramatically reduced ridership on SCT Link's services, although the impact has been unequal across service types. While these impacts are discussed in each mode in the subsequent sections, the graph in Figure 3-27 demonstrates the ridership by week since late March 2020 compared to the same week in the 2018-2019. As of the last week of September 2021, overall ridership was down by nearly 75% compared to the last week of September 2019. The impacts of COVID-19 on ridership have been greatest on the Hwy 99 Express and the Galt-Sacramento Commuter Express.

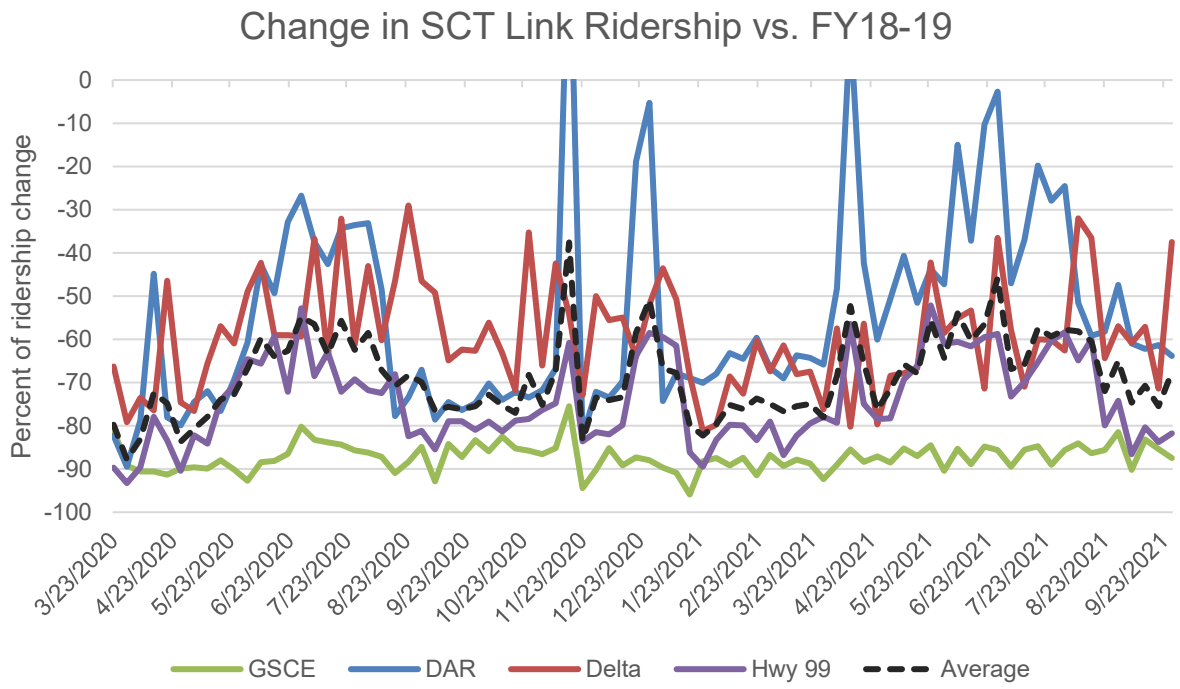


Figure 3-27: Comparing COVID-era ridership by week with FY18-19 ridership.

3.3.1 Systemwide Analysis

In terms of service provided measured by revenue miles (Figure 3-28) and hours (Figure 3-29), generally, SCT Link has been providing stable and marginally more service systemwide. The data below are from NTD reports and capture FY14-15 through FY18-19.[6]

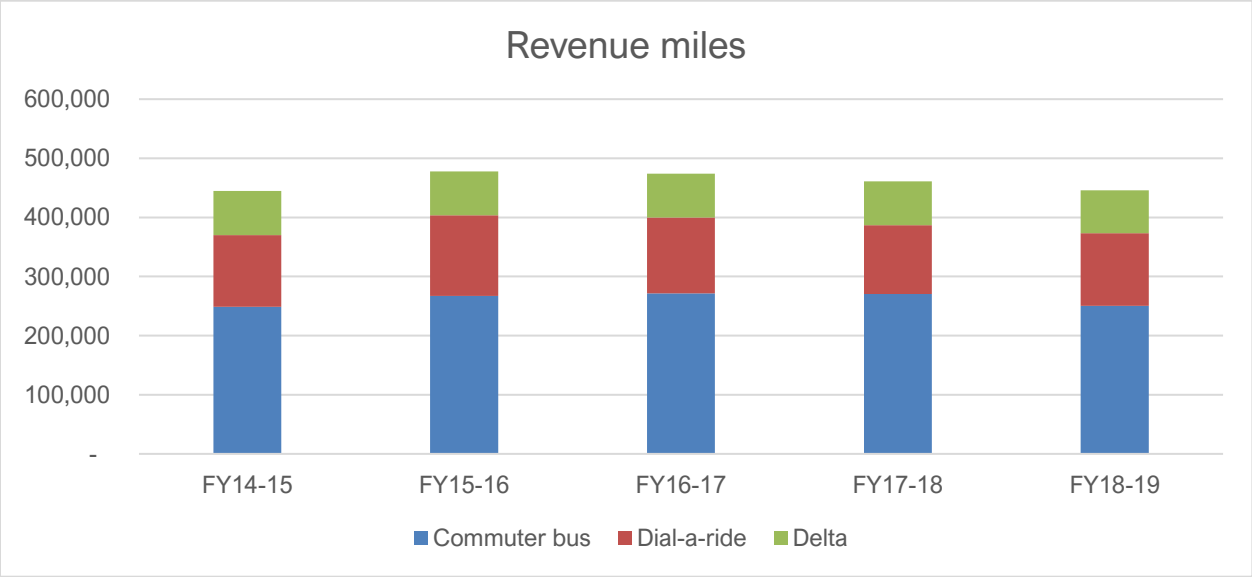


Figure 3-28: Revenue miles, FY14-15 to FY18-19

[6] SCT Link reports three modes to NTD, MB or motor bus, DR or demand response, and CB or commuter bus. NTD defines MB as "A transit mode comprised of rubber-tired passenger vehicles operating on fixed routes and schedules over roadways"—SCT Link reports stats for the Delta route to NTD under the MB mode. NTD defines CB as "Local fixed-route bus transportation primarily connecting outlying areas with a central city. Characterized by a motorcoach (aka over-the-road bus), multiple trip tickets, multiple stops in outlying areas, limited stops in the central city, and at least five miles of closed-door service." SCT Link reports stats for Hwy 99 and GSCE routes to NTD under the CB mode. Finally, NTD defines DR as "A transit mode comprised of passenger cars, vans or small buses operating in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up the passengers and transport them to their destinations." SCT Link reports stats for dial-a-ride to NTD under the DR mode.

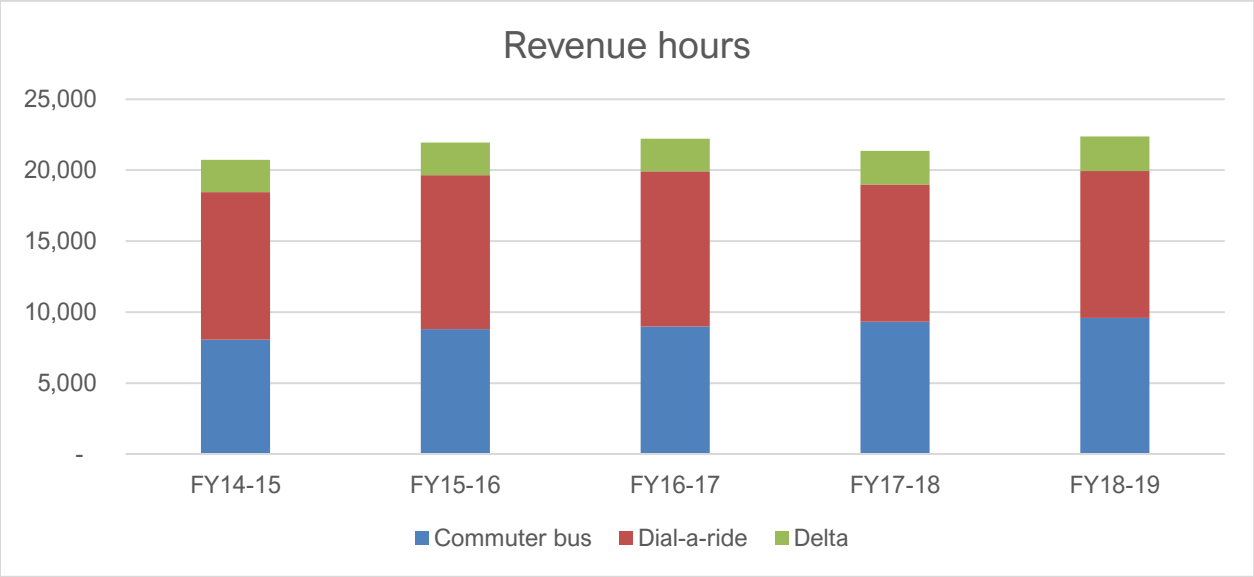


Figure 3-29: Revenue hours, FY14-15 to FY18-19

The resultant ridership has fluctuated as well, but was on a downward trend since peaking in FY15-16; commuter bus service has seen an increase in ridership since 2015, but dial-a-ride and the Delta service has seen a small decrease (Figure 3-30). As a proportion of total ridership, commuter riders (Hwy 99 and Galt-Sacramento Commuter Express) make up ~55%, while dial-a-ride makes up 41% and fixed-route ~4%.

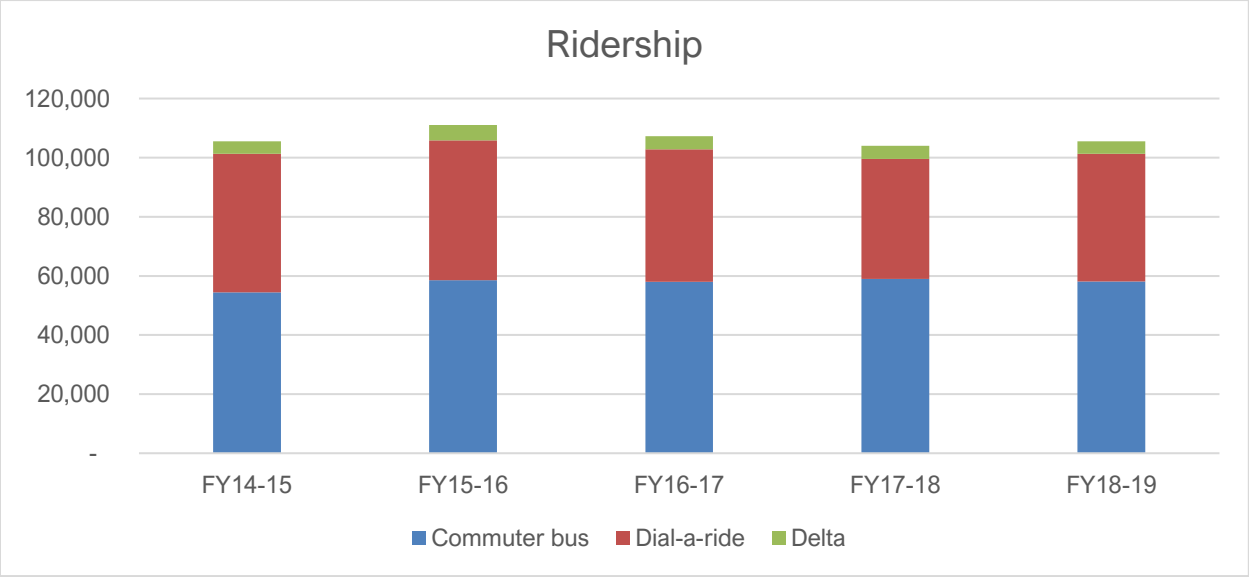


Figure 3-30: Ridership, FY14-15 to FY18-19

Interestingly, in terms of revenue hours, the spilt is more equal between commuter and dial-a-ride (43% of revenue hours is commuter vs. 46% is dial-a-ride, ~11% fixed-route).

In FY18-19, over 56% of operating costs were devoted to commuter services, 27% to dial-a-ride, and 16% to the Delta route. All operating costs by service have been increasing except for dial-a-ride, which

decreased by about ~36% from 2018 to 2019 (Figure 3-31). This significant decrease in operating costs for dial-a-ride is due to a change in how costs are allocated between modes by SCT Link between FY17-18 and FY18-19.

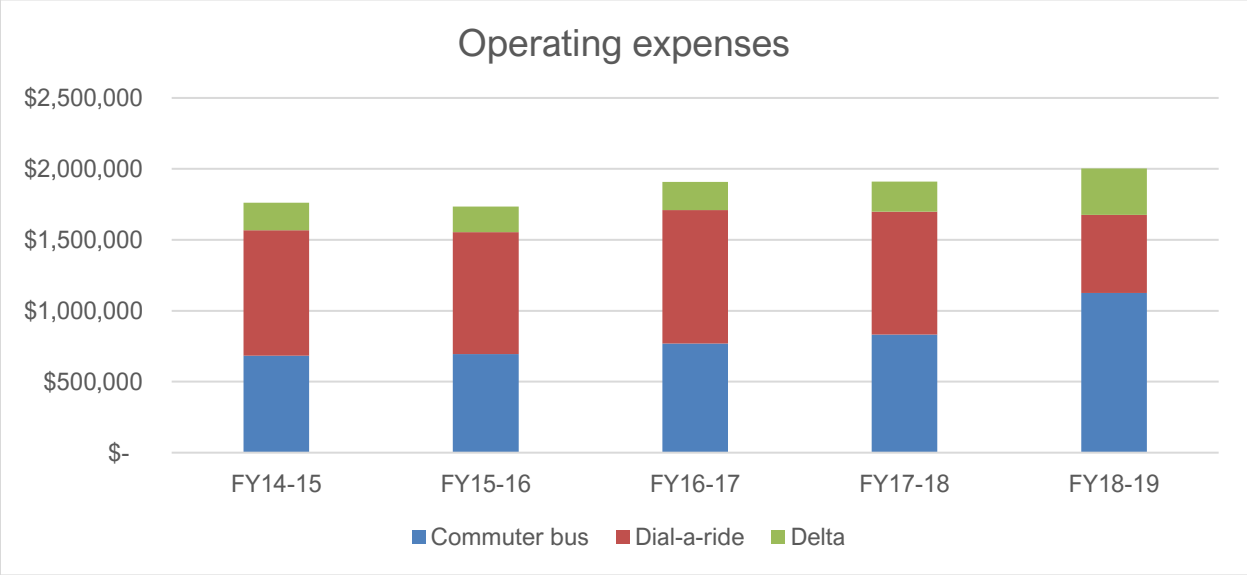


Figure 3-31: Operating expenses, FY14-15 to FY18-19

In a similar manner to expenses, fare revenues have been climbing over time since FY14-15, and commuter bus revenue makes up nearly 67% of all fare revenue, with ~31% from dial-a-ride services (Figure 3-32).

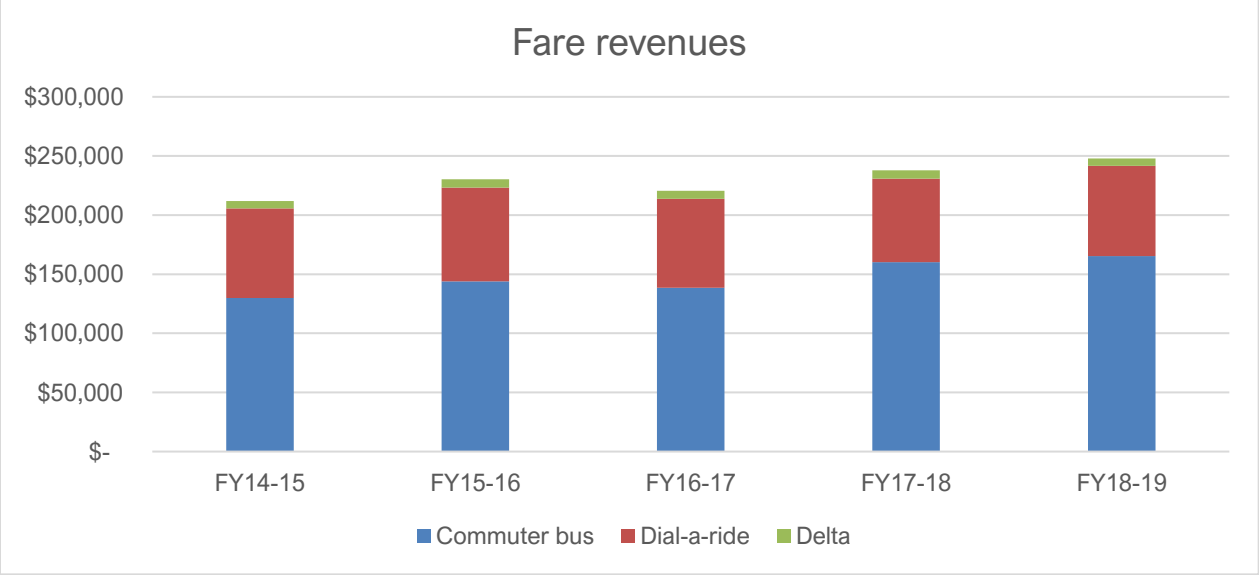


Figure 3-32: Fare revenues, FY14-15 to FY18-19

Table 3-1 displays key performance metrics at the system-level; we dive into these more in subsequent sections.

Table 3-1: Key performance metrics, 2015-2019

	2015	2016	2017	2018	2019
Boardings per hour	5.09	5.06	4.82	4.87	4.72
Cost per boarding	$16.70	$15.63	$17.79	$18.37	$19.00
Cost per hour	$84.99	$79.05	$85.82	$89.38	$89.58

Boardings per revenue hour is a metric that measures productivity—that is, for each unit of investment—revenue hours—how many riders are we carrying? As a rural agency, SCT Link's productivity is understandably low, but the downward trend indicates that while SCT Link is providing more service, ridership isn't increasing to the same degree.

A key measure of cost effectiveness is operating expenses divided by passenger boardings, meaning, how much are we spending to carry each passenger? Lower values are preferable. The analysis in Table 3-1 demonstrates that while operating expenses have increased, SCT Link's cost per boarding is increasing too and becoming less cost effective.

One final key metric is the cost per revenue hour—an indicator of cost efficiency. Lower values are preferable. SCT Link has, overall, been trending towards more expensive costs per revenue hour.

Table 3-2 highlights available on-time performance (OTP) data from SCT Link's operator for fixed-route and demand response services:

Table 3-2: Systemwide on-time performance

Service Type	2019	2020	2021
Fixed Route	Unavailable	99.99%	99.99%
Demand Response	99.82%	99.97%	99.99%

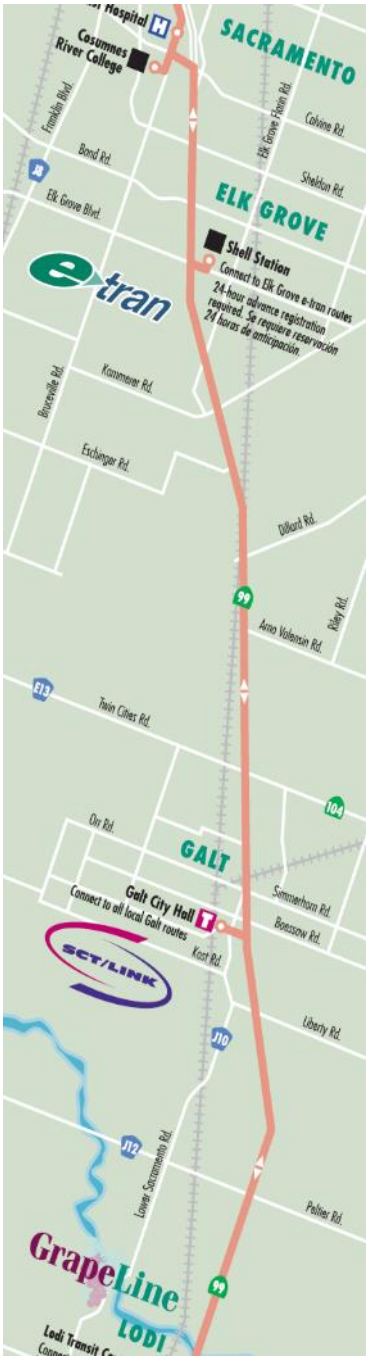
While the statistics in the above table show near-perfect on-time performance, the story is more complex when all factors are considered. Storer reports an "on-time arrival" for its OTP statistics as an arrival up to 15 minutes before or 15 minutes after its scheduled time.[7] This is a generous definition of an on-time arrival compared to industry best practices, which obfuscates the actual timeliness of the service relative to the schedule.

Taken together, this analysis shows:

- Key operating metrics have been mostly stable (i.e., unchanged) over the last five years, although some growth in ridership has been modest
- Commuter bus services provide the bulk of the ridership and operating expenses, followed by dial-a-ride services
- Performance metrics, systemwide, are trending in the negative direction—cost per boarding and revenue hour have increased, while productivity—boardings per hour—has decreased.

[7] Further, this definition of OTP does not align with the definition outlined in SCT Link's Title VI policy.

- To understand areas of improvement, especially in terms of early trips, OTP should be tracked individually for each service type. SCT Link should also work to provide live arrival information, so customers are not adversely impacted if a vehicle arrives early.



3.3.2 Hwy 99 Express

The Hwy 99 Express provides weekday service (no holiday or weekend service) between key destinations in South Sacramento (Kaiser South and Methodist hospitals; Cosumnes River College), Elk Grove, Galt, and Lodi in San Joaquin County. Connections to e-tran, local SCT Link services, Lodi/Grapeline services, San Joaquin RTD, and SacRT services are available. Current fares range from $2 to $4 depending on origin and destination. Hwy 99 service is operated with cutaway vehicles.

Prior to COVID-19 service reductions, headways were once an hour, with a service span of 5:25 am to 7:20 pm for a total of 15 round trips. In response to COVID-19 stay-at-home orders and reduction in ridership, SCT Link maintained the service span, but reduced the number of round trips to 12.

Operational and financial data was analyzed from FY14-15 through FY18-19 to understand pre-pandemic performance. As seen in Figure 3-33 below, the route's service hours have steadily increased over the past five years, from 6,750 vehicle hours in FY14-15 to 7,311 vehicle hours in FY18-19. However, this increase did not translate into improved ridership. In fact, ridership has been slowly declining on the route, which accelerated post-FY17.

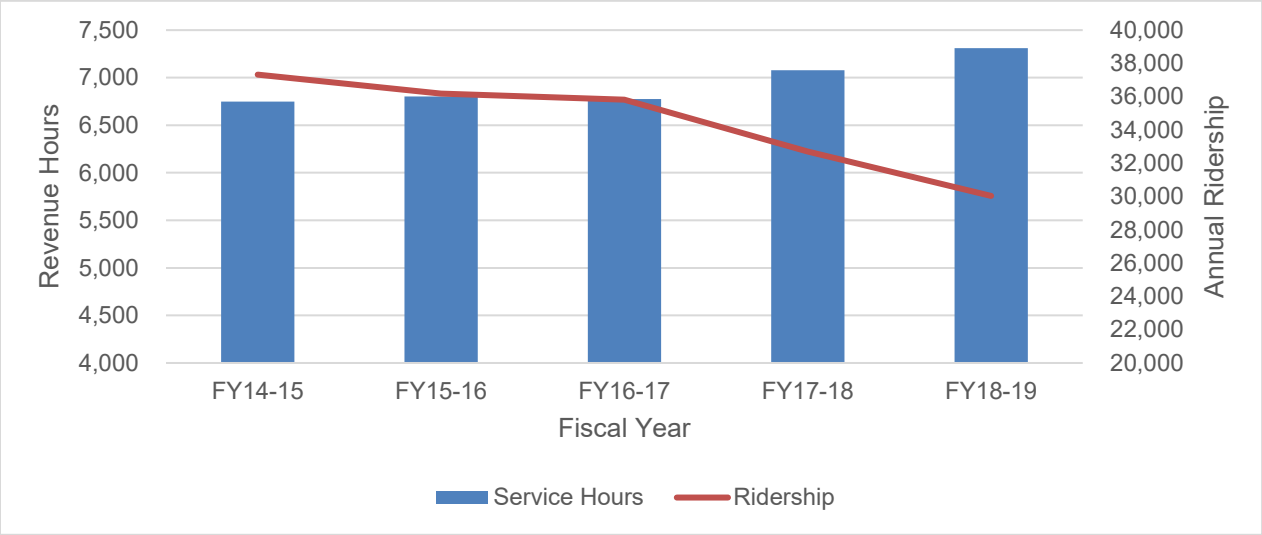


Figure 3-33: Hwy 99 annual service hours compared to ridership

In Table 3-3, boardings per hour are calculated using the values in the above figure. As expected, boardings per hour have been decreasing over the past several years, with a total 26% decrease over the analysis period. In addition, cost per hour has trended upwards.

Table 3-3: Hwy 99 service hour metrics

Fiscal Year	FY14-15	FY15-16	FY16-17	FY17-18	FY18-19
Boardings Per Hour	5.5	5.3	5.3	4.6	4.1
Cost Per Hour	$83.60	$78.79	$85.63	$90.32	$90.33

The annual service mileage for the route has decreased by nearly 12% from FY14-15 through FY18-19, which has influenced the downwards trend in ridership (nearly 20%). This is seen in Figure 3-34 below. Notably, the increase in service hour but decrease in service mileage suggests that the speed of the service has slowed over the past several years.

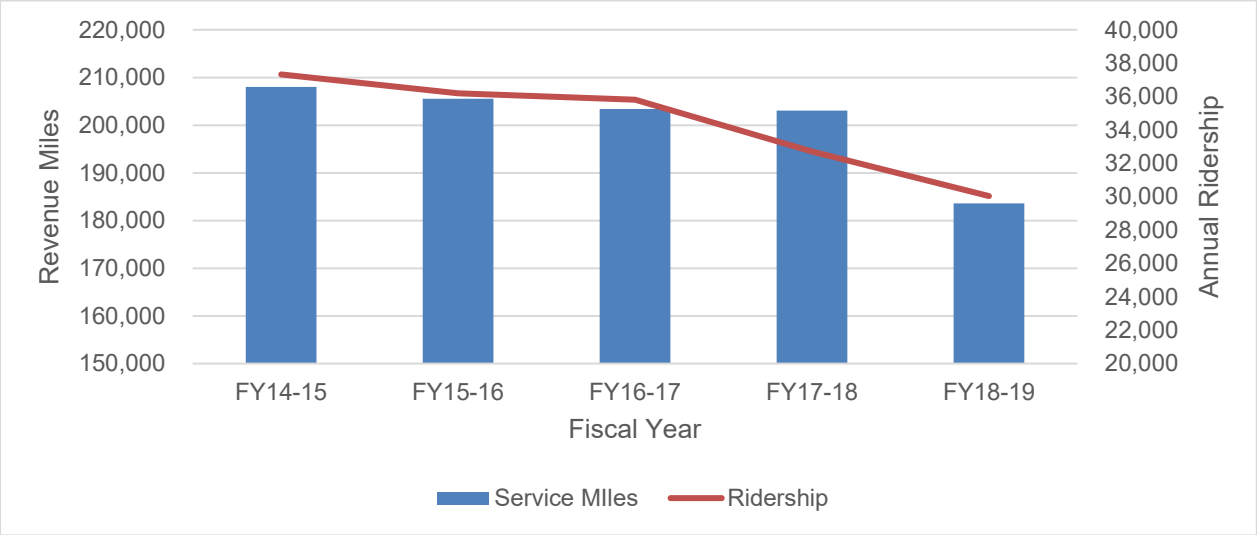


Figure 3-34: Hwy 99 annual service miles compared to ridership

Table 3-4 below shows only a slight decrease in the boardings per mile metric over the analysis period, but an increase in operating cost per mile.

Table 3-4: Hwy 99 service mile metrics

Fiscal Year	FY14-15	FY15-16	FY16-17	FY17-18	FY18-19
Boardings Per Mile	0.18	0.18	0.18	0.16	0.16
Cost per Mile	$2.71	$2.61	$2.85	$3.15	$3.60

3.3.2.1 COVID-19 Impacts

COVID-19 greatly impacted all transit agencies, leading to reduced service to match the plummeting ridership during the peaks of the pandemic. The results were analyzed in Figure 3-35 as seen below.

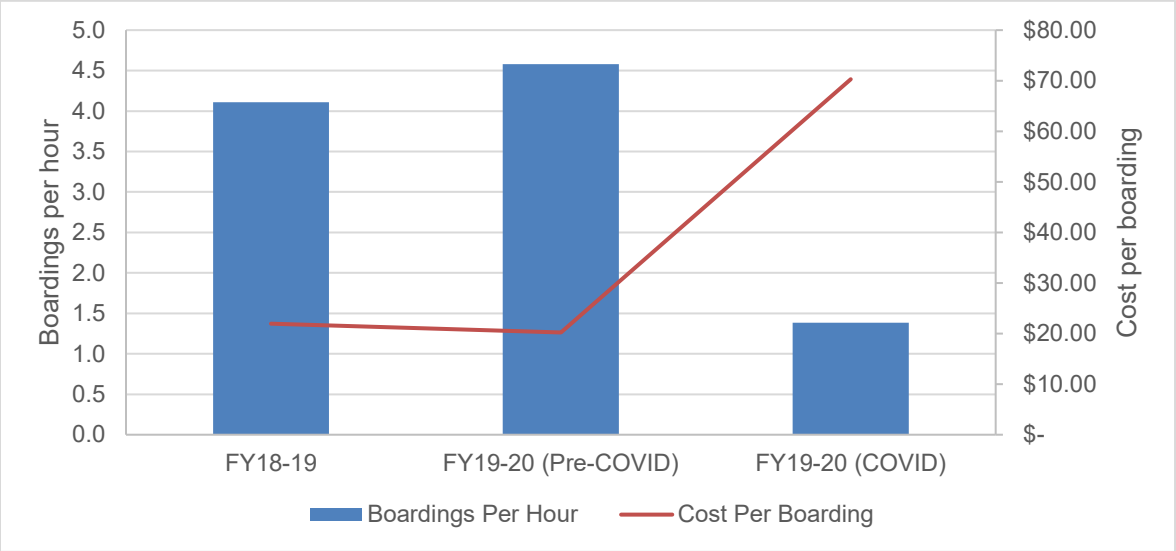
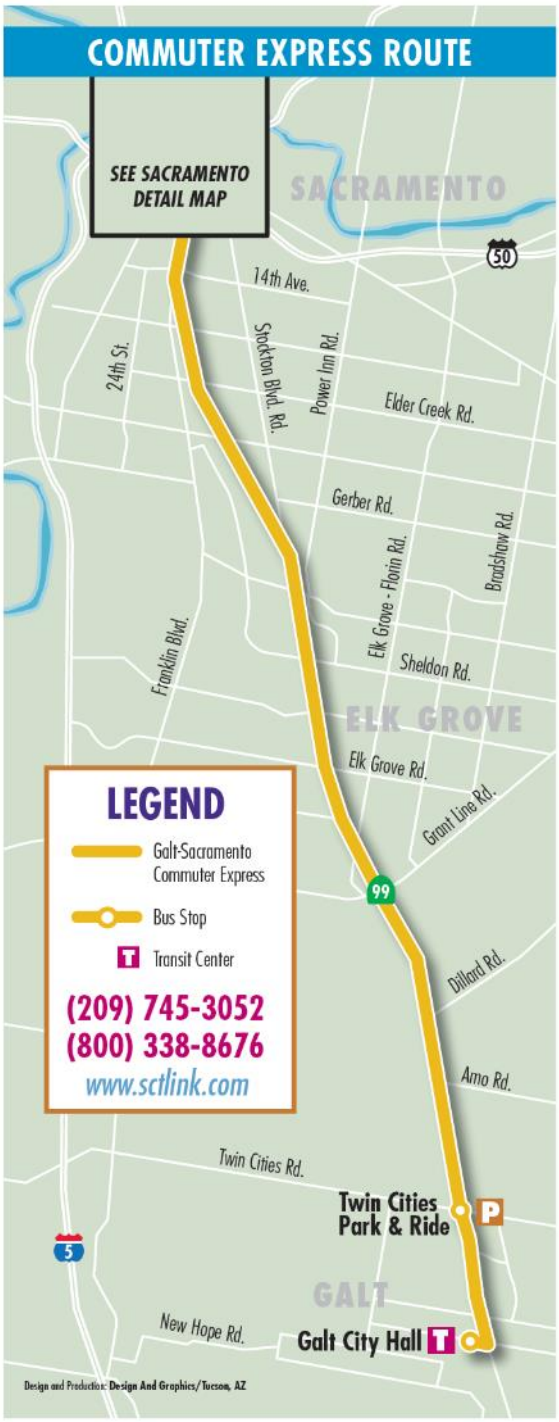


Figure 3-35: Hwy 99 impacts of COVID-19 to operational metrics

The boardings per hour fell by approximately 70%, from 4.6 to 1.4, when comparing between FY19-20 prior to COVID-19 and after COVID-19 had begun. Despite operational adjustments, the cost per boarding increased from approximately $20, to just over $70.

3.3.3 Galt-Sacramento Commuter Express

The Galt-Sacramento Commuter Express (GSCE) operates weekdays (no weekend or holiday service) from 6:30 am to 6:30 pm to connect Galt and Sacramento for commuters who work in downtown Sacramento. This route operates with motorcoaches along Highway 99 (similar somewhat to the Hwy 99 alignment). Whereas prior to the pandemic when service was operated with two morning trips, one midday trip, and two afternoon trips, the dramatic reduction in demand coupled with work from home for many white-collar workers who ride service led SCT Link to cut service to two morning trips and one afternoon trip. Fares range from $2 for discounted rides (seniors, disabled, and youth, 5-12 years), $4 for general one-way riders, and $120 for monthly pass (i.e., the equivalent of 30 one-way trips, or 15 days using return trips in a month). Interestingly, GSCE operates in-revenue service on non-peak direction trips, i.e., in the mornings, while most demand is from Galt toward Sacramento, riders can also use the service toward Galt in the morning, and the converse is applicable for afternoon trips.



SCT/LINK

GALT-SACRAMENTO COMMUTER EXPRESS

NOTICE OF SCHEDULE CHANGE

SCT Link is operating modified service beginning Monday, May 4, as a result of the COVID-19 pandemic until further notice.

GALT SACRAMENTO COMMUTER EXPRESS

	AM	AM	PM
Galt City Hall	6:25	6:55	3:40
Twin Cities Park & Ride	6:35	7:00	3:50
Sacramento			
30th St at R St	7:00	7:38	4:15
L St at Sutter's Fort	7:06	7:43	4:21
L St at 16th St	7:10	7:47	4:25
I St at 12th St	7:15	7:52	4:30
9th St at I St	7:16	7:54	4:31
9th St at N St	7:19	7:58	4:34
Q St at 11th St	7:22	8:01	4:37
Q St at 16th St	7:25	8:03	4:40
29th St at R St	7:30	8:08	4:45
Twin Cities Park & Ride	7:55	8:35	5:10
Galt City Hall	8:05	8:45	5:20

For comments or questions, please contact SCT Link at (209) 745-3052

TIMES ARE APPROXIMATE AND MAY VARY DUE TO WEATHER AND TRAFFIC.

AM times in regular typeface. **PM times in bold typeface.**

Shaded times are timed stops. The Commuter Express may not depart the stop prior to the time shown.

SCT Link is closed on all major holidays, including the day after Thanksgiving and Christmas Eve.

SCT Link esta cerrado todos los días festivos, incluyendo el día después de El Día de Gracias y veinticuarto de Diciembre.

This schedule is subject to change without notice.

The GSCE is SCT Link's most successful route in terms of ridership growth. As seen in Figure 3-36 below, investments in increased service have paid off in the form of increased ridership. Even as service hours held steady from FY16-17 to FY18-19, ridership continued to grow.

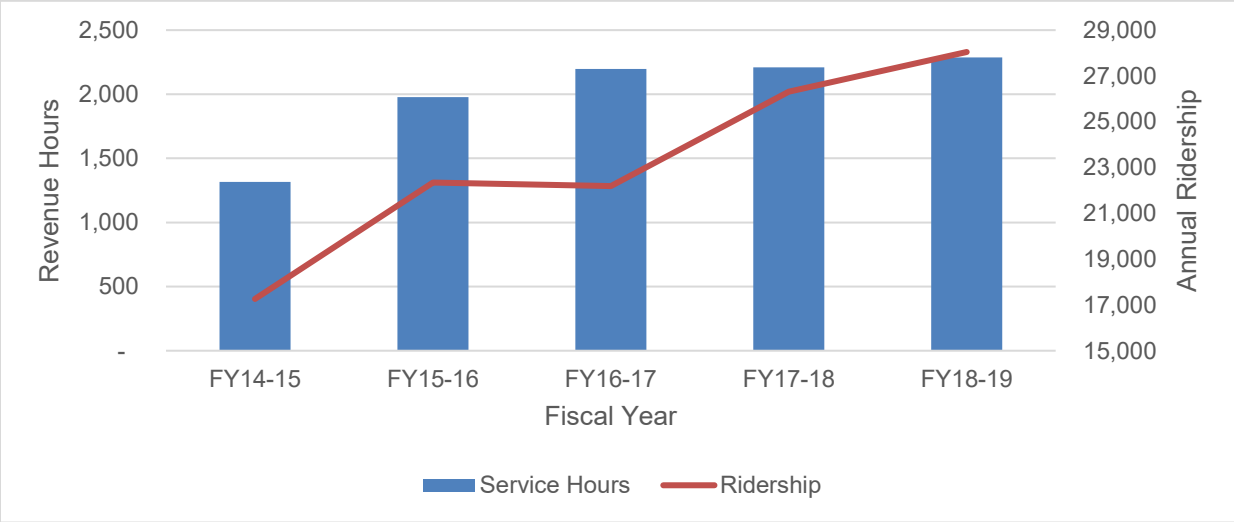


Figure 3-36: GSCE annual service hours compared to ridership

When the metrics are analyzed further and expressed in the form of boardings per hour (Table 3-5), a more stagnant trend emerges. While the highest boardings per hour were observed in FY14-15, the number decreased and then slightly increased into FY18-19. This is likely related to the concept of service elasticity, which dictates that an investment in service will usually result in a disproportionately smaller increase in ridership. The cost per hour has interestingly declined (on average) over the analysis period.

Table 3-5: GSCE service hour metrics

Fiscal Year	FY14-15	FY15-16	FY16-17	FY17-18	FY18-19
Boardings Per Hour	13.1	11.3	10.1	11.9	12.3
Cost Per Hour	$108.67	$84.86	$90.31	$97.13	$90.40

In contrast to service hours, service mileage decreased in FY18-19 after several years of increases, while ridership growth held steady. The trend is illustrated in Figure 3-37 below. The increasing service hours and decreasing service mileage indicates that the average route speed has decreased over the analysis period.

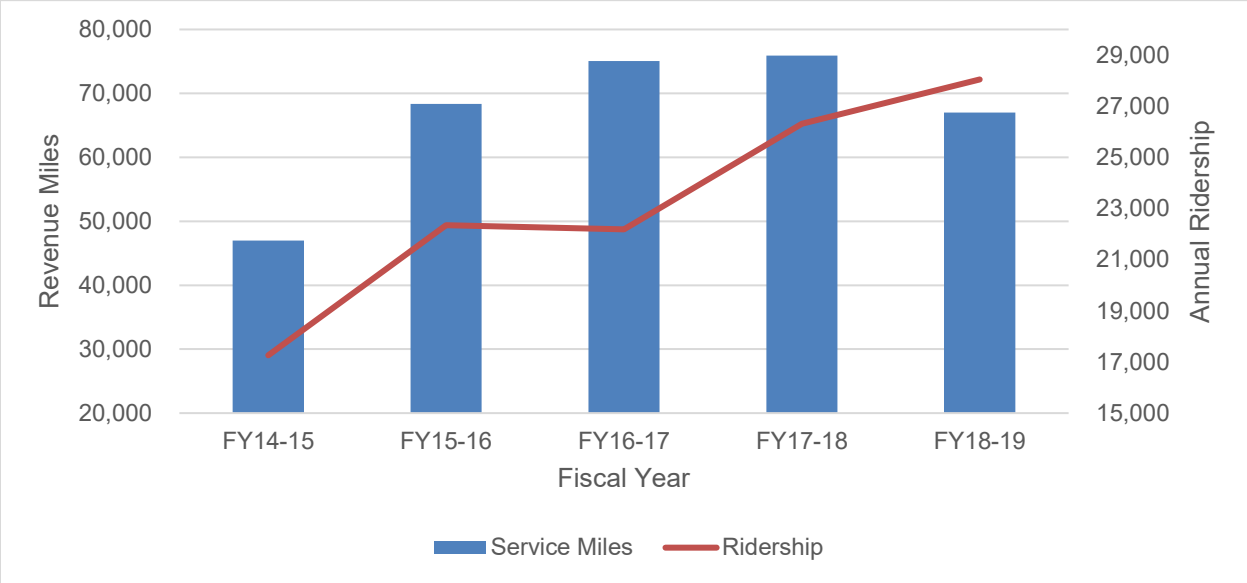


Figure 3-37: GSCE annual service miles compared to ridership

Table 3-6 below shows a relatively stable boardings per mile metric, dipping slightly from FY14-15 to FY16-17 and then increasing beyond previous highs from FY17-18 to FY18-19. The cost per mile follows a similar trend, but cost have only increased marginally between the high of $3.08 in FY18-19 and $3.05 in FY14-15, indicating the costs are being controlled effectively.

Table 3-6: GSCE service mile metrics

Fiscal Year	FY14-15	FY15-16	FY16-17	FY17-18	FY18-19
Boardings Per Mile	0.37	0.33	0.30	0.35	0.42
Cost Per Mile	$3.05	$2.46	$2.64	$2.83	$3.08

3.3.3.1 COVID-19 Impacts

Next, the impact of COVID-19 was investigated for this route, as seen in Figure 3-38.

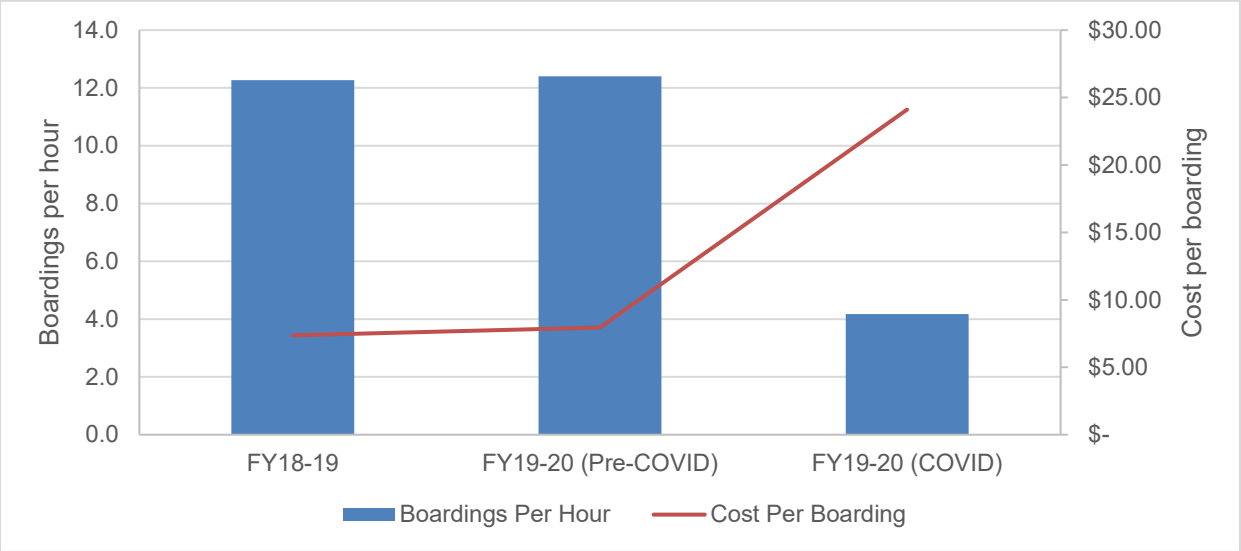


Figure 3-38: GSCE impacts of COVID-19 to operational metrics

Prior to the onset of COVID-19, in FY18-19 and the beginning of FY19-20, the GSCE route experienced roughly 12 boardings per hour. Once COVID-19 hit and in the months following, ridership plunged, and despite a reduction in service hours, the boardings per hour dropped to roughly four (one-third of pre-COVID – a 66% reduction). The cost per boarding jumped in lockstep with the ridership drop, with a change from approximately $10 pre-COVID to nearly $25 during COVID-19. As a route focused on commuting trips and office workers working in downtown Sacramento, the GSCE, like so many of the commuter services in the SACOG region, suffered the greatest loss in ridership due to telecommuting and work-from-home edicts.

3.3.4 Delta Route

SCT Link's Delta Route is a fixed-route 'local' type bus service providing connections with Galt and communities across the Delta including Locke, Walnut Grove, Ryde, and Isleton. Similar to the commuter services, the Delta route operates only weekdays (no weekends and holidays) from 6:20 am to 7:20 pm with cutaway vehicles. Riders can connect at Galt City Hall on SCT Link's other services, namely the Hwy 99 and GSCE services. Riders are also able to request deviations up to three-quarters of a mile from the route alignment; however, these requests must be made in advance.

As of October 2021, due to COVID-19 service reductions, four round trips are operated instead of five round trips in pre-COVID-19 times. Fares vary for the origin-destination pairs; within the Delta, one-way fares are $1 ($0.50 for disabled, seniors and youths), $3 between Galt and the Delta ($1.50 for disabled, seniors, and youths), and $4 between the Delta and Hwy 99 ($2 for disabled, seniors, and youths). Monthly passes are available for $75 and $45 for youths; this pass allows unlimited rides on the Hwy 99 express as well.

The Delta Route is greatly underperforming compared to the other routes operated by SCT Link. Despite similar service hours compared to the GSCE route, ridership is significantly lower, and declining, as seen in Figure 3-39 below. Ridership slightly increased in FY15-16, but has been on a decreasing trend since.

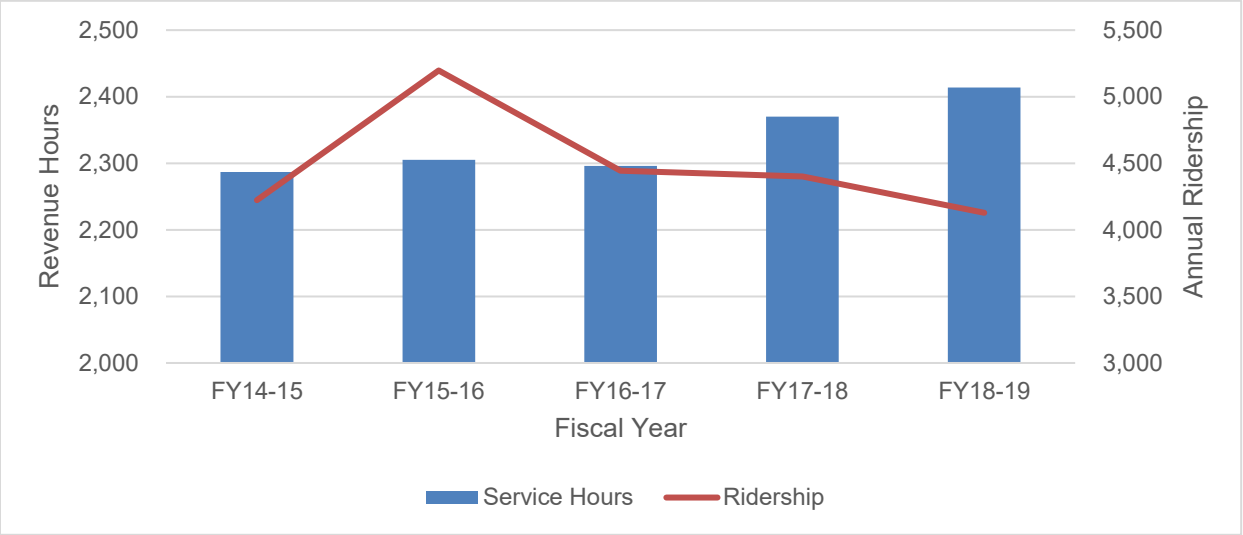


Figure 3-39: Delta Route annual service hours compared to ridership

Based on the figure above, service effectiveness is very low on the Delta Route. Table 3-7 below shows that boardings per hour have hovered around ~2 riders per hour over the analysis period. The cost per hour has gradually increased to the value of slightly over $90 in FY18-19.

Table 3-7: Delta Route service hour metrics

Fiscal Year	FY14-15	FY15-16	FY16-17	FY17-18	FY18-19
Boardings Per Hour	1.8	2.3	1.9	1.9	1.7
Cost Per Hour	$83.62	$78.82	$85.65	$90.32	$90.36

The annual service mileage is seen below in Figure 3-40. Service mileage has decreased on the Delta Route, which is associated with a general decrease in transit ridership on the route. The decreasing service mileage and increasing service hours indicate that the average speed is slowing down, likely due to worsening traffic.

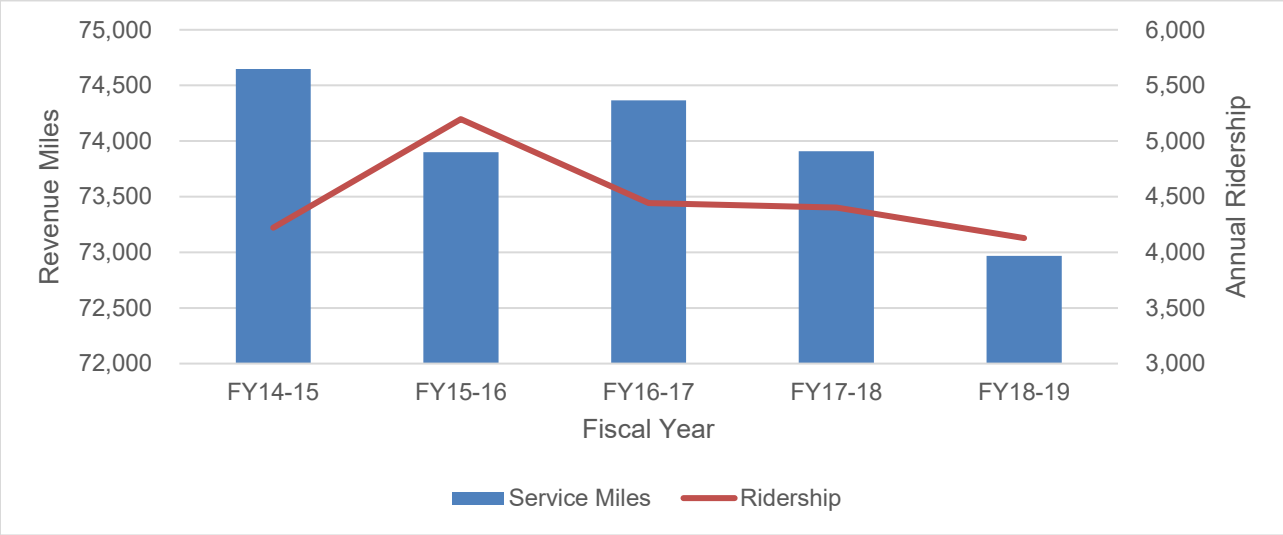


Figure 3-40: Delta Route annual service miles compared to ridership

Table 3-8 shows that despite falling service mileage and ridership, the boardings per mile has remained stable. The cost per mile of the route has increased slightly through the analysis period.

Table 3-8: Delta Route service mile metrics

Fiscal Year	FY14-15	FY15-16	FY16-17	FY17-18	FY18-19
Boardings Per Mile	0.06	0.07	0.06	0.06	0.06
Cost Per Mile	$2.56	$2.46	$2.64	$2.90	$2.99

3.3.4.1 COVID-19 Impacts

The Delta Route saw the lowest change in ridership due to COVID-19, likely due to the high level of 'captive riders' who rely on the service relative to other routes where commuters may have been able to use alternative transportation or work from home. This is seen in Figure 3-41.

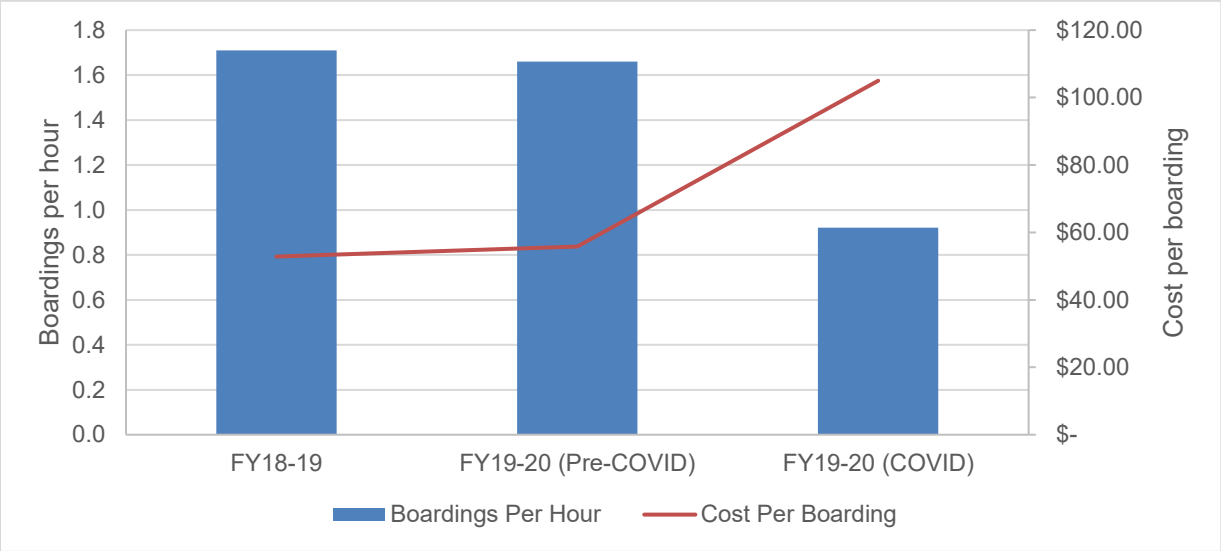


Figure 3-41: Delta Route impacts of COVID-19 to operational metrics

As shown above, the boardings per hour decreased by about 50%, from 1.7 to 0.9 as a result of COVID-19. Despite being a significant drop, this is the smallest reduction of SCT Link's routes, and therefore the most resilient. The cost per boarding roughly doubled, from around $55 pre-COVID to $105 during COVID-19.

3.3.5 Dial-A-Ride Service Analysis

Dial-a-Ride (DAR) service is a curb-to-curb service offered in the area bounded by Twin Cities Road on the north, Kost Road on the south, Alta Mesa Road on the east, and Christensen Road on the west. This service is offered weekdays from 6:30 am to 6:30 pm and on Saturdays from 8:00 am to 5:00 pm (no service on holidays and Sundays). One-way trips cost $2.50 for adults (19-64), while seniors, disabled, and youths 5-18 years old pay $1.75 and children under 4 ride for free with anyone older than 16; no monthly pass or bulk fares are available. Service is operated with cutaway vehicles.

On Tuesdays, SCT Link offers extended service to the Clay Station area of Herald. Fare is $2.50 per one-way trip for all riders using the extended service. On Thursdays and Fridays, SCT Link offers service to

seniors and disabled passengers from Galt to some medical facilities in Sacramento and Elk Grove for $2.50 (one-way).

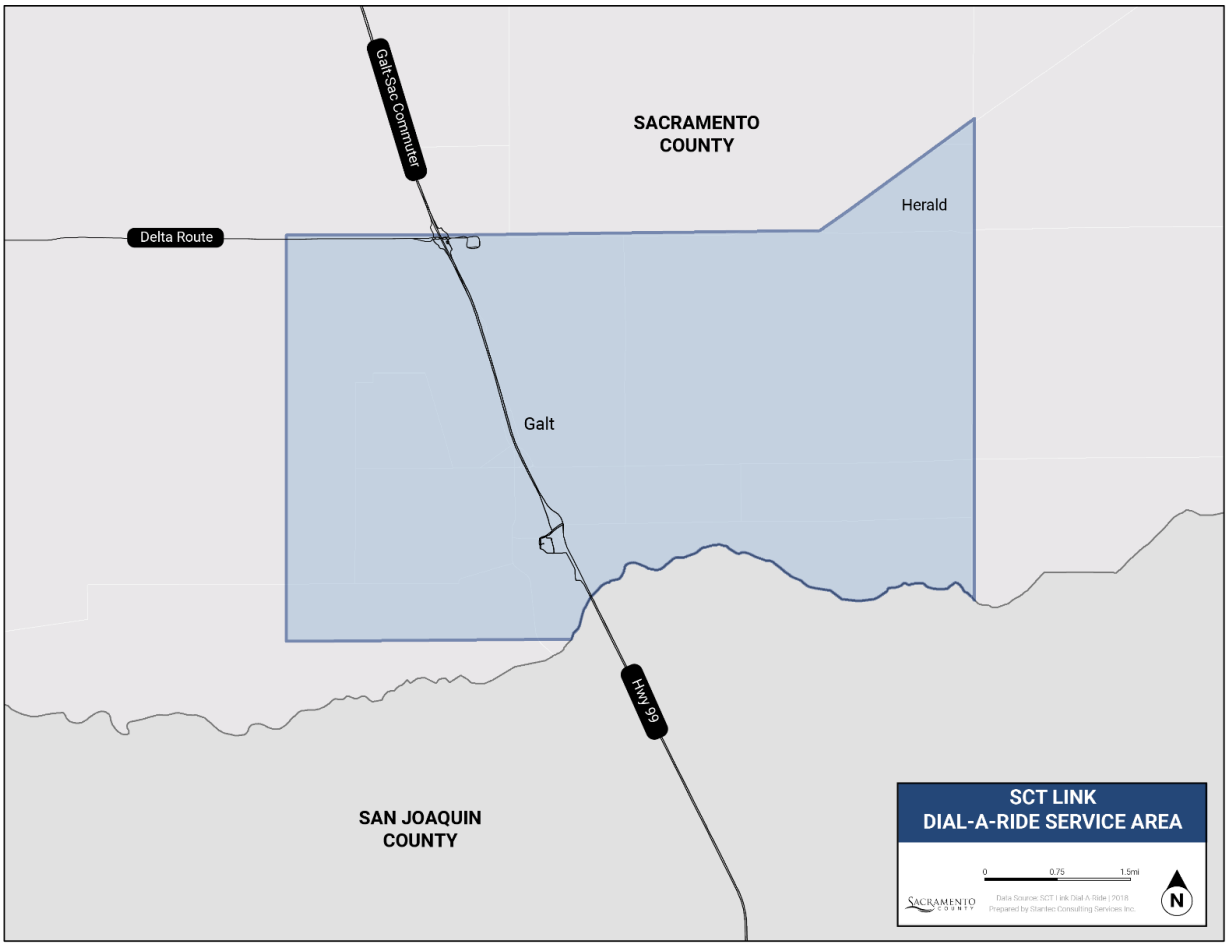


Figure 3-42: Dial-A-Ride service area

Generally, trip requests must be made at least 24 hours in advance and can be made up two weeks prior by calling the reservation line; return trips may be made the same-day if they can be accommodated.

SCT Link's pick-up window policy is 30 minutes—15 minutes prior and 15 minutes after the scheduled pick-up time. Operators will wait five minutes upon arrival for seniors and disabled riders, and three minutes for other riders.

Similarly, SCT Link's no-show policy requires customers to call at least 30 minutes before a scheduled pick-up to cancel a trip. Four no shows within a 6-month period will result in a suspension of service or a cancellation of standing subscription trips—the length of suspension is not clearly stated on the customer brochure.

As a demand-responsive curb-to-curb service, SCT Link did not reduce service during the pandemic per se—service delivered was reduced as a function of reduced trip demand.

Annual vehicle hours for DAR remained fairly constant over the past five years, fluctuating between 10,381 in FY14-15 and 10,354 in FY18-19. During that time, annual ridership also remained fairly constant but saw more significant increases and decreases. Overall, annual ridership decreased 7.5% between FY14-15 and FY18-19, though it did increase 6.6% between FY17-18 and FY18-19.

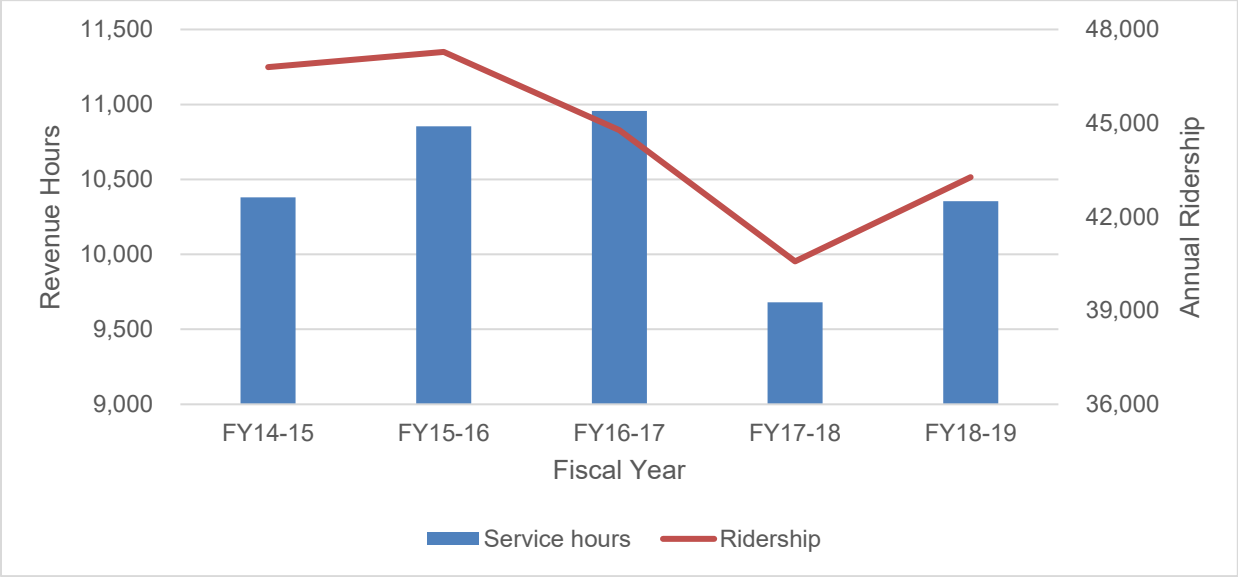


Figure 3-43: Dial-A-Ride annual service hours compared to ridership

Typically, demand response and DAR services are difficult to maintain as productive services in terms of metrics such as boardings per hour, and are traditionally more costly than fixed-route services to operate. Table 3-9 shows that SCT Link's DAR service is quite productive in terms of boardings per hour for a demand response service type, maintaining over four boardings per hour between FY14-15 and FY18-19, seeing a slight decrease to 4.18 boardings per hour in FY18-19. Operating costs per hour decreased significantly during the past five years, which is due to change in cost allocations that resulted in a 37.7% decrease in operating costs for DAR services, as vehicle hours operated maintained fairly steady during this time.[8] Overall, SCT Link is maintaining a DAR service that is relatively productive in terms of boardings per hour.

Table 3-9: Dial-A-Ride service hour metrics

Fiscal Year	FY14-15	FY15-16	FY16-17	FY17-18	FY18-19
Boardings Per Hour	4.51	4.36	4.09	4.19	4.18
Cost Per Hour	$85.10	$79.05	$85.82	$89.39	$53.12

Because DAR service provision is essentially a function of demand, vehicle miles also remained fairly constant over the sample time period to service the fairly constant ridership demand. Annual vehicle miles fluctuated slightly year-to-year, decreasing 6.7% between FY14-15 and FY18-19. Vehicle miles were highest in FY15-16 to match the year of highest passenger demand.

SCT Link manages to maintain low annual vehicle mileage compared to peers because SCT Link DAR operates in a relatively small service area; providing trips predominately within the city of Galt means that

[8] The systemwide cost per hour has steadily increased.

vehicles do not have to travel long distances to complete trips. Even though SCT Link provides trips to an extended service area on some days, these special trips to Elk Grove and Sacramento for medical purposes can benefit from scheduled/subscription group trips to make these trips as efficient and productive as possible.

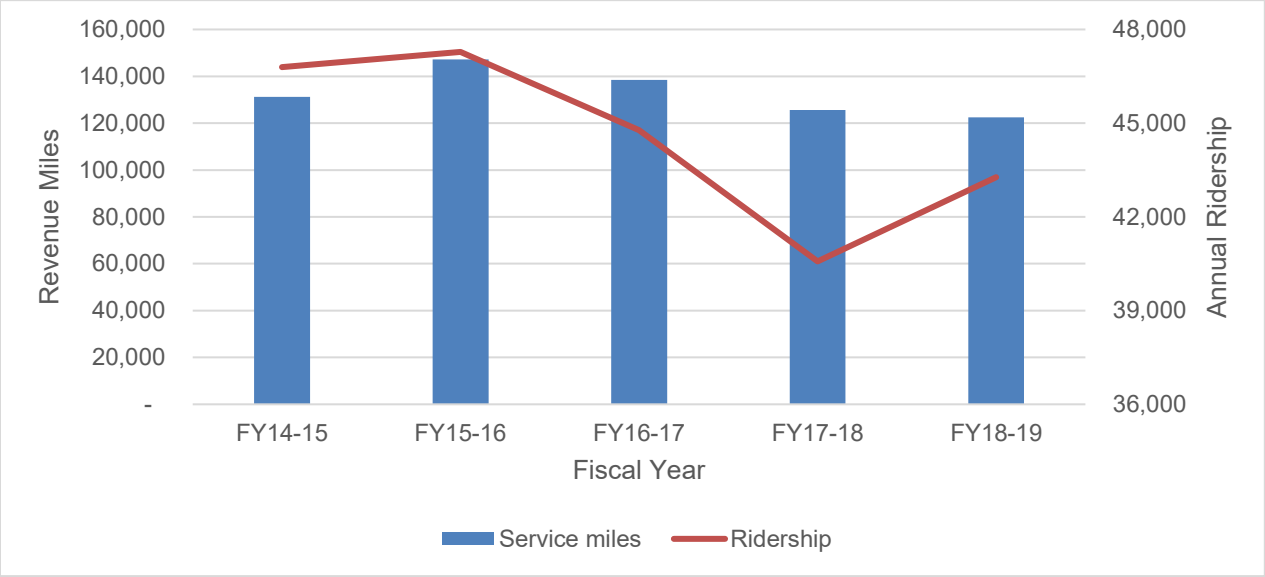


Figure 3-44: Dial-A-Ride annual service miles compared to ridership

DAR boardings per mile have remained consistent over time, and are on the higher end compared to many peer agencies. Cost per mile experienced a similar decrease between FY17-18 and FY18-19 as seen in costs per hour due to the reallocation of operating costs while providing constant annual vehicle miles.

Table 3-10: Dial-A-Ride service mile metrics

Fiscal Year	FY14-15	FY15-16	FY16-17	FY17-18	FY18-19
Boardings Per Mile	0.36	0.32	0.32	0.32	0.35
Cost Per Mile	$6.73	$5.83	$6.79	$6.89	$4.49

DAR and demand-response type services are important community lifeline services, and provide transportation options for those who do not have other mobility and accessibility options. One of the most important facets of DAR service is the customer experience, and it should be an agency priority to provide a high-quality customer experience and pleasant ride. One way that this can be measured is through on-time performance; specifically, how long does a customer have to wait past their scheduled pick-up time for their vehicle to arrive? This is especially important as a late pick-up could result in a rider missing a medical appointment or other important commitment.

Figure 3-45 below shows the distribution of trips for one example day (November 13, 2018) grouped by how many minutes late (or early) the vehicle arrived. Overall, the vast majority (87%) of trips arrived one minute before or exactly on the scheduled pick-up time, and 53% of trips arrived early, between one and five minutes before the scheduled time. This could be an issue as customers will be ready for the vehicle

to arrive at the scheduled pick-up time, and not before[9]. Twelve trips arrived one minute past the scheduled pick-up time, and one trip arrived five minutes late. Overall, SCT Link is doing a good job of ensuring that their DAR trips do not arrive very late, and should continue to strive to maintain excellent OTP, at least based on the analysis of one example day; consistent measurement and tracking of disaggregated arrival times is needed to ensure quality service is delivered and tackle any reoccurring problems.

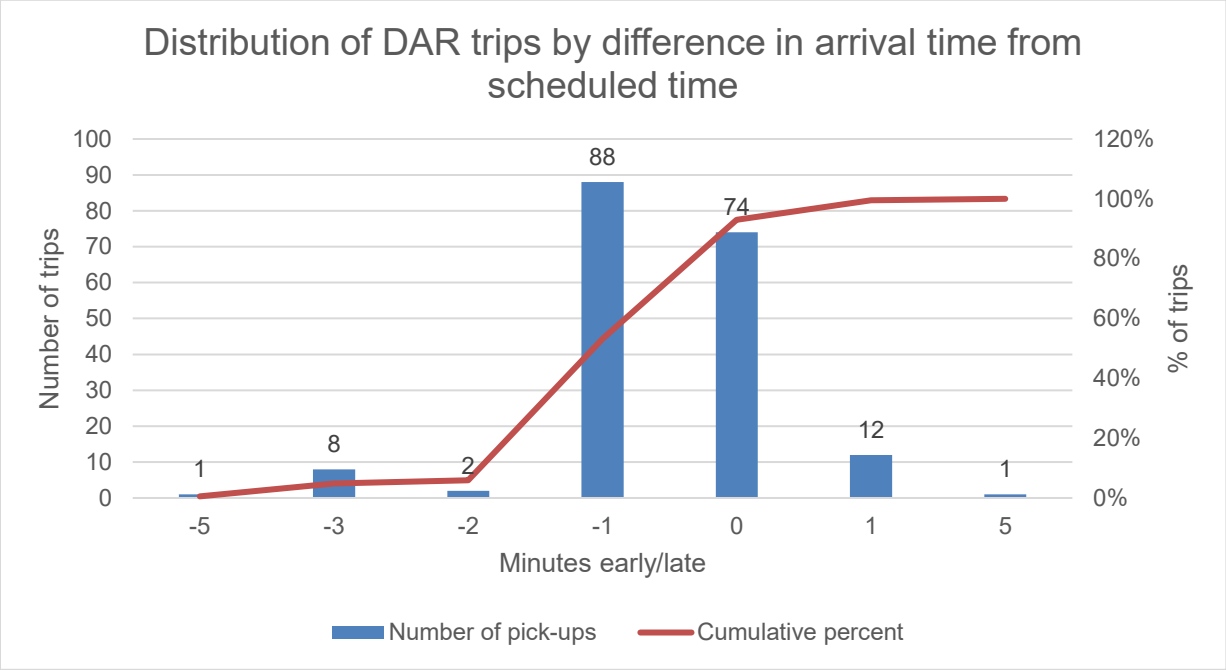


Figure 3-45: Distribution of DAR trips by difference in arrival time from scheduled time

SCT Link and Storer Transit provided more detailed OTP data at the trip level for DAR services, which allows us to take a deeper dive into the on-time performance of services between 2017-2018 and 2019-2020.

This data divides and records trip time into the following categories: on time, early, between 1-15 minutes late, between 16-30 minutes late, between 31-45 minutes late, between 46-60 minutes late and over 60 minutes late. Figure 3-46 and Table 3-11 show the breakdown of trips by OTP for each year of data provided.

[9] However, the DAR policy states that "riders are to be ready to board the bus 15 minutes before the scheduled pick-up time. Drivers will wait 5 minutes for Senior/Disabled riders, and will wait 3 minutes for other riders."

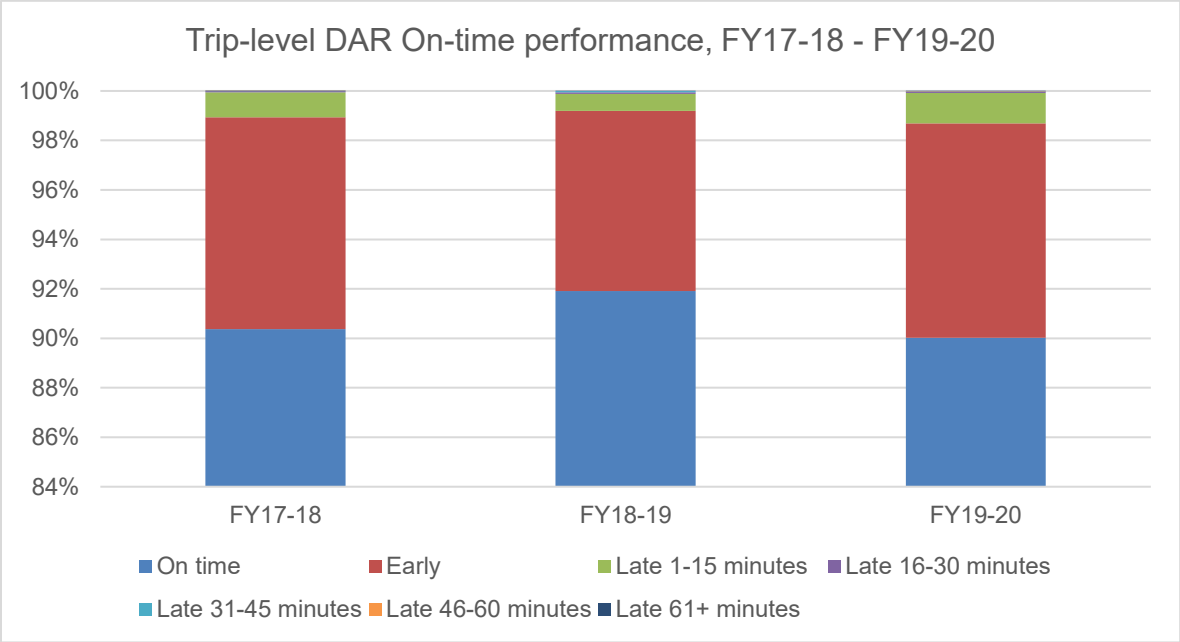


Figure 3-46: Trip-level DAR OTP, 2017-2018 - 2019-2020

Table 3-11: Trip-level DAR OTP, 2017-2018 - 2019-2020

	FY17-18		FY18-19		FY19-20		Total	
	No. of trips	**# of trips**	**No. of trips**	**# of trips**	**No. of trips**	**# of trips**	**No. of trips**	**# of trips**
On-time trips	36,539	90.369%	40,168	91.916%	29,839	90.023%	106,546	90.848%
Early trips	3,462	8.562%	3,181	7.279%	2,874	8.671%	9,517	8.115%
Late 1-15 minutes	409	1.012%	302	0.691%	408	1.231%	1,119	0.954%
Late 16-30 minutes	19	0.047%	23	0.053%	19	0.057%	61	0.052%
Late 31-45 minutes	2	0.005%	25	0.057%	2	0.006%	29	0.025%
Late 46-60 minutes	1	0.002%	-	0.000%	2	0.006%	3	0.003%
Late 61+ minutes	1	0.002%	2	0.005%	2	0.006%	5	0.004%
Total trips	40,433	100.000%	43,701	100.000%	33,146	100.000%	117,280	100.000%

Overall, 90.8% of DAR trips are considered on time between 2017 and 2020 and interestingly, it is more common for trips to be early than late. SCT Link operations should strive to be on-time, and not early, due to the negative rider impacts early departures have on their overall mobility and accessibility. SCT Link and Storer should track OTP at the trip/vehicle level disaggregated by mode to understand more precisely where and when these early trips are happening, as well as provide live arrival information to its customers.

The vast majority of late trips are between 1 and 15 minutes late, and the number of trips 16 or more minutes late is a very small percentage of overall trips (0.084% of all trips).

3.3.5.1 *Customer Database Analysis*

SCT Link's DAR database includes 7,103 customers (as of June 2021). The customer database includes information on whether the customer uses a mobility device and their primary address. Of the over 7,000 registered customers, 418 (or 5.9%) reported use of a mobility device. Because SCT Link's DAR service is for the general public and is not constrained to those who qualify due to age or disability under the ADA, the proportion of customers who use a mobility device is quite low. Nevertheless, all vehicles are equipped with lifts and wheelchair spaces and are ADA compliant; all operators must be trained on proper procedures associated with assisting customers with mobility devices and customer service.

The breakdown of customer using a mobility device by type is presented in Figure 3-47.

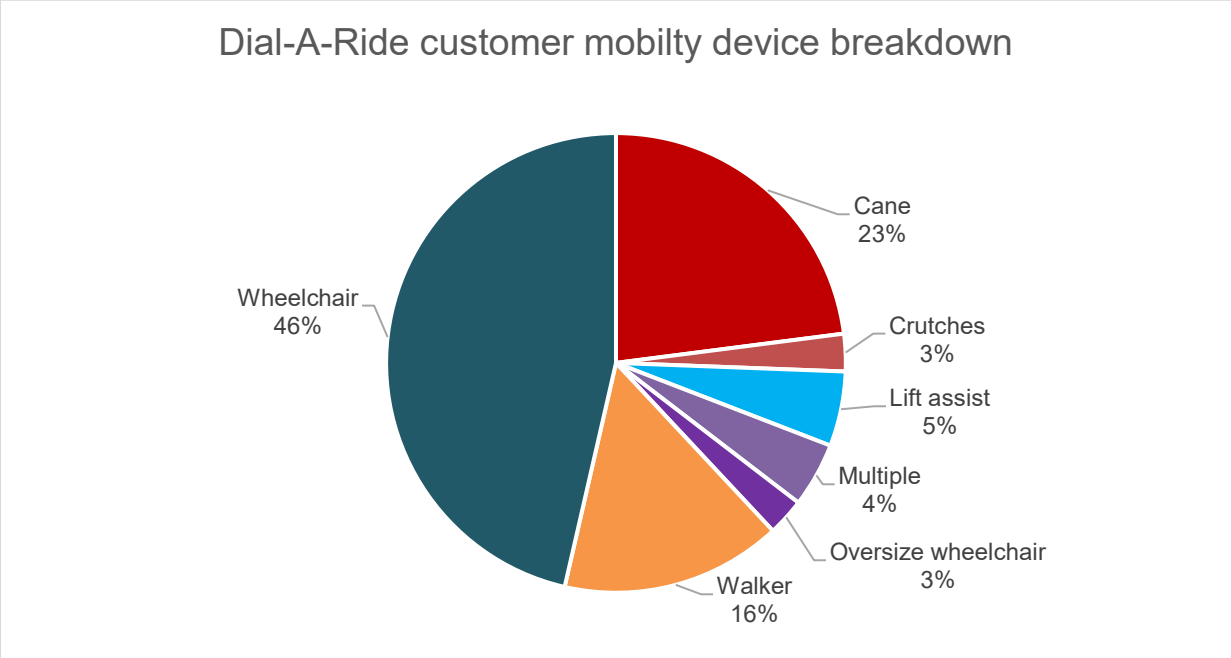


Figure 3-47: Dial-A-Ride customer mobility device breakdown

Of the customers who report use of a mobility device, the most prevalent is use of a wheelchair (46%), followed by a cane (23%) and walker (16%). Less common mobility devices include oversize wheelchairs, crutches, and requiring use of the lift, or the use of multiple mobility devices. These include customer entries which include a wheelchair and a walker; potentially, these customers can use either device depending on specific circumstances related to that trip. Overall, the vast majority of customers are ambulatory and can ingress and egress the vehicles without needing to deploy the lift and do not use a mobility device. Nonetheless, it is important to maintain a fleet of vehicles that can accommodate all the various mobility devices listed above for the customers who require it.

Next, it is important to understand where customers are located throughout the service area as that largely influences trip lengths and the abilities to see efficiencies in trip delivery through shared trips, if home locations are located near one another. Figure 3-48 shows the distribution of customer home locations throughout the service area, with Table 3-12 showing a breakdown by county and Table 3-13 a more detailed breakdown by city/community. The 68 customers registered in San Joaquin County are personal care assistants (PCAs) for other DAR customers, and SCT Link does not provide DAR service in San Joaquin County.

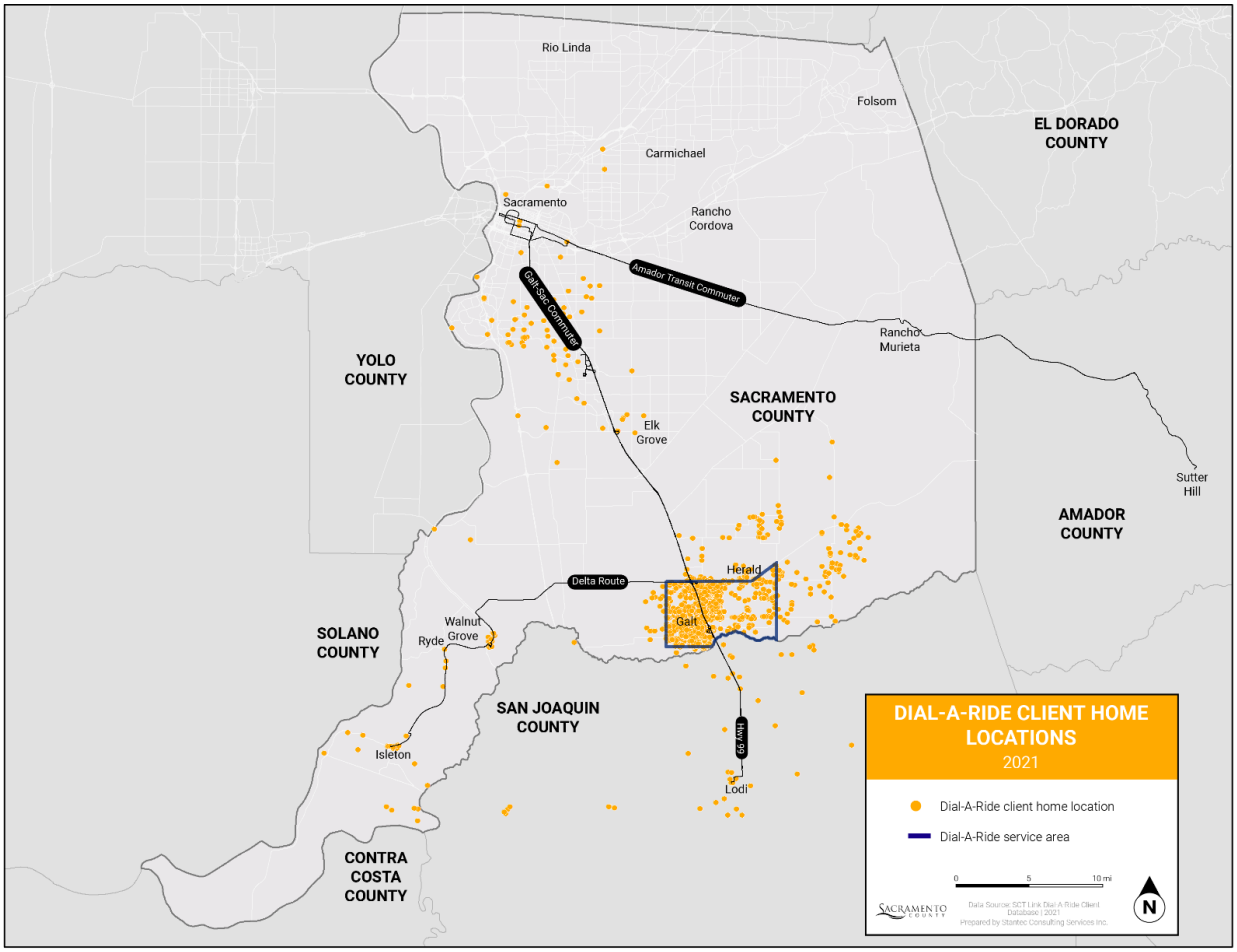


Figure 3-48: Dial-A-Ride customer home locations

Table 3-12: Dial-A-Ride customer home location breakdown by county

Counties	Count	%
Sacramento County	7,035	99.0%
San Joaquin County	68	1.0%

Table 3-13: Dial-A-Ride customer home location breakdown by city

Cities	Count	%
Galt	6,546	92.2%
Herald	248	3.5%
Elk Grove	73	1.0%
Sacramento	67	0.9%
Lodi	51	0.7%
Isleton	45	0.6%
Walnut Grove	36	0.5%
Courtland	12	0.2%

Cities	Count	%
Acampo	11	0.2%
Wilton	7	0.1%
Stockton	3	0.0%
Lockeford	1	0.0%
Rio Vista	1	0.0%
Tracy	1	0.0%
Woodbridge	1	0.0%

Most customers are located in Galt and Herald, which makes sense are these are the two communities inside the service area. Lower concentrations of customers are seen in other parts of the county, such as Elk Grove, Sacramento, Isleton, and Walnut Grove. These customers may take fixed-route service to Galt and then use DAR to get around Galt locally. However, these customers make up a small minority of total customers, indicating that the DAR service is predominately used by Galt residents for local travel within Galt and travel to Elk Grove and Sacramento for medical trips on specified days, and is not commonly used by people from other areas of the county. SCT Link's DAR policies do not specify that a customer must live within the service area; however, trips can only be scheduled within the service area for that particular day.

3.3.5.2 Trip Analysis

Three days of passenger trip data from November 2018 were also analyzed to understand major DAR trip generators and uncover patterns in use. The example days spanned a Tuesday, Wednesday, and Thursday, and thus had the opportunity to capture extended service to the Clay Station area of Herald on Tuesday and service to some medical facilities in Elk Grove and Sacramento for participating customers on Thursday. All trip pick-up and drop-off locations for the sample days are mapped in Figure 3-49.

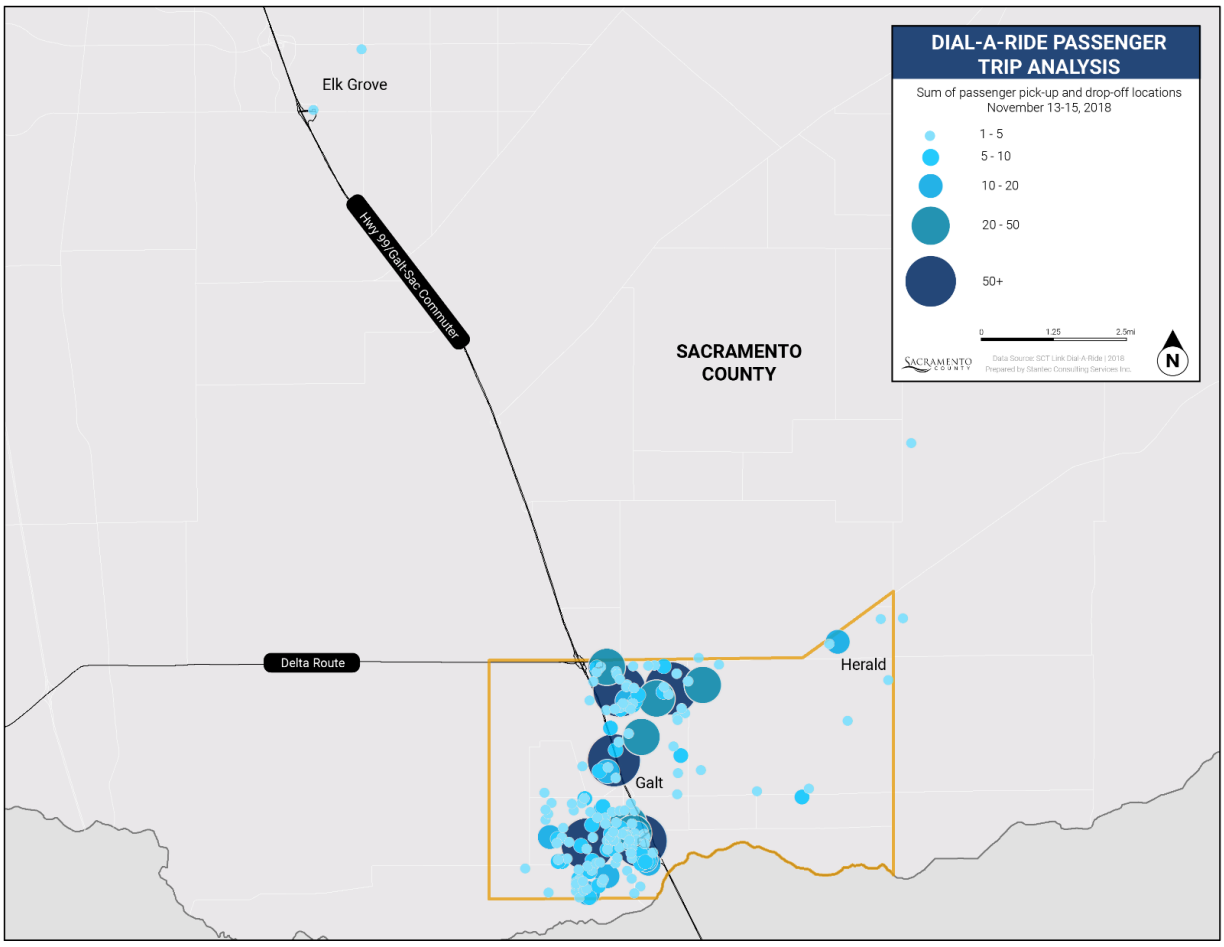


Figure 3-49: Dial-A-Ride passenger trip analysis

Figure 3-49 shows the sum of passenger pick-up and drop-off locations. For example, if one passenger was picked up and six were dropped off at one location, that would count as seven trips at that location. Consistent with customer home locations, the majority of trips destinations were in and around Galt.

Five locations had over 50 passenger pick-ups/drop-offs, detailed in Table 3-14.

Table 3-14: Most popular Dial-A-Ride destinations

Address	Notes	Sum of pick-ups and drop-offs
21 C St Galt, CA 95632	Valley Oaks Elementary School	96
380 Civic Dr Galt, CA 95632	Galt City Hall	73
800 Lake Canyon Ave Galt, CA 95632	Lake Canyon Elementary School	73
997 Park Terrace Dr Galt, CA 95632	Robert L McCaffrey Middle School	60
820 N Lincoln Way Galt, CA 95632	Galt Mobile Estates	51

Interestingly, three out of the five top DAR destinations are local public schools, likely due to the fact that students who live within a certain radius around the schools (one mile for elementary and two miles for middle and high schools) are not eligible for school bus services. Due to this, there is a high demand from

students for DAR services for school-bound trips. However, because these students are within a close radius of the school, these trips are not overly long and vehicles do not have to travel long distances to complete the trips. Due to the many students who are going to the same destination at the same time, SCT Link should continue to group these trips together to make trip delivery as efficient as possible. Galt City Hall was another popular destination; DAR customers could be taking DAR to Galt City Hall to transfer to fixed-route services. Finally, Galt Mobile Estates is a large mobile home community that is a popular DAR destination, likely due to the high density of people living there.

In the dataset, trips outside of Galt were rare. In Herald, Arcohe Union Elementary School was the most popular destination. Other destinations in Herald were residential areas and the Herald General Store. All locations in Elk Grove were at or around the Elk Grove Shell Station, which is used as a transfer center providing transfers to SCT Link fixed-routes and City of Elk Grove e-tran services.

3.3.5.3 COVID-19 Impacts

Comparing the ridership in FY19-20 with a partial impact of the pandemic with FY18-19 ridership on DAR, overall ridership was down about 23%. However, comparing the ridership in the data available for July 2020 through February 2021 (9,623 boardings) with a comparable timeframe of July 2019 through February 2020 (27,775 boardings), ridership was down nearly two-thirds. And while the nature of DAR service is such that service is only provided when a rider requests a journey, pre-COVID productivity (boardings per revenue hour) hovered at 4.3, which is excellent for a demand response system, productivity fell by about 50% to 2.0 boardings per revenue hour (Figure 3-50).

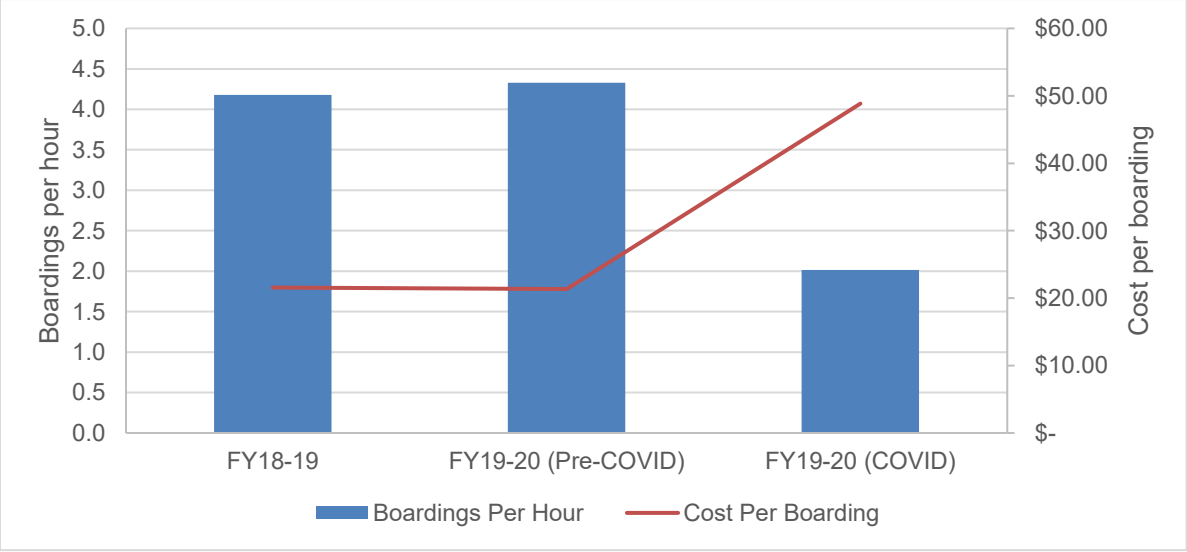


Figure 3-50: Dial-A-Ride impacts of COVID-19 to operational metrics

Thus, while controlling for service supplied, productivity of DAR took a hit during COVID-19. As a result, the cost per passenger boarding more than doubled, from about $21 per boarding to $49 per boarding.

3.3.6 Amador Transit Sacramento Express (East County)

The County of Sacramento also has an agreement with Amador Transit for shared service on Amador Transit's Route 1 Sacramento Express. This weekday commute route has stops in Amador County, Rancho Murieta in the eastern portion of Sacramento County, and central Sacramento. Rancho Murieta has two stops in the south and north part of the community.

The innovative contract for Route 1 service sees the County pay for service operated within Sacramento County, while Amador Transit pays for the Amador County portion of the service. On an annual basis, SCT Link pays $80,000-86,000 to Amador Transit for Route 1.[10]

Amador Transit initially shifted to an on-request service model via phone bookings from March 19 through June 30, 2020 in response to the stay-at-home orders during the initial wave of COVID-19. Afterward, Amador Transit restored service levels on the Sacramento Express; existing service levels are already quite limited. Indeed, one morning outbound round trip is provided from Sutter Hill through Rancho Murieta to downtown Sacramento back to Sutter Hill, while one afternoon round trip is also provided. Unlike other typical commuter services, return trips in the non-peak direction are operated 'in service', i.e., open to passengers. We note that the GSCE also operated in-service in the reverse direction (from Sacramento to Galt in the morning, and from Galt to Sacramento in the afternoon). Service operates on weekdays only (no weekend of holiday service).

Fares differ depending on origin-destination pairs: Amador-Sacramento is $7, Rancho Murieta-Sacramento is $3, and Rancho Murieta-Amador is $4. Various discounts are offered for SacRT monthly pass holders, Amador Transit monthly pass holders, and for students and seniors.

The operational performance of this contracted route was analyzed. Data for FY18-19 only covered the first nine months of the fiscal year, so the data was extrapolated to a twelve-month estimate to compare with previous years.

First, the annual service hours were compared to ridership, seen below in Figure 3-51.

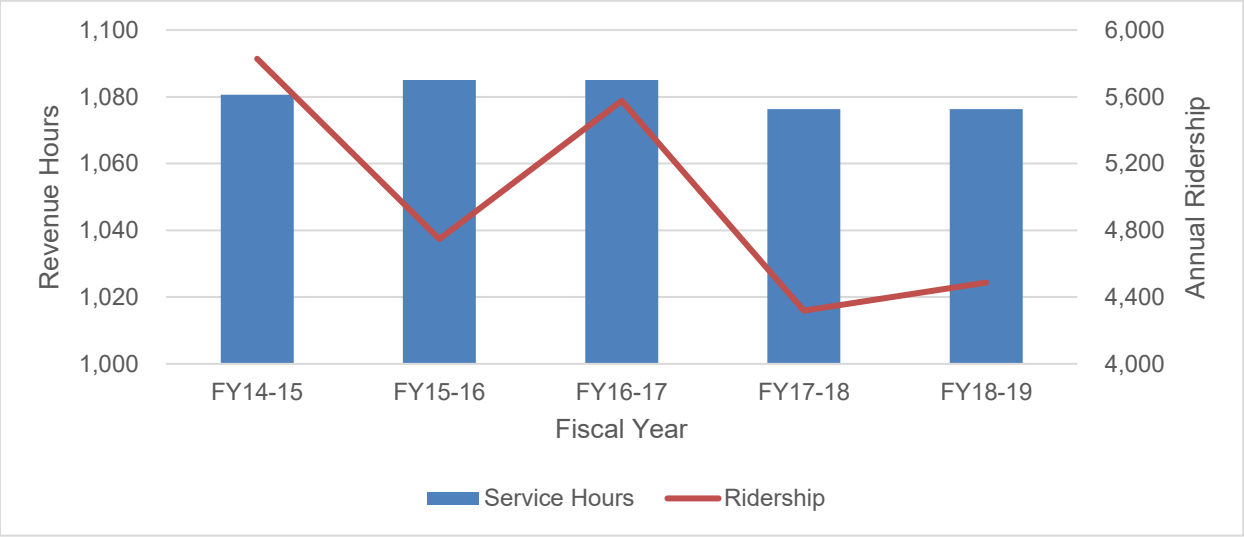


Figure 3-51: East County annual service hours compared to ridership

The service hours have held steady, with between 1,076-1,085 service hours consistently provided during the analysis period. However, ridership has trended slightly downwards over the years; only ridership on the Delta route is lower than ridership on the Amador route. As a commuter-focused service, the annual Amador route ridership is substantially lower compared to SCT Link's other commuter routes, by about 80-85% compared to the Hwy 99 route and the GSCE.

[10] In FY18-19, total operating costs were $86,536, and about $7,211 per month. Farebox recovery ratio averages 10-12%.

To investigate further, the boardings per hour are displayed below in Table 3-15. As expected from the figure above, the boardings per hour is in a decreasing trend. Boardings per hour for the East County service is also on the lower end compared to other SCT Link services, and as discussed in Section 3.4.3, is well below the peer average productivity for commuter routes of ~12 boardings per revenue hour. Due to the contracted nature of the service, cost per service hour was steady throughout the analysis period.

Table 3-15: East County service hour metrics

Fiscal Year	FY14-15	FY15-16	FY16-17	FY17-18	FY18-19
Boardings Per Hour	5.4	4.4	5.1	4.0	4.2
Cost Per Hour	$74.81	$74.81	$74.81	$74.81	$74.81

Next, annual service mileage was explored (Figure 3-52). Similar consistency is observed for service mileage, with slightly variation over the analysis period (26,784-27,000 miles).

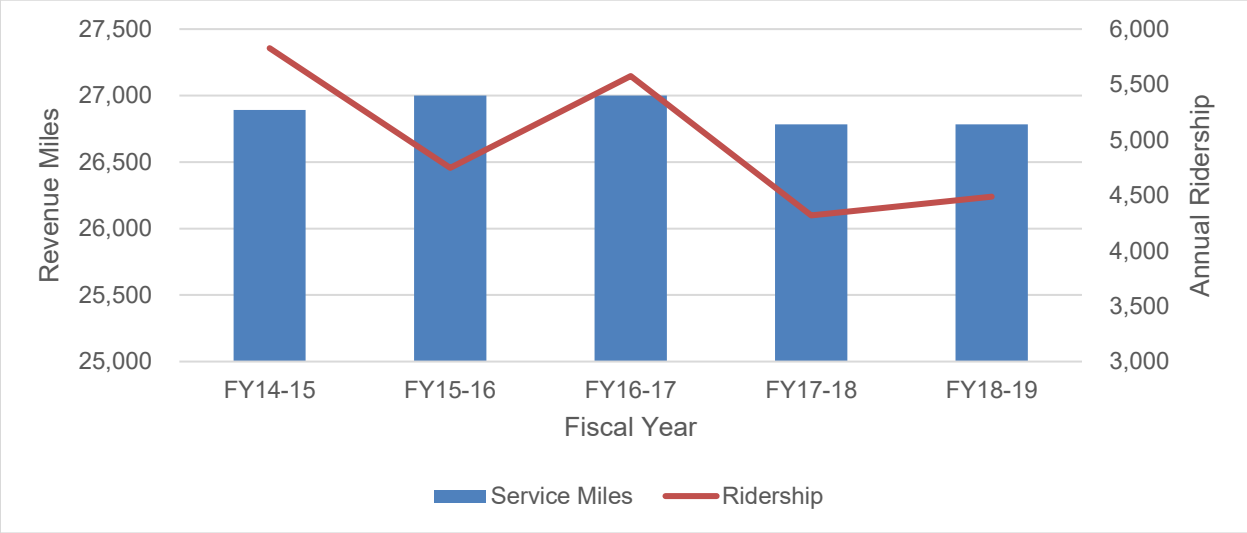


Figure 3-52: East County service miles compared to ridership

Analyzing service mileage metrics, a slight decreasing trend in the boardings per mile is observed. The cost per mile is static, due to the contracted nature of the service. Notably, this contracted route has a similar cost per mile to the Delta Route, but a significantly lower boardings per mile metric.

Table 3-16: East County service mile metrics

Fiscal Year	FY14-15	FY15-16	FY16-17	FY17-18	FY18-19
Boardings Per Mile	0.22	0.18	0.21	0.16	0.17
Cost Per Mile	$3.01	$3.01	$3.01	$3.01	$3.01

Data past FY18-19 was not provided, so COVID-19 impacts could not be investigated.

3.4 Peer Comparison

To grasp SCT Link's performance and how it compares to other transit agencies that are comparable and serve comparable communities, we conducted a peer comparison using National Transit Database (NTD) statistics.[11] The purpose here is to understand how SCT Link perform against certain peers and peer averages, especially with the goal understanding where SCT Link falls short or excels.

The peer group includes rural agencies in California, agencies in smaller cities, and neighboring transit services in the Sacramento region. Note that not all peers operate the same modes of service as specified by the FTA.[12] The data presented below reflects FY18-19 data, the latest available on the NTD website.

Table 3-17: Peer transit agencies selected for comparisons.

Agency	Type	Modes operated	2019 Ridership	Service area population	Service area size (sq. mi.)	Density
San Joaquin Regional Transit District	Urban	Fixed-route, commuter, demand-response	3,598,100	762,997	1,426	535
Yolo County Transportation District	Urban	Fixed-route, demand-response	1,211,452	528,880	109	4,852
Butte County Association of Governments	Urban	Fixed-route, demand-response	1,091,148	175,260	202	868
Yuba-Sutter Transit Authority	Urban	Fixed-route, commuter, demand-response	931,948	145,132	813	179
City of Elk Grove	Urban	Fixed-route, commuter, demand-response	754,871	174,025	42	4,143
County of Placer	Urban	Fixed-route, commuter, demand-response	740,597	386,166	169	2,285
El Dorado County Transit Authority	Urban	Fixed-route, demand-response	399,537	148,614	1,719	86
Nevada County Transit Services	Rural	Fixed-route, demand-response	239,140	NA	NA	NA
San Benito County LTA	Rural	Fixed-route, commuter, demand-response	120,244	NA	NA	NA
SCT Link	***Rural***	***Fixed-route, commuter, demand-response***	***105,479***	***25,000***	***53***	***472***
Tuolumne County Transit	Rural	Fixed-route, demand-response	86,581	NA	NA	NA
Amador Transit	Rural	Fixed-route, commuter, demand-response	65,662	NA	NA	NA
Mariposa County Transit	Rural	Demand-response	5,910	NA	NA	NA

[11] SCT Link reports three modes to NTD, MB or motor bus, DR or demand response, and CB or commuter bus. NTD defines MB as "A transit mode comprised of rubber-tired passenger vehicles operating on fixed routes and schedules over roadways"—SCT Link reports stats for the Delta route to NTD under the MB mode. NTD defines CB as "Local fixed-route bus transportation primarily connecting outlying areas with a central city. Characterized by a motorcoach (aka over-the-road bus), multiple trip tickets, multiple stops in outlying areas, limited stops in the central city, and at least five miles of closed-door service." SCT Link reports stats for Hwy 99 and GSCE routes to NTD under the CB mode. Finally, NTD defines DR as "A transit mode comprised of passenger cars, vans or small buses operating in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up the passengers and transport them to their destinations." SCT Link reports stats for dial-a-ride to NTD under the DR mode.

[12] The prior SRTP included a cursory peer comparison with local agencies Placer, Yolo, and Yuba-Sutter.

3.4.1 Local Fixed-Route

The local fixed-route service considered in this analysis, as reported to the FTA, includes the Delta route operated by SCT Link.

Table 3-18 captures the key operating statistics reported to the FTA in 2019, sorted by peak vehicles for maximum service.

Table 3-18: Key operating statistics for local fixed-route service, 2019.

Agency	Peak Vehicles	Revenue Miles	Revenue Hours	Ridership	Operating Expenses	Fare Revenues
San Joaquin Regional Transit District	68	2,108,514	169,741	3,428,230	$31,513,328	$2,066,860.00
Yolo County Transportation District	41	1,967,606	101,114	1,187,499	$11,696,139	$2,089,147.00
Butte County Association of Governments	26	971,728	67,780	949,871	$6,166,233	$1,211,744.00
County of Placer	17	1,433,337	70,720	632,389	$11,822,665	$577,977.00
City of Elk Grove	16	509,948	37,613	362,402	$4,892,540	$433,233.00
Yuba-Sutter Transit Authority	14	581,158	49,457	731,507	$4,121,882	$506,790.00
Nevada County Transit Services	10	$303,195	16,117	204,795	$2,344,937	$199,691.00
Tuolumne County Transit	10	182,576	11,267	54,573	$1,130,122	$105,939.00
El Dorado County Transit Authority	9	543,116	29,434	208,090	$3,708,333	$177,096.00
Amador Transit	8	189,982	9,358	36,493	$1,112,519	$55,499.00
San Benito County LTA	4	65,480	5,524	28,847	$372,077	$39,476.00
SCT Link	***1***	***72,967***	***2,415***	***4,128***	***$327,811***	***$6,219.00***

Table 3-18 shows the variety in operating characteristic of SCT Link and the selected peers. The Delta route, in 2019, saw about 73,000 riders. SCT Link transitioned its four fixed-route services to dial-a-ride, and the analysis below may spur some discussion around considering a similar approach for the Delta route.

SCT Link's boardings per revenue hour on the Delta route is the lowest among its peers, at 1.7, well below the peer average of 9.6 boardings per revenue hour (Figure 3-53).

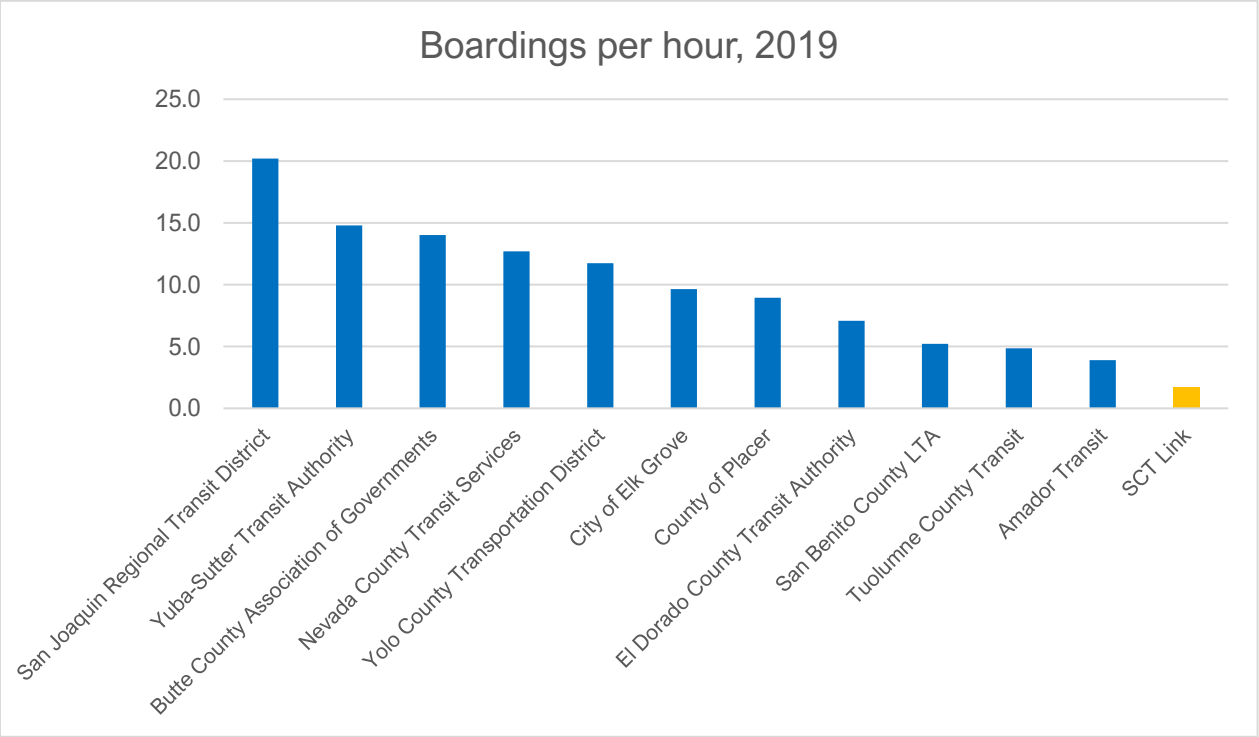


Figure 3-53: Boardings per revenue hour of SCT Link local fixed-route and peers, 2019.

This low boardings per hour is well within the range of typical demand-response services. The upshot of this low productivity is the more expensive cost per passenger boardings of its peer group, at nearly $80 per boarding, nearly four times as much as the peer average of ~$20 per boarding (Figure 3-54).

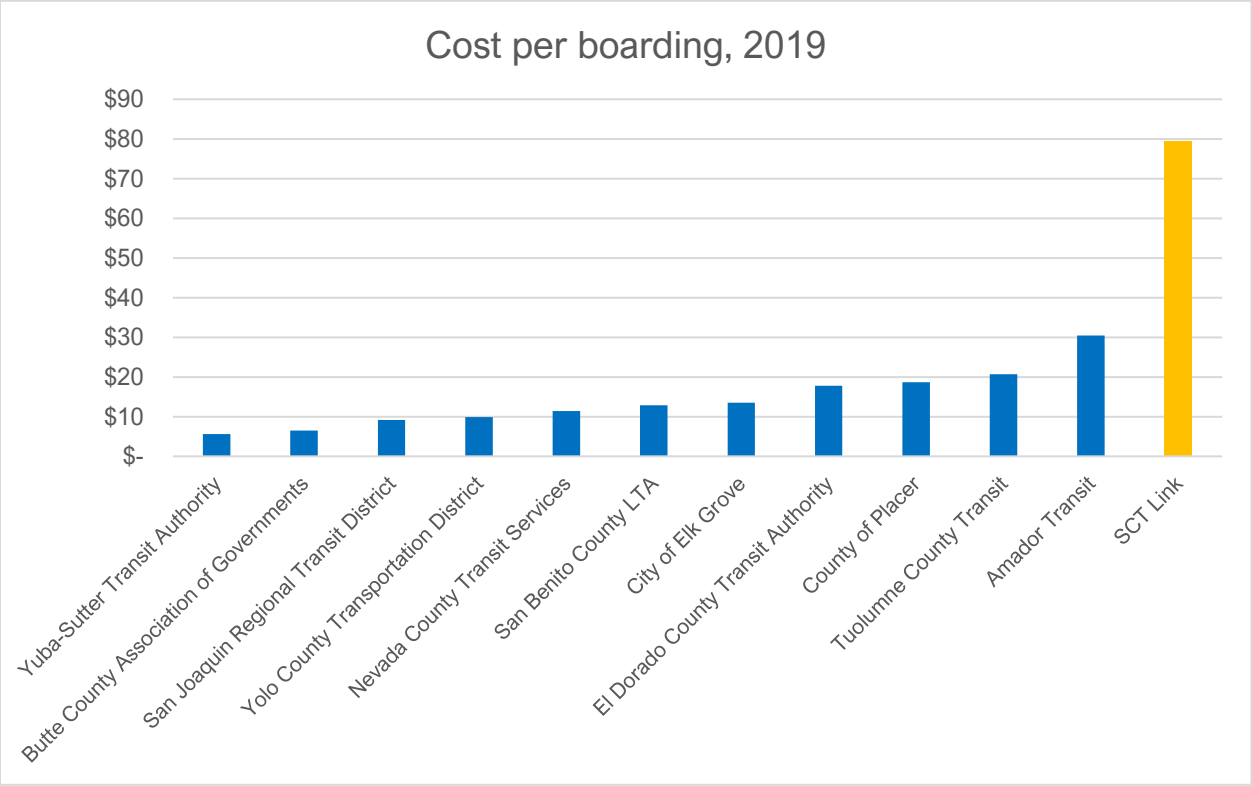


Figure 3-54: Cost per boarding of SCT Link local fixed-route and peers, 2019.

Despite the per boarding costs, SCT Link's fixed-route service is not the most expensive per hour—it places fourth among its peers at $135 per revenue hour, slightly higher than the peer average of $122 per revenue hour (Figure 3-55). Considering that the blended rate in 2019 of $89.58 is the more reflective cost per hour SCT Link pays, this would make SCT Link one of the more cost-effective agencies.

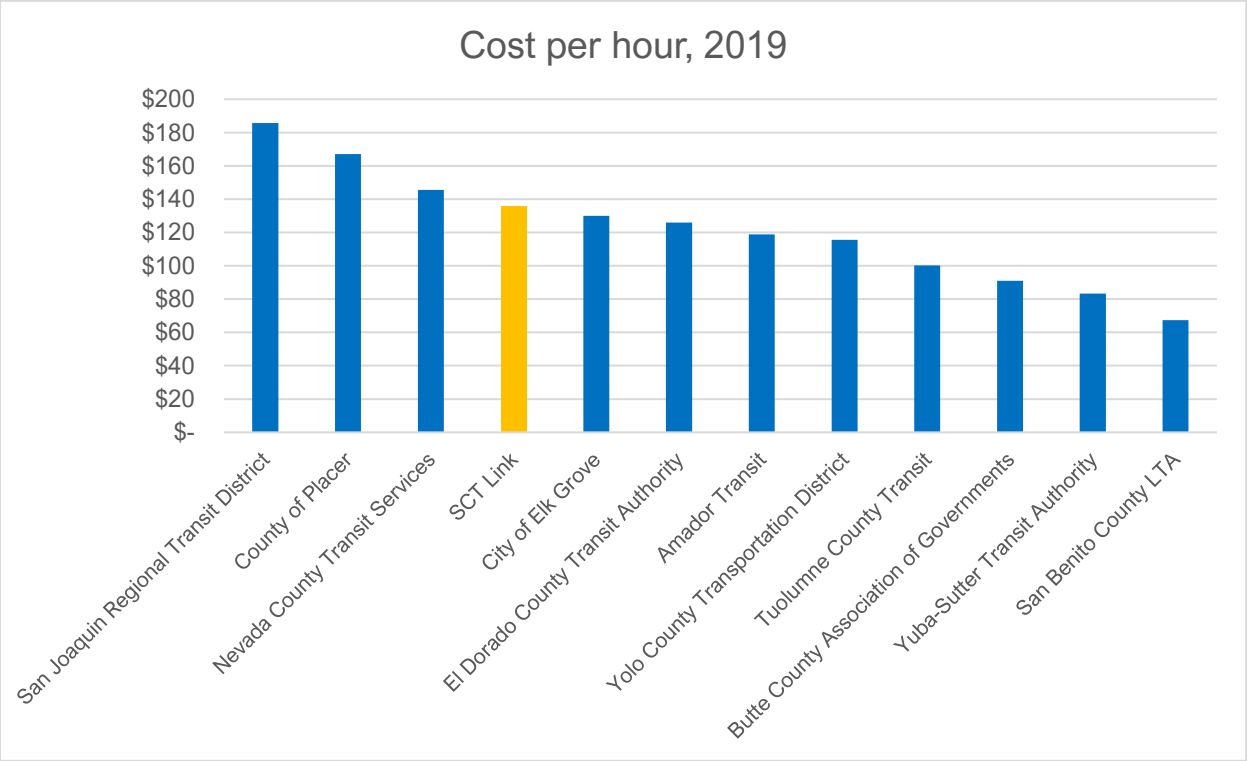


Figure 3-55: Cost per revenue hour of SCT Link local fixed-route and peers, 2019.

Coupling the expensive per boarding cost with a low average per boarding fare ($1.51 per boarded passenger, though above the peer average of $1.22; Figure 3-56) results in a low farebox recovery ratio for fixed route of 2%.

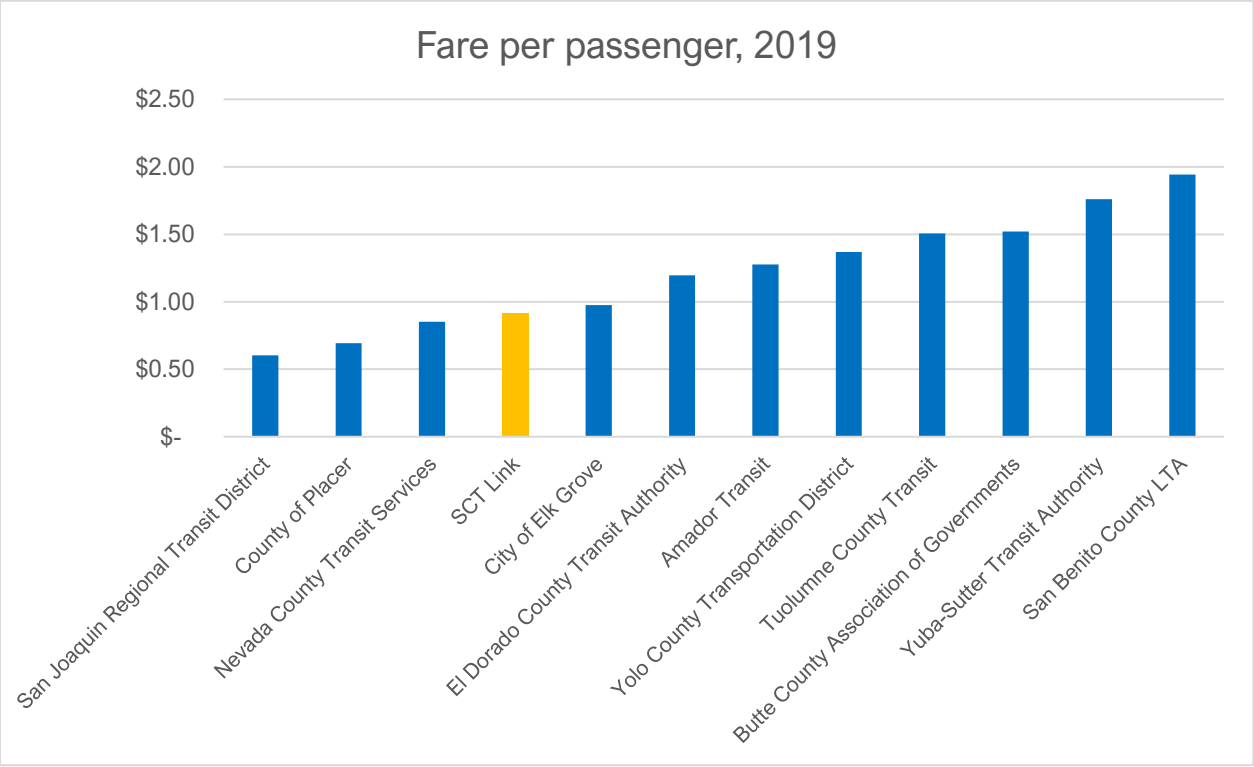


Figure 3-56: Average passenger fare of SCT Link local fixed-route and peers, 2019.

Taken together, this peer analysis shows the poor performance of SCT Link's local fixed-route service. Nevertheless, this analysis presents statistics that do not capture the important function the Delta route provides to the community and its customers. Further, this analysis, together with the analysis below of SCT Link's dial-a-ride service posits a potential shift in service delivery to the Delta communities from a fixed-route, fixed-schedule model to an on-demand model, similar to SCT Link's previous service alterations.

3.4.2 Dial-a-Ride

In 2009, SCT Link transitioned four unproductive fixed-route services to a dial-a-ride or demand-responsive service model. In addition, while most of the peer agencies in Table 3-19 operated demand-response as an ADA paratransit service, several also offer dial-a-ride services similar to SCT Link. Note, SCT Link's dial-a-ride service also provides ADA paratransit service.

Table 3-19: Key operating statistics for demand-response, 2019.

Agency	Peak Vehicles	Revenue Miles	Revenue Hours	Ridership	Operating Expenses	Fare Revenues
Butte County Association of Governments	22	354,046	41,258	141,277	$3,059,730.00	$317,162.00
San Joaquin Regional Transit District	13	173,284	14,116	15,022	$1,504,831.00	$34,224.00
El Dorado County Transit Authority	11	308,072	16,041	42,568	$2,298,860.00	$494,763.00
San Benito County LTA	11	256,585	20,010	56,914	$1,272,892.00	$63,960.00
Tuolumne County Transit	10	130,882	8,904	32,008	$924,645.00	$83,197.00
Yuba-Sutter Transit Authority	10	308,403	24,254	66,060	$2,085,426.00	$170,498.00

Agency	Peak Vehicles	Revenue Miles	Revenue Hours	Ridership	Operating Expenses	Fare Revenues
City of Elk Grove	9	159,888	14,341	20,380	$1,830,734.00	$112,254.00
County of Placer	8	121,986	15,810	29,113	$911,793.00	$22,395.00
SCT Link	***8***	***122,442***	***10,354***	***43,268***	***$550,027.00***	***$76,306.00***
Mariposa County Transit	8	35,510	1,336	5,910	$287,161.00	$70,638.00
Yolo County Transportation District	8	306,994	16,272	23,953	$1,836,943.00	$113,530.00
Nevada County Transit Services	7	137,862	13,445	34,345	$1,260,150.00	$99,070.00
Amador Transit	3	34,043	2,801	20,329	$326,741.00	$36,955.00

At peak service, SCT Link operated the same number of vehicles as Placer County, Mariposa County, and Yolo County. Compared to these peers, its ridership was the highest.

Furthermore, as shown below in Figure 3-57, SCT Link's productivity was the third highest of the peer group at 4.2 boardings per revenue hour, well above the average of 3.0 and similar to the second place Mariposa County Transit at 4.3; only Amador Transit's productivity was greater at 7.3 boardings per hour.

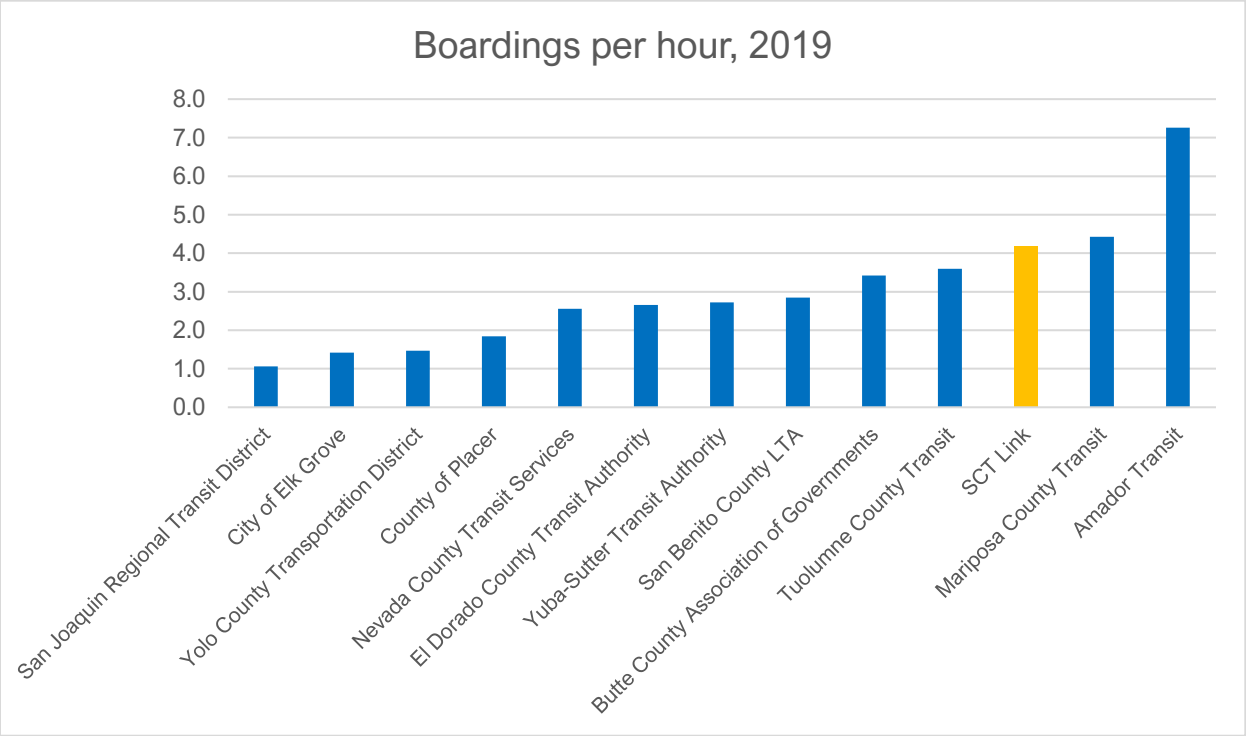


Figure 3-57: Boardings per revenue hour of SCT Link demand-response and peers, 2019.

Most impressively is SCT Link's cost efficiency and effectiveness of its demand-response service. Both its cost per boarded passenger ($12.71; Figure 3-58) and cost per revenue hour ($53.12; Figure 3-59) are both the lowest among its peers, and well below the peer averages ($43.89 per passenger, and $104.17 per revenue hour).

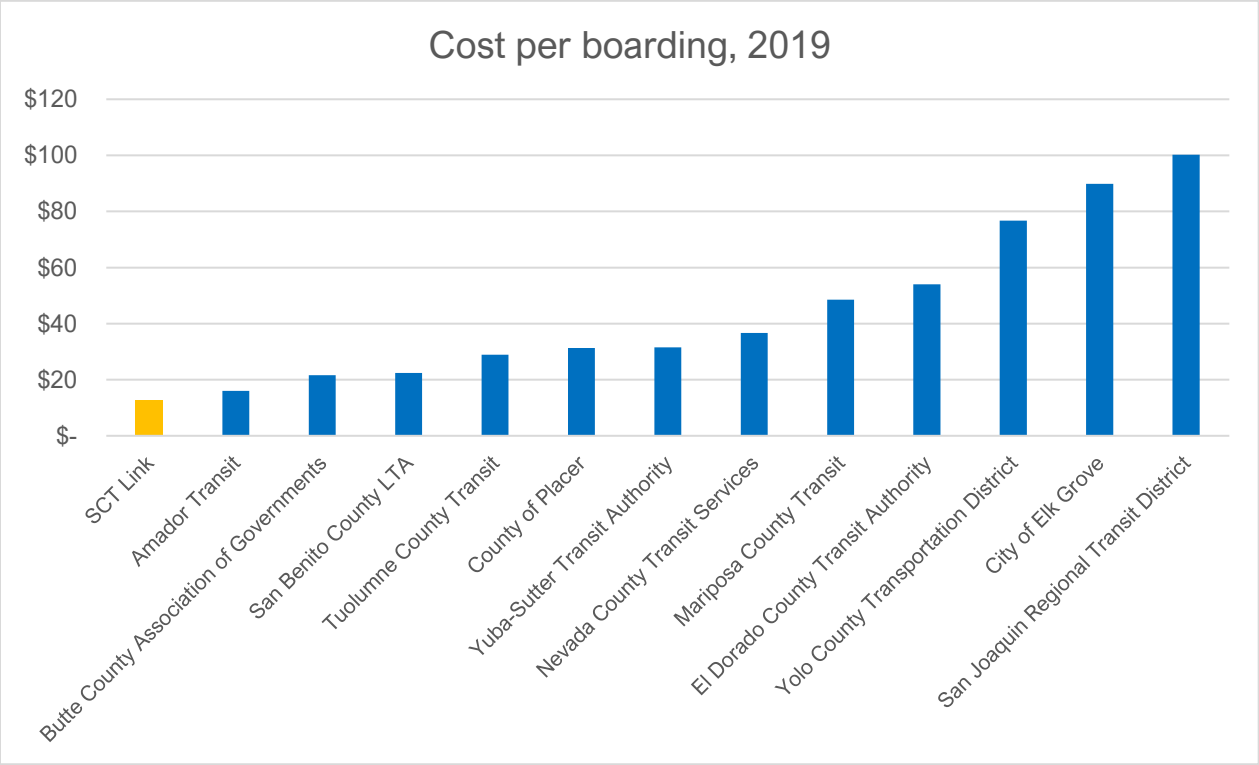


Figure 3-58: Cost per boarding of SCT Link demand-response and peers, 2019.

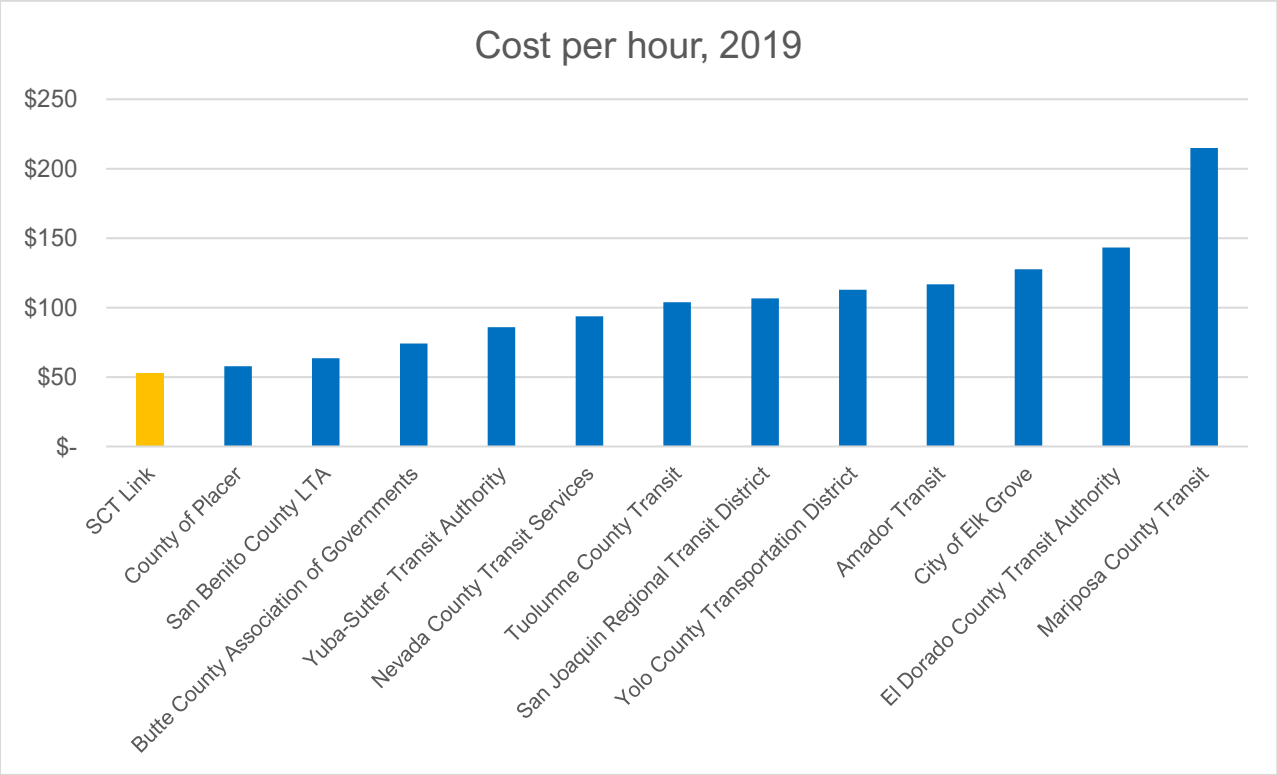


Figure 3-59: Cost per revenue hour of SCT Link demand-response and peers, 2019.

However, one shortcoming is the level of fare revenue and recovery of the dial-a-ride service. While comparing well to its peers by recovering 14% of operating costs from the farebox, SCT Link is third-last in terms of average fare collected ($1.76, peer average $3.99; Figure 3-60).

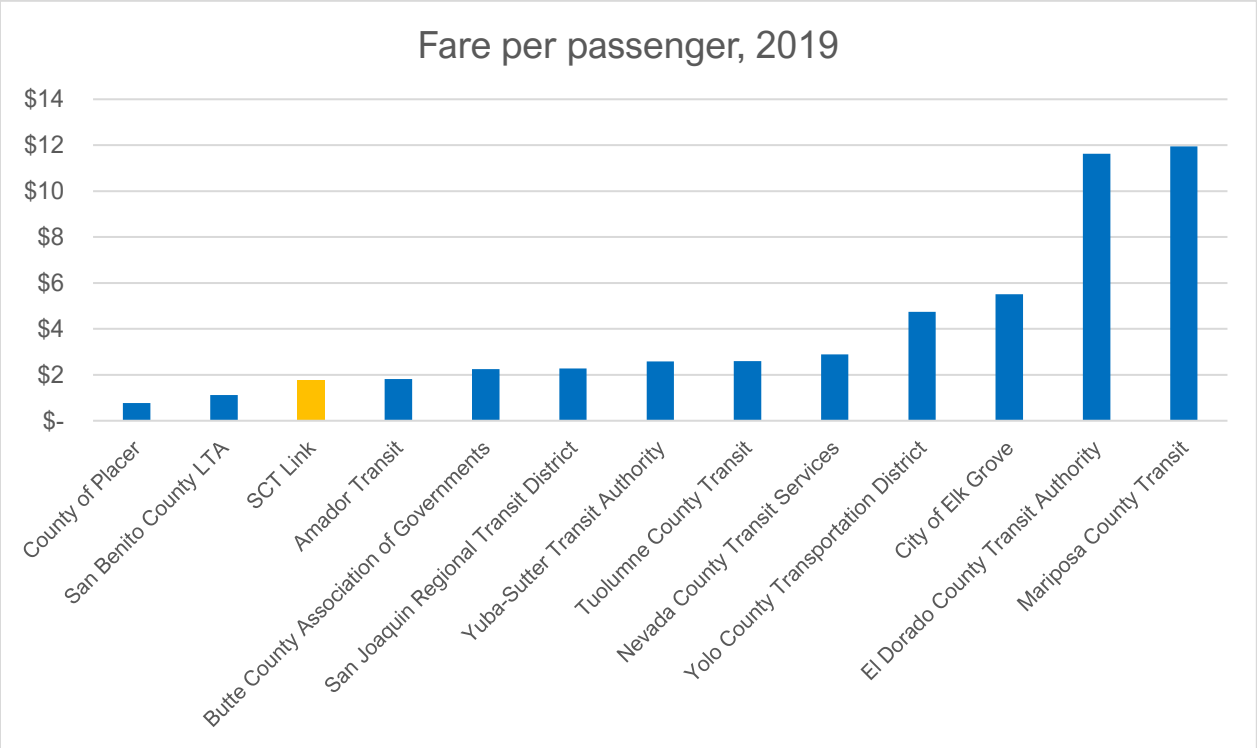


Figure 3-60: Average passenger fare of SCT Link demand-response and peers, 2019.

This low average fare likely results from the low regular fare of $2.50 and the deeply discounted fares for seniors and youth ($1.75). Mariposa County, for instance, charges $5 regular local dial-a-ride curb-to-curb service, and $15 for certain medical trips. While it is likely in the interest of customers and equity for SCT Link to keep fares low, SCT Link could consider a fare by distance model or another fare structure to recoup more fare revenue.

Overall, the demand-response peer comparison shows an impressive performance of SCT Link.

3.4.3 Commuter Bus

Finally, we conducted a peer analysis of commuter bus service. Fewer of the selected peers also offer commuter bus service, whether in commuter coaches like SCT Link and El Dorado County Transit, or in heavy-duty 40-ft transit buses like Elk Grove e-tran (Table 3-20).

Table 3-20: Key operating statistics for commuter bus, 2019.

Agency	Peak Vehicles	Revenue Miles	Revenue Hours	Ridership	Operating Expenses	Fare Revenues
City of Elk Grove	23	332,271	18,348	372,089	$2,900,960.00	$716,861.00
San Joaquin Regional Transit District	11	492,739	14,858	154,848	$2,080,515.00	$789,421.00
El Dorado County Transit Authority	10	279,322	9,159	148,879	$1,771,847.00	$822,564.00
Yuba-Sutter Transit Authority	10	319,044	8,946	134,381	$1,094,067.00	$569,046.00
County of Placer	4	101,682	3,176	79,095	$699,676.00	$378,091.00
SCT Link	***4***	***250,584***	***9,598***	***58,083***	***$1,125,900.00***	***$165,350.00***
San Benito County LTA	3	156,457	6,751	34,483	$454,930.00	$47,600.00

Agency	Peak Vehicles	Revenue Miles	Revenue Hours	Ridership	Operating Expenses	Fare Revenues
Amador Transit	1	45,294	1,614	8,840	$216,320.00	$24,147.00

SCT Link's commuter service is on the smaller end of the peers, and includes the GSCE operated with over-the-roach coaches, and the Hwy 99 Express operated with cutaways.

SCT Link's productivity is on the lower end of the peer range, at 6.1 boarding per hour and below the peer average of 12.9 (Figure 3-61).

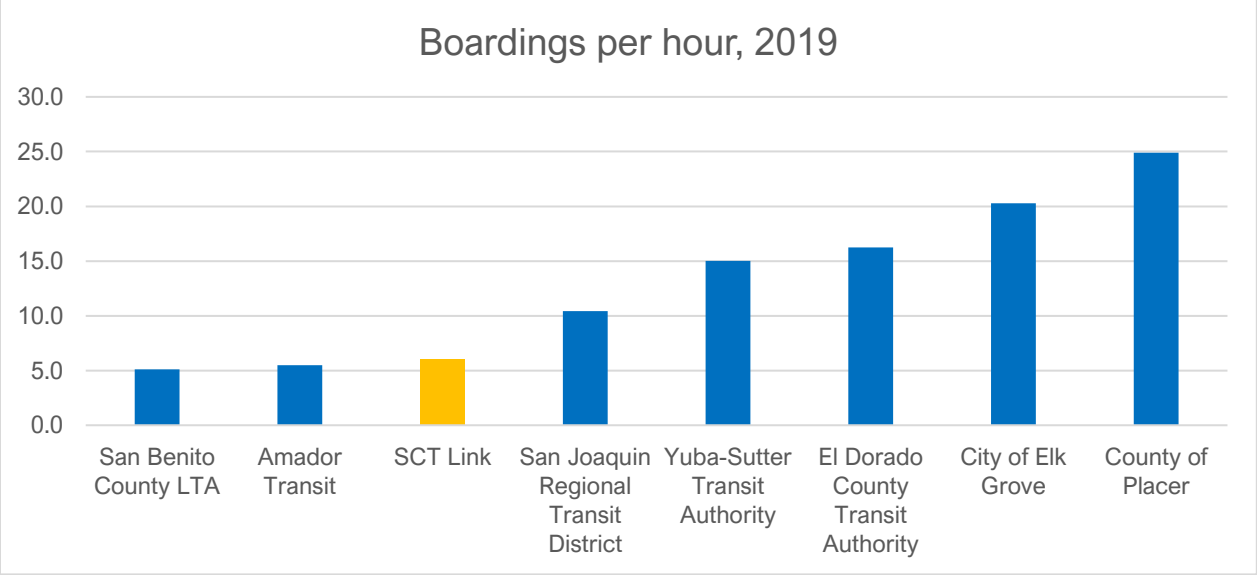


Figure 3-61: Boardings per revenue hour of SCT Link commuter bus and peers, 2019.

Furthermore, SCT Link's cost per passenger boarding is on the costlier end of the peer range, at $19.38 per boarding compared to the peer average of $13.40 (Figure 3-62). This analysis indicates that SCT Link's commuter bus service is comparably lower in service and cost effectiveness than its peers like Placer County and Yuba-Sutter Transit.

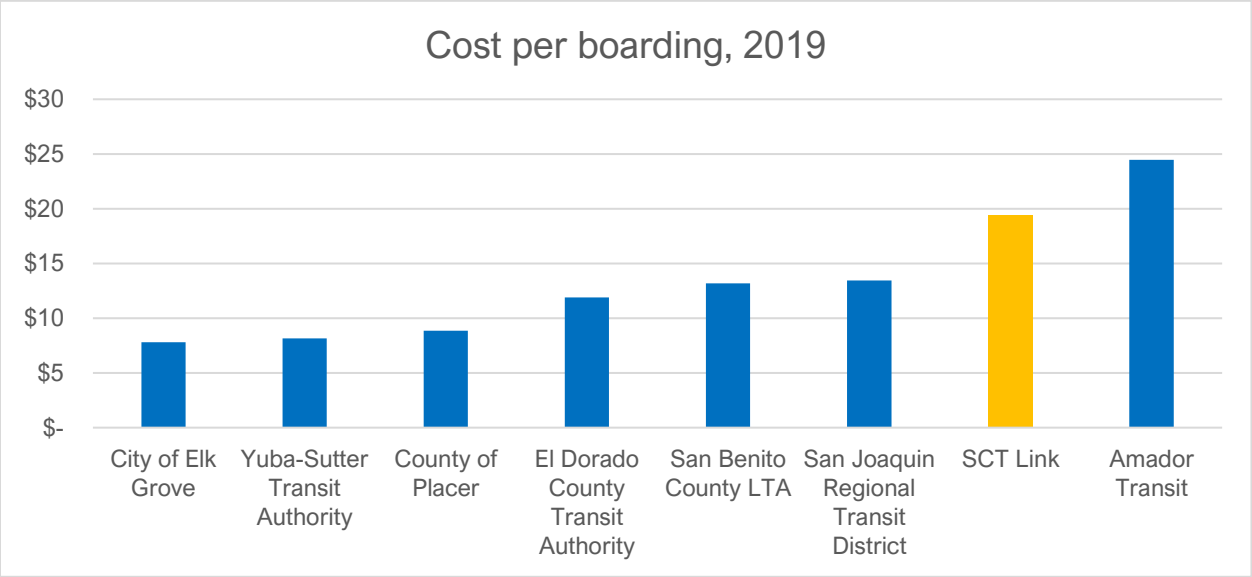


Figure 3-62: Cost per boarding of SCT Link commuter bus and peers, 2019.

Nonetheless, SCT Link's commuter service is the second most cost effective of the peer group. SCT Link's operating expense per revenue hour is $117.31, comparing very favorably to the peer average of $144.11 per hour; only San Benito's service is more cost effective (Figure 3-63).

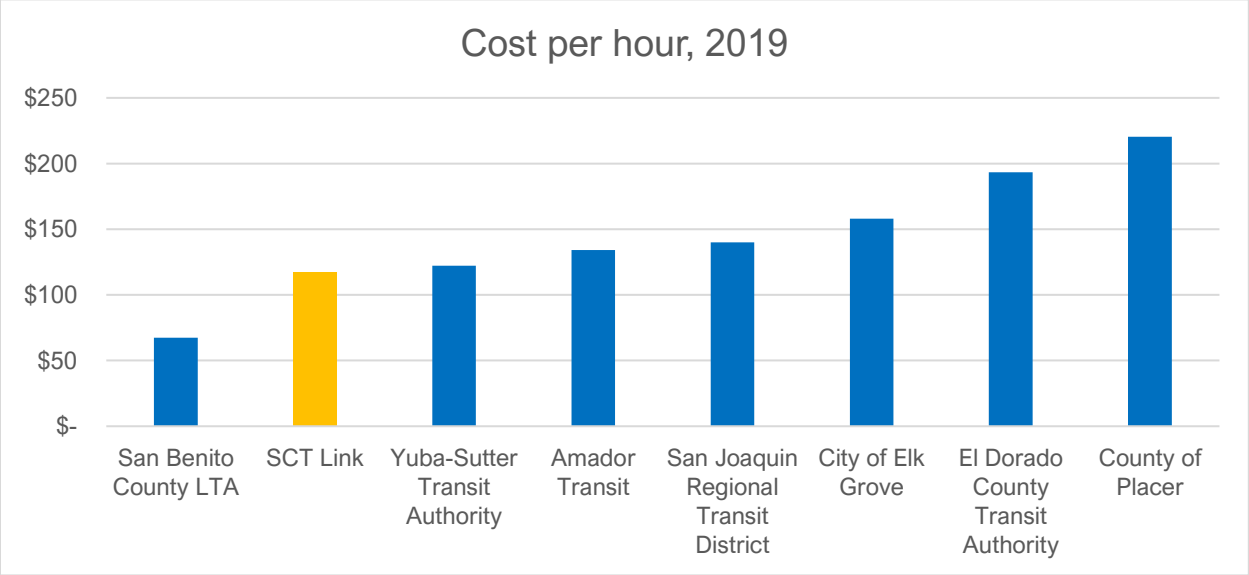


Figure 3-63: Cost per revenue hour of SCT Link commuter bus and peers, 2019.

Finally, compared to its peers, SCT Link's commuter services fall below the peer average in terms of average fare collected, at $2.85 per passenger compared to the peer average of $3.57 (Figure 3-64).

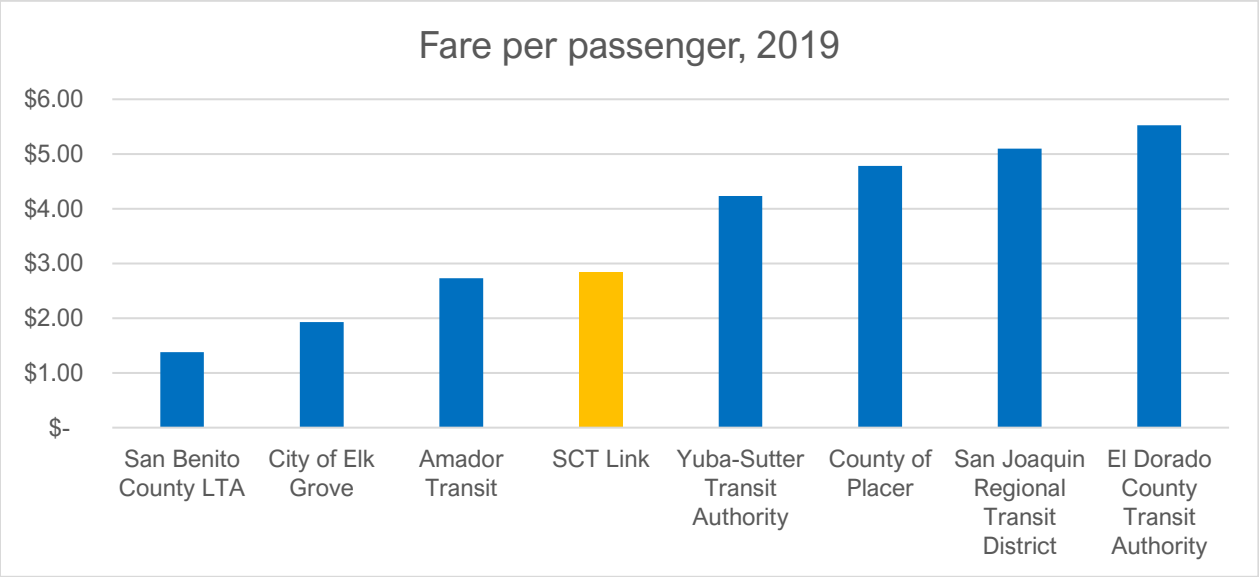


Figure 3-64: Average passenger cost of fare of SCT Link commuter bus and peers, 2019.

Similar to the dial-a-ride service, SCT Link's commuter fares are low compared to several peers. The Galt-Sacramento Express costs $4 for a general fare, and $2 for reduced fares, while the Hwy 99 service is distance based, so trips between Galt and Lodi are $2, and Lodi to Cosumnes River College and Kaiser Hospital in Sacramento cost $4. Interestingly, a trip on the Hwy 99 express between Galt and Kaiser South costs $3, a 33-minute 18-mile trip, while a trip between Galt and downtown Sacramento costs $4 for 1 hour 25-mile trip. This comparison of fares and services reveals some disparity in the level of service and fares, indicating that, depending on the transit market, SCT Link may look to modify its fares to provide either more segmentation between services or to recover more operating costs from its farebox.

As a point of comparison, El Dorado Transit charges $5 for its commuter service to downtown Sacramento, with monthly passes available for $180 (no senior or disabled fare available). SCT Link's one-way fare is $4 and a monthly pass is $120. A small increase in fare for the Commuter Express may be justified.

3.5 Financial Analysis

Financial analysis is an important component of the SRTP and ZEB plan to ensure that the resulting plan is actionable and will result in tangible operational and financial benefits. Prior to evaluating the anticipated financial impacts of ZEB implementation and transit capital/operational changes, however, it is important to review the current state of SCT Link's operating and capital expenses. Doing so will provide valuable insights for crafting the rollout plan while also acting as a basis upon which financial forecasts may be completed.

3.5.1 Operating Expenses

To consider the financial stability of SCT Link, operating expense trending was examined for the data provided by the agency and through NTD annual reports. A gradual increase in operating expenses over time is expected (to account for ongoing service expansions and inflation).

The graph in Figure 3-65 displays the percent increase in operating expenses for SCT Link and several peer agencies between FY14-15 and FY18-19 divided by operating service type (demand response, commuter, and fixed-route bus).

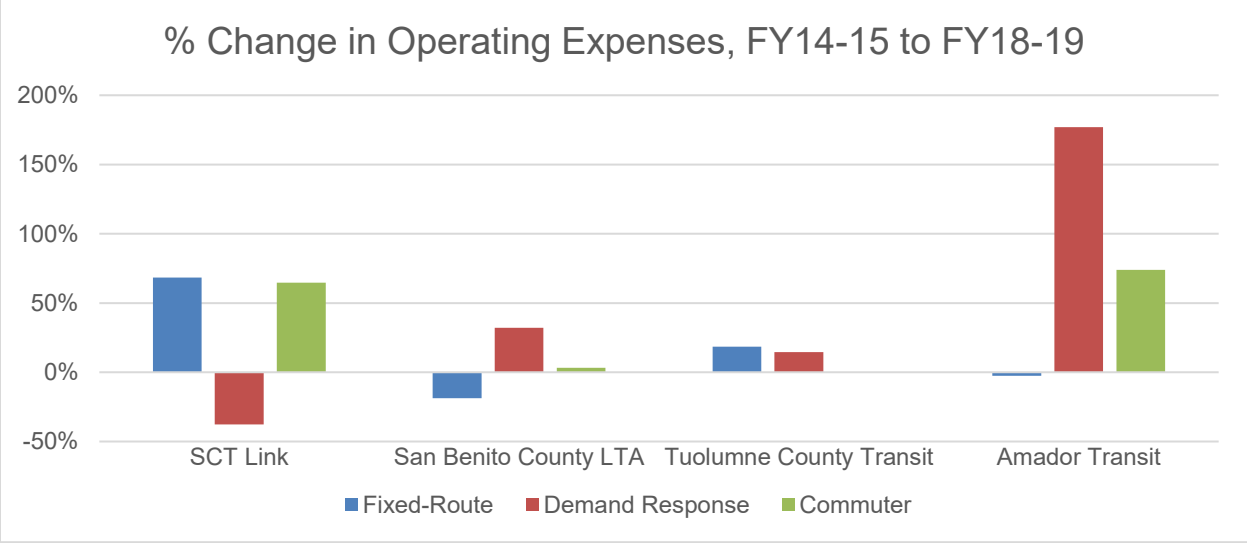


Figure 3-65: Percent change in operating expenses, FY14-15 to FY18-19

Both fixed-route and commuter service increased at a rapid rate relative to most peer agencies. Due to the restructuring of cost allocations, SCT Link's demand-response expenses decreased, the only agency of the peers to do so. It should also be noted that Tuolumne County Transit does not operate a commuter service.

It is also important to look at operating expenses in terms of miles and hours of service provided (Table 3-21).

Table 3-21: Operating cost per revenue hour and mile by mode, 2015-2019

	Cost per revenue mile		Cost per revenue hour	
	FY14-15	**FY18-19**	**FY14-15**	**FY18-19**
Fixed-route	$2.61	$4.49	$85.10	$135.74
Commuter	$2.75	$4.49	$84.82	$117.31

	Cost per revenue mile		Cost per revenue hour	
	FY14-15	**FY18-19**	**FY14-15**	**FY18-19**
Demand response	$7.27	$4.49	$85.10	$53.12

Fixed-route costs per revenue mile have increased by 72% between FY14-15 and FY18-19, and per revenue hour by 60%. Correspondingly, the commuter costs saw a 63% increase in costs per revenue mile, and a 38% increase in cost per revenue hour. The demand response service saw a 38% reduction in cost per both revenue mile and per revenue hour. The key difference in the cost per hour from pre-2019 is how SCT Link allocated costs among the modes; going forward, SCT Link will continue reporting costs by allocating fuel costs across modes. By looking at blended rates, the average cost per hour in FY14-15 was $85.01 and $89.58 in FY18-19, an increase of about 5.4%. The key message is that SCT Link's costs have been increasing over time, albeit by a manageable rate.[13] How to be more productive and cost effective due to ridership decreases, despite modest increases in operating costs, is one of the key issues of the SRTP.

Key metrics to track during the adoption of ZEBs are operating costs per mile and hour, with the assumption that as agencies become more accustomed to operating these vehicles and maintenance costs manifest, cost per mile and hour should drop, although they may initially spike due to capital costs (vehicle acquisition, fueling infrastructure, etc.).

3.5.2 Capital Expenses

In addition to operating expenses, it is important to consider the trending of capital expenses and funding, since the most substantial immediate impact of ZEB adoption will be an increase in capital expenditures.

Capital expenses are dependent on capital needs and funding availability. The funds received over the last few years have been reviewed to understand funding availability for bus transit peer agencies (Figure 3-66).

[13] In actuality, SCT Link pays its operator a rate of $41 per hour for services operated with cutaways, $54 per hour for services operated with motorcoaches, plus a fixed monthly fee, with increases built into the contract for each of the five years of the initial contract, and potential contract extensions.

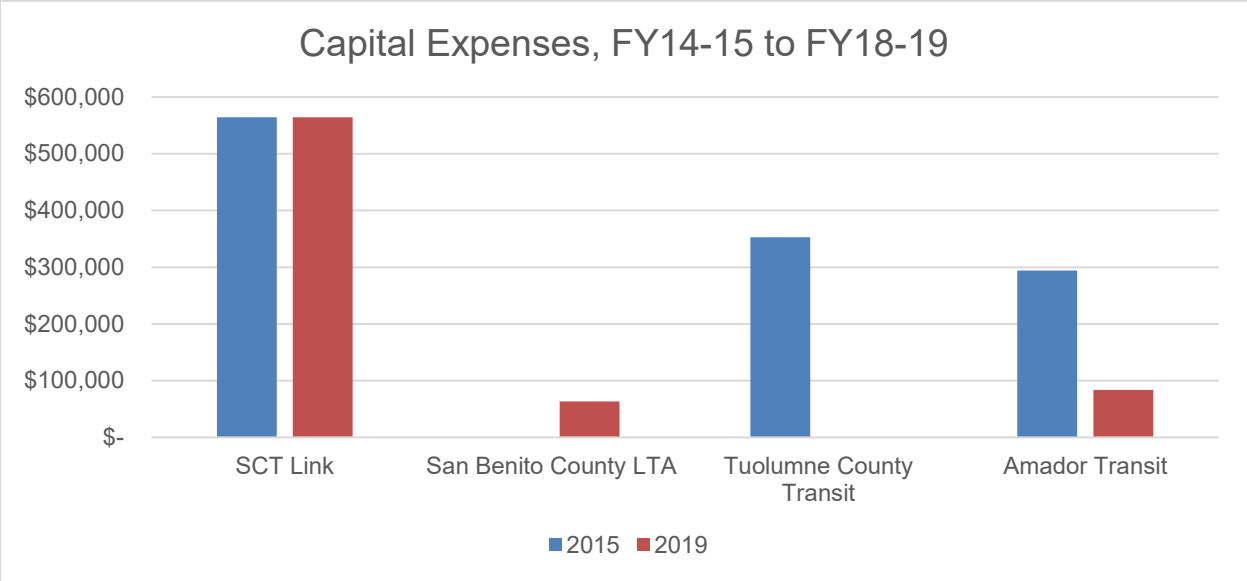


Figure 3-66: Capital expenses, FY14-15 vs FY18-19

Overall, changes in capital funding fluctuates widely, with certain agencies seeing an increase and others a decrease. The amounts vary by agency; for example, San Benito County spent nearly $64,000 in FY18-19 and nothing in FY14-15. SCT Link's capital spending was highly consistent between these two years of analysis, with almost identical sums spent in both years. In both years, SCT Link purchased an MCI coach, in addition to three replacement cutaways. It is best practice to typically ensure that capital spending is as consistent as possible year-over-year rather than subject to significant peaks and valleys in case funding availability changes in the future.

SCT Link's funding sources for capital expenditures do not vary from year to year, although the amounts do, as shown in Figure 3-67.

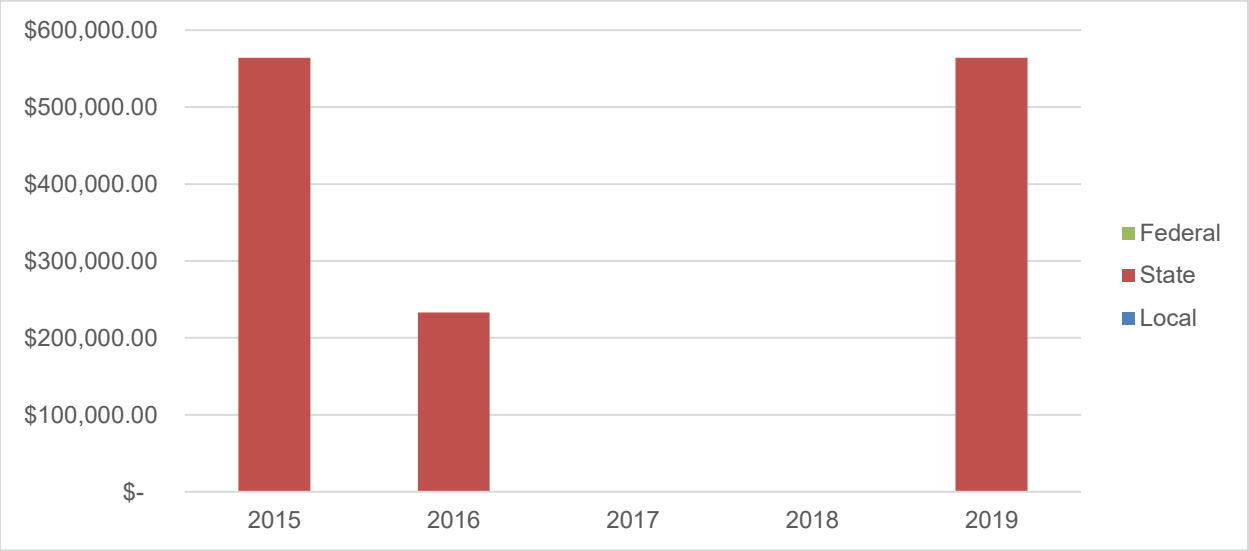


Figure 3-67: FY18-19 capital funding sources

The above figure shows that SCT Link receives the bulk of its capital funding from state fund, with no other capital funding being received from other levels of government in the analysis period. Specifically, major potential sources of capital funding include:

- FTA Section 5311 Rural Transit & Intercity Bus

Going forward, SCT Link will need to explore diverse funding opportunities, some traditional federal and state grants, while also taking advantage of new grant programs geared toward ZEBs and related greenhouse gas reduction and sustainability.

3.5.3 Revenues

Fare revenues were compared for the routes and demand-response service operated by SCT Link. Figure 3-68 below shows the fare revenues for FY19 distributed by each route and service type.

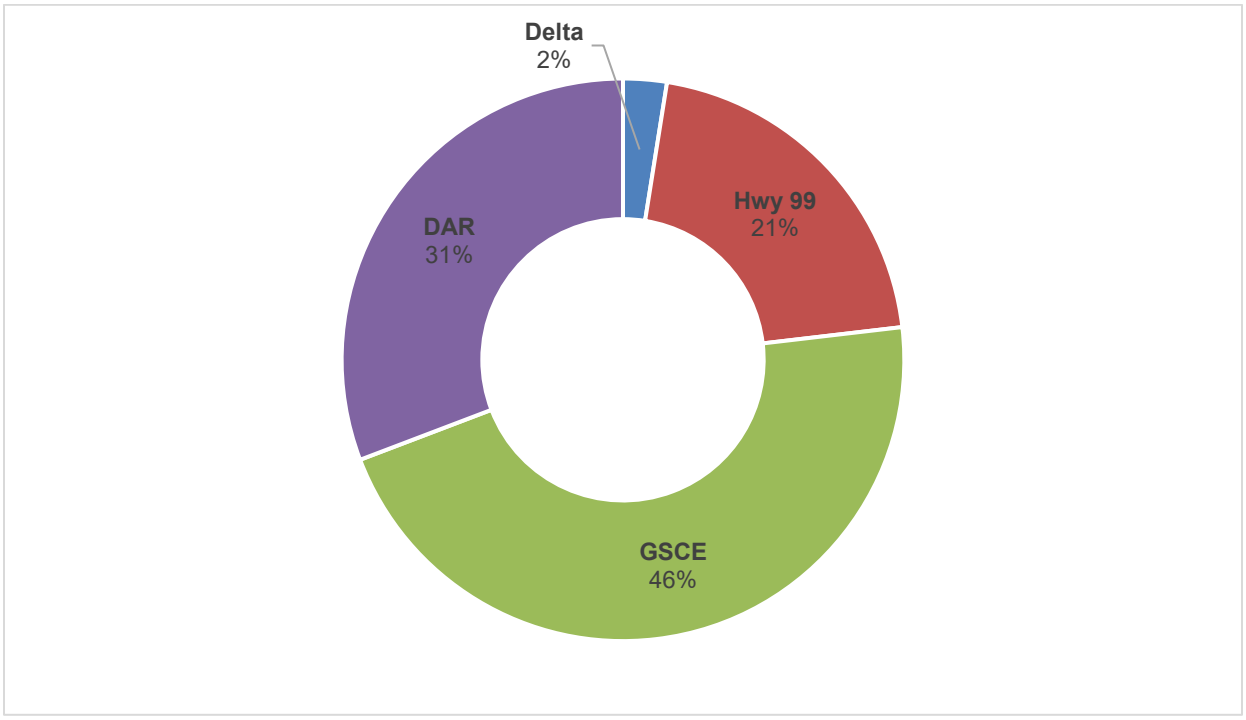


Figure 3-68: FY18-19 fare revenues by route/service

As seen above, the GSCE route generates nearly half of the total fare revenues. Following that route, DAR service and the Highway 99 route generate the majority of the remaining revenue. The Delta route generates only 2% of the total fare revenues. To put this in perspective, total revenues, including outside funding, was included to see the impact of fare revenues, seen in Figure 3-69.

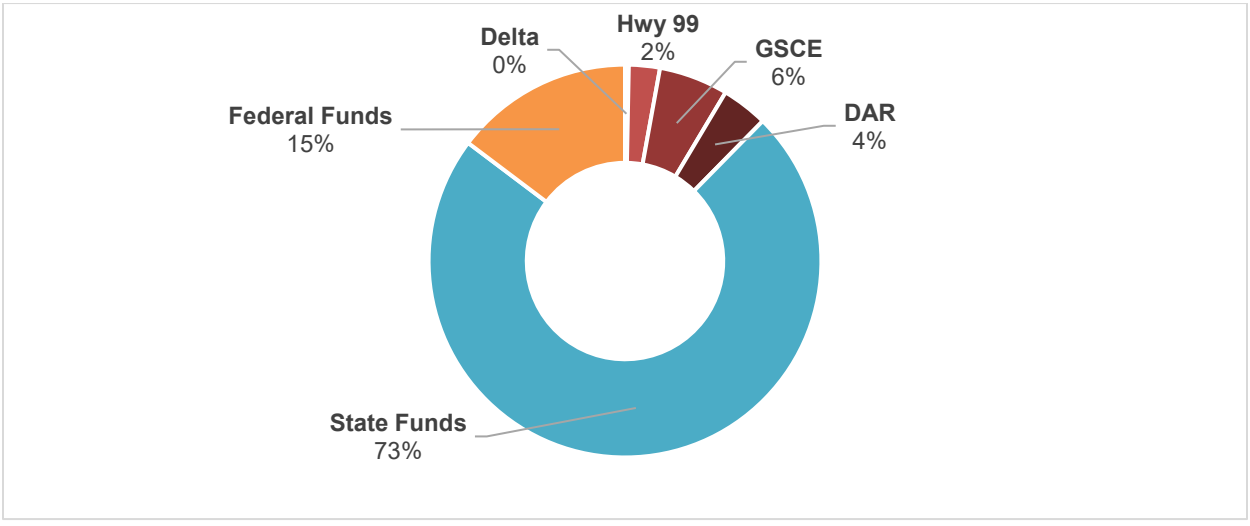


Figure 3-69: Total SCT Link revenues by funding source

As seen above, funding from higher levels of government account for 88% of overall funding, with 12% attributed to the farebox. The Delta route accounts for close to 0% of overall revenues. Next, the fare revenues were compared to operating costs to determine the farebox recovery ratio for each route/service. This is shown below in Figure 3-70.

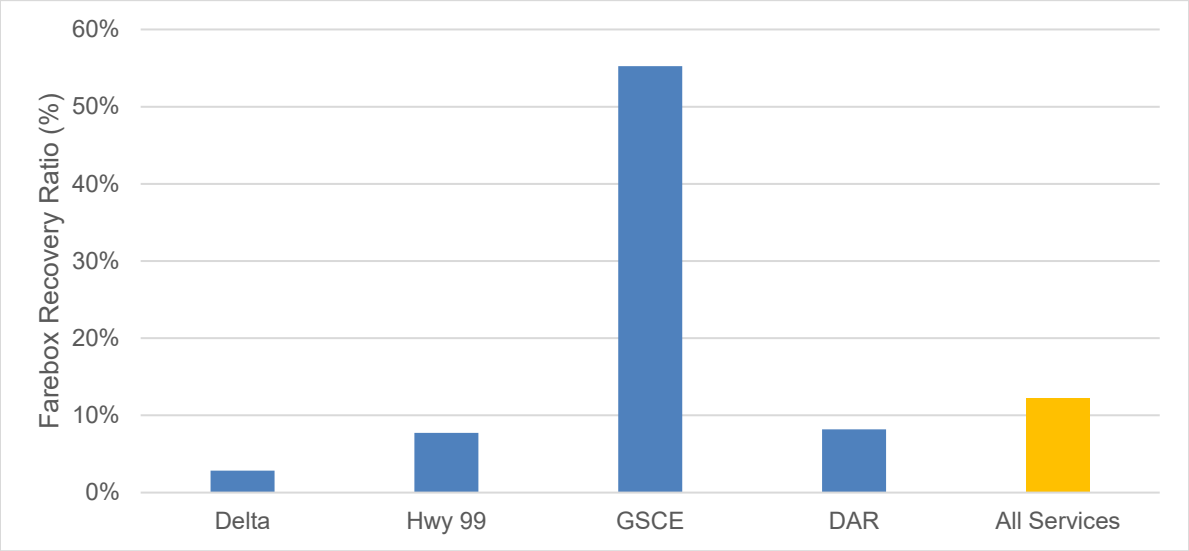


Figure 3-70: FY19 farebox recovery ratio by route/service

As implied from the previous figure, the GSCE route is the best-performing route, with a high farebox recovery ratio of 55%. The Highway 99 and DAR fare recovery ratios are 8%, and the Delta route recovery ratio is 3%. In total, the overall recovery ratio is 12%.

3.6 Summary—Choices and Trade-offs

SCT Link has the difficult job of providing lifeline transit services to a low-density, largely rural service area with dispersed destinations. Moving forward, it will be important to gain an understanding of community priorities when it comes to transit service provision to determine the best path forward given SCT Link's limited resources. Overall, SCT Link is largely allocating its resources to where the community needs it most, by providing commuter services to the many employment centers and other destinations in and around Sacramento, and providing lifeline services to the local Galt and Delta communities. Understanding the need to serve these destinations, the question moving forward will be how to best serve these needs, and how to improve the quality of the services provided. The major findings and implications of the review of SCT Link's existing conditions from a strategic planning point of view are summarized below:

- South Sacramento County is a difficult environment to operate transit in, characterized by low population and employment densities, dispersed destination, and pockets of dispersed communities throughout the service area.
- Commuter (Hwy 99 and GSCE) routes are performing adequately, but their future is unsure due to changes in travel patterns and choices brought about by COVID-19. These routes are essentially as direct as possible and connect these outlying communities to Sacramento. One opportunity for improvement could be by focusing on providing the best, highest-quality service possible (for example, ensuring schedules are timed correctly, focusing on improving OTP, etc.).
- It is known that the Delta Route is not performing well, and it is inherently difficult to serve these Delta communities in an efficient and productive manner. To determine the best path forward for this service, it will be important to understand the travel, mobility, and accessibility needs of the Delta communities.
- Dial-A-Ride is performing fairly well and is quite productive compared to peers in terms of boardings per hour and cost per boarding. If future stages of this project explore expanding the service area or adjusting the service model, it will be important to do so in a way that does not sacrifice the service's productivity.

4 EXISTING CONDITIONS REVIEW – ZEB PLAN

This chapters pertains to the ZEB planning portions of this project. In particular, we reviewed operational characteristics, conducted and documented a site assessment, and assessed other aspects how SCT Link functions to provide an understanding of what SCT Link will need to alter in the future for zero-emission operations.

4.1 Why ZEBs? A Primer on the ICT Regulation

CARB adopted the ICT regulation in December 2018, which requires all public bus transit agencies in the state to gradually transition to a completely zero-emission bus (ZEB) fleet by 2040. This regulation is in accordance with preceding state policies SB 375 and SB 350. SB 375, the Sustainable Communities and Climate Protection Program, creates initiatives for increased development of transit-oriented communities, better-connected transportation, and active transportation. Relatedly, SB 350 supports widespread transportation electrification through collaboration between CARB and the California Public Utilities Commission (CPUC).

ICT also states that transit agencies are required to produce a ZEB rollout plan that describes how the agency is planning to achieve a full transition to a zero-emission fleet by 2040 as well as outlining reporting and record-keeping requirements. Specific elements required in the rollout plan include:

- A full explanation of how the agency will transition to ZEBs by 2040 without early retirement of conventional internal combustion engine buses
- Identification of the ZEB technology the agency intends to deploy
- How the agency will deploy ZEBs in disadvantaged communities
- Identification of potential funding sources
- A training plan and schedule for ZEB operators and maintenance staff
- Schedules for bus purchase and lease options (including fuel type, number of buses, and bus type)
- Construction of associated facilities and infrastructure (including location, type of infrastructure, and timeline)

Small California transit agencies, such as SCT Link, are mandated to submit ZEB rollout plans by July 1, 2023 to CARB. ICT also outlines different ZEB purchase schedules that large and small agencies must adhere to. Beginning in 2021 and continuing annually through 2050, each transit agency will be required to provide a compliance report[14]. The initial report will outline the number of and information on active buses in the agency's fleet as of December 31, 2017. Subsequent reports must include transit agency information, information on each bus purchased, owned, operated, leased, or rented (including make, model, curb weight, engine and propulsion system, bus purchases, and any information on converted buses), zero-emission mobility option information (if applicable), and information on renewable fuel usage (including date purchased, fuel contract number, and effective date, if applicable).

[14] https://ww2.arb.ca.gov/sites/default/files/2019-10/ictfro-Clean-Final_0.pdf

Table 4-1 below outlines the ZEB purchase schedule for small transit agencies for heavy duty transit vehicles. Specific vehicle types, such as motor coaches, cutaways, double decker, and 60-ft. vehicles, are exempt from this purchase schedule until 2026 or later (dependent on Altoona testing being completed). Whereas large agencies are required to start purchasing ZEBs in 2023, small agencies are exempt until 2026, when 25% of new bus purchases must be zero emission.

Table 4-1: ZEB purchase schedule (as a percentage of total new bus purchases for small transit agencies) for standard buses

Year	Percentage
2023	-
2024	-
2025	-
2026	25%
2027	25%
2028	25%
2029 and after	100%

ICT also outlines several flexibility options to comply with ZEB purchase requirements that transit agencies can take advantage of. These include receiving bonus credits for early ZEB purchases, zero-emission mobility options to encourage innovation, enhanced first/last mile connections and improved mobility, and the option to form a joint ZEB group, which entails transit agencies working together to collectively comply with ZEB purchase requirements and a joint ZEB rollout plan. Formation of joint ZEB groups is dependent on certain eligibility requirements (agencies must share infrastructure, be in the same air basin, air district, Metropolitan Planning Organization, or Regional Transportation Planning Organization).

The zero-emission mobility option outlined above specifically refers to a program that provides a zero-emission mobility service, such as a shared mobility bicycle program or any service operated by the agency that include zero-emission transportation, such as microtransit, demand-response service, or autonomous shuttles. The mobility option does not apply to larger buses or fixed-route transit services. Small transit agencies must achieve 180,000 zero-emission passenger miles per year to be eligible for a mobility credit. One mobility credit is the equivalent to having one ZEB in the fleet.

To account for circumstances beyond a transit agency's control that may impact their ability to comply with ICT regulations, the mandate laid out specific provisions for exemptions. Exemptions will be permitted for the following circumstances:

- If the required ZEB type is unavailable
- Daily mileage needs cannot be met
- Gradeability needs cannot be met
- Delays in infrastructure construction
- A financial emergency is declared by the transit agency
- In circumstances where incremental capital or electricity costs for charging cannot be offset after applying for all available funding and incentive opportunities.

Specifically, the ZEB rollout plan required to be submitted to CARB by mid-2023 must include the following components, broken down by CARB into nine sections.

- Section A: Transit agency information
- Section B: Rollout plan general information
- Section C: Technology portfolio
- Section D: Current bus fleet composition and future bus purchases
- Section E: Facilities and infrastructure modifications
- Section F: Providing service in disadvantaged communities
- Section G: Workforce training
- Section H: Potential funding sources
- Section I: Start-up and scale-up challenges

4.2 Background Document Review

To provide a situational context, Stantec reviewed available ZEB plans of SACOG-area transit operators (Figure 4-1), many of which are in the initial stages (Table 4-2).

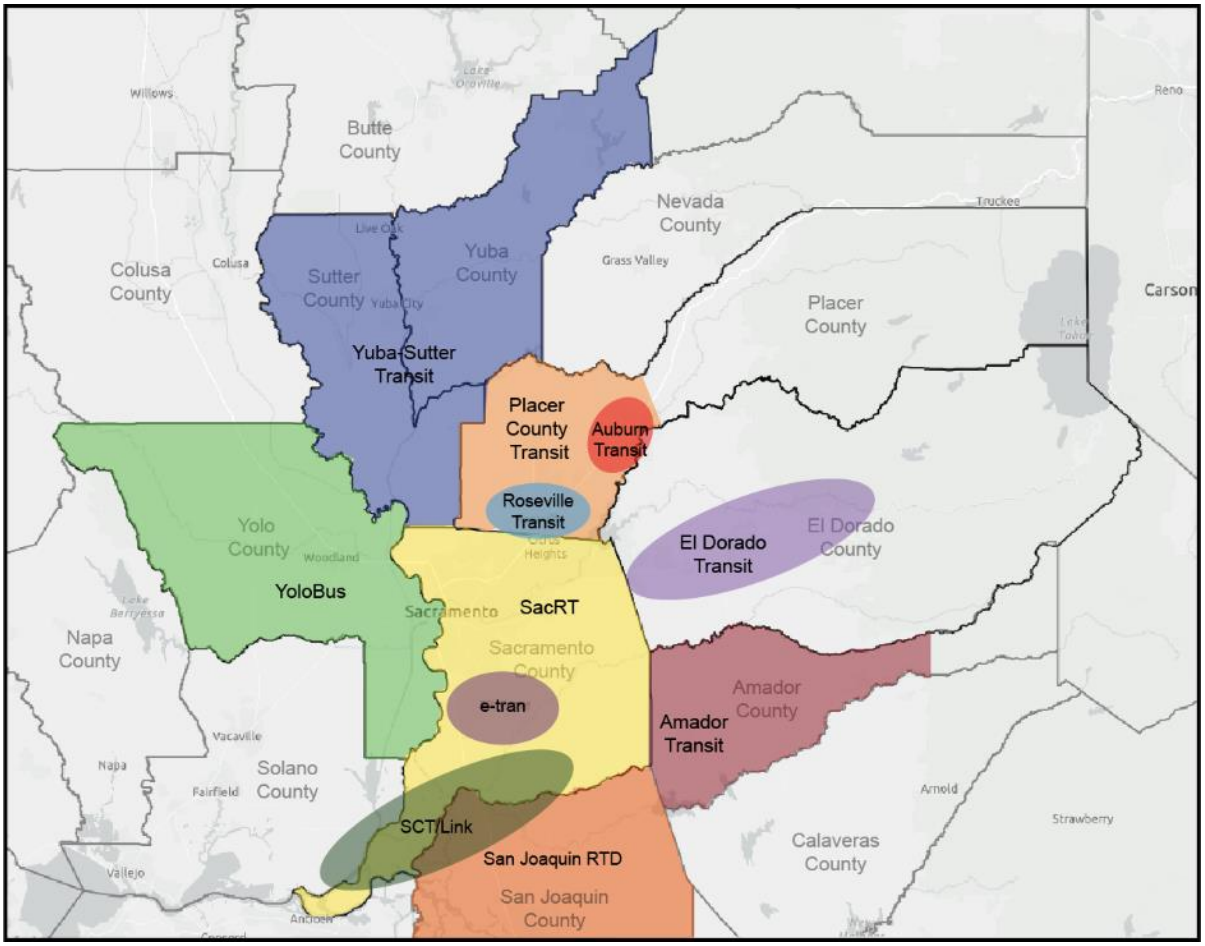


Figure 4-1: SACOG regional transit agencies.

Most operators are trending toward BEBs, including the largest agency, SacRT. Nevertheless, Stantec has interviewed key staff at SacRT and SACOG who indicated that SacRT remains very much interested in exploring all ZEB options, including hydrogen fuel cell buses (FCEBs). Regional leaderships by SACOG and/or SacRT could help provide an organizing force for ZEB coordination among the regional transit operators.

Table 4-2: SACOG regional transit agencies and ZEB technology.

Agency	Fleet Size[15]	ZEB Choice
SacRT	216	In-depot charging BEBs
San Joaquin RTD[16]	77	In-depot and on-route charging BEBs
Yolobus	57	BEBs
Elk Grove	46	In-depot charging BEBs
Placer County Transit (PCT)	41	TBD
Yuba-Sutter Transit	35	TBD
El Dorado Transit	28* (motor coaches and 35-ft heavy-duty bus)	In-depot charging BEBs
SCT Link	**19**	**TBD**
Roseville Transit	11	In-depot and on-route charging BEBs
Amador Transit	7	TBD
Auburn Transit	5	TBD

4.2.1 SacRT ZEB Rollout Plan

SacRT operates 30 fixed routes, 19 commuter routes, 17 seasonal routes in addition to SmaRT Ride on-demand transit, Airport Express bus service, service to UC Davis, and 43 miles of light rail that covers a 400-square-mile service area. SacRT's current bus fleet includes 232 CNG buses, 107 paratransit vehicles, and 15 electric shuttle buses.

SacRT was an early leader in ZEB adoption, acquiring GreenPower electric vans to operate the SmaRT on-demand services. Currently, SacRT is also operating 6 40-ft Proterra plug-in electric buses that 'fuel' or charge in depot with 150 kW plug-in chargers (1:2 charger to dispense ratio).

The ZEB plan assumes a 1:1 replacement of SacRT's fossil fuel-powered fleet while recommending a BEB fleet. However, the plan itself states future purchases as "BEB/FCEB". Therefore, while trending toward BEB based on initial pilots and on real-word constraints, such as the inability to deploy hydrogen assets at their main downtown base located beneath the Capitol City Freeway, it is clear that SacRT will likely adopt the technology that best suits a route's or service's need (fit for purpose). Discussions with SacRT and SACOG staff also indicate the desire to explore the value of FCEBs in SacRT's fleet.

4.2.2 San Joaquin RTD ZEB Rollout Plan

San Joaquin RTD currently operates 46 gasoline-powered cutaways, 4 diesel-powered motorcoaches, 55 diesel-electric hybrid transit buses, and 17 BEBs. RTD adopted its first BEB in 2013.

RTD is planning to continue acquiring BEBs to transition its entire fleet to ZE. Their plan stipulates the purchase of motorcoaches and cutaways with battery sizes and ranges that are currently not on the market but that would fit RTD's needs, including cutaways with 550 kWh batteries for 250 miles of range, and motorcoaches with 660 kWh batteries for 300 miles of range. Transit buses, both articulated and standard models, are planned with 660 kWh batteries for 300 miles of range.

RTD envisions depot charging, as well as on-route/layover charging at its transfer facilities in Stockton. No on-route charger is mentioned for Lodi. Depending on the outcome of the ZEB planning effort for SCT Link

[15] Fleet size according to NTD reporting
[16] San Joaquin RTD is not a SACOG member but was included due to its proximity to and interfacing with the SACOG region and with SCT Link service.

and the needs of the Hwy 99 service, there could be a need for coordination with other agencies at the Lodi Transit Center regarding on-route charging, including RTD and Grape Line.

4.2.3 City of Elk Grove ZEB Rollout Plan

Stantec recently completed the ZEB plan for e-tran in the City of Elk Grove. As an agency with a small fleet and based on route modeling, site assessments, and leadership discussions, Stantec recommended that e-tran transition its fixed-route bus fleet of 46 40-ft. buses to BEBs with in-depot charging. The plan also described the need for electrical upgrades at the facility to accommodate mainly low-power chargers, but also one high-power charger for contingency charging. Unable to replace fossil fuel-powered buses in a 1:1 manner with BEBs, the plan also developed high-level blocking for vehicle assignments that surpass the operating limitations of BEBs and as such, e-tran's peak vehicle requirement increased.

At the time of plan finalization, e-tran services were in the process of being annexed by SacRT. Likely, the ZEB plan will be rolled into SacRT's ZEB plan, since these are living and amendable documents.

Similar to SCT Link, e-tran's small fleet and lack of onsite fueling infrastructure, coupled with the lack of available hydrogen pushed us toward recommending BEBs. Nonetheless, the ZEB plan also designed-in flexibility by providing guidance if e-tran leadership wished to explore FCEBs, similar to SacRT.

Taken together, having regional coordination among SACOG regional transit agencies can accrue several benefits, including bulk purchase prices if equipment is tendered jointly, creating demand for affordable and accessible hydrogen, and creating negotiating leverage of transit agencies with vendors and utilities. Simply put, while an agency like SCT Link or e-tran or El Dorado Transit independently may be unable to sway OEMs or PG&E, combining forces particularly with SacRT is likely to aid the push to net-zero public transportation.

4.2.4 SCT Link Management Improvement Plan

In 2013, SCT Link and SACOG engaged a consultant to produce a management improvement plan. Relevant here were the review, assessment and recommendations for the operations and maintenance facility and for fueling functions.

For the operations and maintenance facility, the assessment noted the lack of space for fleet growth and the shortcomings of being unable to maintain motorcoaches onsite, among other constraints and challenges of not having a purpose-built facility. The near-term recommendation included upgrading the current facility, while looking for future opportunities for a purpose-built facility. At present, with the impending transition to ZEB, investments at the current site, together with other opportunities like expanding into the adjacent space, could help address the constraints noted in the improvement plan.

Relatedly, the study also noted the lack of onsite fueling and the use of nearby City of Galt Corporation Yard Annex for cutaway fueling and the current fueling of motorcoaches in Lodi. The transition to ZEBs could provide the opportunity to 'fuel' or charge onsite in a consolidated manner for all vehicle types.

4.2.5 Contracts and Agreements

Stantec reviewed relevant contracts and agreements that could impact ZEB transition and the SRTP, including elements like responsibility for fueling, vehicle acquisition, and for other potential constraints.

The City of Galt's agreement with Sacramento County describes the cost sharing arrangement for operations by SCT Link's third-party operator, Storer Transit Systems, and County administration. The City of Galt provides access to fueling infrastructure and with the transition to ZE operations, this arrangement may change. Both the City and the County are able to acquire rolling stock.

The County's current contract for operations with Storer Transit is from June 2020 through May 2024 with the ability to option up to 2 additional 2-year terms. The contract specifies the cost structure, including hourly rates for services operated with cutaways and for services operated with motorcoaches, fuel reimbursement rates, and for monthly facility lease costs. Coach and cutaway operators do not belong to a collective bargaining unit. Operators fuel vehicles.

With a transition to ZEBs, the ability for operators to fuel vehicles instead of restricting this duty to servicers increases SCT Link's flexibility for ZEB implementation. Furthermore, with potential savings from ZEBs due to decreased maintenance and potentially savings on fuel costs, coupled with the fact that the County and City are responsible for purchasing vehicles, suggests that future operations and maintenance contracts could see hourly cost savings.

4.3 Current Operations and Service Analysis

This section will look at operational considerations that specifically pertain to the ZEB transition and were not covered in Chapter 1.

4.3.1 Fleet Composition

SCT Link's current revenue fleet is composed of 16 cutaways and three motorcoaches. East County Transit uses one standard 40' bus. Cutaways are used to provide service on the Hwy 99 route and the Delta route as well as for DAR. The three motorcoaches are used on the Galt-Sacramento Commuter Express service, and the one 40' bus is owned by Sacramento County and operated by Amador Transit on their East County Commuter route through Rancho Murieta. Fuel types include gasoline (unleaded) for cutaways and diesel for the other vehicle types. All vehicles are within their useful life benchmarks according to the FTA's Transit Asset Management (TAM) planning purposes, and thus all vehicles should be operating in a state of good repair.

Table 4-3: Sacramento County current revenue fleet composition

Year	# of buses	Make	Length	Seating capacity	Fuel type	FTA useful life[17]	Service type(s)
2016	3	Ford E450 Starcraft/Allstar	26'	16 (2 wheelchair)	Gasoline (unleaded)	10	DAR, Hwy 99, Delta Route
2017	3	Ford E450 Starcraft/Allstar	26'	16 (2 wheelchair)	Gasoline (unleaded)	10	
2018	3	Ford E450 Starcraft/Allstar	26'	16 (2 wheelchair)	Gasoline (unleaded)	10	
2019	4	Ford E450 Starcraft/Allstar	26'	16 (2 wheelchair)	Gasoline (unleaded)	10	
2020	3	Ford E450 Starcraft/Allstar	26'	16 (2 wheelchair)	Gasoline (unleaded)	10	
2014	1	D4500 MCI	45'	57	Diesel	14	Galt-Sacramento Commuter Express
2018	1	D4500 MCI	45'	57	Diesel	14	
2020	1	D4500 MCI	45'	57	Diesel	14	
2016	1	Glaval Legacy Freightliner[18]	40'	39 (2 wheelchair)	Diesel	14	East County Commuter (Amador Transit)

[17] Default Useful Life Benchmark (ULB) Cheat Sheet (dot.gov)
[18] This vehicle is not considered when developing the ZEB plan since it is not operated by SCT Link.

Sacramento County's fleet features different vehicle types to fit demand and the specific services offered while keeping the number of different vehicle types minimized. For example, the County uses cutaways for its DAR service and two of its fixed routes instead of procuring another, larger vehicle type for fixed routes. This will also be advantageous moving forward in the ZEB planning process as fewer different vehicle types will need to be incorporated into the ZEB fleet, which can reduce complexity of the overall ZEB strategy. However, ZEB options for motorcoaches and cutaways are currently limited, and while the technology is rapidly evolving, there are currently fewer ZEB options for these vehicle types. This can be considered a constraint, as there are fewer different ZE options currently available on the market for cutaways and motorcoaches than other vehicle types, such as standard 40' buses.

4.3.2 Daily Block Mileage

It is important to understand how the agency's vehicles are used throughout the day, and specifically when these vehicles are in and out of service to understand constraints and opportunities in regards to charging schedules, and also to inform the preliminary fleet concept development and energy requirements.

Vehicle requirements for a typical weekday[19] for fixed-route and DAR service are shown in Figure 4-2. This includes hourly vehicle requirements (i.e., number of vehicles in service) for commuter services (motorcoaches) and DAR/local service (cutaways).

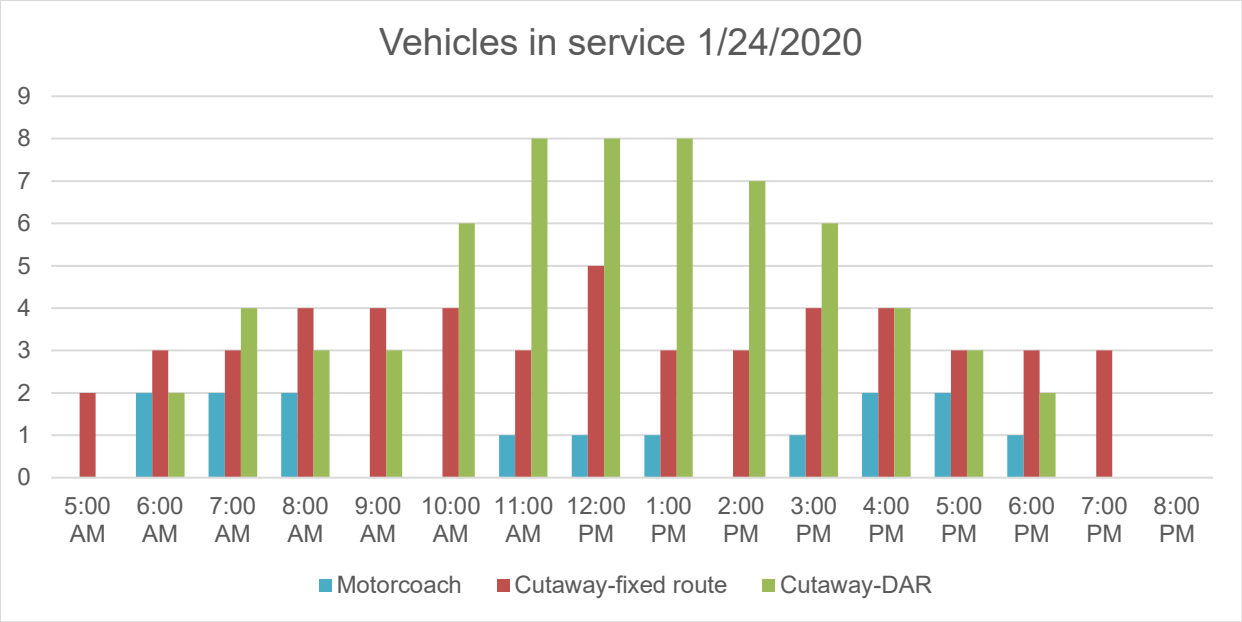


Figure 4-2: Hourly weekday vehicle requirements for SCT Link services

Figure 4-2 shows that total vehicle requirements peak at 12 pm with 14 vehicles in service (13 cutaways and one motorcoach). This is interesting as typically, vehicle use peaks for transit agencies during typical AM and PM peak commuting periods (though the majority of vehicles in service during this hour are for DAR; the daily schedule may be different if DAR service were excluded). Throughout the day, one or two of the three total motorcoaches are in use, with motorcoach use peaking at the more typical commuting hours of 6-8 am and 4-5 pm. The number of vehicles in use stays fairly constant throughout the day and

[19] A representative sample day of January 24, 2020 was selected for energy modeling. A Friday was chosen to incorporate extended DAR service to medical facilities in Sacramento and Elk Grove.

does not see significant changes with the exception of the beginning and ends of service at 5 am and 7 pm, respectively.

One of the largest challenges associated with transitioning to ZEBs are the range limitations associated with both BEBs and (to a lesser extent) FCEBs. Agency-specific circumstances (such as long routes and block lengths, challenging terrain, etc.) can also exacerbate this issue by presenting additional constraints that must be accounted for to avoid interrupting service delivery or negatively affect the rider experience. For the County, this could include cutaways that are in service for the majority of the day, traveling long total distances to provide both DAR and fixed-route service in the same day.

Figure 4-3 shows how many vehicle miles (revenue plus deadhead) for all revenue runs[20] according to the schedule from the representative service day for SCT Link[21]. Understanding vehicle mileages at this level of detail helps build the picture of how many miles SCT Link's vehicles travel in a day. Long runs can potentially exceed range capabilities of current ZEBs, which could pose a challenge to an agency's ZEB transition.

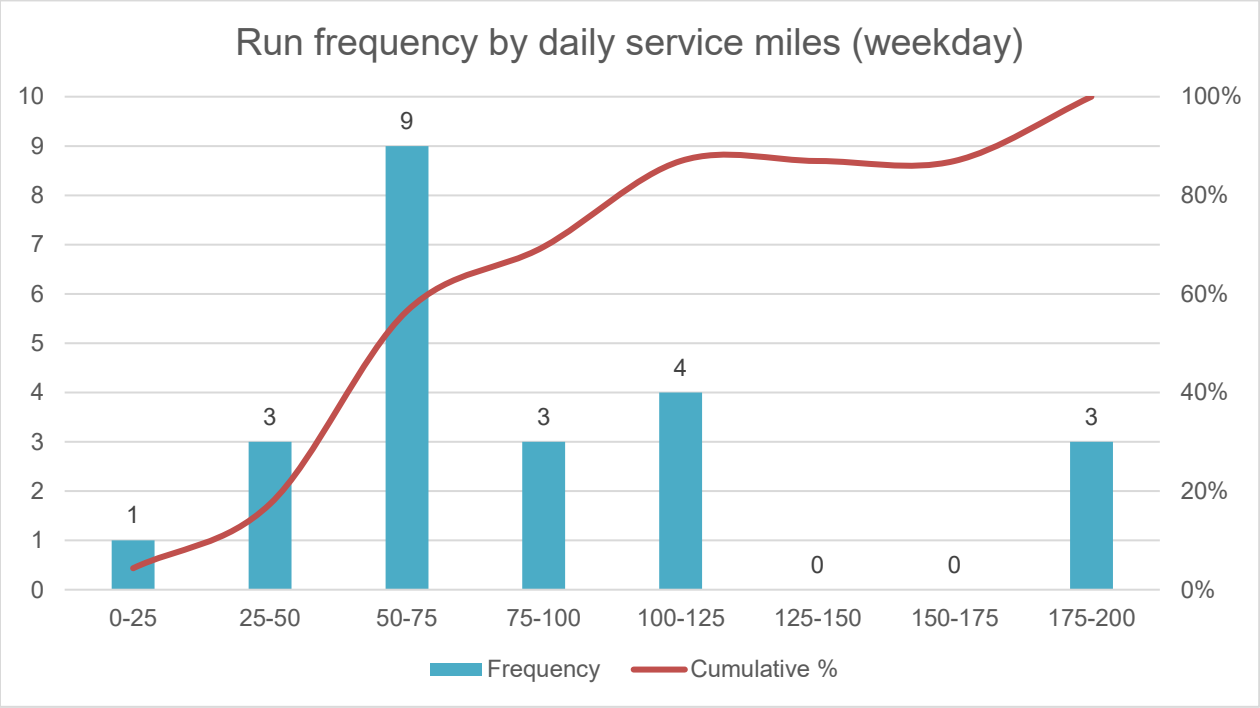


Figure 4-3: Run frequency by daily service miles (weekday)

Specifically, runs are displayed here by frequency (e.g., nine runs have mileages of 50-75 miles, three runs are 75-100 miles, and so on). On an average service weekday, runs average 85 miles, ranging from a minimum of 24 miles to a maximum of 198 miles. Overall, runs for the Galt-Sacramento Commuter Express tend to be more consistent in mileage, with runs ranging from 58-60 miles in length. Runs for other services are more variable; DAR service inherently varies daily based on demand, and as cutaways can do DAR and fixed-route service in the same day, runs for the Hwy 99 and Delta routes can vary widely based on

[20] SCT Link operating data refers to "runs" as one trip that a vehicle does for one service. That same vehicle can complete another "run" on another service in the same service day. For the purposes of this analysis, runs are equivalent to blocks but are referred to as runs to remain consistent with SCT Link data.
[21] January 24, 2020.

the demand for DAR services. For example, a cutaway completes 29 miles of DAR service in its morning run, and the same vehicle completes 97 miles of service on Hwy 99 during its afternoon run. Runs for services completed by cutaways range from 24 miles to 198 miles.

To get the full picture of how much mileage vehicles complete on an average service day, runs were combined at the vehicle level, as many vehicles complete multiple runs in a day. Figure 4-4 shows how many miles vehicles travel on an average weekday when all scheduled runs for each vehicle is combined. While the average run length is 85 miles, the average distance that a vehicle travels in a day is higher, at 130 miles.

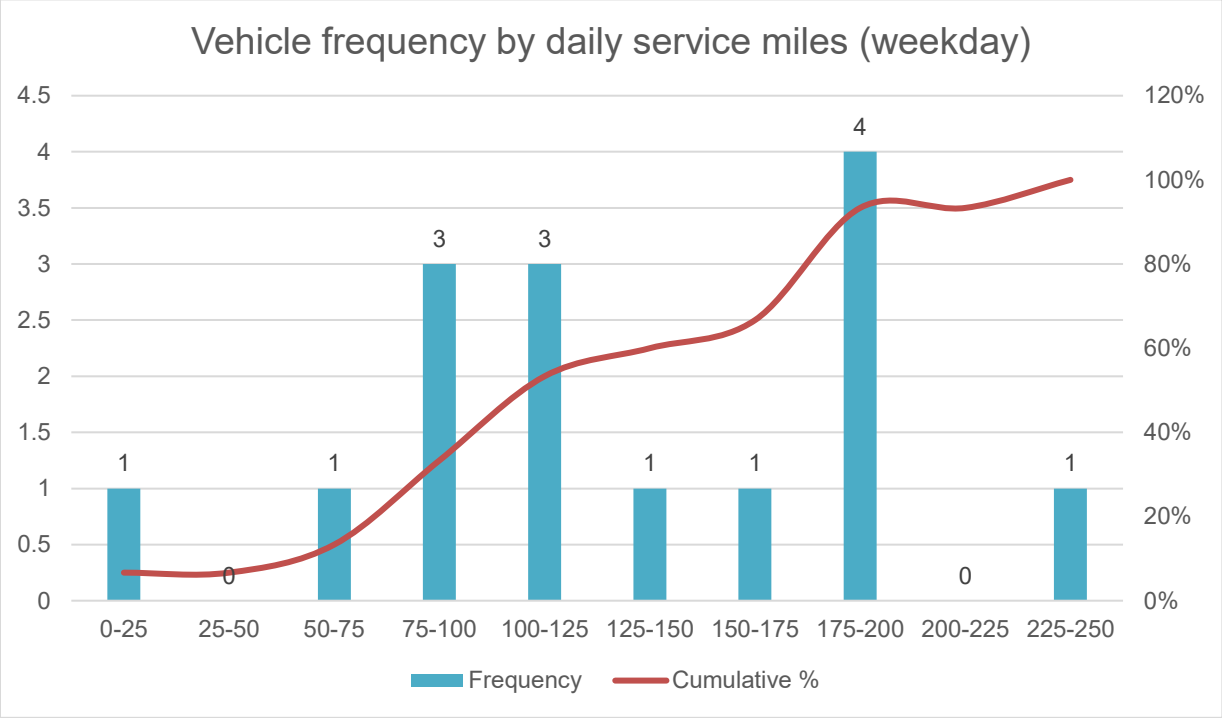


Figure 4-4: Vehicle frequency by daily service miles (weekday)

Figure 4-4 shows that there is indeed a difference between daily mileages of runs and when they are combined at the vehicle level. While there is one vehicle (a cutaway) that travels over 225 miles in a day, all other vehicles travel less than 200 miles, which is reaching the upper limit of range limitations for BEBs without on-route/opportunity charging. Two in-service motorcoaches traveled less than 200 miles, with one traveling 117 miles and the other 177 miles. While we acknowledge that there can be a large amount of variability in the daily vehicle miles of cutaways due to DAR service, it is assumed that 228 miles is the upper limit of how much a cutaway travels in a day, and that the “worst case” scenario for mileage was captured as the sample service day is a Friday with extended DAR service to Sacramento and Elk Grove.

Figure 4-5 shows a visualization of runs combined at the vehicle level to demonstrate the variety of services that cutaways can complete in one day. The breaks between runs can present opportunities for midday charging, but also introduces logistical issues such as necessitating bringing the vehicle back to the operating base, which may contribute to additional deadheading if vehicles currently do not return to the garage between runs. Strategic reblocking and scheduling to provide sufficient time between runs to charge vehicles could be a viable solution, depending if charging will be required based on modeling results.

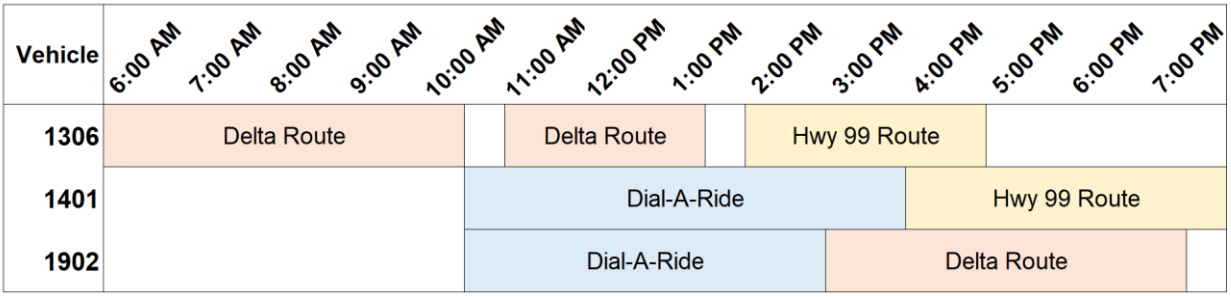


Figure 4-5: Example daily service schedule for cutaways

Because of how cutaways are scheduled, analyzing the range and distance limitations of ZEBs will be required to ensure that cutaways are scheduled in a way that they can complete their daily scheduled service, or that breaks are scheduled between runs that can accommodate enough time charging, without affecting the customer experience or service delivery.

Finally, it is important to look at deadheading to understand if it is significantly contributing to the overall service miles. If that is the case, determining strategies to minimize deadhead could be one option to make the ZEB transition easier and reduce the total daily miles that ZEBs need to travel.

For SCT Link, deadhead mileage is very minimal for runs and ranges between three and 15 miles at the vehicle level. For motorcoaches, deadhead equates to 9% of daily revenue miles, and deadhead averages 7% of daily revenue miles for services completed by cutaways. Overall, the deadheading completed by SCT Link vehicles is minimal and does not significantly contribute to overall daily service miles.

Table 4-4: Daily miles by service type

Service type	Total daily vehicle miles	% of systemwide miles	Daily revenue miles	Daily deadhead miles (mi; % of total mileage)
Dial-A-Ride	511	26%	470	41 (8%)
Delta Route	302	16%	293	9 (3%)
Galt-Sacramento Commuter Express	294	15%	270	24 (8%)
Hwy 99 Route	838	43%	811	27 (3%)
Total	1,945	100%	1,844	101 (5%)

Table 4-4 provides a summary of the distribution of daily miles by service type. Out of 1,945 total daily miles, close to half (43%) are completed on the Hwy 99 route, as expected since this route travels between Lodi and Sacramento all day. This route also displays impressively low deadhead mileage in comparison to total daily miles traveled. While DAR services constitute the most deadheading of any service (with 41 daily deadhead miles), it is still relatively minor in relation to total miles traveled (as deadhead is only 8% of the total daily mileage). DAR constitutes just over half (26%) of total daily vehicle miles, and the Delta Route and Galt-Sacramento Commuter Express service make up 16% and 15% of total daily vehicles miles, respectively.

Overall, this analysis shows that SCT Link does not operate service with significantly long runs or vehicle assignments and is operating a service that minimizes deadheading. Thus, the likely challenge for SCT Link could be more focused on the limited ZE options for the vehicle types operated, and determining the best scheduling strategy for cutaways with DAR service that can be unpredictable and varies day-to-day.

4.3.3 Disadvantaged Communities

CARB defines Section F of the rollout plan as "Providing Service in Disadvantaged Communities." Specifically, this section requires agencies to first identify if they provide service to any disadvantaged communities, and if so, to describe how the transit agency is planning to deploy ZEBs in these communities. Section F also provides a table where transit agencies have the option to provide an estimate of the number of buses to be deployed in each disadvantaged community and during what year. CARB does not provide additional guidance on the level of detail required when denoting the location of the disadvantaged community. However, as CalEnviroScreen defines a disadvantaged community at the census tract-level, it is assumed that listing by census tract is sufficient. An example of this table is provided in Table 4-5 below. This table is optional and not a required component of the rollout plan.

Table 4-5: Service in disadvantaged communities (example, optional component)

Timeline (Year)	Number of ZEBs	Location of Disadvantaged Community

The ICT utilizes information provided by CalEnviroScreen to identify disadvantaged communities. ICT regulation defines CalEnviroScreen as a mapping tool that is developed by the Office of Environmental Health Hazard Assessment (OEHHA) at the request of the California Environmental Protection Agency (CalEPA) to identify California's most pollution-burdened and vulnerable communities based on geographic, socioeconomic, public health, and environmental hazard criteria.[22]

CalEnviroScreen evaluates the burden of pollution from multiple sources in communities while accounting for potential vulnerability to the adverse effects of pollution to identify disadvantaged communities from a wide variety of factors to comprehensively assess the overall health of communities, down to the census tract level. Specifically, CalEnviroScreen identifies disadvantaged communities as census tracts which scored in the top 25% based on the factors used by CalEnviroScreen to assess pollution burden and vulnerability.

Figure 4-6 shows the score for each census tract in Sacramento County. The disadvantaged communities in the Sacramento County are shown in red. This map also features the areas considered EJ communities by Sacramento County, which also shows a significant overlap between these and CalEnviroScreen-defined disadvantaged communities. This makes sense, as CalEnciroScreen was one of the inputs included in determining EJ communities in Sacramento County.

[22] ICT specifies that the most recent version of CalEnviroScreen should be used, which at the time of writing was version 3.0 (found here: https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30).

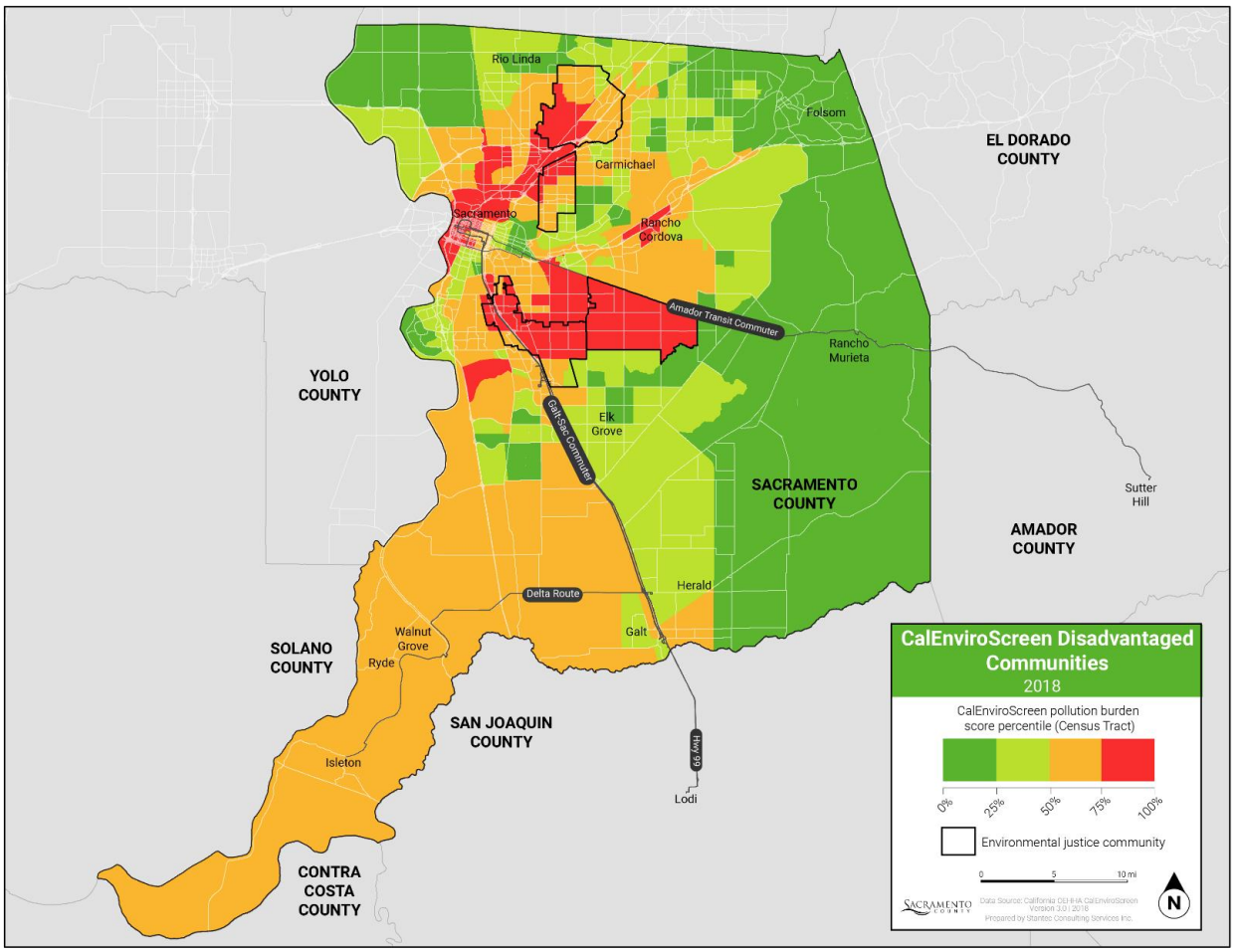


Figure 4-6: CalEnviroScreen disadvantaged communities in Sacramento County

Figure 4-7 shows that while there are disadvantaged communities in Sacramento County, there are none within SCT Link's local service area of Galt, Herald, and the Delta communities. The Hwy 99, GSCE, and Amador Transit Sacramento Express route all touch disadvantaged communities to the south or southeast of Sacramento and within downtown Sacramento. With this information, it can be determined that environment justice goals would be furthered if SCT Link prioritized ZEB deployment along these routes. Strategies to prioritize this deployment will be explored in greater detail in the final rollout plan, after modeling has been completed and a greater understanding SCT Link's ZEB fleet has been achieved.

4.4 Facility Assessment

This section provides an overview of the existing conditions of the infrastructure and facilities at SCT Link's operations and maintenance facility in Galt.

4.4.1 SCT Link Operating Base and Maintenance Facility

This section provides a high-level overview of the existing conditions of the infrastructure and facilities at SCT Link's yard, and also provides general guidance on what facilities and infrastructure may be required and/or considered as part of the agency's ZEB implementation plan. These preliminary considerations will

be built upon in greater detail in the implementation plan to outline required upgrades and modifications to support ZEB operations.

4.4.1.1 General Site Information

The SCT Link facility is located at 140 Enterprise Ct., Suite B in Galt (Figure 4-7). The transit agency's facility is located in a suite within light-industrial warehouse building owned by the City of Galt. The suite is roughly 15,000 square feet (as scaled from a Google map image) and consists of a large contiguous open building space, with a built-out suite of offices used for administration and dispatch, and a 'Mobile Mini' portable office inside the building that is used as a driver-break room. The facility houses fleet parking, employee parking, maintenance, administration, and operations, but does not including onsite fueling. The full fleet of 16 cutaway buses are tandem parked inside the building. Staff commented that this is a secure parking arrangement and results in the buses being less dirty and reduces paint fading. The three MCI over-the-road buses operated by SCT Link are parked outdoors nightly, along the south wall of the building.

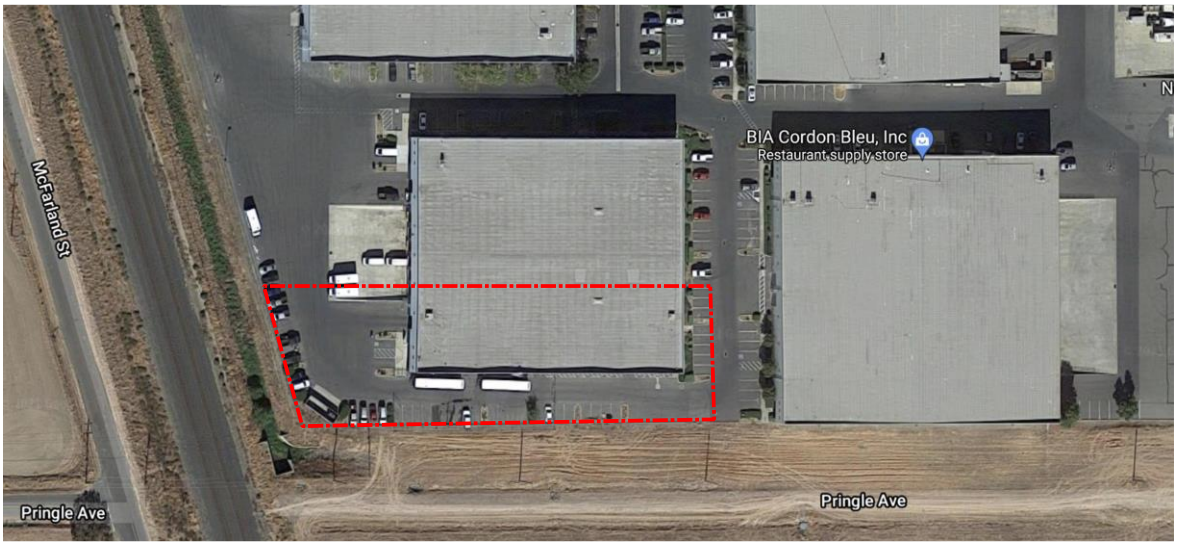


Figure 4-7: Aerial image of facility (Source: Google Maps)

4.4.1.2 Architectural & Maintenance Equipment

4.4.1.2.1 Summary

The actual building on the property was not specifically assessed as part of this report but appears to meet the needs for SCT Link's current operational and maintenance functions. The building has maintenance positions for cutaway vehicles which appear to be adequate for the current fleet. Maintenance on the coach buses is done offsite at a separate facility.

During overnight parking, the space is at a crush capacity with the cutaways filling the majority of the space. The open space is also used for storage of various equipment, tire storage, etc. around the perimeter of the facility (Figure 4-8). A single, surface-mounted lift is installed on the south side of the space. The ceiling in the space is very high, appears to be about 25-feet.

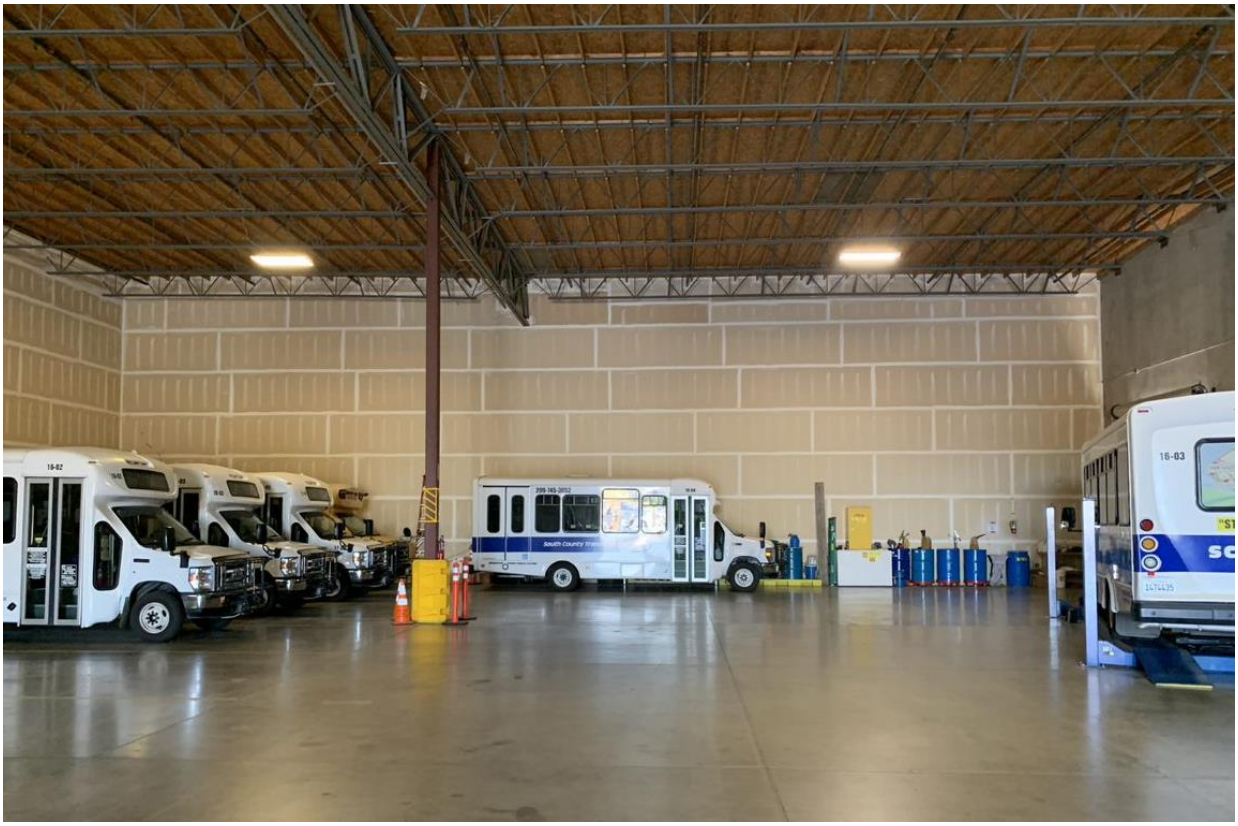


Figure 4-8: Interior vehicle storage and maintenance position

Building systems were not specifically assessed, however the building does not appear to have mechanical exhaust systems for the larger open space. HVAC is provided for the enclosed offices and restrooms. Fire sprinklers are present throughout the building. No gas or CO detection was observed.

4.4.1.2.2 Conditions

The facility and associated maintenance equipment appear to be in good working condition. The presence of an entire building exhaust system is lacking but a tailpipe exhaust system does currently exist. Lighting seems minimal and could be improved, particularly for maintenance and repair functions.

4.4.1.2.3 Preliminary Considerations

Limited improvements to the actual building would be required to accommodate either type of ZEB with the exception of the need to install an exhaust system and gas detection system in the case of implementation of FCEBs. In addition, the necessary tools and specialty diagnostic equipment would be required for either type of vehicle and would be implemented at the time staff are trained to service the particular vehicle.

4.4.1.3 Vehicle Service Cycle

4.4.1.3.1 Summary

Due to the size of the fleet, limited service-cycle infrastructure exists which is typical for transit agencies of this size. Fares are pulled by dispatch and driver in tandem. Cutaways are pulled right when they enter the

building. Fares from coaches are pulled in their parking spaces. Vehicle washing is done by hand adjacent to the building and an automatic, drive-through vehicle wash does not exist on the site. Each bus is washed manually at least one per week along the south side of the building.

Fueling infrastructure on the site is not currently present on the site.

As previously noted, cutaways are parked inside the building and coaches are parked outside adjacent to the building. Buses enter the facility from the east, along the south wall of the building.

4.4.1.3.2 Conditions

The current service cycle operations and functions appear to be suitable for SCT Link's current operations on the property. However, the facility is at its maximum capacity and additional vehicles are unlikely to be able to be accommodated with the current property and facility limits. During site visit it was discussed that the agency is considering expansion into an adjacent suite in the building.

Since no specific equipment exists for service cycle functions, additional assessment of the service facilities was not assessed[23].

4.4.1.3.3 Preliminary Considerations

The current site conditions and service cycle appear to be conducive for implementation of either BEBs or FCEBs. For BEBs, chargers and dispensers will need to be planned throughout the inside of the building and will likely require modifications to the current parking approach inside the building. Designated parking spaces for the larger coach buses would need to be developed to allow BEBs to park long term to charge. If FCEBs are utilized, no changes to the service cycle would be required if the hydrogen fueling station were located offsite comparable to the current offsite fueling scheme in use.

Due to the tight space constraints, there is limited space for optimization of the service cycle. However, future expansion potential into adjacent an adjacent suite may be a long-term solution.

4.4.1.4 Fueling Infrastructure

Facility currently does not have any fueling infrastructure onsite. Coaches fuel at a private Shell station approximately 20 miles away and are fueled by drivers. Cutaways are gasoline and fuel at the City facility in Galt on as-needed basis, at about half tank, and are also fueled by drivers.

4.4.1.5 Gas-Leak Detection System

Since SCT Link operates gasoline and diesel vehicles, the facilities do not have gas-leak detection systems, which would be expected for a CNG-fueled fleet.

If FCEBs are deployed, a new system to detect hydrogen gas leaks would be required. This system will need separate alarm lights that are distinct from the methane leak alarms (if any), as required by NFPA 72 (fire-alarm code).

[23] "Service cycle" refers to the daily routine a bus completes after finishing revenue service to prepare for the next day's revenue service, including refueling, interior cleaning, exterior washing, fare collection, and some minor maintenance checks.

4.4.1.6 *Electrical*

Electrical power is supplied to the SCT Link offices and bus yard complex from a pad mounted transformer located near the southeast corner of the building that is just north of the SCT Link building. The power is routed underground across the road between the buildings and into an electrical panel on the northeast exterior wall. Electrical service is from the overhead SMUD utility lines along Pringle Avenue.

The transformer (PG&E #TX-00126905) serving the building is rated at 500 kVA and transforms the incoming 12 kV power down to 480/277V. Power is supplied to the SCT building through a main outdoor panel that provides service to the various tenant spaces. A stepdown transformer in the SCT parts area east of the office area takes the power down to 120/208V. Wall-mounted distribution panels provide service to the SCT offices and service areas. The existing equipment appears to be in excellent condition.

Figure 4-9: Electrical switchgear

4.4.1.6.1 Conditions

The existing electrical distribution system appears to be in excellent condition and well maintained. Age of the equipment was not determined; but, based on the models of the electrical components it is anticipated that the system has a life expectancy of greater than 20 years before needing replacement. The system appears to be satisfactory for the current demands of the SCT Link operations.

4.4.1.6.2 Preliminary Considerations

The existing electrical system was designed to support the SCT Link office and bus storage area and the bus service operations, which is appropriate for the current requirements of the complex. Primary electrical demands in the office building are lighting, HVAC (in the office and temporary breakroom), and typical office support loads. The bus service area has an air compressor, a small exhaust removal fan, and a portable bus lift. The service area is located within the bus storage area.

The existing 120/208V electrical system is not adequate to serve the loads that would result from the addition of BEB chargers. BEB charger demands vary depending on model but demands often exceed 200 kW per charger and peak fleet charging demands greater than 1 MW are common. The chargers would require a new 480 V electrical service with a new service from PG&E. PG&E has 12 kV distribution lines along Pringle Avenue that could potentially feed a new 12 kV/480 V transformer that could provide service to the chargers. There is an additional PG&E circuit located to the north along Live Oak Avenue.

In addition to the new feed from PG&E, a BEB charging system would require new 480 V switchgear and a new electrical distribution system to serve the chargers.

4.4.2 General Maintenance Facility Considerations

4.4.2.1 Gas Detection and Ventilation Considerations

For a facility considering the implementation of FCEBs, a compliant gas-detection system will be required at the maintenance garage that would operate and maintain FCEBs, as well as in any enclosed building that a FCEB would enter. These systems are similar to those required at facilities that operate CNG buses and require similar ventilation requirements. These systems would be entirely new at the SCT Link facility since the agency does not currently operate CNG vehicles. The current exhaust system(s) were not specifically assessed but are noted as being inadequate for a vehicle repair facility. Any open-flame heating systems would also need to be replaced or removed.

4.4.2.2 Fire Protection Considerations

With the implementation of both FCEBs and BEBs, fire protection and life-safety concerns can be significant. However, due to the relatively new advent of these technologies, building and fire protection codes have not specifically addressed many of these concerns. The National Fire Protection Association (NFPA) 855 ‘Standard for the Installation of Stationary Energy Storage Systems’ is a standard that can potentially be applied to BEB storage, but this particular standard is certainly overkill relative to the capacity of the batteries onboard buses and is intended to be applicable for an indoor application/storage of battery energy storage systems. The need for enhanced fire protection systems has not been determined as a baseline requirement for BEB implementation and would be left up to the discretion of the local fire marshal and the local building officials. Early coordination with the local building authorities is highly recommended to understand their requirements and concerns.

4.4.2.3 Fall Protection and Safety Infrastructure Considerations

Safety is of paramount importance at all bus maintenance facilities and should be assessed at a very detailed level for any future facility modifications. A detailed safety assessment is outside the scope of this report, but assumptions can be made that a new fall protection system inside the building would be required for accessing equipment on the roof of the building. This requirement will not be going away with the implementation of FCEBs or BEBs and may even increase due to battery packs being located on the roof of vehicles. Regardless, equipment will likely continue to be located on the rooftop of vehicles, whether it

be batteries, fuel tanks, or air conditioners, and therefore the demand for additional fall arrest systems may be required in the future based on the work performed at the facility.

4.5 Summary & Key Takeaways

This volume of the report presented a comprehensive review of SCT Link's operating conditions and an assessment of the maintenance and operations facility as they pertain to the future ZEB transition. Major findings and takeaways from the existing conditions analysis that will affect the future steps of the ZEB transition plan include:

- SCT Link's fleet of cutaways and motorcoaches currently have fewer ZEB equivalents than standard 40' buses, and currently, no hydrogen options exist for either bus type. This inherently limits the future ZEB options available.
- A large portion of SCT Link's service is DAR service, which does not operate on a regular, consistent schedule and demand can vary day-to-day. Capturing this variability and ensuring that ZEBs will be able to complete service will be an important step in the modeling process.
- On average, motorcoaches travel approximately 150 miles on an average weekday, and cutaways (both fixed-route and DAR) travel an average of 121 miles, though cutaways can travel over 225 miles a day.
- There are no CalEnviroScreen-defined disadvantaged communities in SCT Link's service area, but both the Galt-Sacramento Commuter Express and Hwy 99 service touch disadvantaged communities south of Sacramento and in downtown Sacramento during their journeys.
- SCT Link's operations and maintenance facility appears to be in good working condition and currently meets the needs of its fleet. Limited improvements to the actual building would be required to accommodate either type of ZEB with the exception of a need to install an exhaust system and gas detection system in the case of FCEBs. Necessary tools and specialty diagnostic equipment would be required for either type of ZEB. Other than some space constraints, the site and current service cycle are conducive to the implementation of ZEBs, and an electrical system upgrade will be required to support the loads that would result from the addition of BEB chargers.

5 ENGAGEMENT AND STAKEHOLDER OUTREACH

Throughout the SRTP and ZEB planning process, multiple stakeholder and public outreach activities were conducted for riders and community members to provide input on how SCT Link can improve public transit services in South Sacramento County, specifically within and around the city of Galt and the Delta communities. A variety of engagement activities were held at different points in the project process, and different activities were held to capture feedback from a variety of audiences. The chapter provides a summary of the outreach conducted throughout the planning process:

- Virtual public workshop #1: A virtual public meeting was held in October 2021 to kick off and introduce the project to riders and the South Sacramento County community. The purpose of the meeting was to introduce the project purpose and timeline and to gain initial feedback from the community regarding current services: what is working well, what isn't working well, and how things can be improved. The intent of the meeting was to use the feedback to help provide insights into current travel and transit use.

- Survey: To obtain more targeted feedback, especially regarding strategies for service delivery in the Delta region, a survey was hosted online for over two weeks in January 2022. Paper copies of the survey were also provided during related ride-alongs and pop-ups around the Delta. In the survey, draft service concepts were introduced for each route/service and respondents were asked to rank their preference for each service improvement (such as more frequent service, later service hours, or extended weekend service). Respondents also provided information on where they travel most frequently and demographic information.

- Delta Region ride-alongs and pop ups: To help bolster survey responses and interest in the project, as an understand the travel behavior of the Delta communities and riders of the Delta Route, a variety of different in-person outreach activities were held in the Delta region. Activities included a day of ride-alongs on the Delta Route and pop-ups at different community events in the Delta region. Paper copies of the survey were also provided at these events.

- Virtua public workshop #2 and pop up: A virtual public meeting held via Zoom in May 2022 to present the proposed service recommendations and solicit feedback from the South Sacramento County community. The workshop was designed to collect feedback on community support, with workshop attendees answered polls regarding their support of each major service recommendation. Two weeks prior to the workshop, a pop up was held in Galt at the Saturday Market to promote the virtual workshop as well as solicit feedback on the proposed service recommendations.

5.1 Virtual Public Workshop #1

Introducing the SRTP and ZEB plan, County of Sacramento held a Virtual Community Workshop to solicit input from community members and transit riders on ways to improve transit in South and East Sacramento County. Outreach to promote the workshop included: direct emails to more than 550 community members signed up to receive SRTP/ZEB project and SCT Link updates, social media strategies included posts on Sacramento County's Facebook account, and targeted Facebook ads on Facebook and Instagram towards users in South and East County, with physical flyers sent along with County utility bills, posted aboard SCT Link's transit services, and distributed to over 80 community organizations.

Held on Wednesday, October 6, 2021, the workshop was attended by 15 attendees via Zoom; live polls were used to collect information from attendees. Demographics of attendees included: 58% from South Sacramento, 34% from other areas, and 8% from Galt. It should be noted demographics included one

attendee did not own a computer and joined via phone, and one there was one attendee with visual impairments present. All attendees responded that they predominantly get where they want to go by car. Presenting from Sacramento County, Mikki McDaniel provided background information on SCT Link services in the East part of Sacramento County and the challenges created by the COVID-19 pandemic. David Verbich from Stantec provided an overview of the Short-Range Transit Plan's purpose and goals including challenges presented by the area serviced by SCT Link.

Open group discussion about the current challenges and opportunities to improve the transit service was facilitated by Gladys Cornell of AIM. Discussion centered around themes of **increasing accessibility for riders, improving cleanliness and safety on buses or at bus stops, as well as better dissemination of information about route and bus changes**. Suggestions also included: earlier route options on major corridors with more flagged stops or connections with other systems, improved trip planning app, and responsiveness of drivers. In addition to existing system improvements, a daily car rental program was suggested as an alternative mobility solution. See Appendix A: Combined Comments from Delta Outreach for the full list of comments received.

Overall, this initial outreach event served as data gathering to understand travel and transit usage in Sacramento County and to help provide context to the analyses conducted throughout the planning process.

5.2 Delta Outreach Activities

Outreach in the Delta was conducted by AIM Consulting in partnership with Sacramento County through three in-person events:

- Pop Up 1 held on Tuesday, January 11, 2022, in front of the food distribution center in Isleton.
- Ride-Alongs (3) on the Delta Route Thursday, January 13, 2022, departing Galt City Hall at 8:20am.
- Pop up 2 held on Friday, January 21, 2022, in front of the Isleton Library that shares space with Isleton Elementary School.

All three events included surveying attendees on the SCT Link Survey; answers were included in the survey results discussed in Section 5.3. The responses from each event are as follows:

- Pop Up 1: 11 survey responses, five surveys in Spanish, and a total of 25 people.
- Ride-Alongs (3): four passengers gave feedback and completed surveys.
- Pop Up 2: 12 survey responses, three surveys in Spanish, in total 35 people were talked to.

From the ride-alongs, AIM staff talked to passengers using the Delta Route for shopping, commuting, and medical visits. One passenger was picked up from her house in Isleton on a detour she requests two times a week, another from Galt City Hall, and the other two passengers boarded at bus stops in Walnut Grove. All three passengers (of those available) ranked microtransit as their preferred mobility improvement. Two passengers indicated more fixed route service as their next preference. Car sharing was ranked second by the third passenger. Two passengers indicated a desire for later service; one to reduce his use of an Uber or Lyft for the return journey, and the other to eliminate their need to change their schedule to be let out of work earlier.

5.3 Survey

Between January 10 and January 26, 2022, an online survey was open to both riders and non-riders to receive feedback from the South Sacramento County community regarding SCT Link and travel behavior in the South County area. In particular, we were interested in gathering feedback on service concepts regarding the Delta service since the current fixed-route service is unproductive.

Survey information was distributed via a bilingual postcard with unique links/QR codes for English and Spanish versions. Sent to the Delta region, 2,584 households across three ZIP codes received postcards by Tuesday, January 11 (Figure 5-1). A copy of the survey and results is included as Appendix B: Community Survey—Instrument and Findings.

Figure 5-1: Survey postcard

In addition to physical mailers, SacDOT and project databases were sourced (1,479 subscribers to SCT Link and 1,128 to SRT/ZEB Plan GovDelivery lists) to send emails and texts about the SCT Link survey. Physical flyers displaying survey information, link, and QR code were posted on SCT Link buses and in bus shelters. In addition to the online survey, hard copies of the survey were available at several locations in the community and during in-person ride-alongs collected along the Delta route on Thursday, January 13. A total of 56 surveys were collected during this time; 84% of responses were in English, with the remaining 16% of responses in Spanish.

5.3.1 Travel Behavior

The first series of questions asked respondents to list three places they travel to most often in the Sacramento region. Each write-in option was followed by a question about how often they travel to that

place. Overwhelmingly, destinations were shopping and grocery stores, in particular: Walmart, Raley's, Sam's Club, Laguna Boulevard in Elk Grove, and Costco. Other specific destinations included medical and government centers: Kaiser Elk Grove, Sutter Downtown Sacramento, Courthouse, and the consulate[24].

Table 5-1: Survey respondent top destinations

Rank	Destination	Frequency
1	Elk Grove	30
2	Galt	21
3	Downtown Sacramento	15
4	Lodi	14
5	Rio Vista	7
6	Midtown Sacramento	7
7	Florin Road	6

To understand travel patterns, data from each respondent was compiled to identify their home location and their top three most frequent destinations, as well as how often they stated they traveled to each of the three destinations (Table 5-2). The full list of responses can be found in Appendix C: Full List of Origins and Destinations.

Due to the bulk of outreach activities located in the Delta Region, those communities (Isleton, Walnut Grove) represent a large portion of responses. Respondents from those communities largely indicated travel to Downtown Sacramento and Lodi less than three days a week, which may indicate the need to travel regularly to these more populated areas for services and shopping opportunities. Some Isleton respondents indicated they work in Rio Vista and the frequency of travel from Isleton to Rio Visa suggests Rio Vista may be an employment destination for residents in Isleton and other Delta communities.

Table 5-2: Most frequent destinations by origin

Origin	Destination	Less than 3 days a week	3-5 days a week	More than 5 days a week	Grand Total
Isleton	Downtown Sacramento	6	1	0	7
Isleton	Lodi	7	0	0	7
Isleton	Rio Vista	1	5	0	6
Walnut Grove	Downtown Sacramento	4	2	0	6
Walnut Grove	Elk Grove	1	4	0	5
Galt	Downtown Sacramento	0	4	0	4
Isleton	Galt	4	0	0	4
Walnut Grove	Kaiser - South Sacramento	4	0	0	4
Walnut Grove	Laguna, Elk Grove	4	0	0	4

Figure 5-2 shows the frequency of destinations by origin location. For example, destinations colored in red have origins in Walnut Grove, yellow have origins in Isleton, and so forth. Overall, this information shows that survey respondents travel to many destinations in different parts of the service area, and while some destinations are close to or within the same origin area, many are in different parts of the county or in neighboring counties, including destinations in Lodi and Rio Vista.

[24] No specific consulate was mentioned by the respondent.

While destinations include many places that SCT Link provides service to, this reinforces the Replica cell phone travel data presented in the draft service concepts memo, showing that people living in the county travel to many different destinations, and while some of them can be reached via SCT Link, in many cases a transit trip (as schedules currently stand) will take longer than driving.

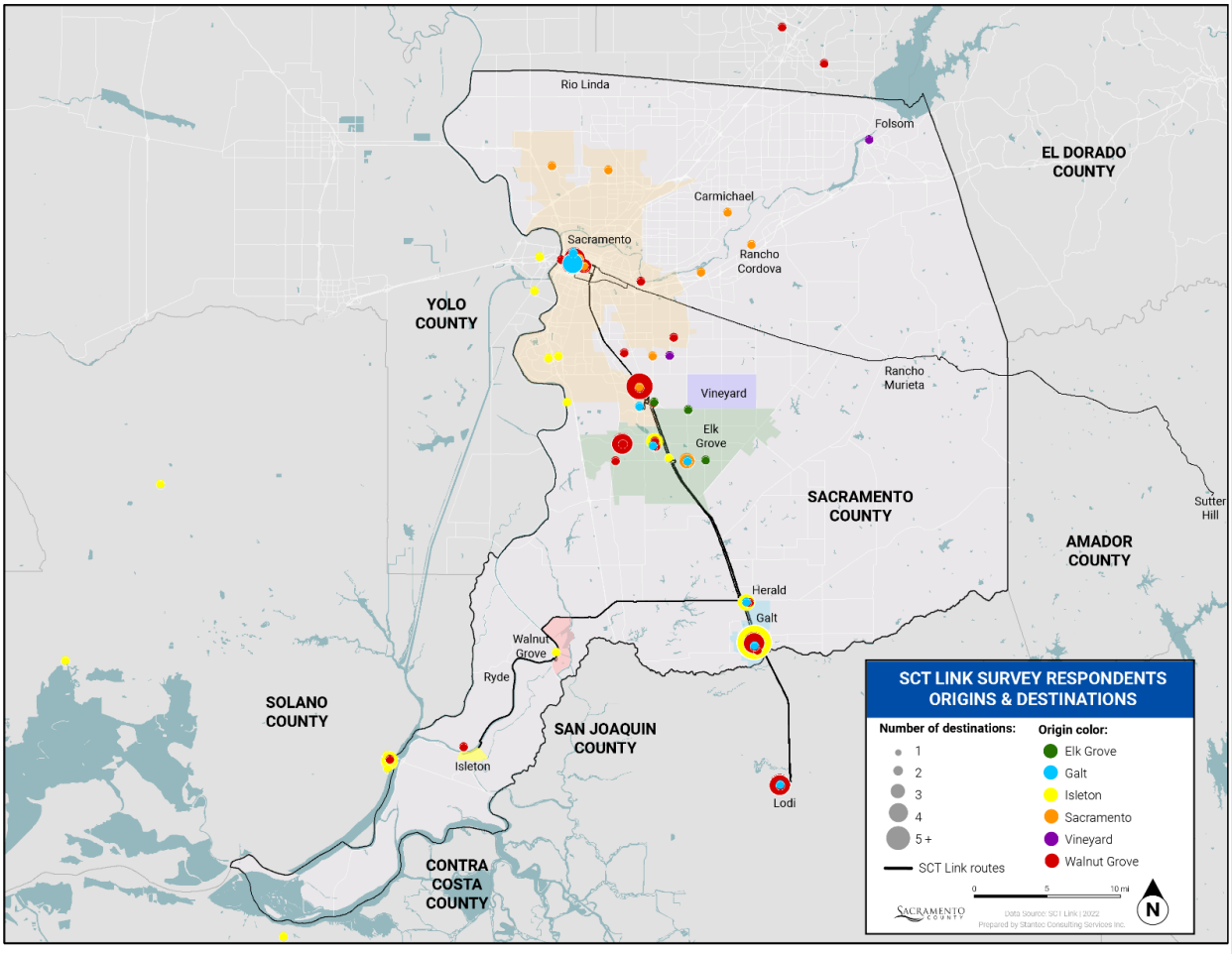


Figure 5-2: Origins and destinations of survey respondents

5.3.2 Route Improvements

The second section of the SCT Link Survey asked respondents questions about their use of the four routes or services provided by SCT Link.

5.3.2.1 Delta Route

Question 7 asked respondents how they travel when the route is not operating to understand the alternatives available for Delta residents. While 73% of respondents indicated they do ride the Delta Route, most (64%) who do ride would drive their own car when the service is not operating. Of other travel options, 14% indicated they would get a lift from a friend or family member, 6% use a taxi or Uber/Lyft, and most of the remaining 17% wouldn't travel at all. This finding suggests that most Delta residents have other options

for traveling, but of those “other” respondents most indicated they wouldn’t travel if SCT Link wasn’t operating service, showing that this is an important lifeline service for some people living in the Delta region.

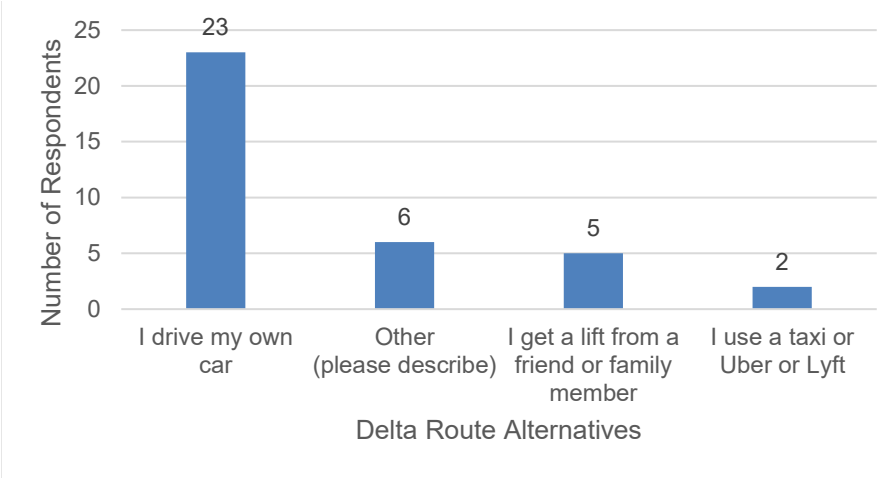
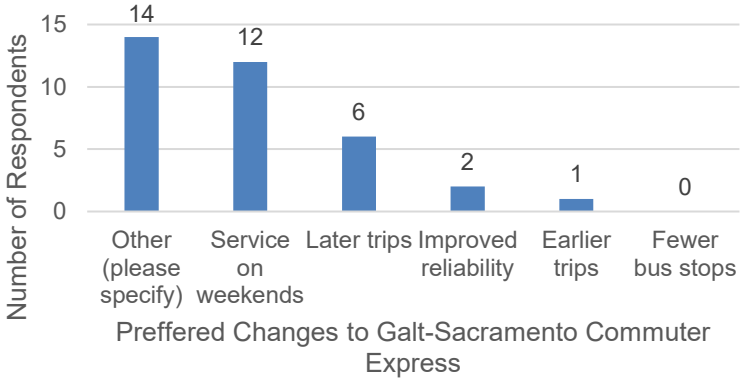


Figure 5-3: Delta Route alternatives

5.3.2.2 *Galt-Sacramento Commuter Express*

Question 8 asked respondents that ride the GSCE what changes could make them ride more often or make it easier to ride.

Most respondents (55%) did not use the route but of those who did, up to three responses were solicited. Service on weekends was the preferred change (12 supportive responses), and later trips received six supportive responses. Of respondents who ride the GSCE, 14 provided other specified responses ranging from increased service throughout the day to addressing safety and security concerns. SCT Link only operates GSCE service on weekdays, which typically aligns with commutes; however, a clear desire to travel on weekends to Sacramento emerged from this survey.



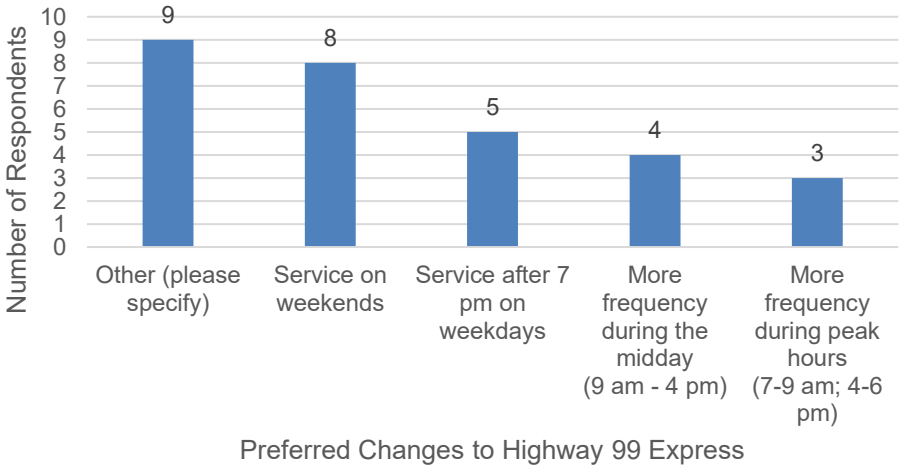
"Other" Responses	
Larger service area	3
More frequent service	2
Later trips	2
No change	2
Improved reliability	1
Safer	1
Total	14

Figure 5-4: Galt-Sacramento Commuter Express preferred changes

5.3.2.3 *Hwy 99 Express*

Question 9 asked respondents to make no more than three selections on what changes would make them ride more often or make it easier to ride.

Respondents who do ride the Highway 99 (45%) did not have a clear preference in improvements. Service on weekends received eight supportive responses, echoing the response in the GSCE question. Evening service after 7pm on weekdays received five supportive responses, more frequent service during the midday received four, and more frequent service during the peak hours received three selections. Of the responses that selected "Other," two indicated changes to service locations (for example, the Costco at Reynolds Ranch in Lodi) and another desired a safer service.

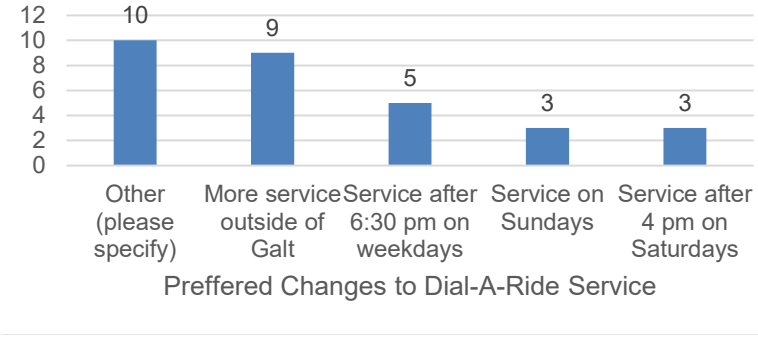


"Other" Responses	
Larger service area	3
Safer	1
No Change	1

Figure 5-5: Highway 99 Route preferred changes

5.3.2.4 Dial-A-Ride Service

Question 10 asked respondents that use DAR what changes could make them ride more often or make it easier for them to ride. Nineteen people responded that they use DAR and selected up to three options for improving the service, as shown in Figure 5-6. More service outside of Galt received 9 supportive responses. Service on Sundays, service after 6:30pm on weekdays, and service after 4pm on Saturdays all received between three and five supportive responses. Ten respondents chose "Other," and wrote in their comments, which reflected a desire for an extended service area. For example, "service a Sacramento," (service to Sacramento) another wrote, "mas lugares" (more destinations), and someone suggested service to Lodi.



"Other" Responses
Extended Lodi service to shopping at Lower Sac/Kettleman Rd., AND Costco shopping at Reynolds Ranch Rd. Extra fare acceptable/expected
mas lugares 'more destinations'
Dial a Ride does not service my area
I don't know how this works I will have to figure it out to see if it works for me.
does it come to Isleton?
servicio a Sacramento 'Service to Sacramento'

Figure 5-6: Dial-A-Ride preferred changes

5.3.3 Mobility Improvements

The third section of the SCT Link Survey asked for ranked improvements to mobility specifically in the Delta and solicited any other comments on how to improve SCT Link services.

Question 11 asked respondents to rank four mobility options for the Delta region, from 1 (most preferred) to 4 (least preferred). Table 5-3 includes the four options, their descriptions, and the weighted average of their scores from respondents.

New Mobility Option	Description	Image	Weighted Score*
Microtransit	On demand, meaning that customers would reserve a trip ahead of time (via phone or app), like Dial-a-Ride, but a wider service area.		2.92
Fixed Schedule	SCT Link could offer trips to different parts of the County on different weekdays. For example, SCT Link could offer direct trips from the Delta to downtown Sacramento on Tuesdays and Thursdays, and trips to Galt on Mondays, Wednesdays, and Fridays. Customers would call SCT Link to reserve a trip on the specific day for the destination they want.		2.80
Carsharing	SCT Link could provide a fleet of cars (possibly electric cars) that customers in the Delta could reserve and then use to get around.		2.63
Volunteer Incentive	SCT Link could offer mileage reimbursement to compensate ADA-certified passengers' friends and neighbors for providing them with transportation assistance.		1.66

Table 5-3: Ranked mobility improvements in the Delta

*The answer choice with the largest average ranking is the most preferred choice. The average ranking is calculated by summing the product of each ranked position weight by the response count for that ranking and dividing the sum by the number of total responses. Weights were assigned as follows: #1 choice = weight of 4; #2 choice = weight of 3; #3 choice = weight of 2; #4 choice = weight of 1

As shown in Table 5-3, microtransit received the highest average ranking. Eighteen respondents gave microtransit first rank and another 18 gave it second rank. Fixed schedule was a close second to microtransit, with an average ranking of 2.80. Fourteen respondents gave fixed schedule first rank and another 18 gave it second rank.

It is worth noting that there was a difference between respondents to the English language survey and the Spanish language survey on this question. While 42 people responded to the English version and only nine to the Spanish version, the Spanish language respondents had a stronger preference for the fixed schedule option. Among respondents to that version of the survey, fixed schedule received a weighted score of 3.22 compared to 2.78 for microtransit. English language respondents preferred microtransit, with a weighted score of 2.95 compared to fixed schedule with 2.71.

5.3.4 Other Suggestions for Improved Service

General comments received from all outreach activities tended to focus on expanded service and later service, but also included health and safety concerns as well as desire for more information about services. A list of all responses is included in Appendix A: Combined Comments from Delta Outreach.

- **Expanded Service:** overwhelmingly respondents wanted expanded service with 28 requests. Six respondents requested expansions into the Delta Loop area, five respondents wanted connections to other services (Amtrak, BART/Bay Area). Other areas mentioned included Elk Grove (2), Isleton (3), and Fairfield (2). Areas also mentioned in requests for expanded service included Lodi, Ox Bow Marina, Rio Vista, Vacaville, Vineyard, and Walnut Grove.

- **Later Service:** later service was desired from three respondents, weekend service by two respondents, with specific requests to reinstate the 4:20pm and 5:20pm trips from two separate respondents.

- **Information:** requests for better information and an overall lack of awareness about SCT Link services were noted by six respondents, one of which wanted information regarding stops.

- **Health and Safety:** A small portion of respondents (three) were concerned about safety on services with one specifically concerned about COVID-19.

5.3.5 Respondent Demographics

The final portion of the SCT Link Survey asked respondents questions related to demographics. Almost a quarter of respondents (23%) said they did not have access to a car. Due to most outreach activities focused on the Delta, communities of Isleton, Walnut Grove, and Galt had the highest representation, as shown in Table 5-4. While a third of respondents preferred not to state their household income, nearly 20% of respondents reported a household income of $80,000 or more.

Respondents largely identified as “Non-Hispanic White” (56%) with Hispanic/Latinx representing the next largest race/ethnicity as a quarter of respondents (25%). African-American/Black (2%), Asian/Pacific Islander (7%), Multiracial (5%), and Native American (5%) made up the remaining responses. As previously mentioned, of the 56 survey responses, nine were responded in Spanish (16%) and the remaining 47 were in English (84%).

Table 5-4: Survey respondent demographics

Car Access	No	23.1%
	Yes	76.9%
Ethnicity	African-American/Black	1.8%
	Asian/Pacific Islander	5.4%
	Hispanic/Latinx	19.6%
	Multiracial	3.6%
	Native American	3.6%
	Non-Hispanic White	42.9%
	Prefer not to say	23.2%
Household Income	Less than $20,000	12.5%
	$20,000 to $39,1000	14.3%
	$40,000 to $59,1000	5.4%
	$40,000 to $59,999	10.7%
	$60,000 to $79,1000	3.6%
	$80,000 or more	19.6%
	Don't know/Prefer not to say	33.9%
Community	Elk Grove	1.8%
	Galt	12.7%
	Isleton	43.6%
	Rio Vista	1.8%
	Sacramento	9.1%
	Vineyard	1.8%
	Walnut Grove	29.1%

5.4 Virtual Public Workshop #2 and Galt Pop-Up

Following the various outreach and engagement activities aimed at gathering information about what riders and the community think about SCT Link service and how it could be improved and thoughts on draft service concepts, two final engagement events were held to present the draft service plan and supporting recommendations to solicit public feedback. These events consisted of an in-person pop-up in Galt and a virtual community workshop.

To wrap up in-person engagement activities, a final pop-up event was held on May 7th, 2022 at the Saturday Market during the Cinco de Mayo Celebration on 4th Street Promenade in Galt. AIM staff engaged with 29 people and received feedback on the SRTP from three of those people. Overall, the feedback was favorable towards proposed increases in GSCE service and transitioning the Delta fixed-route to a demand-response model similar to the service delivery in Galt, but concerns around the quality (cleanliness and safety) of fixed-route services were noted. Younger people were more excited about DAR whereas those older, more transit-dependent riders held reservations about a shift towards DAR potentially reducing the fixed-route services they rely on. Clearly, marketing and communication will be needed if SCT Link transitions from a fixed-route service to a DAR/demand-response model in the Delta to ensure a smooth transition and that customers are properly informed of the benefits to this model and how to execute a journey.

In concluding the community engagement activities associated with the SRTP, a virtual community workshop was held via Zoom on May 19th, 2022, from 5:30 pm to 7:00 pm. The purpose of the workshop was to share the proposed service changes with the community and collect their feedback. The workshop had nine participants and included seven questions asked to attendees via a live poll.

Commencing with an overview of the workshop and meeting agenda, AIM staff facilitated a live poll of questions 1 and 2.

- Question 1 asked attendees about their main travel mode and all three respondents indicated car.
- Question 2 inquired about SCT Link use with two of the three respondents indicating they use SCT Link services.

Sacramento County staff provided background on SCT Link, the routes it operates, and challenges around ridership and cost the transit provider has encountered due to the COVID-19 pandemic. An overview of the SRTP and the goals associated with the project were discussed. Feedback from previous outreach activities was then described by Stantec staff. This included a discussion of the survey results regarding travel behavior and service improvement preferences.

Next, Stantec staff provided details of the proposed service plan for each route or service operated by SCT Link. After each route and the proposed recommendations, a poll was conducted whether attendees supported the recommendation.

- The first recommendation presented discontinuing service in Rancho Murieta on Amador Transit's Route 1 to Sacramento and reallocating those resources to other SCT Link service. Two of the three respondents supported this recommendation. The attendee who voted 'no' was a representative of Amador Transit, and explained their agency is seeing a small increase ridership on that service.
- The second recommendation pertained to increasing service on the GSCE route. All four respondents supported this recommendation. Regarding the permanence of this change, an attendee asked how long proposed changes would be implemented before elimination if unsuccessful. Staff responded that changes would be funded for a year before re-evaluation.
- Recommendations for service adjustments to the Highway 99 route were outlined with two of the four respondents supporting the recommendations. Inquiring about potential fare increases as a result of implementing the recommended service enhancements, a resident went on to express their appreciation for the service SCT Link provides.
- DAR recommendations for expanded service were supported by all four respondents. A question about eligibility was asked by an attendee. Staff responded that DAR is open to the general public but children under 4 years old need to be accompanied by someone 16 years or older.
- The final service recommendation regarded shifting the Delta fixed-route and Galt DAR services to a microtransit service across both service areas. A description of microtransit was provided and all four respondents indicated their support. An attendee asked if rides could be requested via desktop computer and staff responded that rides could be requested via desktop computer.

In concluding this section, Stantec staff outlined the supporting recommendations including a marketing and communications plan, partnerships to improve bus stops, travel and mobility training, and a volunteer driver program.

Stantec staff then provided an update on the ZEB Plan and explained the goal that by 2040, SCT Link's entire fleet would be 100% zero emissions. County staff wrapped up the workshop with a list of next steps and a timeline of the SRTP including a final plan by early summer and adoption by the County Board of Supervisors in early fall 2022.

5.5 Summary of Engagement and Outreach

Throughout the SRTP, engagement with community members and stakeholders played a critical role in framing the plan, its development, and understanding support for the recommendations. Outreach involved four distinctly different methods of engagement for a total of seven activities commencing with the first virtual workshop in October 2021 and culminating in the second virtual workshop in May 2022. Pop-up events, ride-alongs, and a survey informed the SRTP process, influencing recommended service changes.

The initial virtual workshop in October 2021 provided a starting point for community engagement. Through presenting the current challenges SCT Link faces, as well as opportunities, a discussion around alternative service delivery and community perception of transit needs was facilitated. Increasing accessibility for riders, improving cleanliness and safety on buses or at bus stops, as well as better dissemination of information about route and bus changes were key takeaways from workshop participation.

As COVID-19 restrictions began to ease in early 2022, in-person events including the pop-ups and ride-alongs offered opportunities to promote the SRTP while gathering information about the transit needs and preferences of community members and riders in the SCT Link service area. Through these efforts as well as physical and digital marketing, over 1,350 people were signed up to receive project email updates for the SRTP/ZEB project and SCT Link updates. In addition to in-person interaction, responses to the SCT Link Survey were collected at these events.

The SCT Link Survey collected 56 responses, providing data on travel behavior, concerns regarding SCT Link routes, and preferences on service adjustments; 84% of responses were in English, with the remaining 16% of responses in Spanish. Using ranked destinations and frequency, key travel patterns within the region were identified. Specific route changes that collected the most responses centered around improvements like weekend and later service. These preferences reflect the limited span of service currently operated by SCT Link as a mainly weekday service terminating in the early evening. Regionally, SacRT is investing in more weekend and evening service, demonstrating the regional needs to transit service to match travel patterns beyond the weekend commute. Bringing all the community feedback together, service recommendations were created that addressed or complemented takeaways from community outreach. Engagement concluded with the second virtual workshop where recommendations were presented to the community and feedback was solicited. Responses to the polls and feedback gathered from the second pop-up were largely supportive. Minor opposition to the reallocation of the Amador Transit funds and modification to the Hwy 99 Express was expressed, though an attendee noted they only held reservations about the increased Hwy 99 service if it resulted in increased fares and supports the recommendation otherwise. Overall, the community was responsive and supportive of the proposed recommendations.

6 GAPS AND OPPORTUNITIES ASSESSMENT AND GOAL DEVELOPMENT

A key step in the development of SCT Link's SRTP is identifying gaps, needs, and opportunities for mobility in the South Sacramento County communities and for the agency itself. By assessing feedback from our community and stakeholder outreach, together with the existing conditions analysis and an assessment of prior and concurrent local and regional planning documents, we identified gaps in SCT Link's service, identified areas of strength, as well as areas in need of improvement. Gap identification helps to identify objectives and goals for the SRTP.

The needs are organized by major theme and will provide a framework for the development of service concepts and supporting recommendations as the final steps in the planning process.

6.1 Methodology

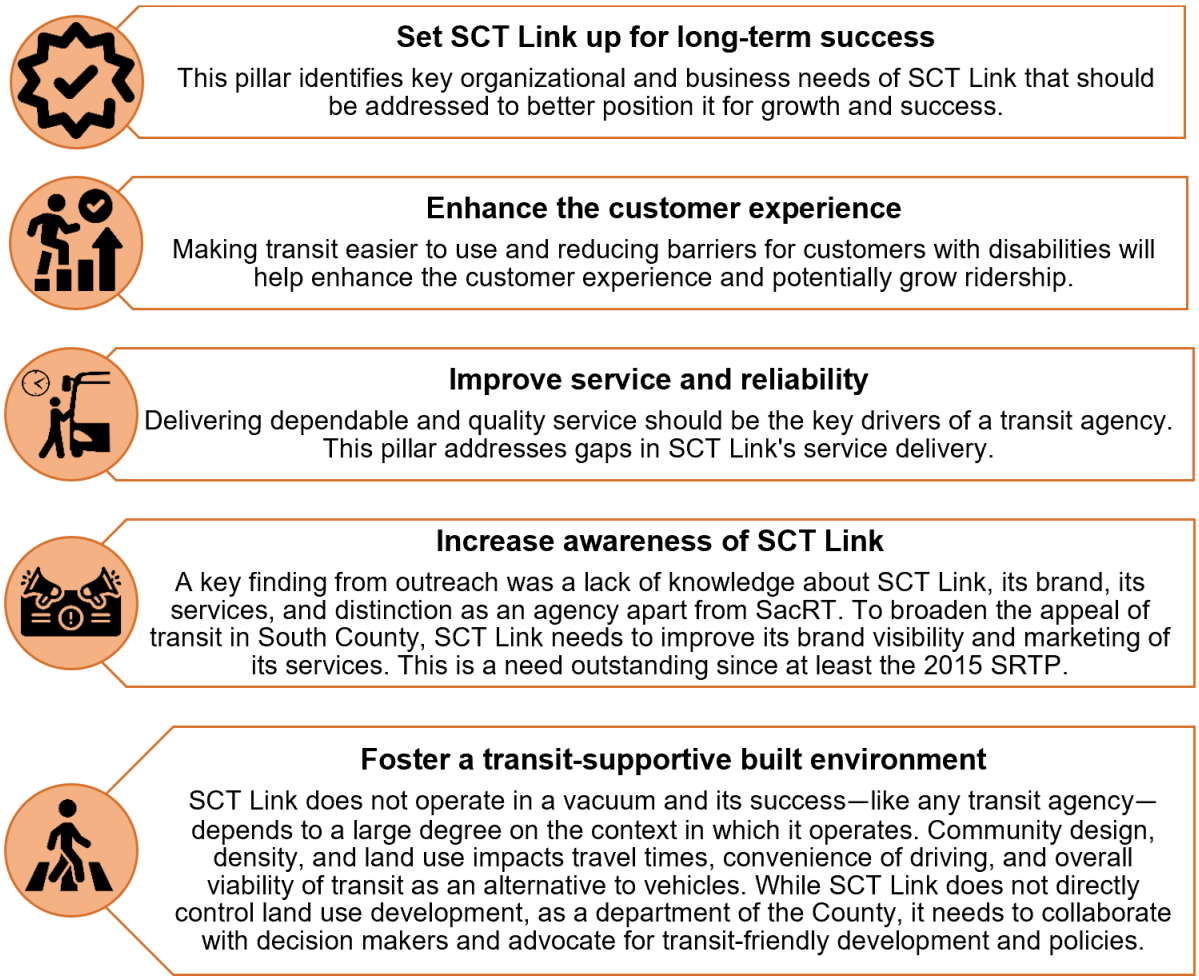
To develop the needs assessment, we first started with a strengths, weaknesses, opportunities, and challenges (SWOC) analysis of SCT Link as an agency, its service area, and its current operations and service delivery. A SWOC analysis is beneficial at highlighting both internal attributes (strengths and weaknesses) and external factors (opportunities and challenges). The SWOC analysis is summarized in Table 6-1. This SWOC analysis was workshopped and refined with input from SCT Link staff.

Table 6-1: SWOC Analysis.

	Factors likely to lead to positive change and further improvement	Factors which may compromise further improvement
Internal	**Strengths**	**Weaknesses**
	• Cost of service has been contained, and is favorable compared to peer agencies • Dial-a-ride program has good productivity for a demand-response service model in a rural/suburban area • GSCE ridership had been growing (pre-pandemic)	• Lack of the ability to actively oversee operations and service delivery • Lack of tracking and reporting of key performance indicators (KPIs) on a regular basis • Lack of awareness of the service/brand, and distinction from regional partners (e.g., SacRT) • Low frequency of services • On-time performance and transfer challenges • Inconsistent fares • Website is non-accessible and generally difficult to navigate and get trip planning info • East County service (route 1) is often overlooked • Lack of customer information • Revenue hours are not interchangeable between cutaway and non-cutaway service
External	**Opportunities**	**Challenges**
	• Reimagine service to the Delta • Regional focus on improving transit through the SACOG NextGen Transit study • Capitalize on positive marketing of ZEBs • Connect Card architecture and data • Improvements to active transportation facilities	• Low density, low walkability, and overall hostile environment for transit use • COVID-19 impacts (weak spending, loss of jobs, work from home, operator recruitment/retention challenges, etc.) • Dependent on the State for funding—no local funding (other than Galt)

Based on the SWOC analysis, the Stantec team identified five pillars to guide the SRTP development (Figure 6-1):

Figure 6-1: Pillars of SCT Link's needs assessment



The pillars along with gaps and needs were workshopped with SCT Link staff. During the workshop, we refined, confirmed, and added new gaps to each of the pillars. This collaborative and iterative process helped develop the assessment presented in the subsequent sections.

6.2 Pillar 1 – Set SCT Link Up for Long-Term Success

SCT Link is a small rural operator and part of the County's DOT. Its service, like many agencies across California, is operated by a third-party contractor that is responsible for operating service and maintaining assets. All other functions, like planning, marketing, oversight, rely to a very large extent on a limited number of County staff.

However, the role of supervisor to the third-party contractor is not a full-time position. And while the operations are small, vigilance and oversight are not the only role a transit manager or supervisor is expected to play. In fact, to constantly improve service, ensure that service delivery is as reported, and to plan and grow effectively, even for a small agency, more time than 0.5 full-time equivalent (FTE) is required.

The gaps and needs in Table 6-2 are aimed at helping SCT Link management pivot from an oversight and reactive role to a more proactive and deliberate mobility provider in South Sacramento County.

Table 6-2: Pillar 1—Gaps and Needs.

Need/gap	Why?	Priority	Considerations
Develop agency-wide mission statement	Mission statements help to guide the agency and unite the agency under a common vision for success. A mission statement is also important to clearly communicate to the public what the agency prioritizes in providing transit service.	High	A mission statement can provide strategic direction for future service changes and can prioritize how to best use limited resources. Mission statements can have many forms and iterations, but all should effectively communicate the strategic goals and priorities of the agency clearly and in a straightforward manner. The most effective mission statements communicate agency values and priorities succinctly and concisely.
Implement a zero-emission bus plan and gradually transition to a fully electric fleet by 2040	Under the CARB ICT mandate, all transit agencies in the state, including SCT Link, are required to develop a ZEB rollout plan and gradually transition to a zero-emission fleet by 2040. This need addresses the requirement to develop a rollout plan, and also to implement the rollout plan and transition to a zero-emission fleet, which will allow SCT Link to invest in a clean technology that will improve air quality and decrease greenhouse gas emissions.	High	Transitioning to a zero-emission fleet will help to decrease greenhouse gas emissions, improve local air quality, and provide a more pleasant rider and operator experience. Transitioning to zero-emission vehicles requires a significant financial investment for vehicle purchases and the associated charging and fueling infrastructure. After development of the rollout plan (a component of this study), SCT Link will need to implement the plan, which includes seeking out and applying for funding to assist with the capital expenses related to the transition, and continuing to update the plan as technology continues to improve.
Improve internal reporting and performance tracking	Better reporting (more detailed and disaggregated) from the contractor is needed to accurately track system performance and service reliability. Specifically, this includes tracking on-time performance across all services (disaggregated and by route/trip), and provide daily metrics broken down by time bands and by mode, and other KPIs such as unaccommodated trips for dial-a-ride service. In addition, examine the possibility of examining on-street supervisors.	High	Requires active oversight of the contractor to ensure reporting and performance tracking is accurate and continues to be accurate over time. Understanding the day-to-day system performance in detail can also help to pinpoint weaknesses in the system so that they can be improved. New technology like automatic vehicle locators (AVLs) to track vehicles and generate on-time performance reports are needed, since current KPIs are self-reported by operators. Aligning KPIs from contract terms with monthly reports is also needed.

Need/gap	Why?	Priority	Considerations
Adjust contractor responsibilities	It is important to hold the contractor to high standards to make sure high-quality service is being provided. Specifically, develop contract with incentives for performance, stipulate service standards, require disaggregated monthly reports, and require the contractor employ advanced technology that is capable of tracking the required data at the required level of detail.	Medium	Requires active oversight of the contractor to ensure that responsibilities are being fulfilled and hold contractor to higher standards. One benefit of implementing this and having more active oversight will be developing a better understanding of how service is day-to-day, which will help to more easily identify ways to improve service.
Achieve 1 FTE devoted to contract oversight, planning, etc. (maybe 0.5 FTE+ in the future)	Hire an additional FTE to achieve 1 FTE dedicated to SCT Link, including planning, contractor oversight, and help implement and follow-through with the gaps and needs addressed in this report. This need was identified in the 2016 SRTP and is still unmet.	Medium	Together with existing staff, this FTE can focus on meeting on a regular basis with operator to track KPIs, proactively address service issues, respond to customer inquiries, assist with strategic planning, plan new service, help with marketing and awareness, make sure website stays up-to-date, etc. Requires increased costs to pay for the additional FTE.

6.3 Pillar 2 – Enhance the Customer Experience

This pillar of opportunity seeks to identify the needs of SCT Link's customers, such as consistency and transparency of service guidelines or standards, fares, and reducing the barriers to riding transit for regular riders as well as potential first-time riders (Table 6-3).

Enhancing the customer experience at several touch points will be important to improve the experience of current riders and entice potential riders. Ensuring trip planning tools are accessible and intuitive is important particularly for trips that may involve transferring between SCT Link and other regional partners, while making fares consistent across modes and easy to pay lowers the barrier to riding. Addressing accessible needs helps SCT Link appeal to a broader audience, particularly riders with disabilities who may have few mobility options.

Table 6-3: Pillar 2—Gaps and Needs.

Need/gap	Why?	Priority	Considerations
Develop "report card" to track system performance (as well as the need for consistent standards for internal use, Title VI, and external reporting)	Regularly track performance in a transparent manner available to the public builds public confidence and helps communicate SCT Link's value to the community.	High	Report card can be developed on a regular basis (monthly, quarterly, etc.) and uploaded to SCT Link website so public can understand system improvements over time.

Need/gap	Why?	Priority	Considerations
			Consistency across reporting formats ensures that all stakeholders understand service guidelines and expectations.
Formalize a process for public feedback/engagement and service requests	Estimating demand for transit service is challenging in a rural community, as modeling and other techniques typically fall short. SCT Link needs to understand demand for travel needs, for example, such as service on the weekends or later in the evening and prioritize service requests. SCT Link also needs a clear way to collect rider feedback (website, call center, etc.) and a reporting mechanism to collect and transmit feedback (compliments, complaints, service requests, etc.) from the contractor to the County.	High	Together with service guidelines, developing a formalized process for prioritizing service requests and modifying services can lead to a transparent process of service appraisals and decision making into service provision and design. Requires staff time to develop and implement a process of service change request prioritization.
Real-time and associated technology, better trip planning	Transit riders often cite lack of knowledge about where their bus is, and the ability to plan a trip, as the biggest pain points of using transit.	High	By providing real-time information and trip planning tools, SCT Link can empower current customers, align with regional initiatives/best practices, and potentially entice more trips on transit. Requires Investment in technology, staff with IT expertise, and ongoing license costs, in addition to startup costs. Could leverage SacRT or other regional expertise.
Assess current fares, fare structure and policy, understand opportunities for expanded fare offerings	Important to ensure that fares are equitable for riders but also recoups a fair amount back to the agency. Fare policy can be a key driver to moderating ridership.	Medium	Exploring fare policy can help rationalize fare categories, while exploring potential fare programs or incentives for certain groups (e.g., students) may help grow ridership.
Establish travel/mobility training program	Often, the barrier to transit use is uncertainty of how to plan and execute a transit trip. Persons with	Medium	Travel training can help decrease demand for dial-a-

Need/gap	Why?	Priority	Considerations
	mobility or other disabilities are often afraid of using conventional transit because of barriers. Teaching people how to ride transit can expand the viability of transit.		ride and increase fixed route ridership. Potential for more internal resources and time dedicated to travel training.
Continue to promote awareness and use of Connect Transit Card	Using smartcards is preferable to cash (faster boarding, less labor to count cash), and can provide data related to demand and passenger travel patterns to inform decision making	Medium	Fare cards are convenient for the customer and can help collect passenger activity for planning. Most customers on SCT Link already use the Connect Transit Card, so SCT Link is starting from a good position.
Fully accessible vehicles (low-floor)	Low-floor vehicles can improve accessibility to customers of all ages and abilities, while also reducing loading and unloading times	Low	Can improve accessibility and reduce loading and unloading times. Low floor vehicles are more expensive than high floor models.

6.4 Pillar 3 – Improve Service and Reliability

Ensuring that service is reliable is integral for providing a high-quality transit experience that will retain existing riders and encourage new riders to try the service. For SCT Link, examining how to improve service and reliability can help captive riders reach their destinations more quickly and can help SCT Link become more competitive with personal vehicle travel (Table 6-4).

Specifically, this pillar explores service aspects such as on-time performance, transit priority measures, and how to best serve challenging urban fabrics, such as the sparsely populated and spread-out Delta communities. Especially for transit critical populations without transportation alternatives, SCT Link service should be dependable and high-quality.

Table 6-4: Pillar 3—Gaps and Needs.

Need/gap	Why?	Priority	Considerations
Address schedules to improve on-time performance and facilitate timed transfers	Ensuring buses arrive on-time and according to service schedules is a vital component of providing a high-quality transit experience. This is compounded when a route has infrequent headways, as is the case with SCT Link. This is further compounded if a customer is taking	High	This measure is partially related to gaps identified in Pillar 1 calling for more stringent and detailed reporting on on-time performance to more accurately track system performance on the route and trip level. First, the agency needs to understand how the system is currently performing before it can address schedules to improve on-time performance and timed transfers. This gap will

Need/gap	Why?	Priority	Considerations
	more than one route to reach their final destination (for example, taking the Delta route to Galt to transfer to the Hwy 99 route). If transfers between routes are not accurately timed, this can result in missed trips, and due to the low frequencies on SCT Link services, this could potentially impact the rider's ability to reach their destination on time.		require the same active oversight as outlined in that gap. Once weak points in the schedule have been identified, the schedule can be adjusted to make sure that transfers are accurately timed and on-time performance remains high. Other measures, such as the transit priority measures outlined below, can also help to improve on-time performance. It will also be important to continue to monitor performance and adjust schedules as needed.
Determine how to best provide service in the Delta Region	Exploring different innovative mobility solutions might better serve the Delta region than the current fixed route service. These service options could include: • Microtransit/on-demand solution • Carsharing • Fixed route to specific destinations (Galt, Elk Grove, South Sacramento, downtown Sacramento, etc.) on different days of the week	High	Outreach and engagement with the Delta communities will be required to determine the best strategy for providing service in the Delta region, which is included as a part of this study and will be used to determine the best path forward for the Delta. This feedback will be used to detail a transportation strategy for the Delta. Requires time and resources dedicated to outreach and engagement, as well as developing and implementing the new service changes, and finally, more outreach to educate the public on the new service changes taking place.
Provide high-quality dial-a-ride service	Understanding who is using dial-a-ride, as well as when, why, and where they are going, can help to identify service improvements and manage demand. Feedback from operations showed that there are concerns with dial-a-ride demand, especially for K-12 students using dial-a-ride to travel to and from school. If operations believe this demand is becoming increasingly unmanageable, SCT Link can explore establishing school trippers to transport these students in a more efficient manner.	Medium	To address dial-a-ride demand from K-12 students in Galt, SCT Link can explore establishing school trippers. Service on Sundays can also be explored as a first step to expanding SCT Link's offerings on weekends (only dial-a-ride operates on Saturdays). In addition, SCT Link should assess certain dial-a-ride policies, such as no-show policies and pick-up windows, to make sure their policies are clear, communicated, and consistent with peer agencies and are in place to provide high-quality and reliable service to the customer.
Collaborate with regional transit partners to explore the possibility of implementing transit priority	Transit priority measures can speed up travel times and improve service reliability. Especially on shared corridors, implementing transit priority measures can speed up transit travel times to move more people more	Low	Requires staff time and resources dedicated to developing partnerships and establishing the correct connections with departments that would have jurisdiction over implementing these changes.

Need/gap	Why?	Priority	Considerations
measures on shared corridors	efficiently and quickly. For example, SCT Link can explore partnering with San Joaquin RTD to implementing a bus only lane on Hwy 99, or a bus only lane during peak commuting hours. SCT Link can also explore other transit priority measures in downtown Sacramento that can help speed up pick-up and drop-off times at stops in the downtown Sacramento area and the more congested, urban areas SCT Link serves.		

6.5 Pillar 4 – Increase Awareness of SCT Link

SCT Link provides a variety of important community services, and acts as a lifeline transportation service to many individuals who otherwise may not be able to get around. Low levels of community awareness of SCT Link not only diminishes new ridership potential and can cause confusion and misconceptions when there are multiple transit agencies operating in the area.

Increased awareness can also help the community understand that SCT Link is an integral community service, providing mobility and accessibility to some of the most vulnerable populations living in South Sacramento County. Increasing awareness of SCT Link services can help non-riders understand the importance of the service, fostering widespread and sustained community support. The following needs and gaps were developed to help increase awareness of SCT Link (Table 6-5).

Table 6-5: Pillar 4—Gaps and Needs.

Need/gap	Why?	Priority	Considerations
Develop marketing and education plan	To improve awareness of service throughout the service area, to advertise services to people who may not be aware of them and grow new ridership potential, to clearly distinguish as different from SacRT (and other services in Sacramento County), to consistently brand service as SCT Link, and to be seen as an important community service that is highly valued by riders and non-riders.	High	Improved awareness can increase ridership, as some people who may use SCT Link services may currently be unaware the services are available. The community can come to value SCT Link service as an important community service supported by non-riders and riders alike. The marketing plan can also help raise awareness of new service changes or concepts coming out of the SRTP process, as well as capitalize on positive marketing aspects of transitioning to a ZEB fleet. Additional resources need to be expended to support this effort.
Ensure SCT Link website is up-to-	Update website and improve accessibility, information, and trip planning.	High	SCT Link's website is one of the main ways riders stay up to date with service changes and obtain information about the services offered. It is very important that changes are made in a timely

Need/gap	Why?	Priority	Considerations
date and accessible	Improve the content management of the website to make sure that the website is kept up to date regarding service changes, schedule changes, or strategic planning processes that the community can be involved in, to make sure that when there is a service or schedule change, it is updated on the website in a timely manner, and to make sure the website consistently adheres to accessibility guidelines for those with visual impairments.		manner so that riders are aware of service changes. It is also important to make sure that the website is accessible, meaning that the website is designed and develop so that people with disabilities can use them, including considerations to navigation not based on colors, alternative text, and functionality for those with disabilities. Finally, maintaining a website that is easy to navigate and aesthetically pleasing can help make it easier for those who are not familiar with technology to use. Additional resources needed to maintain website, additional oversight of website to ensure it stays up-to-date and is updated in a timely manner.
Increase awareness of Amador Transit service	SCT Link is in partnership with Amador Transit to provide stops in eastern Sacramento County along their commuter service into downtown Sacramento. Along with efforts to promote SCT Link services in southern county, SCT Link should work with partners in Rancho Murieta to increase awareness of Amador Transit services for commuters and CSU Sacramento students living in Rancho Murieta or unincorporated areas in eastern Sacramento County.	Medium	Increased coordination between all of SCT Link's operating partners can help to keep everyone on the same page and operating under a common mission to provide high-quality transit services in south and east Sacramento County. SCT Link can establish relationships with local groups and CBOs that can help increase awareness of the Sacramento Commuter route for those who may not know about it. It will also be important for SCT Link to continue to work to establish an open line of communication with Amador Transit so the County is informed of any service changes from Amador Transit in a timely manner. Requires staff resources dedicated to these initiatives.

6.6 Pillar 5 – Foster a Transit-Supportive Built Environment

Most transit agencies across the US have little to no direct control over land use planning and development, rights of way, or a host of other factors that directly impact a community's transit potential and the effectiveness of service. Nonetheless, this doesn't mean transit agencies can't play a role in advocating for more transit-supportive development and design and working to ameliorate passenger amenities.

SCT Link is part of SacDOT, as well as part of the regional transit agency ecosystem of the SACOG region. We have identified a need for SCT Link to cooperate with and spur partners to develop more transit hospitable environments especially where passengers interact with the transit system (stops and facilities), and to foster connectivity with complementary modes, like walking and cycling, to improve the customer experience and potentially grow ridership (Table 6-6). SCT Link and the County should also continue to have monthly collaboration meetings with the City of Galt.

Table 6-6: Pillar 5—Gaps and Needs.

Need/gap	Why?	Priority	Considerations
Develop bus stop/shelter/amenity improvement program	Regularly auditing bus stops, shelters, and amenities to identify accessible and other needs creates a pleasant and safe waiting environment.	High	Improves the customer experience and can support ridership growth. The challenge is that SCT Link/Sacramento County has little direct control over bus stops/waiting environment.
Work with municipal and county partners to improve the built environment	Collaborate with Galt, San Joaquin county, and other municipalities to improve walkability, active transportation and pedestrian connections, bus stop and shelter amenities, accessibility, safety, etc. to provide customers with safer and more comfortable access to transit.	Medium	Improves safety and the customer experience.

7 SERVICE CONCEPT DEVELOPMENT

After identifying existing conditions and the needs of SCT Link and its riders, a key step in the development of the SRTP is to develop service concepts. Service concepts are broad, planning-level ideas for changes to service that will shape the development of the ZEB recommendations as well as the service plan of the SRTP. The goal here is to develop a range of potential service concepts that will drive the service plan and be supported by other recommendations stemming from the gaps and needs.

To develop the service concepts, we leveraged our analysis of existing conditions, customer feedback, SCT Link's goals and objectives, and discussions with SCT Link staff to broadly define potential service adjustments.

These service adjustments are organized by service type and are meant to explore ways to improve the current rider experience and attract more ridership.

7.1 Service Concepts – Galt-Sacramento Commuter Express

The GSCE serves a specific market and purpose—to transport commuters between South County and downtown Sacramento. Geared toward traditional 8-to-5 commuters working in mainly white-collar jobs in Sacramento (government, services, etc.), the GSCE took a massive hit during the pandemic[25] due to telecommuting and remote work policies. While some ridership has been regained, it continues to produce the lowest ridership of all SCT Link services except the Delta route. As of the fall 2021, ridership averages about 15-18 passenger trips per day.

Nonetheless, GSCE ridership was growing strongly before the pandemic, showing the underlying demand for a commuter service as an alternative to driving to (and parking in) downtown Sacramento. While the future of work-from-home and the ramifications of the latest COVID-19 variant are still unclear, the following proposals are aimed at service changes as ridership recovers (Table 7-1). If ridership continues to drop, then SCT Link should maintain services at low levels as needed to adjust service levels to actual demand.

Table 7-1: GSCE Service Concepts.

Service Concept	Timeframe	Rationale	Potential ridership impacts	Potential cost/resource impacts
Restore service to pre-pandemic levels (from 4 round trips to 5 round trips)	When most employers resume office work	GSCE ridership was growing before the pandemic. If ridership returns, then SCT Link should restore service at least to pre-pandemic levels	Could achieve pre-pandemic ridership levels	Minimal and would use existing resources to return to pre-pandemic service levels
Add 1 additional PM trip	After service levels have been	Operators have heard from riders that a later trip returning from Sacramento would help	Could grow ridership to a small degree and help resume	Minimal and would use existing fleet but

[25] Between March 2020 and September 2021, ridership was down by an average of 80%.

Service Concept	Timeframe	Rationale	Potential ridership impacts	Potential cost/resource impacts
	restored to pre-pandemic levels	capture more riders. This aligns with Stantec's other work with commuter services since typically, start times for employees is constrained in the morning, but ending time is more open ended. Providing a later trip could encourage more people to ride the GSCE if they can return home with public transit.	trend of growing ridership prior to the pandemic	add additional revenue hours
Promote "guaranteed ride home" program	When ridership returns to at least 50% of pre-COVID	To encourage potential riders who are concerned about not having a way to get home in case of an emergency or a situation arises where someone needs to return home when the GSCE service is not in operation.	Could grow ridership	Minimal impacts to operating budget depending on the policy/program implemented by SCT Link

One service concept is the implementation of a guaranteed or emergency ride home program aimed at providing a level of security for commuter riders—if an emergency or other issue requires a rider to travel home during the midday when the GSCE is not operating, then another type of transportation will be provided. This type of program is used by many agencies across the country and alleviates one of the major deterrents to riding commuter service—what happens if I have to go home during the day and the bus isn't running?

In the Sacramento region, emergency ride home programs are managed through the Sacramento Transportation Management Association (TMA) and the 50 Corridor Transportation Management Association. Commuters are eligible to participate in the program if they use a commute program (don't drive alone to work) at least 60% of the time and work for a current TMA-member employer. Participants receive up to five vouchers per year for a free ride home (plus tip, in the case of a taxi ride) in the case of an emergency. The TMA provides either a Yellow Cab taxi ride (for trips less than 20 miles or if you are too ill to drive) or an Enterprise rental car for trips more than 20 miles[26].

[26] http://www.sacramento-tma.org/EmergencyRideHome.html

Many large employers in downtown Sacramento are current TMA members[27], but SCT Link can collect additional information from current GSCE riders to understand if they are currently working for employers who are members to understand if the current program is useful to them. SCT Link can also advertise this service as a benefit of commuting via the GSCE. To potentially grow more ridership on the GSCE, SCT Link can work with the TMAs and its members to identify potential participants (employees) who live in South County and could be targeted directly to provide more information regarding the GSCE and the emergency ride home program.

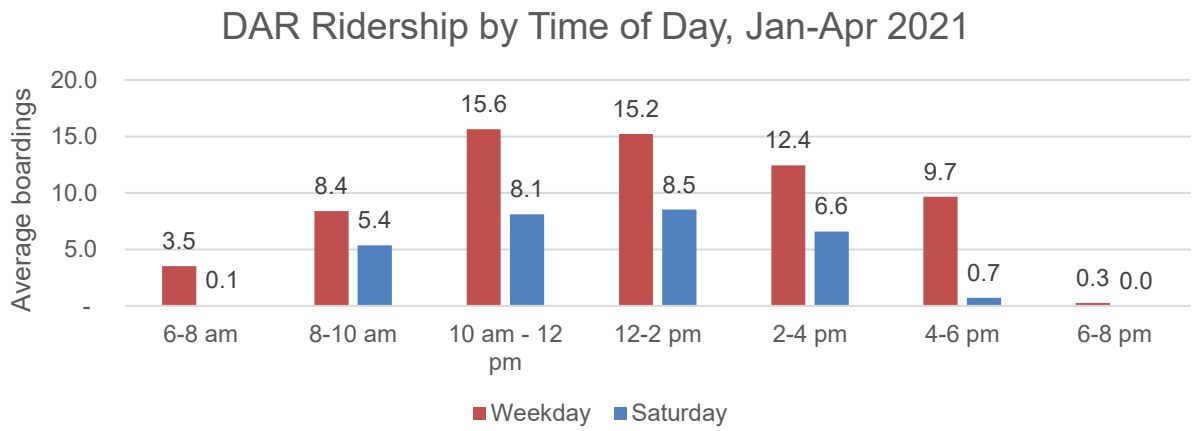
7.2 Service Concepts – Dial-A-Ride

For a demand-response service, ridership was relatively strong before the pandemic and productivity (boardings per revenue hour) was on the higher end of peer agencies and modes. As such, DAR service was doing well. Moreover, compared to all other SCT Link services, DAR has lost the least amount of ridership—ridership is down, on average, by 54% of pre-pandemic levels.

While policies around no shows and late cancellations, among others, are geared to improving trip availability and the customer experience, the service concepts in Table 7-2 are designed to grow ridership and provide a greater level of convenience. Currently, service is restricted to weekdays and Saturdays during most of the day.

The graph below shows the average boardings by time of day for weekdays and Saturdays from January through April 2021. Average daily boardings on weekdays during this period was about 65 passengers, and average Saturday boardings was about 29 passengers, or about 45% of weekday ridership. This is in line with other transit agency reductions in ridership observed on weekends vs. weekdays.

Figure 7-1: Dial-a-Ride Average ridership by hour of the day, Jan-Apr 2021.



Another interesting observation is the relatively strong and consistent ridership on both weekdays and Saturdays between 10 am and 3 pm. Given that ridership on weekdays between 4 and 6 pm is about 62% of peak ridership levels, together with the consistent ridership throughout most of the day, suggests one area for exploration is later service on Saturday evenings. Later service may also help grow earlier ridership because potential riders who weren't riding because of the inability to take a later trip (when service ended)

[27] http://www.sacramento-tma.org/TMA_members.html

may start riding too. Similarly, another potential service adjustment could be to provide later weekday service to incentivize ridership.

Other concepts to explore include piloting a limited amount of service on Sundays as well as potentially exploring more service outside of Galt. Part of Sacramento Regional Transit's (SacRT) recent service redesign was to bolster service on Sundays and as a result of investment in Sunday service, ridership increased. While not a service concept, SCT Link should also explore transitioning to low-floor vehicles when funds become available and vehicles need replacement as an additional way to enhance customer comfort and the customer experience and reduce loading and unloading times for passengers with mobility devices.

Table 7-2 provides a list of concepts that SCT Link could pilot at different time periods over the next 5 years. Service changes that grow ridership should be maintained, while those that do not result in sustained ridership growth can be phased out.

Table 7-2: DAR Service Concepts.

Service Concept	Timeframe	Rationale	Potential ridership impacts	Potential cost/resource impacts
Explore later service hours (after 4 pm) on Saturdays	Short	Ridership is strong most of the day. Providing later service could encourage more riders to ride on Saturday since they have assurance of a ride later in the evening.	Low to medium	Low
Explore later service hours on weekdays (after 6:30 pm)	Short-to-mid	Ridership is strong most of the day. Providing later service could encourage more riders to ride since they have assurance of a ride later in the evening.	Low to medium	Low
Explore Sunday service	Mid-to-Long	Businesses, retail, and other locations are open on Sundays. Offering service on Sunday could provide new ridership opportunities.	Low to medium	Medium
Explore service outside of Galt on more days	Mid	Depending on the chosen strategy for mobility in the Delta region, SCT Link could explore expanding DAR service to the Delta communities during days or hours when service is not operating in the Delta communities.	Low	Low to medium

7.3 Service Concepts – Highway 99 Express

Ridership had been trending downward before the pandemic, but this is an important lifeline and accounts for the second most ridership (29% in FY2018-2019) in SCT Link's system. However, ridership has been

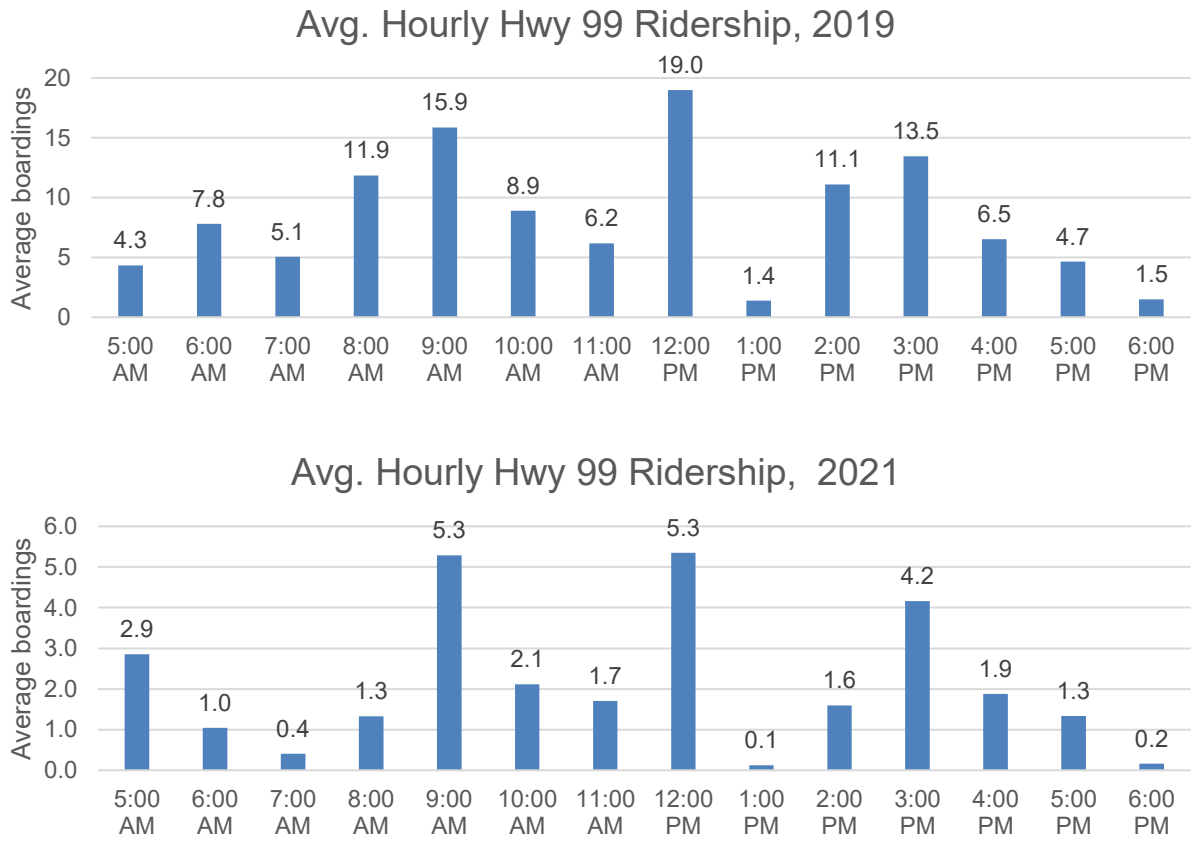
down by about an average of 74% compared to pre-pandemic levels—this varies substantially as some weeks have experienced ridership decreases closer to 50%.

While service has been restored to pre-pandemic levels, some service investments, when funding is available, could include piloting Saturday service in the same vein as the DAR recommendations—investing in weekend service not only provides transportation options to dependent riders, but it may also incentivize new trips. Indeed, many of the destinations along Hwy 99, like the hospitals, are open on weekends, and workers need to travel to these destinations not only on weekdays. Further, riders could also travel into Sacramento on Saturday via the Blue Line LRT station at Cosumnes River College, if the Hwy 99 were operating.

Another key service concept to consider is to improve headways from 1 hour to 30 minutes. To understand when demand is greatest on the Hwy 99, we examined ridership data by hour of the day.

Ridership trends were similar during 2019 and the available 2021 data; in 2019, 65% of ridership was carried during the 9 am to 4 pm daypart, while in 2021, 70% of ridership was carried during that daypart. Interestingly, 25% of ridership in 2019 was carried during 5 to 8 am (compared to 19% in 2021), demonstrating more commuter focused ridership pre-pandemic (Figure 7-2).

Figure 7-2: Hwy 99 Average ridership by hour of the day, 2019 (top) and 2021 (bottom).



These results suggest that investing in service improvements during the midday hours may attract more riders, either new riders trying the service since 30-minute frequencies are far more attractive than 1-hour

frequencies, or more trips from existing riders who may take more trips because of the improved frequencies.

Depending on operator availability, vehicles, and financial constraints, the improvements in headway could be limited not only by time of day, but by route segment too. The graphic in Figure 7-3 demonstrates the volume of passengers between key locations along the Hwy 99 (for 2019 ridership, *top*, and 2021 ridership, *bottom*), while Table 7-3 provides more details.

Figure 7-3: Ridership proportion by route segment, Hwy 99, Jan-Dec 2019 (top) and Jan-Dec 2021 (bottom).

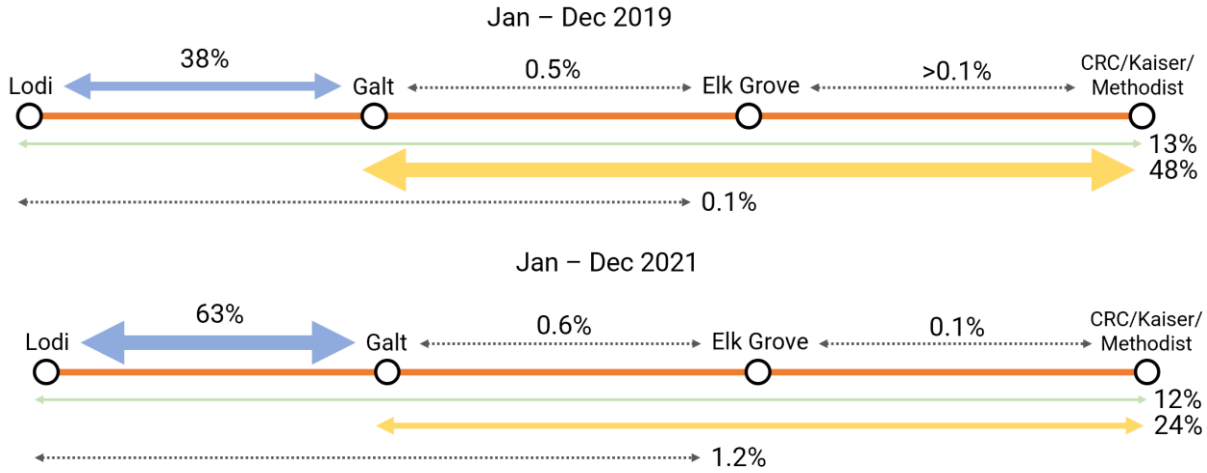


Table 7-3: Ridership between different origins-destinations, Hwy 99, Jan-Dec 2019 and Jan-Dec 2021.

From	To	Ridership (2019)	% (2019)	Ridership (2021)	%
Galt	Lodi	4,595	19.1%	2,072	30.4%
Lodi	Galt	4,599	19.2%	2,191	32.1%
Lodi	CRC, Kaiser, Methodist	3,059	12.7%	811	11.9%
Galt	CRC, Kaiser, Methodist	11,587	48.3%	1,622	23.8%
Elk Grove	CRC, Kaiser, Methodist	7	0.0%	8	0.1%
Galt	Elk Grove	135	0.6%	39	0.6%
Lodi	Elk Grove	23	0.1%	83	1.2%
	Total	24,005	100.0%	6,826	100.0%

In 2019, prior to the pandemic, nearly half of all ridership was between Galt and the CRC/Kaiser/Methodist Hospital, and 38% of ridership traveled between Lodi and Galt. Together, this accounted for 86% of the ridership on the Hwy 99.

In contrast, during January to December 2021, most of the ridership was between Lodi and Galt, accounting for nearly 62% of ridership. The next most heavily used segment is between Galt and CRC/Kaiser/Methodist Hospital, accounting for 24%, and together with ridership between Lodi and CRC/Kaiser/ Methodist Hospital, accounts for a total of 36% of ridership. This reduction in ridership from predominately the Galt-CRC/Kaiser/Methodist Hospital could be due to, at least in part, reductions of in-person healthcare and other activities. It could also be due to reduced demand for traveling to Sacramento via the light rail station

at CRC. Regardless of the reasons, this shift is interesting and indicates that if recent trends are the 'new normal', then depending on available resources, headway improvements between Lodi and Galt could have a significant impact on ridership if SCT Link is unable to improve headways for the entire ~26-mile alignment.

Another recommendation for improved service is piloting a larger vehicle (35-ft bus) on the Hwy 99 route to provide a more comfortable experience for passengers. Larger vehicles can also help ease the transition to zero-emission vehicles, where these larger vehicles have longer operating ranges than current cutaway options.

Table 7-4: Hwy 99 Express Service Concepts.

Service Concept	Timeframe	Rationale	Potential ridership impacts	Potential cost/resource impacts
Explore Saturday service	Short	Currently no service on Saturdays. Saturday service may incentivize more ridership.	Medium	Medium
Explore later service hours (after 6 pm)	Short-to-mid	Ridership is strong most of the day. Providing later service could encourage more riders to ride since they have assurance of a ride later in the evening.	Medium	Low to medium
Increase frequency to 30-minute headways (between 9 am – 3 pm)	Mid	Headways are very low, making service unattractive overall. Investing in increasing service frequencies could attract new ridership by focusing when ridership is currently strongest.	Medium to high	Medium to high

7.4 Service Concepts – Delta Route

The Delta route carried about 4,000 riders, which was about 4% of all of SCT Link's ridership in FY 2018-2019, while it consumed nearly 11% of revenue hours and 16% of revenue miles. At around $51 of subsidy per passenger, the Delta costs over double to subsidize per passenger compared to DAR and Hwy 99.

The low-density nature, low walkability, and generally rural and spread-out nature of the Delta communities makes it almost certain that a fixed-route fixed-schedule service will have low ridership. With only 5 trips per day, very few people would find this level of service attractive or useful, especially if their final destination isn't Galt. But increasing service levels in such an area also comes with significant costs and is unlikely to grow ridership much more.

SCT Link needs to provide targeted mobility solutions to deliver transportation in a manner that reflects the riders, travel behavior, and travel patterns. An analysis of cell phone data for location-based information revealed that most Delta residents commute to work or school in the northern parts of Sacramento County, including downtown Sacramento, and none in Galt (note the lack of destinations in Galt for work/school destinations on the maps in the left column Figure 7-4)—yet, the Delta route operates between Galt and

the Delta, so if people want to commute using the Delta route, they will need to transfer to another route and face long (60+ minute) commutes. Further analysis of location-based data[28] revealed that for non-work/school commutes, Delta residents travel throughout Sacramento County (note the bright colors of census tracts throughout the county in Figure 7-4).

[28] Location-based data (LBD, also known as cell phone data) are anonymized and aggregated data points that provide information regarding travel behavior, including origins and destinations, as well as information related to trips in the Sacramento region. More information can be found: https://www.sacog.org/post/big-data-pilot-project-transportation-planning-replica

Figure 7-4: Analysis of destinations for work and school trips (left) and all locations (right) for Delta residents. Replica data courtesy of SACOG.

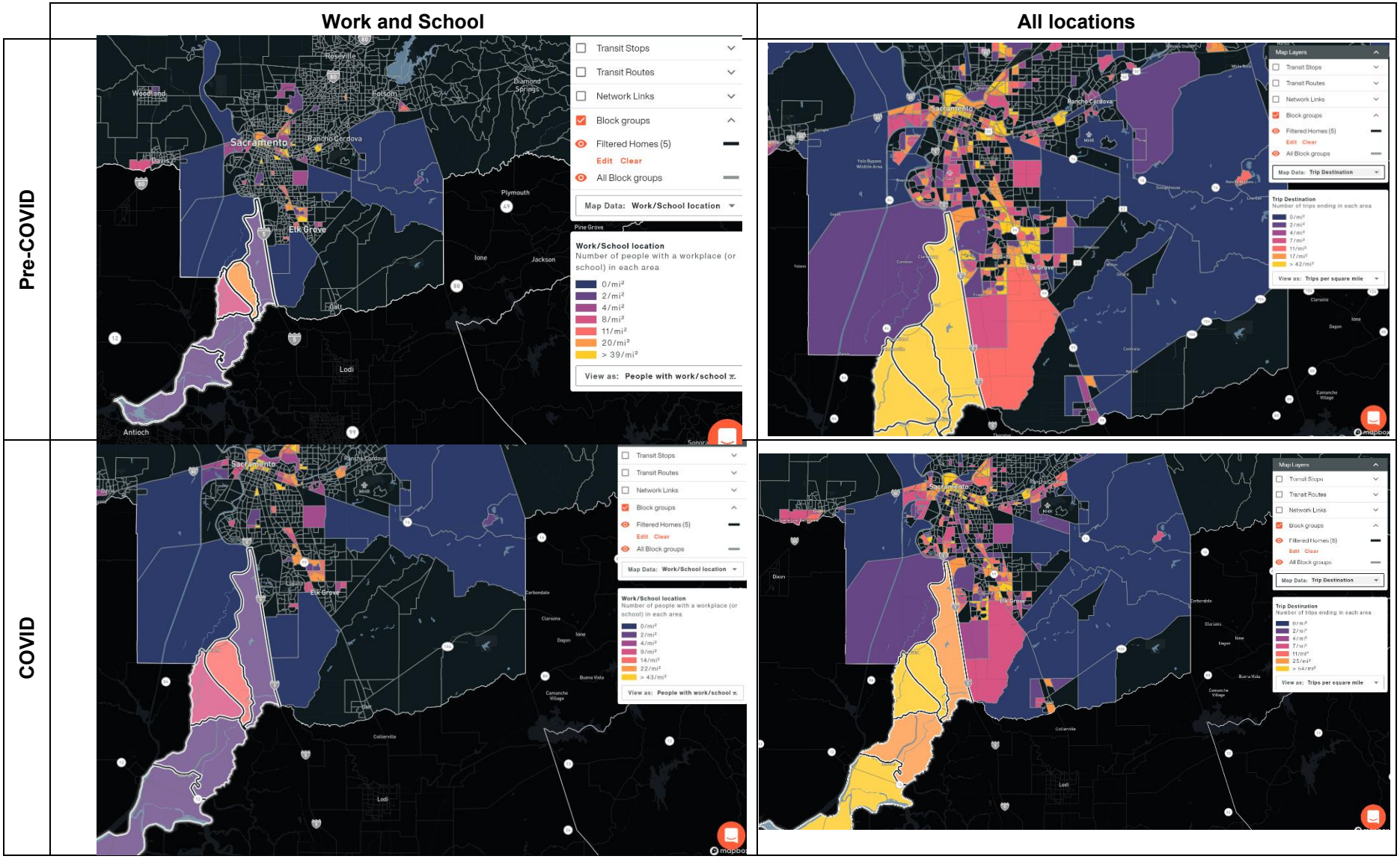


Table 7-5 lists several concepts that, for the most part, are exclusive, i.e., only one of the concepts will be recommended and fleshed out further based on stakeholder outreach and feedback and assessment. As such, a timeframe is not specified as with the concepts related to the other SCT Link services.

Table 7-5: Delta Route Service Concepts

Service Concept	Rationale	Impacts
Fixed-route service with increased headways	Delta ridership is very low. Providing more frequent service could generate some additional ridership.	Would likely generate little additional ridership considering the additional investments needed to increase service. The service area doesn't lend itself to fixed-route service. For example, in Galt, with somewhat higher densities and mixed land uses, SCT Link's DAR service is a better fit compared to the fixed-route service it previously operated.
Transition to on-request Dial-a-Ride type service	Similar to the Galt DAR, the Delta could be converted to a DAR zone for travel within the Delta. Nonetheless, connections outside the Delta would be limited to Galt for riders wishing to travel beyond South County. Curb-to-curb on-demand service between the Delta and points north, like downtown Sacramento, would likely be costly to operate. Eventually, with adoption of technology to enable same day requests and vehicle tracking, this service (as well as the Dial-a-Ride service in Galt) should be transitioned to a microtransit style service.	Depending on demand levels, current resources for Delta route can be shifted to Dial-a-Ride concept
Fixed-schedule service to key destinations throughout county	This service would operate on a reservation basis, based on a schedule of services to certain destinations on certain days. For example, on Mondays and Wednesday, service would be between Galt and the Delta, while Tuesdays and Thursdays would be to downtown Sacramento. This would help achieve some balance in the need to travel from the Delta to different locations across the County.	Depending on demand levels, current resources for Delta route can be shifted to fixed-schedule concept
Carsharing service	Electric vehicle carsharing for residents of rural areas who need to travel to urban areas and do not have a car. This	Frees up resources for other services. SCT Link would need to acquire electric vehicles, charging and related

Service Concept	Rationale	Impacts
	reservation-based program would offer vehicles a central location, providing excellent freedom for residents to travel as needed, but would come with some limitations based on fleet size and availability of reservations.	equipment, as well as parking for the fleet and develop policies and establish a program.
Volunteer ride service	SCT Link could offer mileage reimbursement to compensate passengers' friends and neighbors (who act as drivers) for providing them with transportation assistance.[29]	Frees up resources for other services. SCT Link develop policies and establish a program.

7.5 Service Concepts – Amador Transit Route

On an annual basis, SCT Link pays $80,000-86,000 to Amador Transit for Route 1[30]. This route provides commuter-type service (2 trips in the morning and 2 trips in the afternoon) between western Amador County and downtown Sacramento. The route alignment operates along SR-16 passing through Rancho Murieta to get to Sacramento; the two stops in Rancho Murieta and the portion through Sacramento County is funded by Sacramento County.

Ridership has been declining since FY 2016-17 between Rancho Murieta and Sacramento, from an annual ridership of 7,983 (~32 unlinked trips per day) to nearly 6,000 (24 unlinked trips per day) in FY 2018-19. The most recent figures on ridership is about 3 unlinked trips per day. Only the Delta route performs worse than the Amador route. On a cost per rider basis, pre-COVID performance was about $12 per boarding—with the same fixed costs but lower ridership, the cost per boarding in FY 21-22 is currently about $203 per boarding. SCT Link could work with Amador Transit to use smaller vehicles to right-size capacity to actual demand as one strategy. Furthermore, productivity of the Amador service is well below the 12 boardings per hour peer average for commuter routes, hovering around 3-4 boardings per hour.

Overall, the low ridership produced by this route is likely due to a combination of factors, namely the land use and demographics of Rancho Murieta—a private community with the single-family households that are higher income and have access to cars typically that generate little demand for transit. Coupled with the low levels of transit service, most residents who do work in downtown Sacramento will opt to drive rather than use transit.

Given that the route is designed and operated by Amador Transit, the County of Sacramento has few options when it comes to this service. Some potential concepts are discussed below in Table 7-6.

[29] https://sanjoaquinrtd.com/access-sj/myride/
[30] In FY18-19, total operating costs were $80,519, and about $6,709 per month. Farebox recovery ratio averages 10-12%.

Table 7-6: East County – Amador Transit Route Service Concepts.

Service Concept	Rationale	Impacts
Eliminate service/stops in East County	Ridership is very low and costly per boarding for SCT Link's contribution. SCT Link could reallocate the funding used for East County service to Hwy 99 or DAR, where ridership is stronger.	Reduces mobility to a very small number of daily riders. SCT Link can reallocate funding to services in South County.
Only make one stop in Rancho Murieta	Instead of stopping twice in Rancho Murieta, only stop at the Rancho Murieta Pkwy South.	Minimal to ridership, and will not minimize costs
Maintain status quo	The service to East County is already minimal. Status quo will continue to provide some level of mobility to residents currently ride transit.	None—status quo
Work with Amador Transit to shift to a demand-response service type	While commuting trip purposes may be depressed due to COVID-19, journeys for other trip purposes continue. Exploring a DAR-style of service either within Rancho Murieta or a fixed-schedule type service between Rancho Murieta and Sacramento may result in improved efficiency.	Potential to tailor service levels to demand. Potentially would require different vehicles to operate service (currently operated with one motor coach)

8 ZEB ANALYSIS

As a component of the combined SRTP and ZEB plan, route modeling and bus simulations were conducted to understand the feasibility of ZE options for SCT Link's service. This chapter describes the modeling inputs, methodology, process, and results. Based on these results, we present a discussion of potential fleet solutions for a ZEB fleet to move forward with fulfilling requirements for the ICT mandate under the CARB[31]. The outcomes of this report will also help to inform the recommendations and service concepts components of the SRTP.

8.1 Bus Modeling and Route Simulation

This section describes the process of the bus modeling and route simulation, including the inputs and methodology. Route modeling ultimately helps to answer the question: what is the feasible and ideal composition of ZEBs for my fleet?

Energy modeling uses a two-pronged approach to understanding ZEB feasibility. The two-pronged approach first examines route-level operations, and secondly, examines fuel economy by aggregating route-level outputs to provide block/vehicle level fuel/energy requirements. In this way, we can understand how different ZEB technologies perform under SCT Link's operating conditions, providing a more realistic estimate of operating range and energy consumption, ultimately informing technology selection.

Figure 8-1 provides a schematic overview of the modeling process. The predictive ZEB performance modeling depends on several inputs, such as actual passenger loads, driving dynamics, topography, vehicle specifications, and ambient conditions subject to the environment in which the agency operates.

[31] Amador Transit plans to develop their Zero Emission Bus Rollout Plan separately which will cover East County Transit. This plan only covers services operated by SCT Link in south Sacramento County.

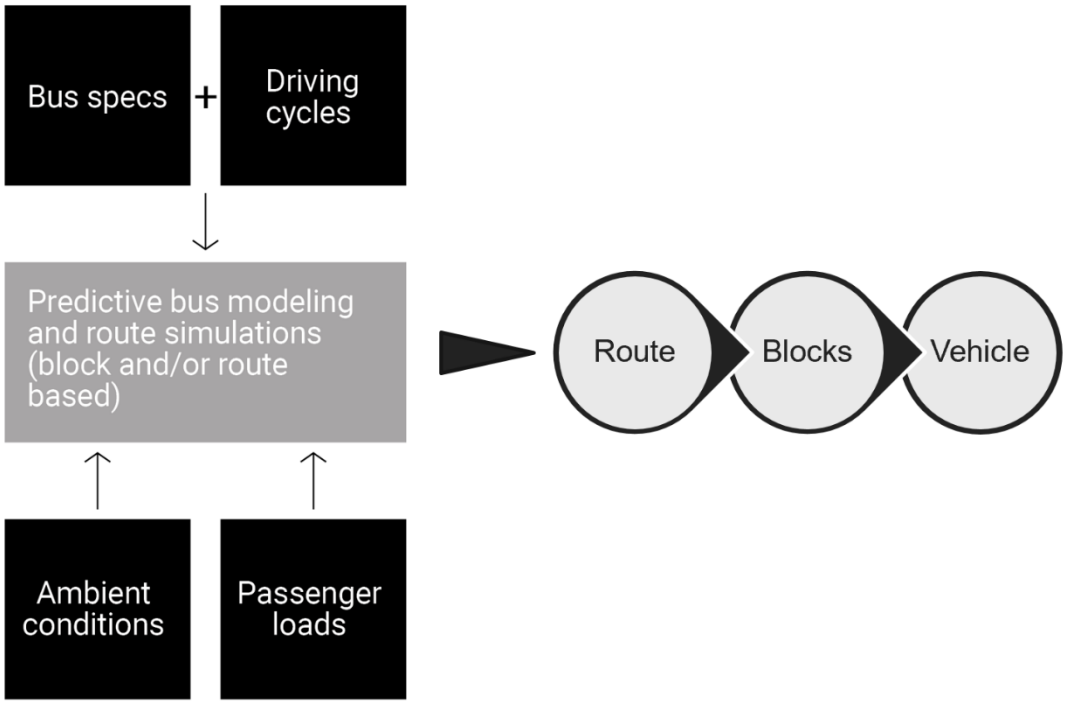


Figure 8-1: Modeling overview

8.1.1 Modeling Inputs

The following sections outline the modeling inputs and specifications for modeling of SCT Link's services, including fixed-route commuter service operated by motorcoaches (the GSCE), and fixed-route (Hwy 99 and Delta) and DAR services operated via cutaways.

8.1.1.1 Bus Specifications

ZEBDecide's energy modeling process predicts ZEB drivetrain power requirements specific to given acceleration profiles. One key component to the modeling is the bus design or bus specifications that include curb weight and frontal dimensions (factors needed to account for aerodynamic drag and rolling resistance coefficients), auxiliary, and HVAC (Figure 8-2).

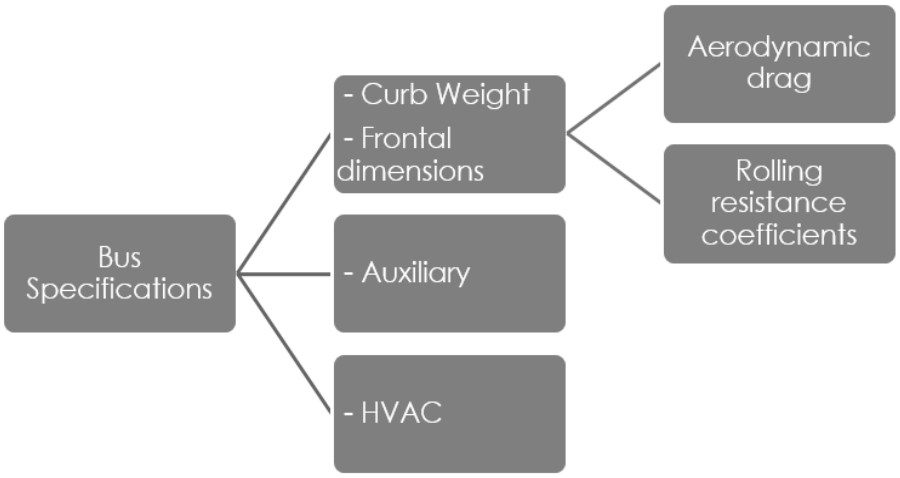


Figure 8-2: Detailed bus specification inputs

For SCT Link, the key bus specification used in the modeling process for each vehicle type are detailed in Table 8-1.

Table 8-1: Battery Electric Bus specifications for energy modeling

BEB Model	**Cutaway**	**Motorcoach (45')**
Battery (kWh)	120	544
Curb Weight (lbs.)	16,200	45,000
Photo of battery electric bus type modeled		

Only battery-electric (BE) vehicles were modeled. FCEBs were not modeled for several reasons, including:

- There are few (if any) viable and tested FCE vehicles comparable to SCT Link's fleet (currently, no motorcoaches, no cutaways, and one FCE van in development).
- SCT Link's small fleet would translate to low hydrogen fuel demand resulting in a more expensive per-bus cost compared to BEBs.

- While SCT Link's site is currently not set up for either BEB or FCEB fueling, hydrogen fueling on-site would require more challenging changes to vehicle flow, upgrades to the facility, and construction of fueling infrastructure. Offsite fueling opportunities in the South Sacramento region are currently insufficient.

Nonetheless, FCE vehicles could likely fit operationally with SCT Link's service profile due to their longer ranges and shorter refueling times and could be feasible with a transition to a smaller vehicle profile, and if hydrogen costs come down in the future. Because the ICT plan is a living document, the plan will provide guidance and considerations for potential FCE replacements should they become a more viable option in the future.

8.1.1.2 Custom Driving Cycles

A driving cycle (also referred to as a duty cycle) is a speed versus time profile that is used to simulate a vehicle's performance, and consequently, its energy use. Stantec captured SCT Link's real-life driving cycles by deploying onboard loggers to capture traveling speed, stop frequency, and traffic levels.

OBD-II GPS trackers (branded AccuTracking) were deployed to track vehicles over the course of the day for a period of two weeks. During this time, the trackers recorded operations for vehicles operating on Highway 99, the Delta Route, the GSCE, and Dial-a-Ride services. Figure 8-3 shows an example of the online dashboard that was used to track the loggers and download the needed data.

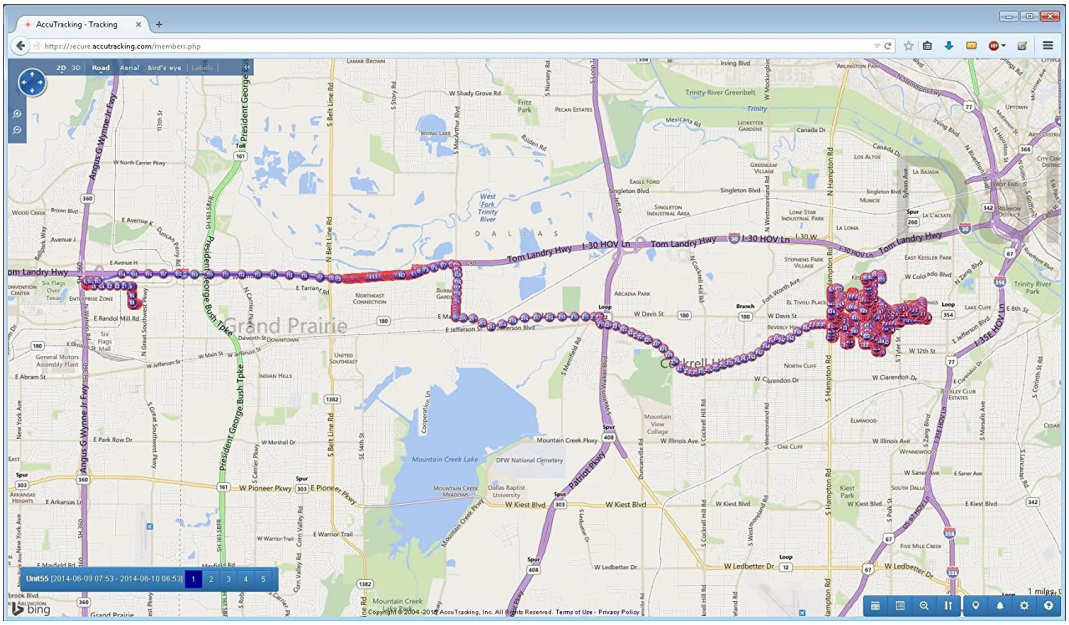


Figure 8-3: Example of dashboard interface for GPS trackers from AccuTracking

The data captured by the loggers was then transformed into custom driving cycles using a software tool developed by the National Renewable Energy Laboratory (NREL) called DRIVE (Drive-cycle Raid Investigation Visualization, and Evaluation). The custom driving cycles outputted by the DRIVE software completes statistical analysis to create a representative driving cycle based on the raw vehicle data recorded by the loggers. An example of the original cycle compared to the representative cycle developed by the DRIVE software is presented in Figure 8-4.

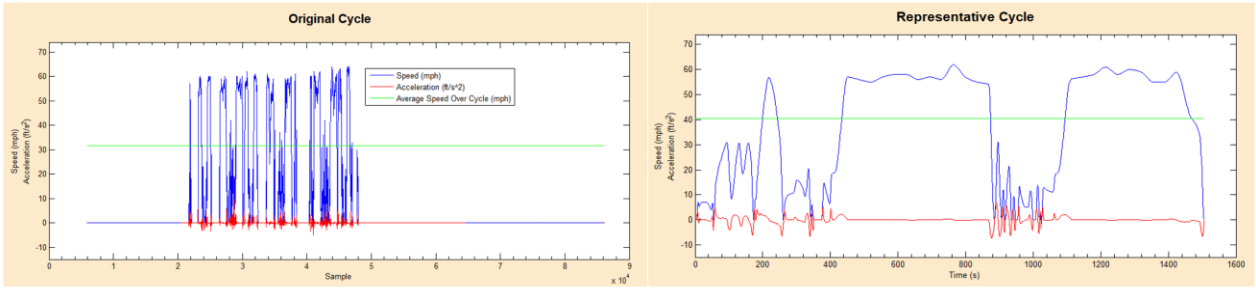


Figure 8-4: DRIVE software example; original cycle captured from loggers on an SCT Link vehicle compared to representative cycle

8.1.1.3 Passenger Loads

To examine the impacts of passenger loads and their associated weight, we used actual SCT Link loading data for each trip during a representative service day (June 20, 2019) which was prior to the COVID 19 pandemic when buses were running at full schedule. Fuel efficiency was modeled under three conditions:

- A moderate, typical condition with passenger loads at 50% of the actual maximum vehicle capacity
- A more strenuous, extreme condition with passenger loads at 90% of the actual maximum vehicle capacity
- A deadheading condition, which assumes no passengers onboard

Depending on the loading data at time of service, the loading capacity was assigned to each vehicle based on its proximity to the above-described conditions. For DAR, a standard 50% passenger load was assumed since no ridership data was available. The data used for the passenger load is described in Table 8-2.

Table 8-2: SCT Link Passenger Load Data for Modeling Approach

Date	Vehicle	Service type	Pull out	Pull in	Ridership	Passenger Load
6/20/2019	1402	Hwy 99	5:02 AM	12:30 PM	20	90%
6/20/2019	1401	Hwy 99	5:02 AM	12:46 PM	14	50%
6/20/2019	1306	Delta	6:05 AM	8:16 AM	5	50%
6/20/2019	GC01	GSCE	6:06 AM	9:13 AM	33	90%
6/20/2019	GC02	GSCE	6:36 AM	9:16 AM	23	50%
6/20/2019	1803	DAR	7:05 AM	10:27 AM	n/a	50%
6/20/2019	1701	DAR	8:06 AM	3:43 PM	n/a	50%
6/20/2019	1308	Delta	8:07 AM	10:20 AM	5	10%
6/20/2019	1306	Hwy 99	8:16 AM	10:04 AM	16	90%
6/20/2019	1603	DAR	8:44 AM	2:28 PM	n/a	50%
6/20/2019	1703	DAR	9:15 AM	5:50 PM	n/a	50%
6/20/2019	1801	DAR	9:45 AM	6:01 PM	n/a	50%
6/20/2019	1601	DAR	10:17 AM	2:42 PM	n/a	50%
6/20/2019	1802	DAR	10:46 AM	2:09 PM	n/a	50%
6/20/2019	1306	Delta	11:10 AM	1:35 PM	4	10%
6/20/2019	GC01	GSCE	11:22 AM	1:21 PM	3	10%
6/20/2019	1602	Hwy 99	12:00 PM	7:14 PM	18	90%

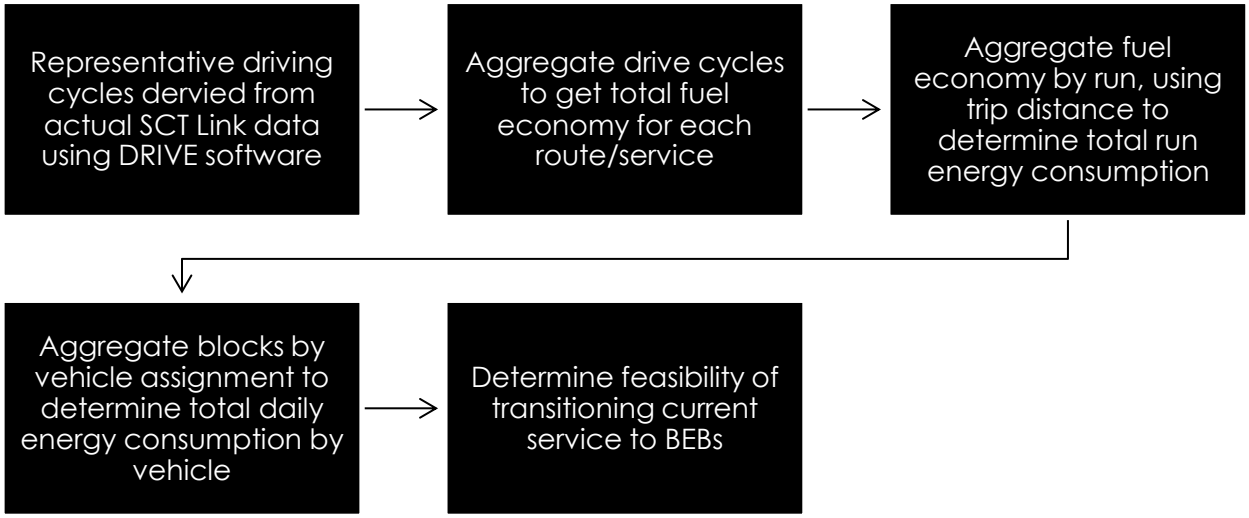
Date	Vehicle	Service type	Pull out	Pull in	Ridership	Passenger Load
6/20/2019	1307	Hwy 99	12:06 PM	7:58 PM	6	50%
6/20/2019	1603	Hwy 99	2:28 PM	4:30 PM	3	10%
6/20/2019	1308	Delta	3:01 PM	7:39 PM	8	50%
6/20/2019	GC01	GSCE	3:24 PM	5:44 PM	28	90%
6/20/2019	GC02	GSCE	4:16 PM	6:54 PM	20	50%

8.1.1.4 Ambient Temperature

Stantec developed a correlation between ambient temperature and power requirements from the HVAC system. The power requirement for modeling purposes was set based on an annual low temperature average of 39°F[32].

8.1.2 Modeling Process

Using the inputs described above, the first step in modeling SCT Link's fixed routes is obtaining route-level fuel economy and energy use using the representative driving cycles derived from the DRIVE software. Route-level fuel economy estimates were subsequently aggregated to the vehicle level to approximate the total 'fuel' consumed over the course of a whole day. The process of going from route, to run, to vehicle assignment is outlined in Figure 8-5.



[32] US Climate Data https://www.usclimatedata.com/climate/sacramento/california/united-states/usca0967
An average low temperature was used as heating a bus takes a bigger toll on the energy efficiency of ZEBs, especially in BEBs as the batteries lack latent heat that can be utilized to support the heating of the bus cabin. Therefore, modeling the lower temperature to be experienced in the region allows us to foresee the worst-case scenario and worst performance of the vehicles so that our modeling accounts for the worst case scenario.

Figure 8-5: ZEBDecide energy modeling process

8.2 Modeling Results

Modeling results for each service type (commuter fixed route, dial-a-ride, and fixed routes using cutaways) are presented below. Due to interlining, Delta Route and Hwy 99 trips are merged for measures of electrification success. For each service, the criteria for determining if a service can be successfully replaced by a BEB is whether the state of charge (SOC) of the battery remains ≥20% after completing its scheduled service[33]. The outputs of the modeling include the average fuel efficiency and driving range for each BEB equivalent.

The overall energy or fuel demand per block was obtained by aggregating the fuel consumption from each trip according to the route-level results. Then, all runs/blocks completed by a vehicle were aggregated at the vehicle assignment-level to understand if the daily service assigned to a vehicle can be completed with the BEB equivalent.

8.2.1 Galt-Sacramento Commuter Express

Figure 8-6 shows the successful electrification of GSCE services using the BE motorcoach specifications in Table 8-1. These results show that 100% of service operated by motorcoaches can be successfully converted to BE equivalents, at both the block and vehicle levels.

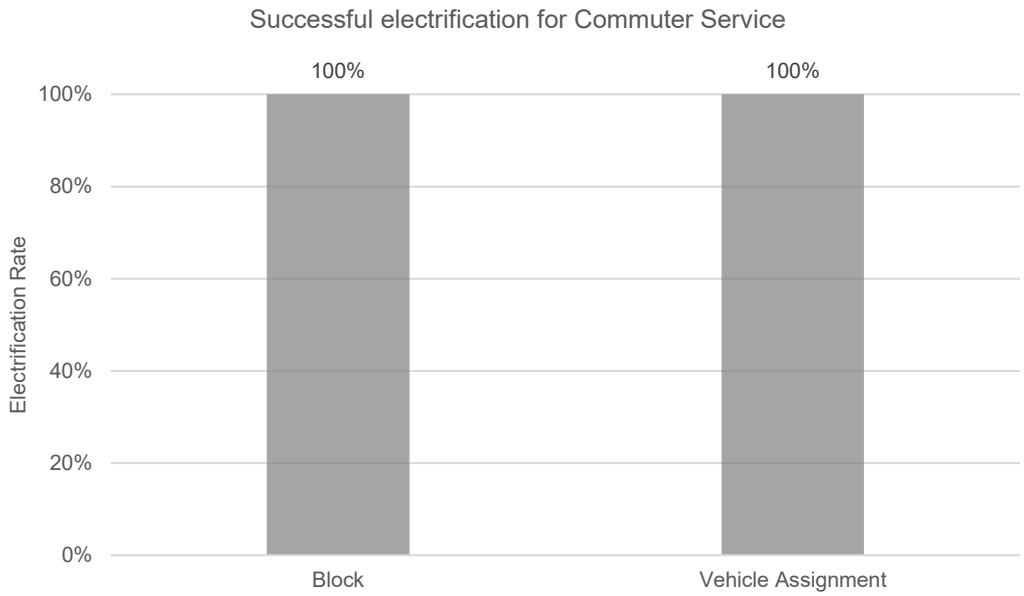


Figure 8-6: Successful electrification for commuter service (Galt-Sacramento Commuter Express)

Table 8-3 presents the average fuel efficiency and driving range for BE motorcoaches currently available on the market.

[33] OEMs recommend that a BEB charge only to 90% of its total battery capacity and not drop below 10% SOC to preserve battery life; dipping below 10% can void the battery's warranty.

Table 8-3: Average fuel efficiency and driving range for BE motorcoaches

Vehicle type	Average fuel efficiency	Average driving range[34]
Motorcoach	2.15 kWh/mi	200 miles

8.2.2 Dial-A-Ride

Due to the smaller batter capacities on currently available BE cutaways, services operated via cutaways may be more difficult to electrify. This is seen in Figure 8-7, where only 57% of blocks and vehicles that operate DAR services can be successfully electrified.

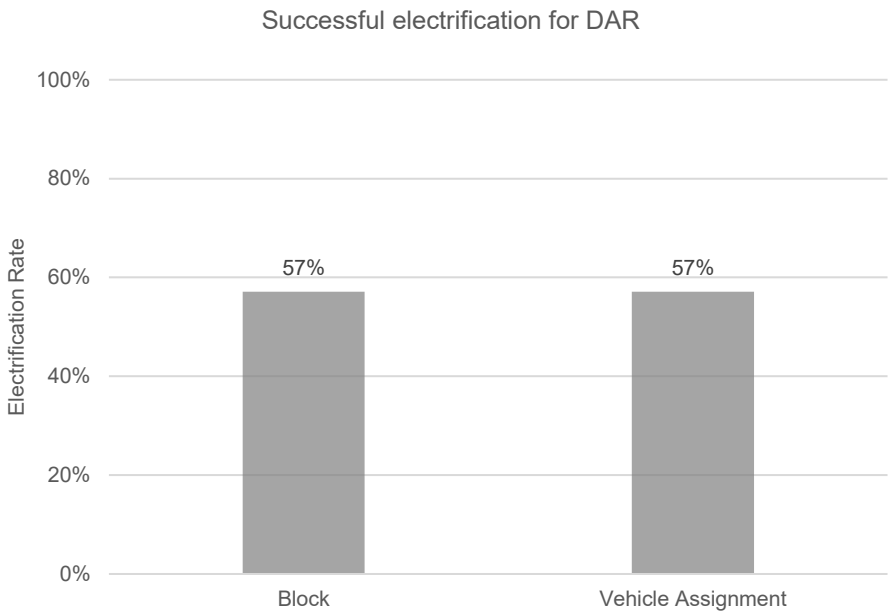


Figure 8-7: Successful electrification for Dial-A-Ride

Table 8-4 shows the average fuel efficiency and driving range of BE cutaways under DAR service.

Table 8-4: Average fuel efficiency and driving range for Dial-A-Ride cutaways

Vehicle type	Average fuel efficiency	Average driving range[35]
Cutaway (DAR)	1.08 kWh/mi	89 – 130 miles

8.2.3 Hwy 99 and Delta Routes

Due to interlining, vehicle-level results for Hwy 99 and the Delta Route are presented together. Results are first presented individually at the block level in Figure 8-8 and combined at the block level and vehicle level in Figure 8-9.

[34] Average daily mileage for a service day on GSCE commuter route of 167 mi with a max of 205 mi.
[35] Average individual trip length for DAR is 78 mi with a max of 125 mi.

While 70% of blocks can be successfully electrified, only 43% of vehicle assignments for the Delta Route and Hwy 99 can be successfully completed by BE equivalents.

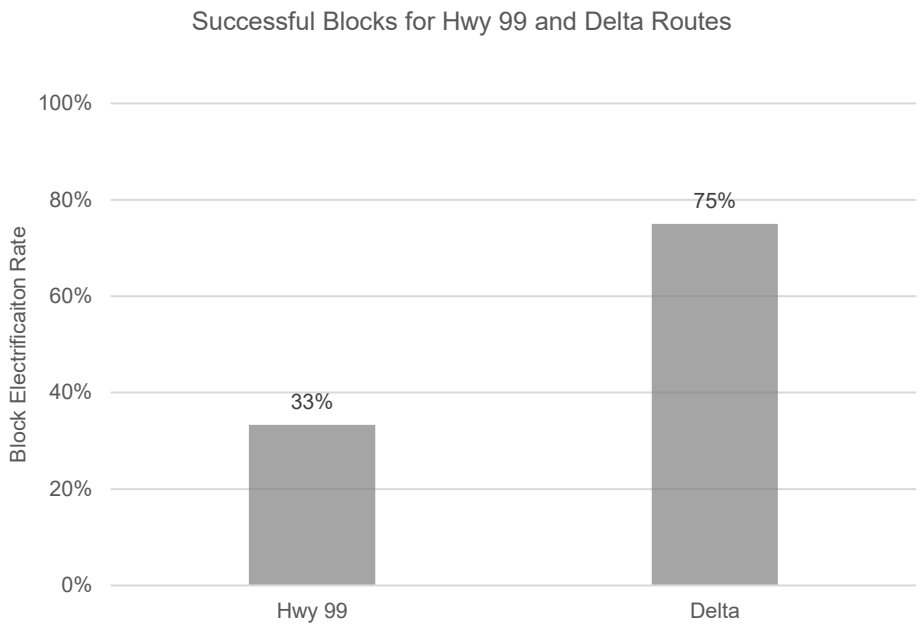


Figure 8-8: Successful block electrification for Hwy 99 and Delta Routes

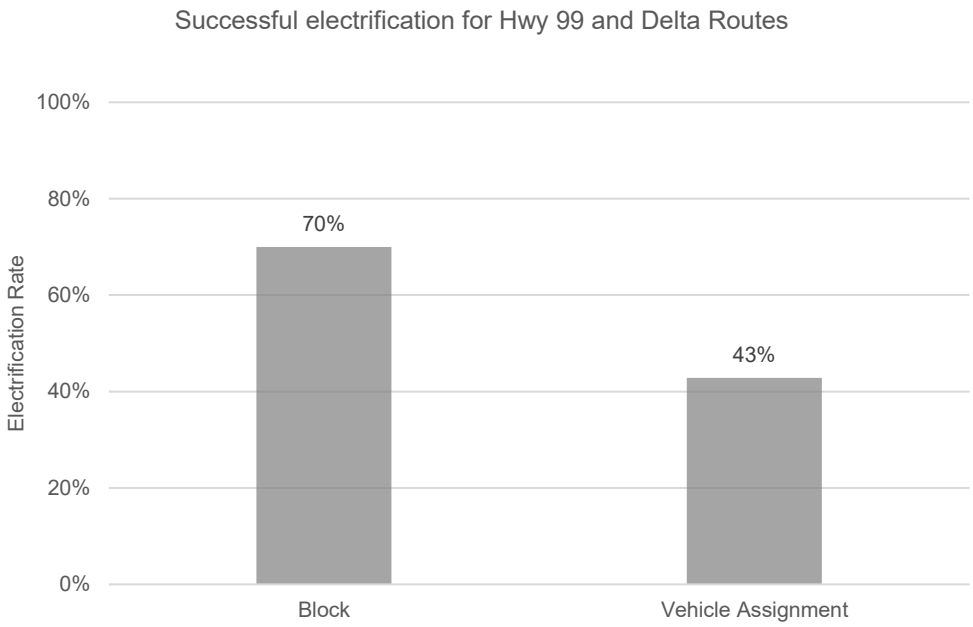


Figure 8-9: Successful block and vehicle electrification for combined Hwy 99 and Delta Routes

Table 8-5 shows the average fuel efficiency and driving range for BE cutaways operating on Hwy 99 and the Delta Route.

Table 8-5: Average fuel efficiency and driving range for Hwy 99 and Delta Routes

Service type	Average fuel efficiency	Average driving range[36]
Hwy 99 (cutaway)	1.23 kWh/mi	78 – 105 miles
Delta Route (cutaway)	1.01 kWh/mi	95 – 135 miles

8.3 Fleet Options and Assessment

Due to the small size of SCT Link's fleet and the types of vehicles it operates, there are somewhat limited options for transitioning to a ZEB fleet, especially considering current technology constraints. Table 8-6 below presents ZEB options for each vehicle type to satisfy the ICT regulation.

Table 8-6: ZE fleet options by vehicle type

Vehicle type	Service(s)	ZEB type	Battery size required	Quantity	Change from current quantity	Comments
Motorcoaches	GSCE	BEB (in-depot charging)	544 kWh	3	N/A	Overnight charging at the depot.
Cutaways	Hwy 99, Delta Route, DAR	N/A; CARB exemption	N/A	N/A	N/A	Current available battery size is ~120 kWh. According to modeling, only 43% of daily service can be completed using BE cutaways for Hwy 99/Delta and 53% for DAR. For the CARB plan, it is possible to assume the use of bigger vehicles (30-ft or 35-ft) instead of cutaways for Hwy 99 service. Also important to note that the ZEB strategy could change if service in the Delta changes based on outcomes of the SRTP.

[36] Vehicles on the Hwy 99 route operate an average of 140 mi/day with max of 200 mi/day. Vehicles on the Delta route operate an average of 155 mi/day with a max of 185 mi/day

Vehicle type	Service(s)	ZEB type	Battery size required	Quantity	Change from current quantity	Comments
Vans	Demand response	N/A; CARB exemption	80	N/A; CARB exemption	N/A	Using electric vans for DAR or future Delta service could improve the fuel efficiency but service would still be restricted to 150 miles per charge.

Finally, Table 8-7 presents a summary of draft service concepts for the SRTP portion of this project and their potential impact on the ZEB planning portion of the project. After service concepts are finalized, the draft ZEB fleet composition will be revisited to finalize the ZEB strategy before proceeding with the next steps of the ZEB rollout plan.

Table 8-7: Draft service concepts and their potential impact on ZEB transition

Service	Current service levels	ZEB concept	Potential service/operations concepts	Potential impacts to ZEB transition
GSCE	2 AM round trips 2 PM round trips	Successful as is; mileage constraints within operating range of ZE motorcoaches	Restore service to pre-pandemic levels Add one additional PM trip	No impact; successful electrification transition is expected
DAR	M-F 6:30am-6:30pm Saturday 8am-4pm	About 60% successful. Daily ranges often exceed ZE vehicle Will need to limit vehicle operating hours Could explore transitioning some or all of service to vans	Explore later service hours on Saturdays Explore later service hours on weekdays Explore Sunday service Explore service outside of Galt on more days	More vehicles in service Recharging between service at public charging stations (if available) Use of smaller, lighter vehicles (van) with better fuel economy
Hwy 99	M-F 5:20am-7:20pm Every hour	Daily ranges often exceed ZE vehicle equivalents' operating ranges Will need to limit vehicle operating hours interlining	Explore Saturday service Increase frequency to 30-minute headways during peak hours (9am-3pm)	More vehicles in service Avoid combining trips with DAR and Delta Potentially transitioning to larger vehicles with larger battery sizes

Service	Current service levels	ZEB concept	Potential service/operations concepts	Potential impacts to ZEB transition
Delta Route	M-F 6:20am-5:10pm 4 round trips daily	Daily ranges often exceed ZE vehicle equivalents' operating ranges Will need to limit ranges and interlining	Exploring on-demand/DAR-style service	More vehicles in service Recharging in between trips Use of smaller, lighter vehicles (van) with better fuel economy TBD depending on service proposal

9 RECOMMENDATIONS, SERVICE PLAN & ZEB STRATEGY

This Recommendations and Service Plan chapter of the SRTP outlines the recommendations that will shape SCT Link throughout the next five years. These recommendations are broadly broken down into two separate but related sections: (1) the first relating to service planning recommendations for SCT Link's services over the coming five years, and (2) the second relating to recommendations related to other aspects of SCT Link, such as fleet replacement (particularly regarding Zero Emission Bus (ZEB) transition), technology, organization, management, and marketing.

This chapter begins with a summary of the overall goals of the SRTP based upon the pillars identified in the needs and gaps analysis, and informed by regional plans, particularly the SACOG Next Generation Transit Study, the County Active Transportation Plan. The service plan and supporting recommendations that follow were designed by considering the needs and opportunities, the service concepts, stakeholder engagement, public outreach, and discussions with SCT Link staff and its operator. A Title VI assessment of the service plan recommendations is also presented and found that the service plan aims at improving service to Title VI communities in South County. An implementation plan outlining action items for the supporting recommendations is also provided.

The latter sections of this chapter outline the strategy and needs for adopting a ZEB fleet to align with California Air Resources Board's (CARB) mandate. Finally, a financial plan is outlined accounting for the estimating operating and capital costs associated with the SRTP recommendations and service plan.

9.1 Overall Goals

Stemming from a collaborative and iterative process with SCT Link staff, initial pillars were developed and revised to guide the development of a Short Range Transit Plan /Zero Emission Bus Plan. Throughout the SRTP process, the five pillars were distilled into four goals that shaped the recommended service changes for SCT Link. Aligned with broader, regional goals from the County's Active Transportation Plan (ATP) [37] and SACOG Next Generation Transit Study[38], these four goals include:

Set SCT Link Up for Long-Term Success—aiming to refine how SCT Link operates as an agency, this goal looks at SCT Link's mission, the ZEB Rollout Plan, service guidelines, business processes, and staffing. By updating key aspects of the agency, SCT Link will align with the SACOG Next Generation Strategy goals of the region by providing better service to *Move the Economy*, through *Financially Sustainable* means that are *Climate Smart*. Aiming to better connect customers to the places they want to go, targeted modifications to priority routes will enable SCT Link to remain financially sustainable and an important link in the region's connectivity.

Core to SCT Link's business plan is the ZEB Rollout Plan. Through initial ZEB vehicle purchase in FY26-27 and with a plan for full ZEB transition by 2040, SCT Link is supporting climate priorities and helping to create a more sustainable Sacramento County (County).

Elevate the Customer Experience—The customer experience is prioritized with formalizing service change requests, investments in customer-focused technology, a fare study review, mobility and travel training, and improved management of SCT Link website content. Emphasizing equity is core to this goal and is supported by both the SACOG Next Generation Strategy and Sacramento County's ATP. Improving

[37] https://sacdot.saccounty.net/Documents/A%20to%20Z%20Folder/Active%20Transportation/Sac%20ATP%20Plan%20+%20Appendices_Final.pdf

[38] https://www.sacog.org/sites/main/files/file-attachments/20210702_sacog-report.pdf

access and information about SCT Link services will allow more people to utilize services more frequently, with a clear mechanism to influence transit decision making in the future. Through travel training programs and technology investments, SCT Link will be more user friendly and easily accessed by customers of all abilities.

Improve Service and Reliability—Improvements to service and reliability come from implementation of the proposed service plan, assessing the need and feasibility for school trippers, and updating key customer policies and system performance metrics. By adjusting the no-show policy for dial-a-ride (DAR) and launching a study for potential school trippers, SCT Link can improve service quality while ensuring equitable access to services. Effective metrics ensure SCT Link remains fast and reliable for the communities it serves and updating those metrics enables schedule adjustments that better reflect actual operations, maintaining cost effectiveness.

Increase Awareness of SCT Link and Foster Transit Supportive Communities—Joining two pillars, this goal aims to update the SCT Link brand while improving coordination between partners within the region for cohesive service and improvements to the built environment. How SCT Link is perceived as a brand and its overall community awareness heavily influences ridership. Marketing strategies can educate the public and encourage transit ridership by providing relevant information and emphasizing the system's usefulness.

Effective coordination between systems facilitates interconnectivity within the region and moves the economy as a major commuter resource, connecting people to jobs and other opportunities. Coordination between partners and authorities having jurisdiction (AHJs) is essential to SCT Link implementing improvements of the built environment that can encourage transit use and make transit a more convenient option.

9.2 Recommended Service Plan

The following section describes the proposed service plan for east and south Sacramento County, including SCT Link and the East County service operated by Amador Transit. The overarching intent includes:

- Stabilizing and recovering after the ridership losses caused by COVID-19 (pandemic). While the worst of the pandemic and the loss in ridership was experienced during 2020 and 2021, as of early 2022, ridership is still recovering and the goal of the early years of the service plan is to strategically add service to at least pre-pandemic levels, and expand where warranted.

- Focusing on enhancing services that draw the majority of SCT Link's ridership—i.e., DAR and Hwy 99. This includes providing service later in the day as well as service on weekends to expand mobility options. Ridership may nonetheless be low initially on new services; therefore, SCT Link will need active marketing and education campaigns to make riders aware of these changes and their benefits to the community.

- Transitioning from a fixed-route model for the Delta route to a demand-response model, similar to the DAR service in Galt. As part of this approach, it is recommended that SCT Link invest in technology that will ultimately enable same-day ride requests on the demand-response services (effectively transitioning from a 'dial-a-ride' service to a 'microtransit' service where customer can either use an app or telephone line to reserve a trip). At the same time, vehicle tracking will enable live arrival information for trip planning purposes across modes and regional agencies. These enhancements will ultimately facilitate connectivity across all transit modes and providers helping to reduce barriers to transit use and making transit a more convenient option.

- Reallocating resources away from the extremely low ridership East County service to the workhorses of the SCT Link network—the DAR service and Hwy 99.

9.2.1 Galt Sacramento Commuter Express (GSCE)

The GSCE is a commuter service aimed at connecting Galt with downtown Sacramento during peak hours on weekdays. Due to the pandemic, demand on the GSCE has fallen sharply. While the recovery from the pandemic and the return to in-person activities is still in flux, as of March 2022, the State of California has eased many restrictions and in-person activities are restarting. As such, for the interim, it appears best that SCT Link maintain the current schedules of GSCE service, given its commuter focused market.

For the short-term plan, we have assumed a rebound of in-person activities including work, so our plan aims first at operating similar service hours to pre-pandemic conditions, and future years will see prudent growth in service (Table 9-1). Once additional stabilization occurs, it will be important to assess permanent changes, particularly as it relates to continued trends for remote work.

Table 9-1: GSCE Service Plan.

	Recommendations
FY23-24	• Restore service levels to pre-pandemic levels (i.e., one mid-afternoon trip). • Promote TMA-operated emergency ride home program.
FY24-25	• Continue to promote emergency ride home program. • Conduct schedule review to design schedules reflective of actual operations due to traffic changes and improve on-time performance.
FY25-26	• Add one additional round trip later in the afternoon (such as a 5:40 pm departure from Galt).
FY26-27	Continue previous service.
FY27-28	Continue previous service.

By working with the local TMA, SCT Link can gain insight as to the current level of participation from residents of South Sacramento County and develop ways to expand employer participation as a way to grow ridership. Emergency ride home programs can foster ridership by providing access to a guaranteed ride home when the GSCE isn't operating (such as during the midday). This work can be part of a broader investment in the marketing, branding, and overall awareness of SCT Link's services.

Finally, given the rebound in traffic as we recover from the pandemic, it will be important for SCT Link to actively monitor on-time performance of the GSCE and adjust schedules as needed so that bus schedule information is accurate. If riders choose to use the GSCE to commute to work, appointments, and other time sensitive activities in Sacramento, providing them with reliable and realistic schedules will help build trust and loyalty from ridership. Put another way, if bus schedules are not reflective of actual operating conditions and riders cannot rely on the accuracy of schedules, they will be more likely to leave the service. The adoption of service standards, implementation of technology to track performance (instead of relying on self-reporting by SCT Link's operator), and active contract management also play an important role in this recommendation.

9.2.2 Galt Dial-a-Ride (DAR)

SCT Link's DAR is the main service provided to the City of Galt, providing curb-to-curb service Monday-Saturday. DAR was instituted in 2009 to replace four unproductive local fixed routes and is productive for a DAR service in terms of boardings per hour. The service plan recommends strategically increasing service levels to grow ridership by providing a more attractive, flexible, and reliable service. The customer requests for more service to medical centers, as well as more service later in the day particularly informed the proposed service plan below; service to Herald on an additional weekday (Thursday) is recommended to expand the ability of riders to access to the residents who live in Herald.

Table 9-2: DAR Service Plan.

	Recommendations
FY23-24	• Extend service span to 8 pm on weekdays. • Pilot extended service for medical trips for all weekdays.
FY24-25	• Extend service span to 7 pm on Saturdays. • Pilot service to Herald on Thursdays. • With AVL[39] and an app solution, transition the DAR service to a microtransit service delivery integrated with the Delta microtransit service.
FY25-26	Continue previous service.
FY26-27	• Pilot Sunday service 8 am – 6 pm.
FY27-28	Continue previous service.

In addition to the service improvements in Table 9-2, it will be beneficial for SCT Link to continue to monitor on-time performance through the adoption of service guidelines and technology (like AVL, to avoid operator self-reporting).

Other strategies to improve on-time performance includes adopting a longer cancellation window. Currently, riders have up to 30 minutes prior to the scheduled ride to cancel a trip without being attributed a 'no show'[40]. For example, SacRT demand-response style paratransit service requires trip cancellations no later than 2 hours before a scheduled pick-up. Industry best practice typically specifies a 1- or 2-hour minimum window for late cancellation. It is recommended that SCT Link move to a 1-hour late cancelation window to allow for re-allocating resources as 30-minutes is frequently inadequate to redeploy a vehicle. To align with industry standards, the 1-hour window can be reevaluated for a 2-hour window in FY24-25.

As further discussed in Section 9.2.4, it is recommended that the Delta route be transitioned to a demand-response, DAR type of service. As such, both the DAR in Galt and the Delta could eventually be part of a single brand of service called microtransit. Microtransit would require that SCT Link adopt more advanced scheduling technology along with vehicle-tracking/GPS technology to eventually accommodate the same-day trip requests, dynamic routing and passenger grouping, app-based scheduling, and vehicle tracking that customers have come to expect from modern transit agencies. The DAR service is ripe for improvements geared toward encouraging more ridership by providing an up-to-date customer experience including accommodating same-day trip requests—ultimately providing more freedom and flexibility when it comes to traveling.

For example, as part of SacRT's microtransit service, SmaRT Ride, customers can book a curb-to-curb trip (although SacRT's service is not reservation based)—leveraging a rider app (or a customer phone line for those unable to use a mobile app) to request trips, track vehicles, etc. SCT Link could work with SacRT to understand their technology journey in the implementation of SmaRT Ride, with the ultimate goal of adopting an app-based system for reserved and on-demand trips for the Delta and Galt services.

[39] AVL, automated vehicle locator, is a GPS-like technology that allows operators the ability track vehicles, and get real-time arrival information. SCT Link is looking to procure AVL in the next year or two.

[40] At SCT Link, a customer is deemed a "no-show" when a DAR trip is canceled within 30-minutes of the scheduled pick-up time. Accumulating four no-shows in six months will result in a suspension of subscription service or service in general.

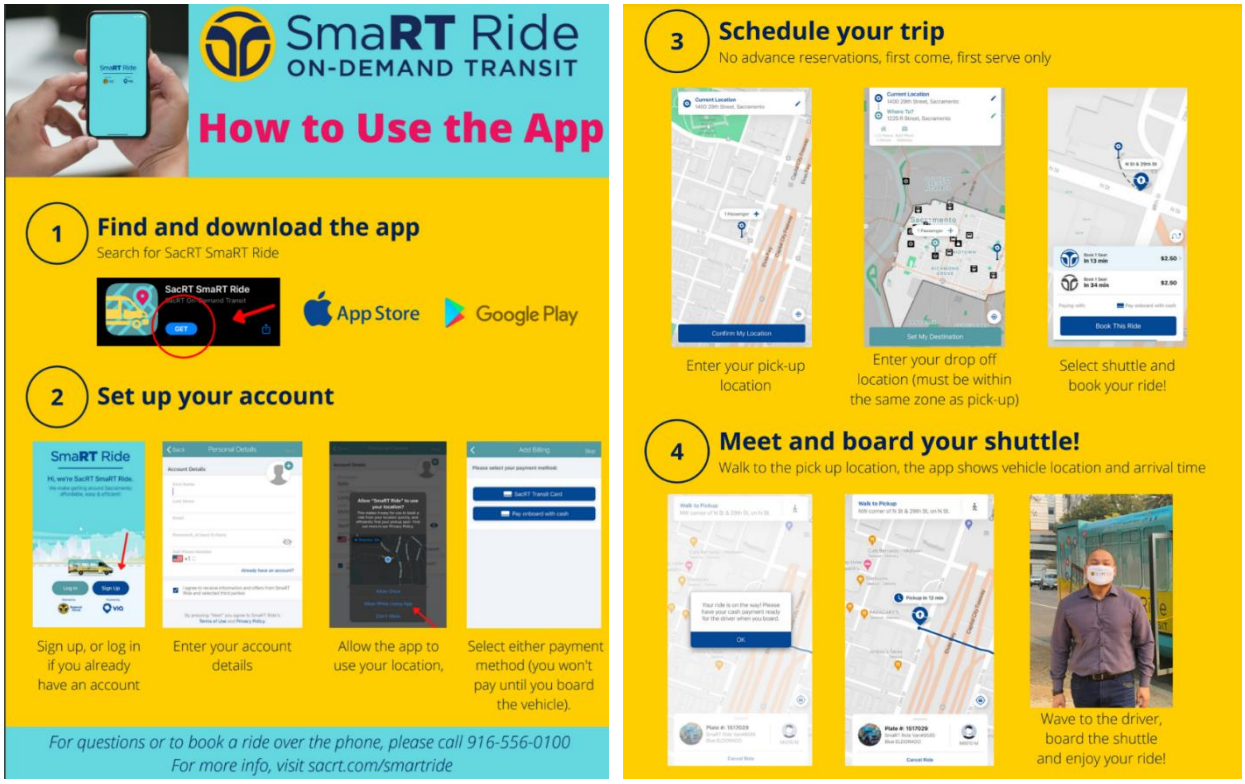


Figure 9-1: SmaRT Ride app example.

9.2.3 Hwy 99

The Hwy 99 is the backbone service providing connectivity throughout South Sacramento County, and to places like Lodi, Elk Grove, through the connection with SacRT's Blue Line light rail station at Consumes River College, to downtown Sacramento and other transit operators in the region. Throughout stakeholder engagement, a sentiment was expressed for connections with Sacramento on the weekends. Therefore, a key service recommendation is to pilot weekend service on the Hwy 99 Express so that customers who want to go to Sacramento can use the Hwy 99 and Blue Line to complete that journey. SCT Link and SacRT could collaborate to ensure both that schedules align to facilitate transfers and that the cost to transfer between operators is not a deterrent to riders.

Table 9-3: Hwy 99 Service Plan.

	Recommendations
FY23-24	• Pilot Saturday service (60-minute headways, 8 am - 6 pm).
FY24-25	• Extend service span to 8:20 pm on weekdays. • Conduct schedule review to design schedules reflective of actual operations due to traffic changes and improve on-time performance.
FY25-26	Continue previous service.
FY26-27	• Increase frequency to 30 min service on weekdays between 9 am - 4 pm.
FY27-28	• Pilot Sunday service (60-minute headways, 8 am - 6 pm).

In addition to the service recommendations in Table 9-3, to provide reliable service it will be important for SCT Link to review and adjust the schedule of Hwy 99 to reflect actual operating conditions. As a service

that operates once an hour, missing a trip due to an early arrival can derail a customer's schedule reducing trust and ridership on SCT Link. Therefore, publishing and adhering to accurate schedules is the first step in delivering the service as designed.

If SCT Link adopts vehicle tracking technology, there are a number of related improvements that can be provided to customers that should result in increased ridership. Recommendations include making live arrival information available on all platforms (like Google Maps and Transit App) so that riders can track the actual bus location allowing them to know whether buses are running late or early. A similar enhancement would be instituting real-time arrival boards at key bus stops, such as Galt City Hall. Finally, conducting a data analysis study would be extremely valuable to understand bus stop-level passenger activity (boardings and alightings); the data which could be provided by the AVL would facilitate the evaluation of whether bus stops could be eliminated or changed, and whether additional amenities should be provided, such as bus shelters, bike racks or benches.

9.2.4 Delta

The Delta Route is underperforming and serves a community that is difficult to provide transit service to in an effective fashion—population is sparsely distributed and destinations outside of the Delta are long distances (over 10 miles). Ridership on this fixed-route service is low (generally less than 10 riders per day), but there are still people living in the Delta who rely on SCT Link as an important transportation mode.

Based on community feedback, analysis, and considerations of peer agency practices, it is recommended that the Delta service transition from a fixed-route, scheduled service to a demand-response service, similar to the DAR service that SCT Link operates in Galt. This service would use the same resources (vehicles, operators, schedulers, etc.) that are used for the current fixed-route service and DAR service in Galt, so no new infrastructure would be required, The primary investment would be the education and outreach to inform customers and the Delta communities about the service delivery changes. The service plan in Table 9-4 provides transition lead time to allow SCT Link to prepare for this service switch. If this change is adopted, it was clear from the outreach that SCT Link will need to develop and implement a robust outreach plan, particularly in Spanish, to help inform and educate about these proposed changes to the Delta route.

Table 9-4: Delta Service Plan.

	Recommendations
FY23-24	• Use lead time to plan transition to demand-response service.
FY24-25	• Transition to demand-response service in a DAR fashion (reservations required through a phone call) for both the Delta and Galt as one zone.
FY25-26	• Pilot fixed-schedule service between the Delta and Sacramento. • With AVL and an app solution, the DAR service will transition to a microtransit service delivery.
FY26-27	• Explore volunteer driver program for Delta communities (see section 5.3.1).
FY27-28	Continue previous service.

Based on travel patterns and customer feedback, the proposed initial service design is for customers to call SCT Link to reserve a trip at least 24-hours in advance, similar to the DAR service in Galt. Service would be provided curb-to-curb for trips internally to the Delta, as well as to destinations in Galt. Customers wishing to travel to other destinations could connect to the Hwy 99 and GSCE as needed. Policies like no-show and cancellations, would be uniform for both Galt and Delta services. The maps in Figure 9-2 and Figure 9-3 demonstrate the new, melded demand-response zone that is proposed to extend between the Delta and Galt.

Like with the DAR service in Galt, with an adoption of AVL and a microtransit app, SCT Link will be able to provide live arrival information and same-day service.

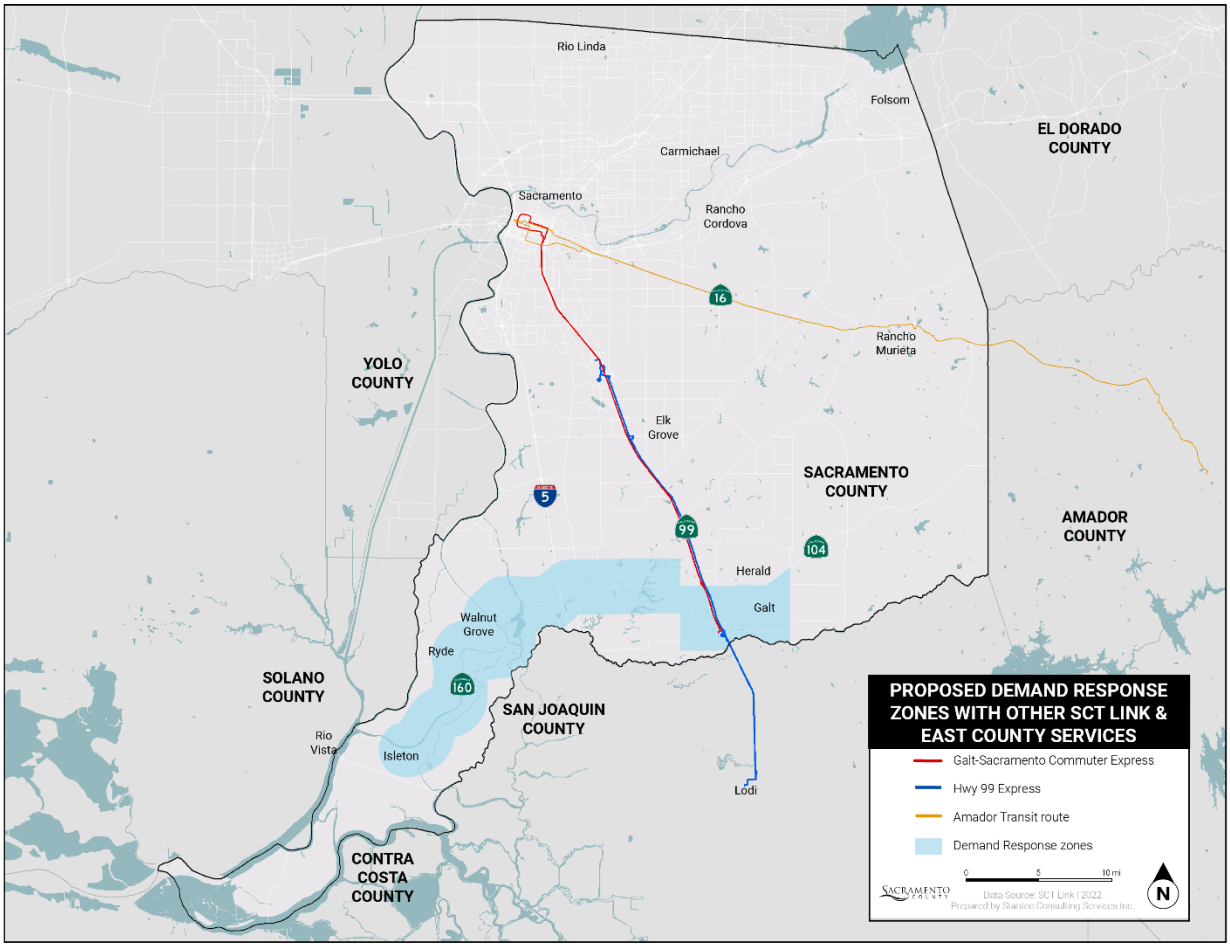


Figure 9-2: Proposed SCT Link and East County Transit service map overview.

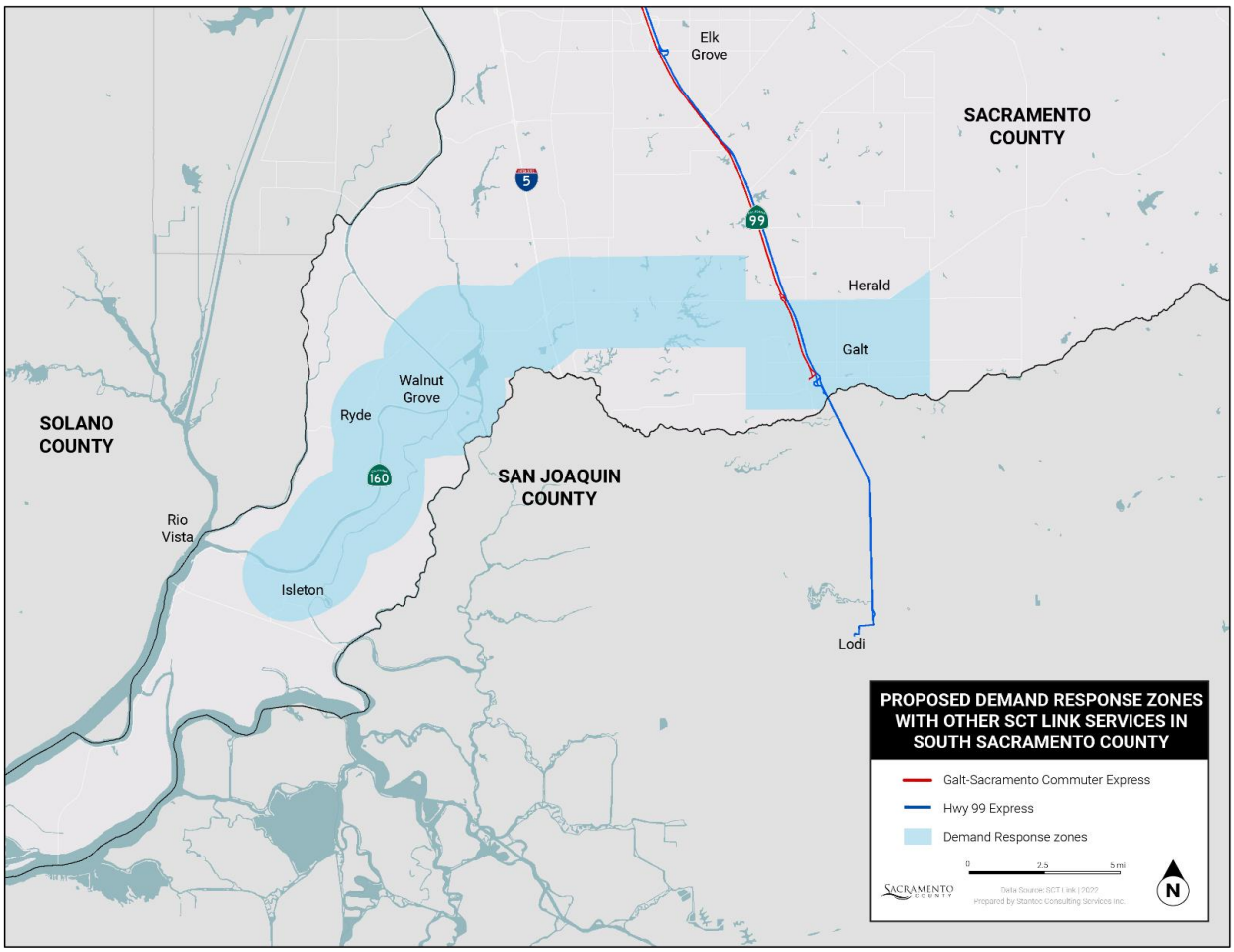


Figure 9-3: Proposed SCT Link and East County Transit service map overview zoom in to South County.

Using the Delta route and the Galt DAR current fare structures, the following initial fare structure is proposed for these demand-response services (Table 9-5).

Table 9-5: Proposed fare structure for demand-response services.

Origin	Destination	Proposed Fare	Notes
Delta	Delta	$2.50	Similar to the Galt DAR fare.
Galt	Galt	$2.50	No change from the current Galt DAR fare.
Delta Galt	Galt Delta	$4.00	This fare would include a transfer to other SCT Link services. This fare is higher than the trips that are only within the community given the travel distance between Galt and the Delta.

As with the Galt service, the Delta and Galt DAR services can become one “brand” under SCT Link DAR, and then with technology adoption and modernization, ultimately transition to a microtransit style of service.

Furthermore, SCT Link should pilot a fixed-schedule service between the Delta and downtown Sacramento. While outreach and the travel data suggest strong travel demand between the Delta and Sacramento, to prepare for the pilot, it is recommended that SCT Link launch a more thorough investigation of the demand

for this service to help inform the key characteristics of the service design of a fixed-schedule service, including:

- Days of operation
- Trip departure times
- Stop locations

To conduct this study, SCT Link should survey riders of the Delta on different potential options regarding days of operation and departures times and stop locations for a fixed-schedule service. Furthermore, SCT Link could hold outreach events in the Delta to solicit feedback on alternatives. Nonetheless, while an interesting concept, the fact remains that the population density in the Delta is low and likely most people prefer the flexibility of driving to Sacramento instead of relying on a fixed-schedule—ridership will likely be low.

Finally, another potential avenue for piloting is testing a volunteer driver program. While case studies are provided in Section 9.4.3.1, the ultimate goal of the volunteer driver program concept is to provide subsidized trips for people in the Delta who have friends or family who are able to provide them with transportation. This program, ideally, would be operated by a local group/transportation provider focused on mobility to minimize the cost to the County.

Overall, the proposed service plan for the Delta is focused on providing a service that is better suited to the travel patterns of this challenging service area.

9.2.5 Amador Transit / East County

Apart from the Delta Route, the Amador Transit/East County service is the most underproductive service in SCT Link's network. Furthermore, as a commuter service, the productivity of the Amador route is much lower (about 3-4 boardings per hour) than an average of peer commuter services (~12 boardings per hour). While it is tempting to continue to subsidize the service since the bus is passing through Rancho Murieta on its way to downtown Sacramento, the facts mitigate against that approach. Our assessment shows that the level of ridership generated is very low and the market for transit is quite slight–Rancho Murieta has very low density residential land use with high household incomes and vehicle ownership rates.

As such, the recommendation is to stop subsidizing the Amador Transit route once the contract with Amador Transit ends in FY24-25; SCT Link's limited financial resources could then be repurposed to provide more service in South County where the need is greater and the potential for ridership is higher (Table 9-6). Based on the market analysis, peer comparisons, and performance analysis, should ridership on the Amador route exceed 8,000 annual boardings (or ~30 unlinked trips per day, the peak ridership recorded by this route, which was in FY16-17) by FY24-25, SCT Link could reconsider the recommendation of service elimination.

Table 9-6: Amador Transit/East County Service Plan.

	Recommendations
FY23-24 FY24-25	• Continue service as usual. Use lead time to plan for service reallocation (hearings, outreach, etc.).
FY25-26	• Reallocate service to South County services.
FY26-27	No service.
FY27-28	No service.

9.2.6 Summary of Service Plan

Table 9-7 provides a summary of the recommended service plan by mode FY23-24 through FY27-28.

Table 9-7: Proposed service plan summary.

Mode/Service	FY23-24	FY24-25	FY25-26	FY26-27	FY27-28
GSCE	• Restore service levels to pre-pandemic levels (i.e., one mid-afternoon trip) • Promote TMA-operated emergency ride home program	• Continue to promote emergency ride home program • Conduct schedule review to design schedules reflective of actual operations due to traffic changes and improve on-time performance	• Add one additional round trip later in the afternoon (such as a 5:40 pm departure from Galt) for a total of six trips	• Continue previous service	• Continue previous service
DAR	• Extend service span to 8 pm on weekdays • Pilot extended service for medical trips for all weekdays	• Extend service span to 7 pm on Saturdays • Pilot service to Herald on Thursdays	• Continue previous service	• Pilot Sunday service 8 am – 6 pm	• Continue previous service
Hwy 99	• Pilot Saturday service (60-minute headways, 8 am - 6 pm)	• Extend service span to 8:20 pm on weekdays • Conduct schedule review to design schedules reflective of actual operations due to traffic changes and improve on-time performance	• Continue previous service	• Increase frequency to 30 min service on weekdays between 9 am - 4 pm	• Pilot Sunday service (60-minute headways, 8 am - 6 pm)
Delta	• Use lead time to plan transition to demand-response service	• Transition to demand-response service in a DAR fashion (reservations required through a phone call)	• Pilot fixed-schedule service between the Delta and Sacramento	• Explore volunteer driver program for Delta communities	• Continue previous service
Amador Transit/East County	• Continue service as usual. Use lead time to plan for service reallocation (hearings, outreach, etc.)		• Reallocate service to South County services		

Using the service plan, revenue hour estimates were developed for each plan year and are used to forecast operating costs for the SRTP in Section 10. Table 9-8 provides a summary of revenue hour estimates and the assumptions used to develop these estimates.

Table 9-8: Proposed Revenue Hours by Mode.

Mode/Service	FY22-23 (Baseline)		FY23-24		FY24-25		FY25-26		FY26-27		FY27-28	
	Rev hours	Comments	Rev hours	Comments	Rev hours	Comments	Rev hours	Comments	Rev hours	Comments	Rev hours	Comments
GSCE	2,287	• Based on FY22-23 budget provided by the County	2,287	• Restores service levels to pre-pandemic levels	2,287	• Continues with pre-pandemic service levels	2,632	• One additional round trip of ~1.33 hours every day of operation (no service on weekends or holidays)	2,632	• As in FY25-26	2,632	• As in FY25-26
DAR (*actual hours will vary because of demand-response nature of this service*)	10,354	• Based on FY22-23 budget provided by the County	11,353	• Assumes 4 additional revenue hours per weekday to provide service until 8 pm, and service to medical appointments outside of the Galt service area	11,535	• Assumes 2.5 additional revenue hours per Saturday • Assumes 1 additional revenue hour for service on Thursdays in Herald	11,535	• As in FY24-25	12,055	• Assumes 10 additional revenue hours for service on Sundays	12,055	• As in FY26-27
Hwy 99	7,311	• Based on FY22-23 budget provided by the County	8,395	• Assumes 20 additional revenue hours for service on Saturdays (2 vehicles, 10-hour span)	8,858	• Assumes ~5 additional revenue hours per weekday (no holidays) to provide service until 8:20 pm	8,858	• As per FY24-25	16,633	• Assumes ~35 additional revenue hours for weekdays (30-minute frequencies)	17,717	• Assumes 20 additional revenue hours for service on Sundays (2 vehicles, 10-hour span)
Delta (*actual hours will vary because of demand-response nature of this service*)	2,415	• Based on FY22-23 budget provided by the County	2,415	• Based on current fixed-route service as SCT Link prepares to transition to demand-response service delivery model	5,020	• Assumes 2 vehicles operating in service for 10-hour span (8:30 am-6:30 pm) on weekdays (no service on weekends and holidays	5,522	• Assumes 10% growth in service levels to track with demand and potential fixed-schedule service pilot	6,074	• Continues to assume 10% growth	6,682	• Continues to assume 10% growth

Mode/Service	FY22-23 (Baseline)		FY23-24		FY24-25		FY25-26		FY26-27		FY27-28	
	Rev hours	Comments	Rev hours	Comments	Rev hours	Comments	Rev hours	Comments	Rev hours	Comments	Rev hours	Comments
Amador Transit/East County	1,063	• Based on FY22-23 budget provided by the County	1,063	• Based on FY22-23 budget provided by the County	1,063	• Based on FY22-23 budget provided by the County	0	• Reallocate service to South County services	0	• Reallocate service to South County services	0	• Reallocate service to South County services
Total Annual Revenue Hours	23,430		25,513		28,763		28,547		37,394		39,086	
Change compared to FY22-23 (Baseline)	--		9%		23%		22%		60%		67%	

Based on the service plan and revenue hour forecasts, the following vehicle needs are estimated by service type (Table 9-9 and Table 9-10). Overall, the proposed service expansion is not anticipated to grow the fleet significantly since many of the service improvements are geared at either extending the service span on weekdays, so a small complement of vehicles would remain in service later, or providing new service on weekends. In summary, peak needs are not expected to grow significantly. Note that East County fleet needs are not shown below since these vehicles are not maintained or operated directly by SCT Link.

Table 9-9: Peak vehicle needs by year.

	FY23-24	FY24-25	FY25-26	FY26-27	FY28-29
GCSE	2	2	2	2	2
DAR	9	9	9	9	9
Hwy 99	2	2	2	4	4
Delta	2	2	2	2	2

Table 9-10: Total fleet size.

	FY23-24	FY24-25	FY25-26	FY26-27	FY28-29
Motorcoaches	3	3	3	3	3
Cutaways	16	16	16	18	18
Total	19	19	19	21	21

9.3 Title VI/Environmental Justice Impacts

SCT Link examines a number of different demographics to assess environmental justice and Title VI populations within the SCT Link service area and how any changes to service will impact these populations. SCT Link must respect federal Title VI policies which stipulate that services changes shall not disproportionately or disparately impact low-income communities, minorities, or both. Figure 9-4 and Figure 9-5 show the percentage of these population groups with the new service plan, and Figure 9-6 shows the recommended service plan with census tracts that have a higher percentage of households living below the poverty level than the service area average (low-income census tracts) and census tracts with a higher percentage of minority households than the service area average (minority census tracts).

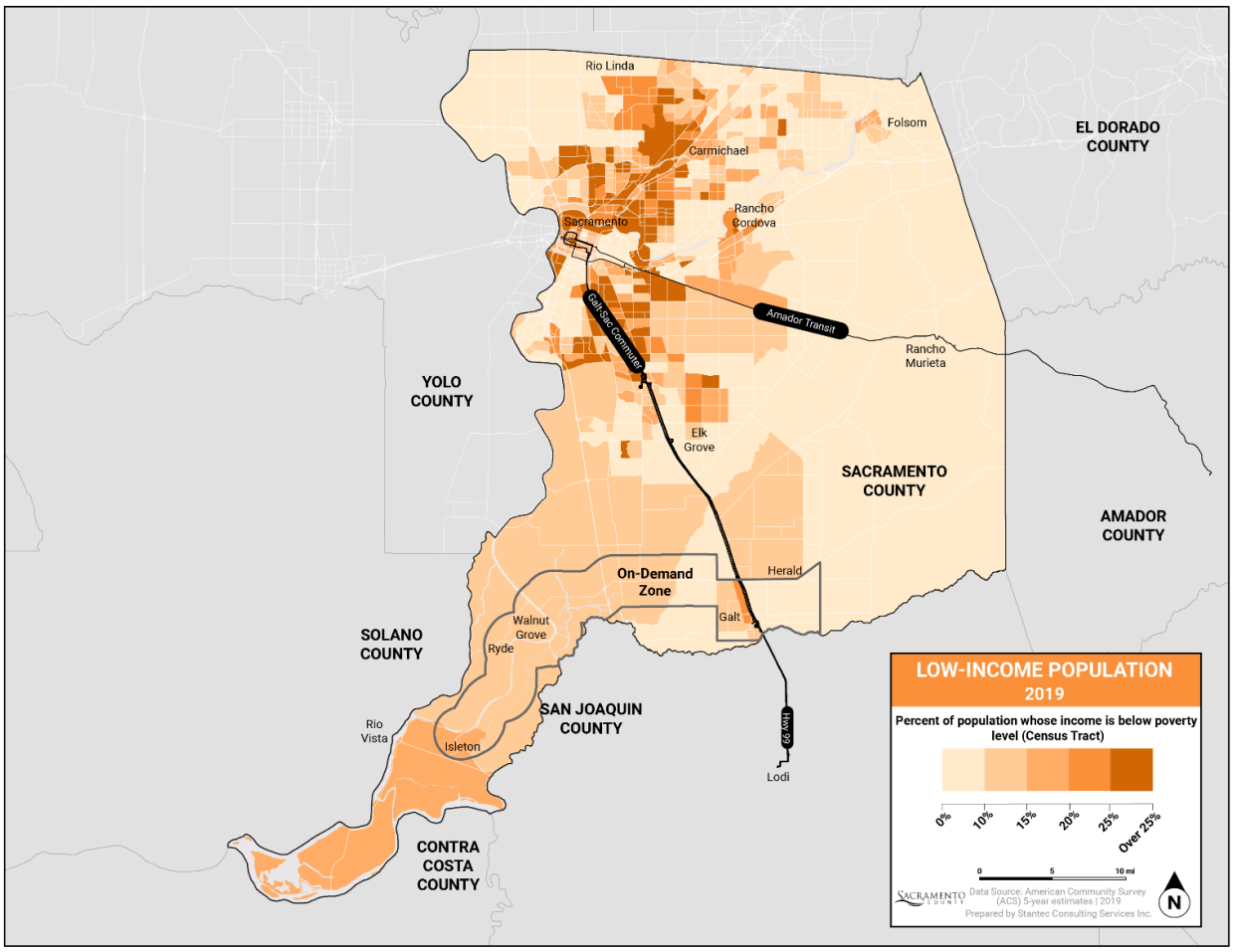


Figure 9-4: Low-income populations in Sacramento County

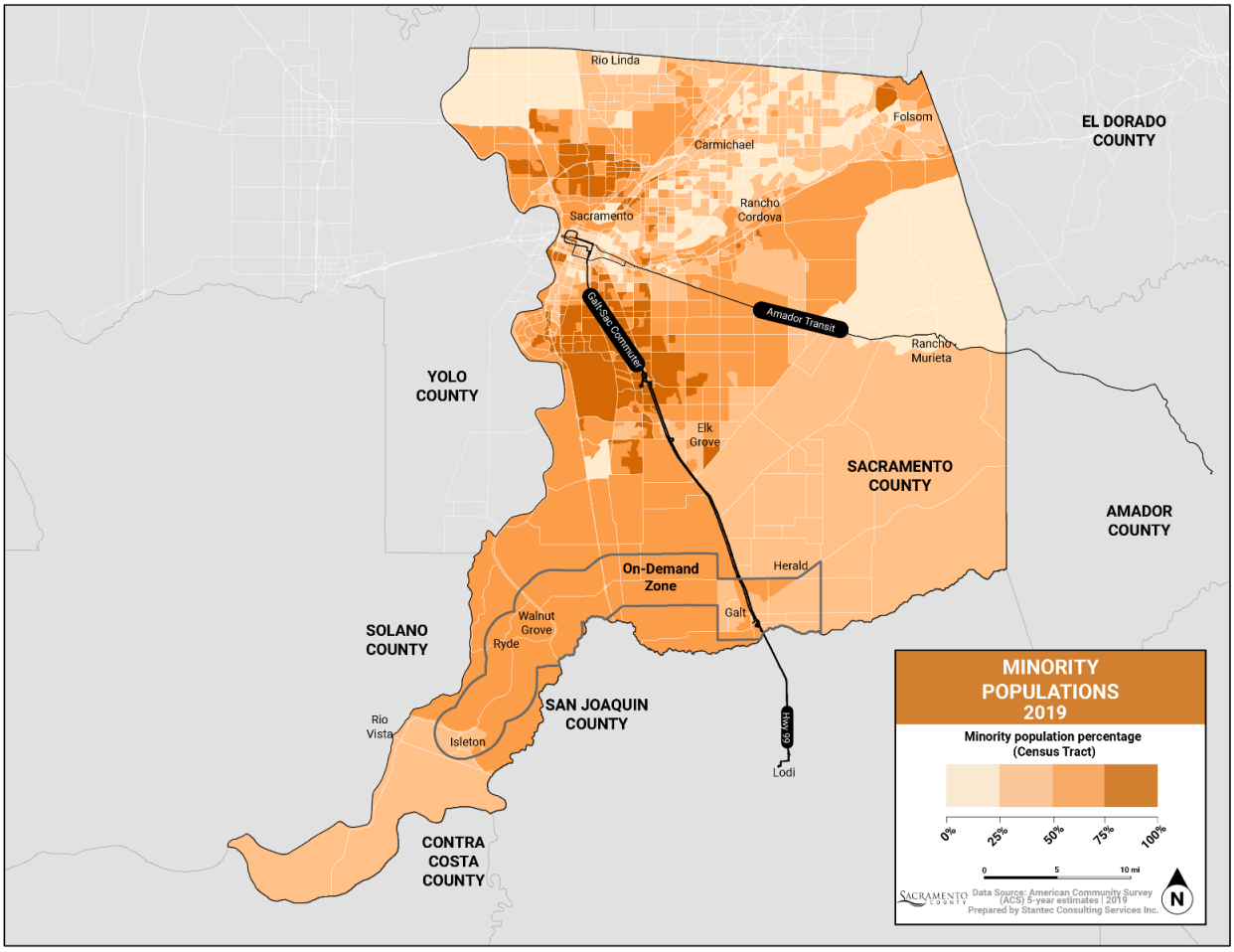


Figure 9-5: Minority populations in Sacramento County

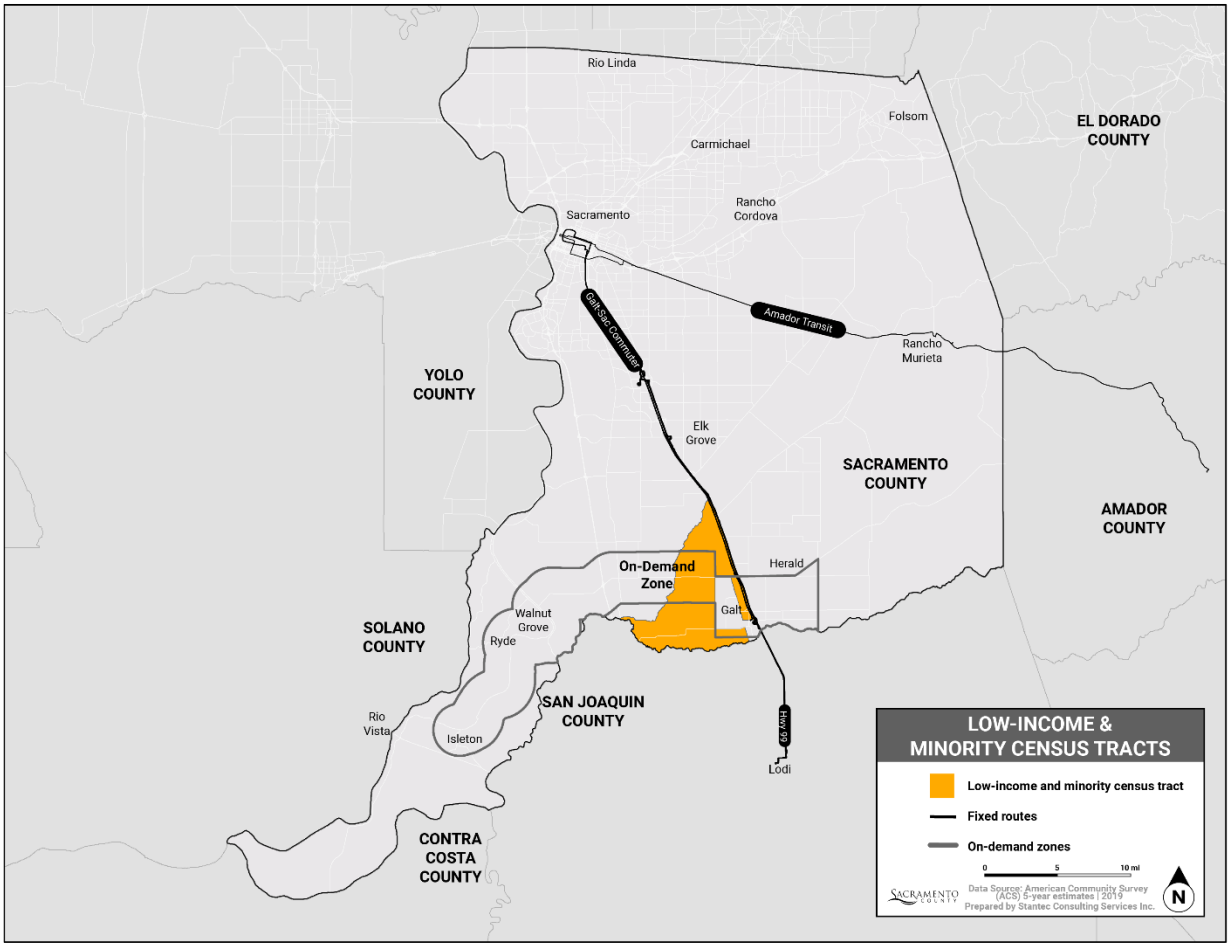


Figure 9-6: Low-income and minority census tracts in South Sacramento County service area

According to the recommended service plan, service is set to improve (either with more frequent service, a longer service span, or transition to an on-demand service to replace infrequent fixed route service) in all parts of the service area except for east Sacramento County, specifically Rancho Murieta. Moreover, these figures show that east county contains no minority census tracts and no low-income census tracts. Even though service is being removed from this area, it does not result in a disparate or disproportionate impact on any Title VI populations.

9.4 Supporting Recommendations

In addition to the recommended service plan, the actions detailed in this section are proposed as supporting recommendations to help SCT Link achieve the following goals:

1. Set SCT Link up for long-term success
2. Elevate the customer experience.
3. Improve service and reliability.
4. Increase awareness of SCT Link and foster transit supportive communities

9.4.1 GOAL A – Set SCT Link Up for Long-Term Success – Summary

Below is a summary of actions related to Goal A; sections 9.4.1.1-9.4.1.5 provide additional details on each.

GOAL A – Set SCT Link Up for Long-Term Success				
FY23-24	FY24-25	FY25-26	FY26-27	FY27-28
A1. Develop and adopt agencywide mission statement A2. Submit ZEB Rollout Plan to CARB by July 1, 2023 and follow phasing plan for vehicles and infrastructure to achieve full transition by 2040. A4. Design data collection strategic plan to outline data collection necessary for decision-making, technology needed for data collection, and plan to use the data. A4. Deploy AVL on all vehicles.	A3. Develop and adopt transit service guidelines. A4. Refine data collection strategic plan and update plan or data collection needs accordingly.	A3. Use data to refine service guidelines. A4. Annually review data collection strategic plan, the state of data collection, technology used to collect data, and how data is used; adjust plan and data collection and analysis methods. A5. Increase to1 full FTE dedicated to SCT Link planning, oversight, marketing and outreach, and to support the ZEB rollout (from current .5 FTE).	A2. First ZEB vehicle purchase. A3. Continuously measure service based on guidelines and adjust as needed. Identify priority routes/ areas for more (or less) service when resources become available (or constrained). A4. Annually review data collection strategic plan, the state of data collection, technology used to collect data, and how data is used; adjust plan and data collection and analysis methods. A5. Assess FTE levels and adjust accordingly.	A3. Continuously measure service based on guidelines and adjust as needed. Identify priority routes/ areas for more (or less) service when resources become available (or constrained). A4. Annually review data collection strategic plan, the state of data collection, technology used to collect data, and how data is used and adjust plan and data collection and analysis methods. A5. Assess need to adjust FTE levels and adjust accordingly.

9.4.1.1 *A1. Develop and adopt agencywide mission statement to frame the design and delivery of mobility services*

Developing an agencywide mission statement that succinctly frames the agency's vision for providing mobility can be a powerful tool to help align everyone within the agency behind a common goal and clearly communicate the mission and vision to the public. A mission statement can help to guide future strategic initiatives and future planning decisions and build awareness for the agency.

Recently, many transit agencies have been opting to adopt mission statements that are concise and clearly articulate the guiding principles and goals of the agency painting a clear picture to the public of what the agency is and its goals. Mission statement development produces the best results as a collaborative process among all departments and sectors of the agency that creates agencywide buy-in resulting in a mission statement that everyone believes in, because they were part of crafting it.

Table 9-11 provides some examples of mission statements from other peer transit agencies; the guiding principles are in bold. Determining what principles guide SCT Link and transit service delivery in south and

east Sacramento County can be a good starting point for the development of mission statements; while every agency is unique with different guiding principles, they are often similar or overlapping, such as safety, equity, reliability, sustainability, and/or innovation.

Table 9-11: Example mission statements

San Joaquin RTD Our primary mission is to provide a **safe**, **reliable**, and **efficient** transportation system for the region.
YoloBus Yolo County residents enjoy **innovative** and **efficient** mobility options **connecting** them to places they want to go.
Yuba-Sutter Transit To provide **safe** and **cost-effective** public transportation services that **increase mobility and improve the quality of life** for Yuba and Sutter County residents.
Santa Barbara MTD To **enhance the mobility** of South Coast residents, commuters, and visitors by offering **safe**, **appealing**, **equitable**, **environmentally responsible**, and **fiscally sound** transit service.
Golden Empire Transit District We **make life better** by **connecting people to places** one ride at a time.

9.4.1.2 A2. Implement the ZEB Rollout Plan

As discussed in greater detail in Section 9.6, CARB's Innovative Clean Transit (ICT) mandate requires that SCT Link fully transition to a ZEB fleet by 2040. According to the phasing plan outlined in Section 9.6, implementation of the plan will begin in 2026 with SCT Link's first purchase of a battery-electric cutaway ultimately achieving a 100% ZE fleet by 2040. To support the ZEB rollout plan and to ensure full implementation by 2040, critical steps for SCT Link include:

- Ensure vehicle procurements adhere to the fleet replacement plan and phasing schedule.
- Ensure that the necessary facility modifications are completed as outlined in the plan providing sufficient lead-time for facility modifications to be completed on-schedule.
- Work with the operations contractor (contractor) to develop a robust and comprehensive training program for operators and maintenance staff.
- Develop agencywide training introducing the new technology to all agency staff so everyone is on the same page regarding upcoming changes.
- Pursue grants and other funding opportunities to help fund the ZEB transition.

- Take this opportunity for positive marketing to emphasize SCT Link's commitment to sustainability and the environment highlighting the improvements in vehicle conditions, such as a quieter ride and less noise on neighborhood streets.

- Continue to stay up-to-date on technological advances in the ZEB space and update the rollout plan accordingly, so it remains a living document.

9.4.1.3 A3. Develop clear service guidelines

It is recommended that SCT Link develop more robust transit service guidelines. Developing guidelines can provide clear answers to questions about service expansion, help prioritize service changes and requests, as well as align planning and decision-making with the guiding principles laid out in SCT Link's mission statement.

The development of clear service guidelines by SCT Link will also inform data collection, service design, and performance expectations of the contractor. The adoption of such clear and transparent service guidelines will provide critical guidance to apply when determining how to adjust existing service as well as how and where to introduce new services. For instance, these guidelines provide thresholds for the number of residents or jobs (or density) that need to be met before considering adding transit service for a particular area, as well as parameters for the type of transit service for new areas (frequency, span, vehicle type, etc.).

SCT Link can start this process with the SCT Link Service Policy (effective October 22, 2013) and including the updated Title VI policy as well as in the current operations contract, but adding more specificity to these general statements would provide clearer guidance on where SCT Link should provide service and what levels should be provided. Additionally, as SCT Link begins to implement the recommendations from this SRTP and introduces new service types to areas (such as replacing fixed route with DAR in the Delta), SCT Link can develop service guidelines inclusive of on-demand/microtransit/dial-a-ride modes to areas that may need transportation services, but are not dense enough to support fixed route.

While some agencies have long or complex standards or indicators, SCT Link can benefit from a simple set of indicators and metrics—preferably by service type—that are updated periodically to account for actual performance and community input. This list can provide a monitoring program whereby SCT Link reports these metrics quarterly to the Board. Some key metrics include:

- Service standards:
    - Vehicle load
    - Policy headway
    - On-time performance
    - Service span
    - Stop spacing and area coverage
- Performance metrics:
    - Boardings per revenue hour and mile
    - Operating cost per boarding
    - Farebox recovery ratio

- Complaints per 1,000 boardings
- Miles between vehicle failures

- Service policies:
  - Transit amenities
  - Dial-A-Ride call wait times
  - Vehicle type assignments to service classes

Some good examples of transit service guidelines or service standards include Santa Monica Big Blue Bus[41], San Joaquin RTD[42], and the Redding Area Bus Authority in Shasta County[43].

9.4.1.4 A4. Modernize business processes and adopt new technology

Modernizing business processes and adopting new technologies will ensure SCT Link is fully prepared for the future and to take advantage of the multiple benefits associated with new technologies such as automatic vehicle location (AVL). This adoption of new technologies will also help in developing a data collection strategic plan to provide SCT Link with accurate, disaggregated data on areas like service reliability and on-time performance that are currently self-reported by the operations contractor.

Along this line, It is recommended that SCT Link acquire AVL technology on all vehicles during FY23-24. AVL uses computers and GPS to track the location of buses in real time. Not only does this aid in internal reporting on schedule adherence and on-time performance, but it also improves the customer experience as customers can now track their buses through real-time information, often through a third-party app like Transit. AVL can also enable implementation of an on-demand/microtransit service model where users can schedule a ride in real time and track their vehicle while waiting and during the course of the journey. AVL can also aid in tracking bus operator performance, which will be even more important to closely track after battery electric buses have been introduced (more on that in Section 9.7.1). AVL can also improve safety by reducing response times to operational problems due to the improved communication between bus drivers and dispatchers. AVL, combined with computer aided dispatch (CAD), has also been proven to further improve the safety and security onboard vehicles when the systems include a silent alarm and video monitoring capabilities. For example, Denver RTD saw a 20% decrease in assaults onboard after adding an AVL/CAD system to its vehicles[44].

In addition, a robust data collection strategy will help SCT Link to plan service more efficiently and strategically and assist with contractor oversight. Data collection that is detailed and disaggregated can help SCT Link cross-check information received from the contractor to ensure consistency between reporting methods. This plan, at a minimum, should specify annual ride checks and develop a sampling plan to capture all routes and services to capture information such as:

- Passenger boardings and alightings by stop. This data helps plan the appropriate amenities and siting of bus stops (even those that SCT Link does not have jurisdiction over so that data-driven

[41] https://www.bigbluebus.com/uploadedFiles/Content/Newsroom/News/BBB_Service%20Design%20Performance%20and%20Evaliation%20Guidelines_%202015.pdf
[42] https://sanjoaquinrtd.com/wp-content/uploads/2020/06/SRTP-2018-Update_FINAL.pdf
[43] https://www.srta.ca.gov/DocumentCenter/View/1771/RABA-Short-Range-Transit-Plan-2014-FINAL
[44] https://www.transitwiki.org/TransitWiki/images/8/8e/CUTR_RealTime.pdf

input can be provided to the appropriate party), helps inform route alignments, identifies trip-level passenger loads, etc.

- On-time performance, ideally at each stop, as well as trip start and end times. This data can help track trip running time across the day, inform scheduling (like trips that need more or less running time), provide information about dwell times, and provide real-world information for timing points. Developing realistic schedules will help improve on-time performance and reliability as well as identify if routes need additional (or less) layover time. Tracking average wait times for DAR in Galt and the Delta will also be important to understand when more (or less) supply is needed to meet demand.

To be effective, the data collection strategic plan should also outline any technology needs and when they need to be phased in, such as the AVL discussed above.

9.4.1.5 A5. Achieve 1 FTE fully dedicated to SCT Link planning and oversight

On the County side, SCT Link employees wear many hats outside of just SCT Link, including oversight and administration of other areas such as active transportation. To truly modernize SCT Link, provide exceptional customer service, meaningfully improve SCT Link service and implement the service plan and recommendations provided here, we recommend that SCT Link devote 1 full-time equivalent (FTE) position at the analyst level dedicated to SCT Link to report to the County's transit manager to develop and help execute functions critical to the agency's success, including:

- Contractor oversight
- Marketing, outreach, and awareness
- Planning, data collection and analysis, and monitoring of performance
- Support SRTP service plan and recommendations
- Support the ZEB rollout

9.4.2 GOAL B – Elevate the Customer Experience – Summary

Below is a summary of actions related to Goal B; sections 9.4.2.1-9.4.2.5 provide additional details on each.

GOAL B – Elevate the Customer Experience				
FY23-24	FY24-25	FY25-26	FY26-27	FY27-28
B2. Deploy AVL on all vehicles to enable real-time arrival information for customers. Coordinate with third-party apps like Transit to provide improved trip planning and real time arrival information to customers.	B2. Transition to "on-demand"/microtransit model for DAR in Galt and the Delta using an app-based reservation system that enables more same-day trips. B3. Launch fare study review and ensure coordination with regional partners. B4. Continuously promote travel training options.	B1. Develop formal process for receiving requests for service changes that is shared with all of SCT Links partners. Develop process for evaluating and prioritizing implementation of service requests. B3. Implement recommendations from the fare study and continue	B3. Continued coordination with regional partners. B4. Continuously promote travel training options. Continue to develop partnerships with other organizations and nonprofits to provide more travel	B3. Continued coordination with regional partners. B4. Continuously promote travel training options. Continue to develop partnerships with other organizations and nonprofits to provide more travel

GOAL B – Elevate the Customer Experience				
FY23-24	FY24-25	FY25-26	FY26-27	FY27-28
B3. Continue to promote use of Connect Card. B4. Identify list of local nonprofits and groups that can provide mobility and travel training and develop travel training guidelines. B5. Improve content management of website, including timely website updates.	Continue to develop partnerships with other organizations and nonprofits to provide more travel training options. B5. Continue to monitor website content management performance to ensure website is maintained with up-to-date information.	coordination with regional partners. B4. Continuously promote travel training options. Continue to develop partnerships with other organizations and nonprofits to provide more travel training options. B5. Continue to monitor website content management performance to ensure website is maintained with up-to-date information.	training options. B5. Continue to monitor website content management performance to ensure website is maintained with up-to-date information.	training options. B5. Continue to monitor website content management performance to ensure website is maintained with up-to-date information.

9.4.2.1 B1. Develop a formal process for requests for service changes

SCT Link would benefit from developing a formal process for receiving and considering service changes that clearly shows how rider and community input is integrated into SCT Link's services and that includes regular engagement with riders. Currently, SCT Link receives feedback on its services informally through a few different outlets (for example, when an operator receives feedback or a complaint, the contracted operator documents and sends to the County). In addition to these approaches, feedback could also be received by the City of Galt at City Hall (where riders can purchase Connect Cards) and through other outlets like the regional Unmet Transit Needs process[45].

Developing a formalized process for receiving feedback and dissemination service change information among all involved parties (the County, Storer/operator, and municipal partners like the City of Galt) is an important first step in developing a formal process for requests for service changes. SCT Link can also work to advertise requests for unmet transit needs. Prior to the initiation of the unmet transit needs process every year, SCT Link can advertise to the public how they can provide feedback on buses and at bus stops, on social media, through local newspapers and press releases, and notices to other social services agencies. SCT Link should also send outreach materials to SACOG and the City of Galt so these agencies can advertise on behalf of SCT Link as well. Finally, SCT Link should regularly advertise on vehicles and bus stops an email address riders can send feedback to at any time throughout the year outside of the unmet transit needs process.

After a formal process for collecting and storing requests/feedback has been established, the graphic in Figure 9-7 provides an example of a process that SCT Link can refine and adopt for addressing service requests.

[45] Each year, the Unmet Transit Needs process is carried out to identify and evaluate any potential needs that are not being met through existing public transportation services and is a requirement of the Transportation Development Act. Typically, agencies advertise ways for the community to provide input such as through online surveys and public meetings. Comments are compiled and then assessed to determine if the comment is in fact an unmet need, if it is reasonable to meet, and if funding is available to fund the need. Each agency determines its own definition of "Unmet Transit Need" and "Reasonable to Meet" with review and input by SACOG.

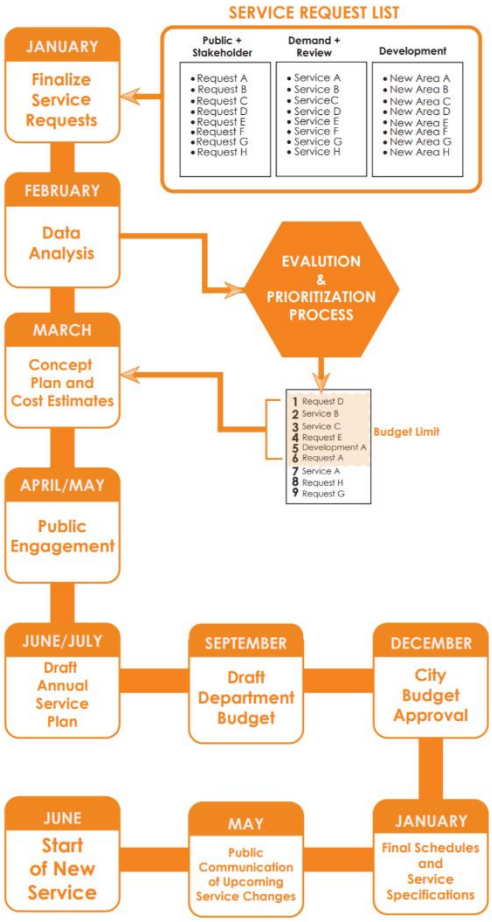


Figure 9-7: Example of a process for evaluating, prioritizing, and implementing service requests

First, all service requests would be compiled for analysis and evaluation. The criteria for analysis and evaluating the service requests come directly from the transit service guidelines, and can be criteria like estimated ridership vs. cost for service, density and diversity of land use, or safety of bus operations. The service requests are then prioritized based on their score in the evaluation process; requests are then refined based on the analysis and public/stakeholder engagement and feedback. Evaluation can leverage different techniques, including multiple account evaluation where concepts are measured against accounts like 'equity' or 'cost' so that each concept is scored and compared. Based on funding levels, the highest ranked service proposals are adopted for implementation, and inserted into the annual service plan. Finally, SCT Link rolls out the service changes along with the necessary marketing and outreach to promote and advertise the changes leading up to the new service period.

By developing a service standards document, SCT Link will be able to show the community how it handles service requests and will address concerns over favoring one area over another as well as demonstrating why it provides the specific services and geographic coverage in its plan. This type of decision documentation can help to both explain and shape the design of services.

9.4.2.2 B2. Invest in technology to improve trip planning and riding

The benefits associated with adopting AVL on all vehicles was summarized in supporting recommendation A4, including the improvements to riders and the rider experience by enabling real-time vehicle location to

aid in trip planning and enable real-time arrivals. Investing in these types of technologies can benefit the rider and enhance the customer experience in two main ways for SCT Link: benefits to trip planning and the ability to facilitate same-day trip requests for on-demand/microtransit services.

After acquiring AVL on all vehicles, it is recommended that SCT Link explore partnerships with third-party mobile applications for easier communication of live-arrival data providing improved functionality and user interface. This would rely on SCT Link first generating a real-time (dynamic) General Transit Feed Specification (GTFS) feed that can be picked up by third-party platforms such as Google Maps and Transit App (example in Figure 9-8). This opportunity would allow platform developers to do what they do best—building apps to communicate information cleanly and clearly, using simple user interfaces—while also allowing SCT Link to focus on its core business of providing effective and efficient services to south and east Sacramento County.

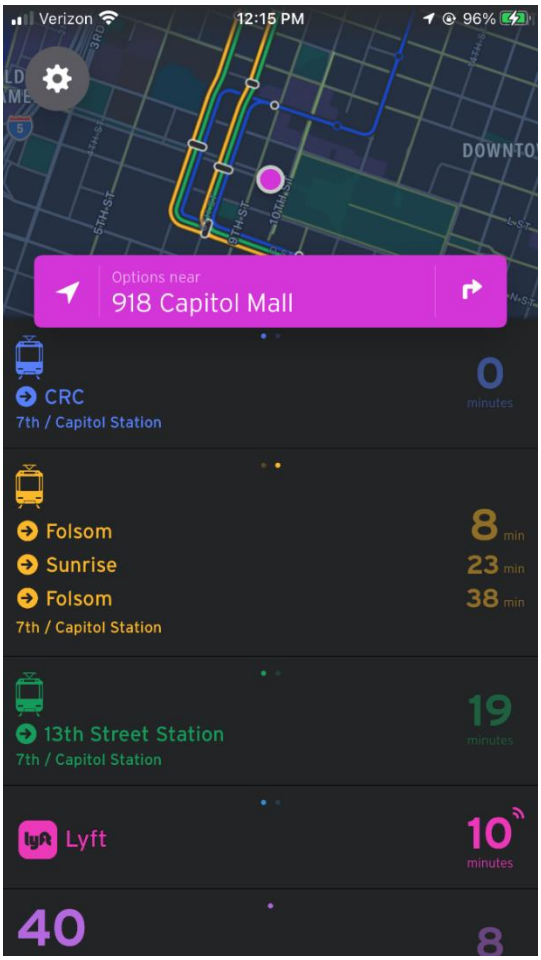


Figure 9-8: Example Transit App screenshot showing SacRT options around the Capitol Mall

In addition to the trip planning benefits, AVL will also enable SCT Link to transition its dial-a-ride services to an on-demand/microtransit model that can accommodate same-day trip requests. Third-party software

platforms such as Via[46], Transloc[47], Ecolane[48], and others provide software solutions for microtransit trip planning and scheduling. Figure 9-9 shows an example screenshot from an on-request microtransit service operating in the Antelope Valley. The screenshot from the Transit App in Figure 9-10 shows how microtransit services can be integrated with fixed route transit options to provide riders with a simple and easy way to use multiple modes to get to their final destination. In addition to providing a better customer experience, the use of these software to dynamically plan and manage on-demand services can help to enhance service productivity and efficiency.

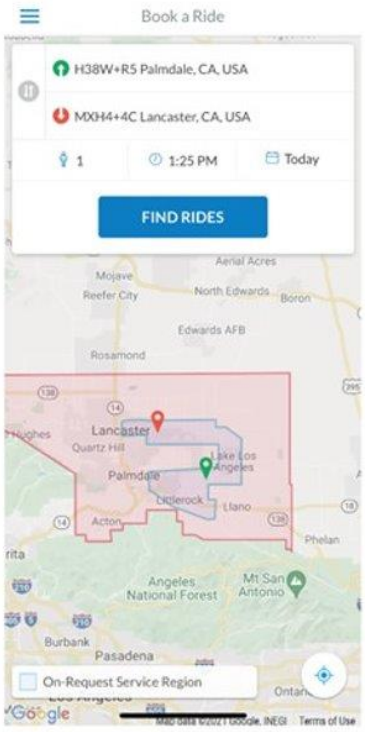


Figure 9-9: Example screenshot of trip-booking app from the On-Request microtransit service provided by the Antelope Valley Transit Authority

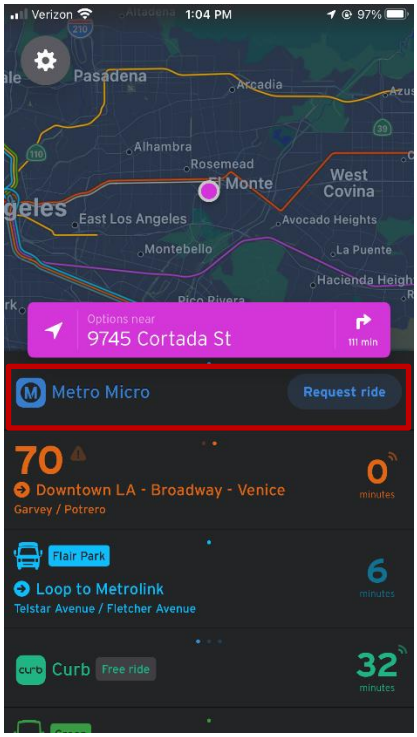


Figure 9-10: Example screenshot of the Transit App showing both fixed route and microtransit options (Metro Micro)

9.4.2.3 *B3. Launch fare study review and ensure coordination with regional partners as outlined in the Next Generation Transit Study*

As SCT Link invests in expansion of service, it would be beneficial to also launch a fare review study, ensure coordination with regional partners as outlined in the SACOG Next Generation Transit Study[49], and continue to promote Connect Card usage as much as possible. The latter will allow SCT Link to take full

[46] https://ridewithvia.com/resources/articles/what-is-microtransit/
[47] https://transloc.com/solutions/on-demand-microtransit/
[48] https://www.ecolane.com/solutions/microtransit
[49] https://www.sacog.org/sites/main/files/file-attachments/20210702_sacog-report.pdf

advantage of the data produced by Connect Card use and will also help create efficiencies and time savings as fewer customers must take the time to pay a cash fare.

As service continues to evolve, launching a fare review study will help to ensure fares remain equitable while still achieving goals related to farebox recovery. Specifically, the study can look at the current fare categories and consistency between services and service types (for example, the Hwy 99 and Delta routes state a Student category but other services have a Youth category specifying ages 5-18), and can look to develop standards and rules related to adjusting fares in the future. The study should also include a review of transfer policies and aim to develop a clear and simple transfer policy that ultimately enables easier travel when using multiple transit providers.

The study can also include a peer review of similar rural transit agencies to understand their fare structures, different fare categories, and transfer policies, such as free transfers to SCT Link fixed routes from microtransit when that is implemented in FY25-26, and streamlining transfer policies with other regional agencies.

The study can also look at the current organization of different pass types (both individual and bulk pass types) to understand what fare categories make the most sense for SCT Link to provide, and if SCT Link could benefit from providing other pass types, such as bulk passes aimed at employers, educational institutions, or other organizations.

SACOG's Next Generation Transit Study, approved by the SACOG Board of Directors in October 2021, outlines a strategic reimagining of public transportation and provides a vision for the future of mobility that emphasizes moving people by improving inter-regional connections, technology, and the rider experience. One of the plan's recommended strategies is to create a seamless user experience that is cohesive, comfortable, and connected. Regional fare integration (and trip planning ability) is a large part of this; specifically, simplifying fares and trip planning to make transit seamless and ultimately remove barriers and friction points for transit users. SCT Link already promotes the use of the regional Connect Card, and should continue to do so, but it will also be important to stay proactively engaged with regional partners to achieve the following short- and long-term goals outlined in the report[50]:

- Short-term:
    - Engagement in regional integration efforts. Regional entities like SACOG will engage regional partners to facilitate coordination efforts including regional traveler information and trip planning tools, fare integration strategies, enhancing major transfer points between different operators, and coordinate schedules for transfers at key locations. As an operator that provides commuter services, it is important for SCT Link to stay engaged with efforts around ensuring seamless transfers between providers.
    - Regional fare strategy for Connect Card that aligns with statewide goals. In order to study potential options for integrating fare structures in the region to make fare payment more seamless and present a more unified system, a regional fare integration study should be conducted that clearly defines needs and challenges related to integration and supports the continued use of Connect Card and launch of Connect Card 2.0.
- Long-term:
    - Full integration of fares, fare payment, and traveler information systems across operators and third-party mobility providers.

[50] https://www.sacog.org/sites/main/files/file-attachments/20210702_sacog-report.pdf

- Develop a coordinated network with seamless transfers and coordinated schedules at key transfer points in the regional network.

9.4.2.4 *B4. Partner with local nonprofits to provide mobility and travel training*[51]

Many community-based organizations (CBOs) and nonprofits work to help connect their clientele with various transportation services, and numerous transit agencies outsource various parts of accessible transportation to nonprofits or CBOs (for example, the Denver RTD outsources paratransit eligibility and travel training to Easterseals Colorado). Identifying partnerships with agencies with similar goals to provide these services can help to lessen the internal service burden on the County while still providing the services and empowering more people with the knowledge needed to benefit from available transit services.

To adopt this approach, SCT Link will first need to develop travel training guidelines for potential partners to follow. SCT Link can conduct a peer review of other travel training programs, and specifically travel training programs for agencies with similar service offerings, to develop best practices and guidelines for its own travel training program. For example, SCT Link can review travel training guidelines for other rural agencies connecting to urban centers such as San Joaquin RTD or Delta Breeze, whose travel training is administered through Solano Mobility. Guidelines should also be established for monitoring performance and ensuring this training continues to follow the guidelines. Travel training guidelines should be updated accordingly over time as needed; for example, as trip planning resources improve or when an app-based platform becomes available for on-demand/microtransit service.

After developing travel training guidelines, SCT Link will need to identify potential partners who may be interested in providing the travel training, such as the 50 Corridor TMA or South County Services (a nonprofit located in Galt that provides a variety of services specifically for Galt and the Delta communities).

SCT Link should advertise how to sign up for travel training at bus stops and at Galt City Hall. While SCT Link will not be directly completing the travel training sessions, they should have some administrative time available to support third parties as needed.

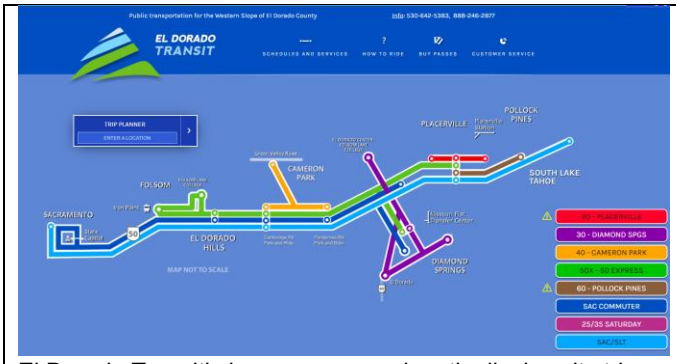
9.4.2.5 *B5. Improve content management of SCT Link website*

A transit agency's website is often a potential passenger's first impression of the transit agency and may influence someone's decision to ride. It is imperative that websites are maintained, updated promptly so that current information is always displayed, easy to navigate, accessible, and aesthetically pleasing. As SCT Link's contractor is in charge of maintaining the website, the County needs to improve the content management and hold the contractor accountable to ensure that information is updated in a timely manner and up-to-date information is always displayed on the website. If the website contains incorrect information or information that is outdated, a rider or potential rider will not be able to rely on its accuracy and may choose not to ride.

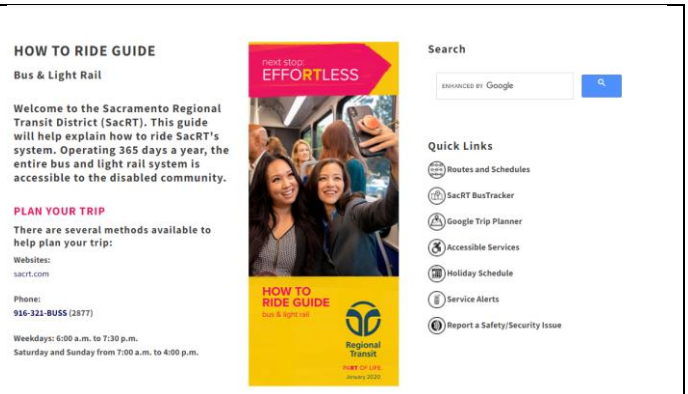
As part of the marketing, awareness, and branding efforts further discussed in Goal D1, SCT Link can work with the contractor to refresh its website to be consistent with new branding guidelines. SCT Link can look to other transit agency websites that show information in a clear and inviting way that is easy to navigate while maintaining a consistent brand while also following best practices in accessible websites for those with vision or other impairments. A refresh of the website organization and layout will also provide an opportunity for SCT Link to highlight its mission statement and new trip planning capabilities. Figure 9-11

[51] Travel training refers to one-on-one individualized training that gives people the skills required to travel safely on public transportation, as well as being able to navigate the public transportation system (including how to read maps and schedules, how to locate bus stops, how to flag down a bus, how to plan your trip, etc.) and its associated technologies such as trip-planning applications and Connect Card usage.

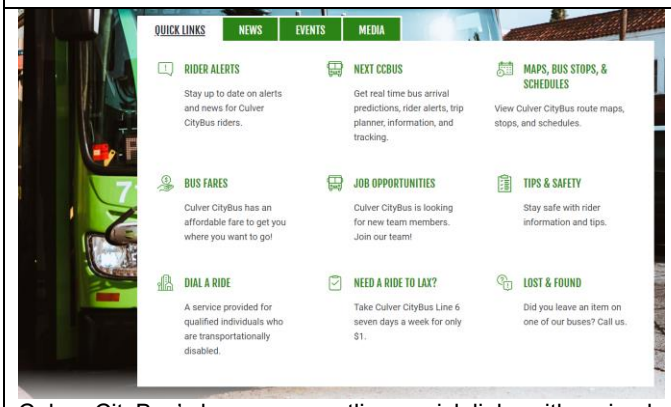
outlines some transit agency websites that demonstrate the benefits outlined above. As an interim step, it may be worthwhile to align SCT Link's website with the County's main branding, or as a webpage on the County's website.



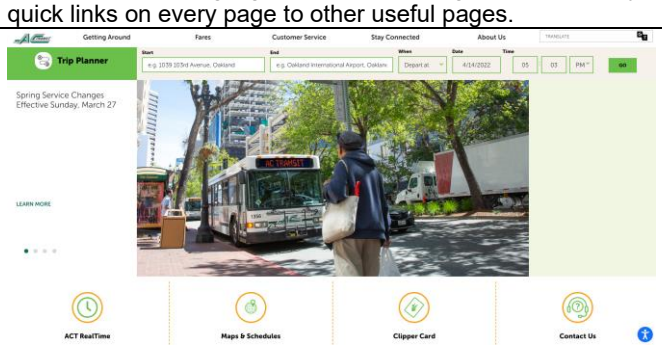
El Dorado Transit's homepage prominently displays its trip planner and all routes with the ability to click on each route for more information.



SacRT's website highlights a helpful rider guide and displays quick links on every page to other useful pages.



Culver CityBus's homepage outlines quick links with a simple description of what each link is.



AC Transit's homepage is designed with the rider in mind, with trip planning information at the top of the page, useful links at the bottom, and important news highlighted in the middle.

Figure 9-11: Example transit agency websites

9.4.3 GOAL C – Improve Service and Reliability - Summary

Below is a summary of actions related to Goal B; sections 9.4.3.1-9.4.3.4 provide additional details on each.

GOAL C – Improve Service and Reliability				
FY23-24	FY24-25	FY25-26	FY26-27	FY27-28
C1. Prepare and implement phased service plans recommendations. C3. Study and develop a new no-show and late cancelation policy. Educate the public on no-show impacts and potential changes.	C1. Prepare and implement phased service plans recommendations. C2. Conduct school tripper feasibility study and implement recommendations. C3. Adopt new no-show policy.	C1. Prepare and implement phased service plans recommendations. C4. Continuously refine schedules based on actual on-time performance and running time data from AVL technology.	C1. Prepare and implement phased service plans recommendations. C4. Continuously refine schedules based on actual on-time performance an running time data from AVL technology.	C1. Prepare and implement phased service plans recommendations. C4. Continuously refine schedules based on actual on-time performance and running time data from AVL technology.

GOAL C – Improve Service and Reliability				
FY23-24	FY24-25	FY25-26	FY26-27	FY27-28
C4. Develop and adopt revised on-time performance metrics for each service mode.	C4. Use AVL technology to capture actual on-time performance. Use on-time performance reports to adjust schedules to better reflect actual operations.			

9.4.3.1 C1. Implement the service plan recommendations

The service plan proposed in the SRTP lays the groundwork for a modern and responsive transit system in south Sacramento County. Each year of the service plan proposes strategic changes and/or expansions of service to provide better service to riders who are largely transit dependent.

While Section 9.2 provides details related to the service plan, below we describe some additional concepts and case studies for service changes.

Throughout this study, a key focus has been addressing the Delta Route and understanding ways to better serve the Delta communities. Through analysis and stakeholder engagement, the SRTP proposes the transition to a demand-response model similar to the Galt DAR service. Once implemented in FY24-25, It will be essential that SCT Link monitor ridership and engage with customers to understand how the demand-response model is performing in terms of:

- Ridership and boardings per revenue hour
- Accommodated (and refused) trips
- On-time performance
- Trip wait times
- Customer satisfaction

In the first few years, SCT Link will need to continuously monitor and adjust this service based on actual performance and customer feedback.

In addition to the demand-response model for service in the Delta, the whole DAR “brand” will leverage technology to eventually accommodate same-day service requests and dynamic routing, vehicle tracking, and other elements of microtransit service as discussed elsewhere in this report.

Apart from the on-request service model transition, we also explored other service models including fixed-schedule service and volunteer ride programs.

Fixed-schedule service is particularly interesting for SCT Link to explore because of the travel patterns observed of residents of the Delta. Based on travel data, it is apparent that Delta residents travel throughout Sacramento County, such as to destinations in Elk Grove and Sacramento. A fixed-schedule service operating a few days in the week and booked either online or by phone reservation could provide direct service between the Delta and places in Elk Grove and Sacramento.

To following steps are recommended to refine the service design of a fixed-schedule pilot, SCT Link:

- Conduct outreach in the Delta to understand the preferences for destinations outside of Galt and the Delta. For instance, would ridership be stronger for direct service to downtown Sacramento, or should stops in Elk Grove be included?
- Determine how often service can be provided sustainably. Should service be twice a week? Once a week? Furthermore, what times should the bus depart and return?
- Determine the appropriate fare. If the service operates between the Delta and Sacramento, the distance traveled should be considered for the fare, similar to the GSCE.

Taken together, to enact this approach SCT Link will need to conduct robust and bilingual outreach to help specify the service characteristics of a pilot for fixed-schedule service. SCT Link will then need to market the service and monitor its performance and adjust accordingly. In the end, SCT Link should develop information similar to the example in Figure 9-12 from a rural transit agency in Texas just outside of Austin.[52]

Community Served	Destination	Route Day	Departure	Return	One-Way	Reduced
City of Blanco	Local Service	Tue, Wed & Thurs	9:00a - 12:30p		$2.00	$1.00
	To: Johnson City	Tue & Thurs	1:00p	4:00p	$4.00	$2.00
	To: Marble Falls	2nd Monday	8:30a	2:00p	$6.00	$3.00
	To: Austin	4th Friday	8:30a	2:00p	$6.00	$3.00
	To: San Marcos	2nd Friday	8:00a	2:00p	$6.00	$3.00
	To: San Antonio	1st & 3rd Friday	8:00a	2:00p	$6.00	$3.00

Figure 9-12: Example of a fixed-schedule service from CARTS in Texas.

One another avenue explored was a volunteer ride service model. There are different models that communities with rural settings like the Delta and Galt have implemented with varying levels of success. SCT Link should continue to explore the potential for volunteer ride services.

Volunteer Driver Programs: volunteer driver programs are programs that transit agencies or other community organizations can employ to help people with limited mobility get around. These can either be services in which a friend, family member, or community members volunteers their time and automobile to help riders get to where they need to go and are reimbursed for it, or passengers are matched with eligible drivers in the community by the organizing agency. One of the benefits of volunteer driver programs is their

[52] https://www.ridecarts.com/services/country

flexibility; they can take many different forms to best fit the specific transportation gaps as well as the level of involvement and oversight desired by the organizing agency. As a part of this SRTP process, two volunteer driver programs in the region were interviewed to understand how the program is set up and identify best practices in implementing volunteer driver programs.

MOVE Stanislaus: Volunteers on the Go

MOVE is a non-profit organization dedicated to connecting the residents of Stanislaus Count with transportation options. MOVE provides a variety of programs to help achieve this goal, such as travel training, assisting with paratransit edibility assessments, and transportation services to veterans for medical appointments. The Volunteers on the Go (VOGO) program is a pilot program that provides rides to Stanislaus and San Joaquin County residents who live in rural areas with no public transit access. Volunteers use their own vehicles to provide rides for these residents and are reimbursed for fuel costs. Volunteers and riders are matched for trips by MOVE, and riders are required to reserve rides in advance.

The VOGO program launched in November 2019 through a CARB grant. At the beginning, the program suffered from low demand and challenges related to COVID-19. However, MOVE expanded program eligibility and increased marketing and outreach to raise awareness about the program, which brought ridership up to around 65 riders a month. The program is being phased out due to a lack of consistent funding, but MOVE shared the following best practices and lessons learned from their experience with the VOGO program:

- To retain high quality volunteers, it is important to make them feel valued. It is also important to reimburse not only for the mileage of the trip, but also for deadheading. MOVE has found that reimbursing for deadhead mileage has made a significant difference in retaining good volunteers.
- It is important to test the technology platform to make sure it is capable of doing what the program needs. For example, MOVE initially acquired the VAMOS app so that clients would be able to schedule and track rides in real-time. However, MOVE later learned that the technology was unable to provide accurate tracking or reservations, so riders were required to call in and schedule rides in advance. For MOVE, this resulted in a larger administrative burden than they had originally anticipated.
- If using an app-based platform to reserve rides, it is important to train users on how to use the app to reduce administrative burden as much as possible but also important to provide other options for being unable to use the app and services in different languages.

San Joaquin RTD My Ride

Unlike MOVE, the San Joaquin RTD My Ride program is overseen by the RTD, specifically falling under Access San Joaquin (the Consolidated Transportation Services Agency for unincorporated areas of San Joaquin County and member jurisdictions). The RTD oversees the contract with MTM Inc, who administers the program.

My Ride is a self-directed mileage reimbursement program that enables ADA-certified passengers to compensate their friends, family, and neighbors for providing them with transportation assistance within San Joaquin County. Residents who are ADA-certified are automatically eligible for My Ride. Under this program structure, riders find their own driver who receives mileage reimbursement. The passenger and driver are required to complete a mileage report submitted to the RTD by the 10th of each month, and both the driver and passenger are required to complete waivers so that RTD is not held liable, and RTD only interacts with the passenger and not the driver. The program launched in 2018, and currently sees approximately 15 regular users per month.

Rides can be reimbursed for medical trips and all essential trips including shopping, religious gatherings, and others. RTD is currently exploring expanding the program for cross-county trips. RTD noted the following lessons learned and best practices:

- More outreach and awareness building have a direct impact on program participation.
- Because passenger eligibility is based on ADA eligibility, this helps to reduce the administrative burden. However, this excludes some people from using the service because they may be ADA-certified but not know anyone to be a volunteer driver for them. This has started conversations about RTD recruiting volunteer drivers that they pair with people interested in using the program. That opens RTD up to more potential liability by directly recruiting drivers, and may increase administrative burden if RTD needs to assist drivers and passengers in scheduling trips.
- Because passenger eligibility is based on ADA eligibility, this helps to reduce demand for costly paratransit service.
- Set up a comprehensive tracking system from the beginning. Even though initial program participation may be low, and everything can be tracked manually, initially setting up the program with an automated and streamlined tracking system will enable the program to scale up more smoothly and easily.
- Even if the program will initially begin without the agency recruiting the volunteer drivers, getting the volunteer recruitment model fleshed out early will also help the program be able to expand in that direction.
- Because programs like My Ride can grow and change, which might entail changes to the program model, it is important to develop different model options at the outset that could accommodate the program at different stages throughout its growth so that the program can continue to grow and impact more people.
- Invest in technology that can streamline program administration or mileage tracking by automatically uploading to the agency's system to further reduce the administrative burden and ensure all mileage reports are accurate.
- In addition to the liability waiver, background checks and passenger assistance training is important to prevent injuries and focus on safety.

9.4.3.2 C2. Study the feasibility of school trippers

The DAR service in Galt experiences strong peak hour demand from students who use the service to ride to and from school. While this demand is generally accommodated, it has been reported that student demand may sometimes reduce the ability for DAR to provide other trips, or that students who are no shows cause scheduling and reliability issues with the DAR service. As shown in Table 9-12, three of the top five pick-up and drop-off locations from a sample of three weekdays in November 2018 were elementary and middle schools.

Table 9-12: Top DAR Pick-up and Drop-off Locations from a Sample of Trips, November 2018

Address	Notes	Sum of pick-ups and drop-offs
21 C St Galt, CA 95632	Valley Oaks Elementary School	96
380 Civic Dr Galt, CA 95632	Galt City Hall	73
800 Lake Canyon Ave Galt, CA 95632	Lake Canyon Elementary School	73
997 Park Terrace Dr Galt, CA 95632	Robert L McCaffrey Middle School	60
820 N Lincoln Way Galt, CA 95632	Galt Mobile Estates	51

Working with staff from the elementary and high school districts, we recommend SCT Link explore whether it can feasibly design a bus route(s) that can be used as school trippers. While the main intent would be to provide relief to potential crowding on DAR or reduce the impacts of no shows or late cancellations, any school tripper service funded with FTA funds must be open to the general public. Furthermore, it may be challenging to design a single route or set of routes that effectively captures student demand. Nonetheless, SCT Link staff could work with the schools to survey students and their parents, as well as leverage existing DAR data, to identify potential locations for bus stops and a bus route alignment. The impacts of a revised no-show policy discussed in Section 9.4.3.3 should also be considered in the school tripper feasibility study.

9.4.3.3 C3. Adjust no show and late cancelation policy

No-show policies are a very commonplace practice across paratransit and DAR programs in North America. At SCT Link, a customer is deemed a late cancelation or “no-show” when a DAR trip is canceled within 30-minutes of the scheduled pick-up time Accumulating four no-shows in six months will result in a suspension of subscription service or service in general.

A 30-minute window is very narrow compared to industry standards as most programs require a minimum of 2 hours’ notice. 30 minutes is not enough time for SCT Link to redeploy its resources to another trip since schedules are groomed and manifests created well in advance to the start of the service day SCT Link would be in a much better position to serve its customers with at least a 1-hour cancelation window; this could aid in reducing the agency’s unaccommodated rate. Further, SCT Link can reassess the 1-hour cancelation window for a 2-hour window in FY24-25.

No-shows are a significant disruptor to DAR operations since resources are wasted—a vehicle and driver are sent and paid for, but no customer is transported. In addition, since DAR is a shared-ride service, other customers who may be already onboard the vehicle are inconvenienced by having to wait for someone who never shows up. This situation potentially denies service to someone else in need to the service. To manage this problem, all paratransit and DAR programs have a no-show policy to discourage registrants from abusing the program and to help them understand they have a responsibility in being a good patron of the program. No-show policies typically outline a graduated penalty system that often leads to service termination for chronic and repeat offenders.

Important to consider, no-shows share similar operational impacts with both late cancelations and cancelations-at-the-door. Therefore, they usually share the same policy and are viewed as a “totality of

customer behavior" at many other peer transit agencies. Cancelations-at-the-door occur when the customer cancels their trip when the vehicle has already arrived at the pick-up location and customer does not take the trip.

Analyzing a sample of DAR data from January through April 2021, daily no-shows range from 0 to 7, for an average of 2 no-shows per day, which is about 3.0% of all trips. Table 9-13 shows the monthly totals of no-shows, total trips, and no-show rate. Interestingly, the previous SRTP estimated 5 average daily no-shows from 2014-2015 data, and considering ridership in early 2021 was much lower than in 2014-2015 due to COVID-19, suggests that no-shows, while a small percentage, continue to negatively impact trip delivery.

Table 9-13: Sample of No-Show Rates, early 2021.

	Monthly No-Shows	Monthly Passengers	Monthly No-Show Rate
January 2021	31	1,133	2.7%
February 2021	48	1,204	4.0%
March 2021	45	1,472	3.1%
April 2021	79	2,530	3.1%

Based on the negative impacts of late cancelations and no-shows, it is recommended that SCT Link's current policy be revised to better align with industry best practices and to help SCT Link better manage resources and address on-time performance issues tied to no-shows.

First, SCT Link should redefine the no-show policy into the following categories:

- **Late cancelation:** any trip that is canceled with less than two hours' notice from the scheduled pick-up time. This includes trips that are booked as a same-day trip request.
- **Cancel-at-the-door:** any trip where the customer cancels after the vehicle has arrived at the pick-up location.
- **No-show:** A no-show occurs when a vehicle arrives at the pick-up location and the operator is unable to locate the customer.

Shifting from a 30-minute to two-hour cancelation window brings SCT Link in line with regional transit agency policies, such as SacRT[53], Yolobus[54], and San Joaquin RTD[55]. El Dorado Transit, operating in a rural environment similar to SCT Link, requires 24-hour in advance cancelation for its DAR program[56]. Overall, this policy change, recommended by the 2017 SRTP, will help improve service quality for DAR riders.

Of course, situations arise that sometimes require spontaneity and cancelation of trips that would fall into the late cancelation or no-show categories. Currently, SCT Link allows customers four no-shows within six months—exceeding this threshold results in a suspension of service, although it is unclear how long it will last.

To help accommodate flexibility, several transit agencies have developed a policy of escalating actions geared at allowing a certain number of violations within a certain timeframe to be accumulated without triggering a service suspension. For instance, SacRT has the following policy for violations of no-show/late cancelation within a rolling 12-month period:

[53] https://www.sacrt.com/apps/wp-content/uploads/SacRT-GO-Riders-Guide-June-2020_FINAL.pdf
[54] https://yolobus.com/wp-content/uploads/2022/03/YolobusSpecial-CancellationsandNoShows-EN.pdf
[55] https://sanjoaquinrtd.com/wp-content/uploads/2022/03/ADARidersGuide_2022.pdf
[56] https://eldoradotransit.com/dial-a-ride/general/

- *1st Violation Counseling/Warning Letter*
- *2nd Violation 1-day suspension*
- *3rd Violation 5-day suspension*
- *Subsequent Violations 30-day suspension*

The Toronto Transit Commission in Toronto, Ontario, Canada has adopted an innovative approach for its paratransit program called Life Happens. Customers are provided eight Life Happens Points (LHP) every month which they can use against late cancelations, cancelations-at-the-door, and no-shows. Points do not carry over to subsequent months. Late cancelations count as one point, no-shows and cancelations-at-the-door count for two points.

Customers have not violated the policy until they have used up their eight LHPs. Policy violations are addressed according to the following graduated regime noting that service suspensions do not occur until the policy has been violated twice within a six-month period:

- *1st occurrence – customer receives a letter*
- *2nd occurrence – seven-day service suspension*
- *3rd occurrence – 14-day service suspension*
- *4th occurrence – 30-day service suspension*
- *5th and subsequent occurrences – 60-day service suspension*

Most agencies tend to focus on managing no-show behaviors through public education. Punitive and corrective measures are usually only applied to those customers with a documented frequency of violations within a certain time frame. Typically, no corrective action is applied to infrequent violators (no-shows less than 5% of all scheduled trips).

It is recommended that SCT Link work with customers to develop a similar “life happens” policy to allow a certain number of late cancelations and no-shows, acknowledging that flexibility is required but ensuring that abuse is minimized for the benefit of the program and other customers.

This approach should be accompanied by developing an appeals process so customers may contest no-shows and suspensions.

Taken together, it is recommended that:

- SCT Link develop a new policy for no-shows and late cancelations for the DAR/demand-response services.
- SCT Link design a “life happens” points system to provide customers with flexibility, but ensuring that abuse is minimized, and the service remains sustainable and available for other customers.
- SCT Link develop an appeals process for customers who wish to contest suspensions.

The policy should be revised and communicated to passengers prior to adoption. Once adopted, SCT Link will update all printed and online materials to reflect these new changes.

9.4.3.4 *C4. Update on-time performance metrics and monitor performance accordingly*

On-time performance and reliability are the cornerstones of customer satisfaction and loyalty. In the previous SRTP, customers generally were satisfied with the service overall, but it is noteworthy that the element that ranked the lowest was on-time performance and reliability. Moreover, because of the

infrequent service levels of SCT Link, a missed bus or connection could result in very long waits or entirely disrupt a passenger's schedule.

Currently, only DAR on-time performance is monitored and reported, with a pick-up window for 'on-time' trips that ranges from 10 minutes before a scheduled pick-up time to 20 minutes past a scheduled pick-up time; no other metrics are reported for the other modes, like the Hwy 99 or GSCE services. Reports show on-time adherence for the DAR service of over 99% since at least January 2019 through May 2021.

It is recommended that SCT Link update its on-time performance indicators and ensure that it regularly measures and evaluates performance, holding its operator accountable.

The following is recommended to align SCT Link with industry standards:

Mode/Service	Early	Late	Acceptable on-time target
DAR/demand-response/on-demand/microtransit	Vehicles arriving 10 minutes prior to the scheduled pick-up window	Vehicles arriving 20 minutes later than scheduled pick-up window	90-99%
Fixed-route services	Any departure from a time point earlier than the scheduled departure time (i.e., buses should never leave a time point before the scheduled pick up time)	Any departure from a time point 5 minutes later than the scheduled departure time	90-99%

SCT Link should adopt the standard for fixed-route services and implement these as measures that the operator must report monthly and by service. SCT Link should also work to collaborate on defining time points along its fixed-route services—i.e., bus stops where on-time performance measurements will be taken.

While current procedures involve manual reporting of on-time performance, with the adoption of AVL technology, on-time performance reporting could then become automated, alleviating the burden on the operators, and aiding in the reliability of these measurements.

Finally, as SCT Link begins to acquire more data from AVL technology and on-time performance tracking, this information can we used to refine schedules where needed—i.e., if on-time performance is an issue along certain segments of the Hwy 99 route, for instance, staff should work to investigate the underlying causes, adjustment running times as needed, and monitor on-time performance trending.

9.4.4 GOAL D – Increase Awareness of SCT Link and Foster Transit Supportive Communities – Summary

Below is a summary of actions related to Goal B; sections 9.4.4.1-9.4.4.3 provide additional details on each.

GOAL D – Increase Awareness of SCT Link and Foster Transit Supportive Communities				
FY23-24	FY24-25	FY25-26	FY26-27	FY27-28
D1. Identify and implement quick wins for improved brand visibility, marketing, and community partnerships.	D1. Develop a branding and marketing strategy. D2. Ensure continued coordination with the City of Galt and other	D2. Ensure continued coordination with SACOG, the City of Galt, and other partners on scheduling, fares, service requests, and marketing.	D1. Refresh the SCT Link brand. D2. Ensure continued coordination with SACOG, the City of Galt, and other partners on scheduling, fares,	D2. Ensure continued coordination with SACOG, the City of Galt, and other partners on scheduling, fares, service requests, and marketing.

GOAL D – Increase Awareness of SCT Link and Foster Transit Supportive Communities				
FY23-24	FY24-25	FY25-26	FY26-27	FY27-28
D2. Ensure continued coordination with SACOG, the City of Galt, and other partners on scheduling, fares, service requests, and marketing. D3. Ensure SCT Link participates in land use planning with AHJs.	partners on scheduling, fares, service requests, and marketing. D3. Collaborate with partners on active transportation campaigns and projects. D3. Initiate bus stop study.	D3. Collaborate with partners on active transportation campaigns and projects. D3. Work with AHJs to install more bus shelters and accessible benches.	service requests, and marketing. D3. Collaborate with partners on active transportation campaigns and projects. D3. Install more bus shelters and accessible benches.	D3. Collaborate with partners on active transportation campaigns and projects. D3. Implement bus stop signage refresh.

9.4.4.1 *D1. Identify and implement quick wins for improved brand visibility, marketing, and community partnerships.*

Sometimes, people don't ride transit service because they aren't aware of the services and its benefits, the destinations it serves, or maybe they've heard negative things from others about the service. Raising the SCT Link brand equity in the community is crucial to supporting SCT Link's mission. Surveys and stakeholder engagement found that knowledge about SCT Link services was lacking within the communities. Comments ranged from not knowing anything about public transit to "I don't know how to find out about the bus." Further, the prior SRTP noted the need for a marketing plan—that recommendation has been carried through to the current SRTP.

Customers have diverse reasons to use public transit. The opportunity exists to leverage these reasons as valid considerations to position transit as a "cool" choice. There is a new generation of customers with a latent demand for public transit, but the feedback indicates that the value proposition of SCT Link has not been sufficiently established. SCT Link could embark on a public education campaign that prompts answers to an overarching question, as an example...*Why is SCT Link the Cool Choice?* Some possible answers include:

- Economic impact of reducing regional congestion – *traffic costs money*
- Environmental benefit – *keeping our community clean*
- Lifestyle benefit – *we drive, you enjoy life*

An example is shown from King County Metro's recent "Just One Trip" campaign trying to entice prospective customers to give King County Metro a chance for just one ride on the premise they will be hooked afterward (Figure 9-13).

Figure 9-13: Transit advertising from King County Metro

At Fort Saskatchewan Transit (FST) in Alberta, Canada, the agency made replica bus stop signs that contained user information and placed them all over the city to raise awareness for its services.

Below, the replica sign is shown at the entrance of a local superstore (Figure 9-14, top sign in photo).

Figure 9-14: Guerilla and street marketing

From its experiences, Stantec believes nothing is more effective in attracting discretionary riders than being in the community promoting the message. This is a simple solution to educate would-be riders about transit and raise awareness. Oftentimes, people are interested in trying transit but intimidated at the prospect of the "first ride."

Shown below, again in Fort Saskatchewan, is a community festival where one of FST's buses is parked and used as a "free attraction" for families (Figure 9-15). This fun and innovative approach to community engagement was well received and is believed to be directly linked to new ridership. In the South County context, community engagement activities could coincide with important community events.

SCT Link could explore having a bus present at community events during hotter months as a place with air conditioning for people to cool off, and once SCT Link receives its first battery electric bus, this bus can be displayed at community events to inform the public both of SCT Link's services and the agency's commitment to sustainability.

Figure 9-15: Cooperative Marking for transit at community events

Local businesses and organizations can help promote SCT Link through the use of their media opportunities such as digital screens in retailers, kiosks at shopping centers, and inserts in company/organization communications.

Suggested messaging opportunities for local business partners could include:

- Sponsorship and/or advocacy of SCT Link and public transit.
- Promotional discounts for those who ride SCT Link and show a valid transit pass.

While the messaging is focused on service, the underlying intent for SCT Link is for the agency to gain wide support in the community it serves. Here is an example of a very successful cooperative marketing relationship between Famima, a bakery, and LADOT transit service in Los Angeles (Figure 9-16).

Figure 9-16: Cross-promotion of transit use and retailers

In this example in Figure 9-16, customers are given a discount at the bakery for showing their monthly transit pass, can purchase transit fare media at the store, and are shown on a map how to get to the business using the transit routes that serve the location. A similar approach could be used in Galt to partner with local businesses served by transit, which would be mutually beneficial both to transit and the business. The associated marketing strategy should outline different business groups who could partner with SCT Link for promotions and discounts, as well as potential bulk purchases of commuter bus passes.

Marketing to internal transit staff cannot be overlooked. It is important to consistently inform and train staff on how to communicate with transit customers. For ease of education and information distribution, this can be produced as a series of actionable online self-help and or guidance systems for both staff and riders that enable frontline staff to act as ambassadors of the new SCT Link brand and its services. This online portal could be called – "*It's Our Link" SCT Link Employee Engagement Program*. Here is an example of *BC Transit's Employee Engagement Action Plan* (Figure 9-17). Finally, it could also be worthwhile to promote SCT Link's services directly to County and City of Galt employees as viable alternatives to private auto trips.

Figure 9-17: Internal marketing, BC Transit

In summary, SCT Link could expand its customer base by revamping its identity and the method it communicates to current and prospective customers. A modern visual and written presence would elevate customer interest and experience. Establishing a "transit is cool" or similar culture is a recommended focus of future marketing efforts.

New branding and marketing must be supported with a properly funded effort including the services of a marketing agency/consultancy procured to guide the efforts and produce content. Experience has shown that the most successful transit programs in North America that have steady ridership growth invest between 2-5% of their operating budgets on marketing.

We appreciate that financial resources are finite. From our experiences at numerous transit agencies across North America, Stantec has seen and proven that investments in marketing translate into sustained, as well as new ridership. A marketing investment for transit in South County should be scalable, economical, and results-oriented to build interest in transit.

9.4.4.1.1 Immediate recommendations

- Identify quick wins for improved brand visibility and marketing, and community partnerships. Quick wins can be tabling at local events, presentations to organizations, or engaging at community meeting spaces (such as the Galt Senior Center). Execute quick wins.
- Modernize SCT Link's website, ensure it is up-to-date with information and schedules and make it consistent with branding and messaging (for example, removing the "/" between "SCT" and "Link" on all materials and appearances for consistency).

9.4.4.1.2 Short-term recommendations

- Retain marketing agency/consultancy with transit expertise. This firm would assist SCT Link to develop a marketing plan, undertake a branding review, and devise a future action plan.
- Develop a pragmatic marketing plan, provide clear direction, and outlines an actionable implementation plan for the market. At a minimum, the marketing plan should contain the following components:
    i. Vision and Objectives
        i. Identify business objectives
        ii. Audience analysis
    ii. Marketing Strategy
        i. Branding recommendations
        ii. Marketing medium evaluation
        iii. Tactical recommendations include:
            1. Building awareness
            2. Guerilla & Event Marketing
            3. Community Outreach
            4. Digital marketing / social media
            5. Cooperative Marketing
            6. Employee engagement
    iii. Measuring Return on Investment
        i. Establish KPIs/Performance metrics
    iv. Budget
    v. Implementation plan

9.4.4.2 *D2. Ensure continued coordination with SACOG, the City of Galt, and other partners on scheduling, fares, service requests, and marketing.*

The shared vision set forth by SACOG in the Next Gen Transit Study positions SCT Link to be a unifying voice for transit-supportive communities in the areas it serves. SCT Link – coordinating between SACOG, SacDOT, and the municipalities served – could enhance its facilitation of a responsive transit service by implementing the formalized process for service change requests outlined in Goal B1 (Section 9.4.2.1). A framework developed by SCT Link would help facilitate efficient communication regarding service change requests received by another jurisdiction for trips occurring within SCT Link's service area.

Regional connectivity begins with better communication and coordination but continues with orchestrated service scheduling and aligned transfers. SCT Link can build on wins related to service change requests and expand work with other agencies like SacRT and San Joaquin RTD to elevate the customer experience when traveling between jurisdictions. It is recommended to expand Hwy 99 service to weekend stems from customers' desires for car free travel to Sacramento. Through service coordination, intersecting routes can be identified for timed connections with brief layovers, to ensure ample time to make connections but not so much that layovers feel burdensome.

As a service provider, the onus lies with SCT Link to ensure transfer payment is fast and intuitive to the rider. As discussed in Section 9.4.2.3, continued promotion of the Connect Card as a simple and efficient means of payment is a recommended a priority for SCT Link. Leveraging the familiar brand, Connect Card for SCT Link fares should be advertised more widely. Currently, the SCT Link website has no mention of fare payment options and only shows the Connect Card on brochures of each route. Customers looking to ride SCT Link need to know Connect Cards are accepted and be seamlessly directed to the Connect Card website for more information and purchasing options. Connect Card is a valuable tool – research shows that not only do boarding times decrease with next generation payment methods, but high-quality ridership data is produced from each boarding as well.

Shared data across the region will support strategic decision making to strive towards the SACOG Next Generation Transit Strategy goal of regional interconnectivity. In an earlier chapter, Stantec compiled a comprehensive set of data from its community engagement for SCT Link. Leveraging this data to shape service changes and data-driven decisions requires ongoing and expanded data collection. Supporting responsive data goals of SACOG Next Generation Strategy, lessons learned from SCT Link's SRTP outreach should be shared with partners, to facilitate larger data sets based on consistent surveying tactics.

Data driven decisions can be used to guide strategic funding towards consistent priorities across the region. Leveraging working groups and shared data, SCT Link can collaborate with its partners to identify the most transit competitive corridors in its service area, potentially targeting these for improvements that can speed up transit. To support SACOG's Next Generation Strategy, SCT Link can aim for fast and reliable service, supporting SCT Link's system health as well as that of its partners.

SCT Link does not operate in isolation but interacts with multiple agencies and municipalities. Furthermore, SCT Link is an integral part of the region's transit connectivity particularly from San Joaquin County to Sacramento. Riders originating from, or traveling to, destinations outside of SCT Link's service area face challenges in accessing cohesive service. Successful connections without challenging transfers, long wait times, or anxiety of missing the connecting service build confidence in a rider's ability to depend on transit. Continued coordination with partners from SACOG to municipalities and other transit providers will facilitate a seamless user experience.

9.4.4.3 D3. Work with municipal and county partners to improve the built environment & bus stops

Elements like land use and density, parking minimums, site design, roadway width and weight restrictions, sidewalk design, and maintenance, among others, are beyond SCT Link's direct control. However, these elements factor into a customer's decision to use transit, impact the ability to provide transit service, and influence how productive and cost-effective transit could be. As a transit provider with limited jurisdiction, SCT Link is unable to make improvements to the built environment alone. Advocating for measures that prioritize a 'transit first' model requires a seat at the table. By working with authorities having jurisdiction (AHJs), SCT Link can represent transit and active transportation priorities at meetings dealing with land use as an active voice and champion within the communities it serves.

Sacramento County lags behind the rest of California in the non-single occupancy commuter mode split. Based on the 2019 American Community Survey (Figure 9-18), only 3% of Sacramento County commuters

utilize transit while other active transportation modes represent an even smaller portion. Long-term infrastructure changes cannot be relied on to shift the needle towards more sustainable and healthier travel options. Through coordinated efforts to incentivize and improve alternative travel options, SCT Link can contribute to making the communities it serves transit supportive.

In working with AHJs, SCT Link can leverage the Sacramento Active Transportation Plan to guide cooperation particularly the first three goals:

- **Goal 1**: Safety & Comfort "Provide safety enhancements at major intersection near important community destination, such as schools, parks, and transit stops."
- **Goal 2**: Connectivity & Access "Ensure walking, bicycling, and rolling routes connect to both neighborhood—serving destinations—such as schools, libraries, parks, and transit stations—and regional destinations such as job centers and major commercial areas."
- **Goal 3**: Equity "Focus on improving active transportation connections to transit stops and community destinations, giving priority to connection in disadvantaged communities."

9.4.4.3.1 Collaborate with partners on active transportation campaigns and projects

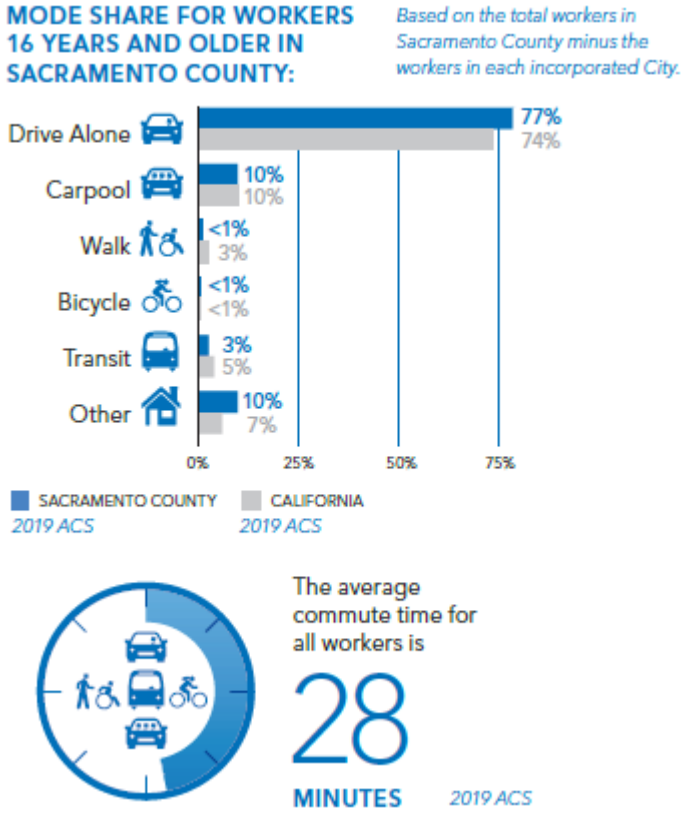


Figure 9-18: Commute Mode Split from Sacramento Active Transportation Plan

Cities like Los Angeles and Houston, in addition to redesigning bus routes and focusing on key routes and frequent service, realize that in order to expand ridership and improve the customer experience, bus travel must be faster and more reliable. Scheduling and operations management can only do so much—the reality of operating buses in mixed-traffic on surface streets means that bus riders are at the mercy of traffic.

Infrastructure to support bus priority and improve reliability/bus operations can be costly, but it doesn't need to be. In fact, several changes are more policy-oriented than infrastructure-oriented. SCT Link can take incremental steps, with easy wins first and build up to more challenging projects over time as it addresses reliability issues, builds trust and relationship with partners who control rights-of-way and infrastructure, and throughout community engagement.

Stantec recommends the following approach to bus priority strategies and infrastructure planning:

- Establish a "transit supportive task force" whose goal is to identify and implement projects aimed at improving quality for customers and enhancing active transportation infrastructure. The task force should be led by an SCT Link staff who champions bus priority in the South County community. The task force should include representation from stakeholders at the SACOG, the

cities of Galt and Isleton, and SacDOT, Sacramento County, as well as residents/bus riders, and businesses. Having a broad buy-in and consensus will be paramount for the more challenging projects.

- The task force should develop a strategic plan that lists priority areas for improvements, and potential solutions for each. These projects should be classified in phases.
    - SCT Link should use other recommendations in this current SRTP to align with the goals and projects for the bus priority plan, such as incorporating service changes, marketing and branding opportunities, and bus stop improvements, among others.
    - The plan should participate in the identification of key transit-competitive corridors. These corridors should also be identified through approaches and priorities consistent with SACOG metrics to allow for cooperative funding.
- Upon plan adoption, SCT Link should begin implementing key projects as specified by the plan.
- SCT Link can then evaluate the performance of the interventions on travel time, reliability, and ridership using the data collection strategy it develops, as well as adjusting service per the transit service guidelines. The transit service guidelines should be adjusted as needed based on the outcomes of infrastructure and priority policies.

Having a strategic plan that outlines the goals and purposes of interventions, with a focus on moving people, will make SCT Link a strategic and pragmatic mobility provider. Projects that could be considered by SCT Link include:

- Sidewalks and sidewalk maintenance – fully ADA-accessible, consistent sidewalk facilities in good repair are essential for successful fixed route transit as first and last mile connections are most commonly completed by foot. Compiling a map of the existing sidewalk network with a condition index could facilitate maintenance and direction for filling gaps. Addressing sidewalk conditions in South County would be consistent with Goal 4: Maintenance of the Sacramento Active Transportation Plan.
- Cul-de-sac connectors – improved accessibility can be achieved by providing pedestrian accessways between cul-de-sacs and adjacent roadways. Successful examples of these connectors can be seen along Galt's West A street (shown below in Figure 9-19). Identification of other communities that would benefit from similar connectors would be an important priority of the task force.

Figure 9-19: Communities along W A St with pathways between cul-de-sacs and A St (source: Google Maps)

- Mobility Hubs – identified as “Infrastructure Programs” in Sacramento Active Transportation Plan, mobility hubs can support first and last mile solutions for transit riders. Important facilities like the Twin Cities Park and Ride could be drastically improved by incorporating active transportation modes as part of site redevelopment. Bike storage lockers, repair stations, and parking are tactics that could be implemented to support a mobility hub concept.

For SCT Link to support the vision and goals outlined in the Sacramento Active Transportation Plan and SACOG Next Generation Strategy, development decisions need to be made with transit and active transportation in mind. Planning at the human scale for mixed-use development means changing from

dispersing and separating complementary land uses like retail and housing which prioritizes vehicle use, to bringing destinations closer together instead fostering transit use. Removing parking minimums in development requirements, leveraging connections with cycling infrastructure, and pricing parking appropriately are all ways to help build the attractiveness of public transit.

9.4.4.3.2 Improve Bus Stops and Active Transportation Connections

SCT Link collaborates with municipal departments when examining service requests or planning service for recent developments or developing active transportation projects. However, SCT Link needs to leverage these connections to promote the 'transit first' culture among the staff of cities served by SCT Link and with other partners like the SACOG and SacDOT. Only by having a seat at the table with a champion for transit service and transit customers can SCT Link help shape policy and development so that new retail opportunities provide convenient access to bus stops with frontage along a street with a bus line for example, or so that new residential developments occur with street designs that facilitate rather than detract the ability of a bus to service this development.

SCT Link can also leverage work to improve active transportation in Galt, particularly cycling since it can extend the reach of people traveling by transit. SCT Link's vehicles are already equipped with bike racks, and SCT Link can ensure that all vehicles have functioning bike racks with slots for three bikes to maximize the number of riders who can bring their bikes on board. Another strategy is to investigate the potential for a program to integrate bike parking at transit stops, and together with the recommendation for a bus stop study, SCT Link could roll out bike parking across its network.

Wayfinding can be an asset to multimodal travel. Implementation of a wayfinding system could highlight Galt's walking and bicycling infrastructure, promoting active transportation for first/last mile solutions. Monitoring the progress of Downtown Sacramento Transit Integrated Study may provide insight into the success of wayfinding in the area. SCT Link can then collaborate with each municipality to consider the feasibility of adding wayfinding to the bus stop modernization in that area.

Figure 9-20: Capital Metro 13" E-paper display from Luminator

Assessing the potential of more modern, technology-enhanced bus stops could improve the accessibility of the SCT Link system. Leveraging AVL technology means real-time passenger information, providing up to the minute information on bus arrival and departure times as well as service interruptions or changes. Not only is AVL data available for trip planning apps, but physical signage at stops ensures populations without smartphones have access to tools for better trip planning. Older populations, who may experience limited technology literacy, can particularly benefit from digital at-stop signage. Capital Metro in Austin, TX implemented e-Paper displays[57] as bus and rail stops; installing 148 solar-powered 13-inch displays with text to voice buttons and larger 32-inch boards along its 83 routes (Figure 9-20). Utilizing a cost-efficient product, Capital Metro was able to deliver a variety of up-to-date information from transit departures to service disruptions. SCT Link could look to pilot bus stop improvements at its main hub at Galt City Hall as a test case.

To a large degree, particularly for agencies like SCT Link with a majority of less frequent services, the bus stop waiting environment plays a substantial role in customer experience and satisfaction. Providing shade, in particular, would go a long way to improving customer experience during the waiting portion of a transit journey. Improving the customer experience even before they board a transit vehicle can help grow ridership from different market segments.

Key aspects of the recommended bus stop modernization program include:

- Work with AHJs to develop a bus stop guidelines and improvement plan. Industry best practices can be effectively used to identify proper infrastructure for bus stops and support developing an action plan that prioritizes stops based on need.

[57] E-PAPER-Case-Study (lmknowledgehub.com)

- Initiate and maintain a bus stop inventory.
- Identify a strategy for productive spacing between stops to balance bus speeds and convenient access for passengers. Additionally, develop an actionable list of low-hanging fruit for infrastructure to improve the customer waiting experience, such as the Twin Cities Park and Ride facility.
- Ensuring stops are accessible for customers of all abilities. An accessibility infrastructure checklist should be applied to bus stops for targeted improvement. Furthermore, based on the data collected including stop usage as well as feedback from SCT Links bus stop inventory, the plan should develop a prioritized list of stops that need accessibility improvements. These improvements will work together with travel training and other policies that help DAR riders use SCT Link for more trips.
- Finally, the plan should outline improvements like shelters to protect customers from the elements, and more seating to make sure customers are comfortable while waiting for a transit vehicle. Working together with the City of Galt, SCT Link can also enhance the placemaking and urban design qualities of key bus stops, such as improved lighting, larger sidewalks, bike racks and repair kits, and information regarding transit connections.
- Identify funding sources and partners to implement the bus stop improvements. The Sac Metro Air District is one source of funding for stop improvements through the Targeted Green Infrastructure Fund (TGIF)[58], as well as the Clean California Local Grant Program[59] from Caltrans.

9.5 Implementation Plan

Table 9-14 presents the full implementation plan, sorted by goal. Note that the service plan details can be found in Section 9.2.6.

[58] http://www.airquality.org/businesses/incentive-programs/transit-stop-improvement
[59] https://cleancalifornia.dot.ca.gov/local-grants

Table 9-14: SCT Link and East County Transit SRTP Implementation Plan

	1 FY23-24	2 FY24-25	3 FY25-26	4 FY26-27	5 FY27-28
GOAL A - Set SCT Link Up for Long-Term Success					
A1 **Develop agencywide mission statement to frame the design and delivery of mobility services**	Develop and adopt agencywide mission statement.				
A2 **Implement the ZEB Rollout Plan**	Submit ZEB Rollout Plan to CARB by July 1, 2023 and follow phasing and implementation plan for vehicles and infrastructure to achieve a full ZEB transition by 2040.			First ZEB vehicle purchase.	
A3 **Develop clear service guidelines**		Develop transit service guidelines. Adopt guidelines.	Use data to refine service guidelines.	Continuously measure service based on guidelines and adjust as needed. Identify priority routes/areas for more (or less) service when resources become available (or constrained).	
A4 **Modernize business processes and adopt new technology**	Design a data collection strategic plan to outline the data collection necessary for decision making, the technology needed for data collection, and plan to use the data. Deploy AVL on all vehicles.	Use data to refine data collection strategic plan and update plan or data collection needs accordingly.	Annually review data collection strategic plan, the state of data collection, technology used to collect data, and how data is used and adjust plan and data collection and analysis methods based on annual review.		
A5 **Achieve 1 FTE fully dedicated to SCT Link planning and oversight**			Achieve 1 full FTE dedicated to SCT Link planning, oversight, marketing and outreach, and to support the ZEB rollout.	Assess need to adjust FTE levels and adjust accordingly.	
GOAL B - Elevate the Customer Experience					
B1 **Develop a formal process for requests for service changes**			Develop a formal process for receiving requests for service changes that is shared with all of SCT Link's partners (City of Galt, etc.). Develop process for evaluating and prioritizing implementation of service requests.		
B2 **Invest in technology to improve trip planning and riding**	Acquire AVL on all vehicles to enable real-time arrival information for customers. Coordinate with third-party apps like Transit to provide improved trip-planning and real-time arrival information to customers.	Transition to "on-demand" model for DAR in Galt and the Delta using an app-based reservation system that enables more same-day trips.			
B3 **Launch fare study review and ensure coordination with regional partners as outlined in Next Gen Transit Study**	Continue to promote use of Connect Card	Launch fare study review and ensure coordination with regional partners.	Implement recommendations from the fare study review and continue coordination with regional partners.	Continued coordination with regional partners.	
B4 **Partner with local nonprofits to provide mobility and travel training**	Identify list of local nonprofits and groups (like 50 Corridor TMA) that can provide mobility and travel training in South Sacramento County and develop travel training guidelines.	Continuously promote travel training options on website, social media outlets, and in other SCT Link materials. Continue to develop partnerships with other organizations and nonprofits to provide more travel training options.			
B5 **Improve content management of SCT Link website**	Improve content management of the SCT Link website, including more timely website updates.	Continue to monitor website content management performance to ensure website is maintained with current and up-to-date information.			
GOAL C - Improve Service and Reliability					
C1 **Implement the service plan recommendations**	Prepare and implement service plan recommendations.				
C2 **Study the need for school trippers**		Conduct study and implement recommendations.			
C3 **Adjust no-show and late cancellation policy**	Develop new policy and educate the public and riders.	Adopt new policy.			
C4 **Update on-time performance metrics and monitor performance accordingly**	Develop and adopt revised on-time performance metrics.	Use AVL technology to capture actual on-time performance. Use on-time performance reports to adjust schedules to better reflect actual operations.	Use on-time performance reports to adjust schedules to better reflect actual operations.		
GOAL D - Increase Awareness of SCT Link and Foster Transit Supportive Communities					
D1 **Develop marketing and branding plan**	Identify and implement quick wins for improved brand visibility, marketing, and community partnerships.	Develop a branding and marketing strategy.		Refresh the SCT Link brand.	
D2 **Improve coordination with municipal and regional partners to promote service and engagement for service requests**	Ensure continued regional coordination with SACOG, the City of Galt, and other partners on scheduling, fares, service requests, and marketing.				
D3 **Work with municipal and county partners to improve the built environment & bus stops**	Ensure SCT Link participates in land use planning with AHJs.	Collaborate with partners on active transportation campaigns and projects. Initiate bus stop study.	Install more bus shelters and accessible benches.		Implement bus stop signage refresh.

9.6 Technical Considerations for Zero-Emission Bus Conversion

9.6.1 ZEB Predictive Bus Modeling

Predictive bus modeling was completed on SCT Link's current operations to understand how SCT Link service could operate under a ZEB fleet to fulfill CARB's ICT mandate which requires all transit agencies in the state to transition to a 100% ZEB fleet by 2040. As the ZEB planning was completed in conjunction with SRTP planning, the ZEB plan takes into consideration the SRTP service plan so that full ZEB operations can still be achieved after implementing the service plan.

9.6.1.1 Fleet and Power Modeling Overview

ZEBDecide, Stantec's fleet modeling tool, was used to determine the ideal ZEB composition for SCT Link's fleet[60] (which is made up of motorcoaches and cutaways). The predictive ZEB performance modeling depends on several inputs (shown in Figure 9-21), such as passenger loads, driving cycles (or duty cycles), topography, vehicle specifications, and ambient conditions subject to the environment in which the agency operates.

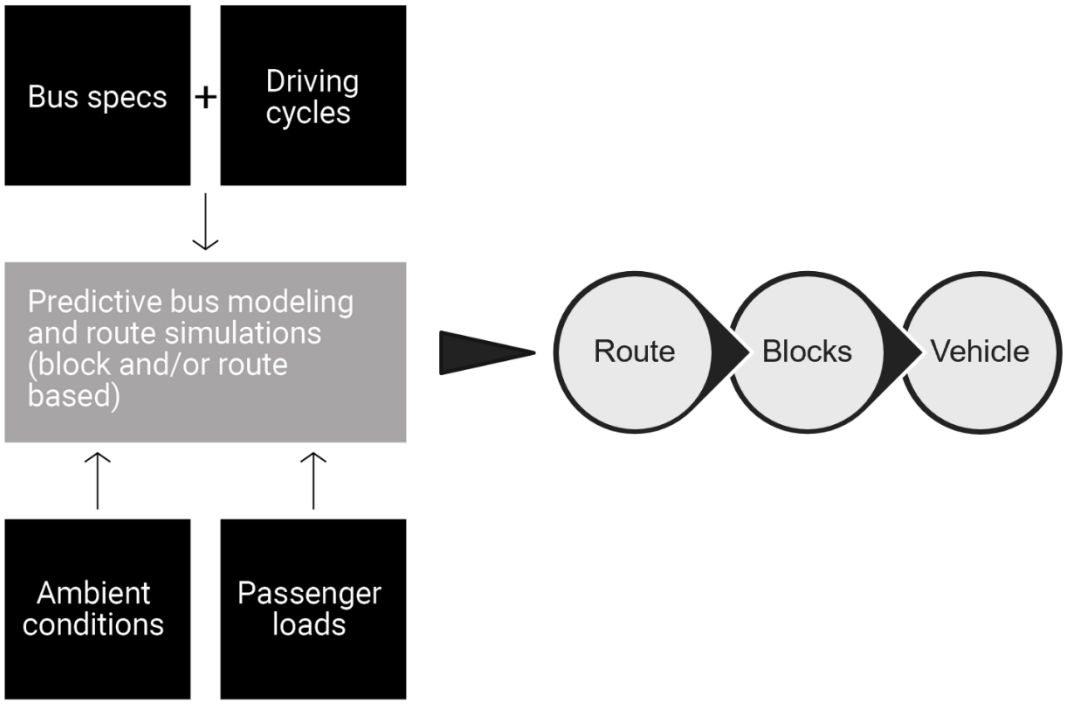


Figure 9-21: ZEB modeling overview

The modeling inputs and methodology are described in detail in the previous report, titled "Zero-Emission Energy Modeling and Potential Fleet Concepts". It is important to note that only battery electric buses (BEBs) and not fuel cell electric (FCE) buses were modeled for the following reasons:

[60] Amador Transit is completing its own ZEB rollout plan separately which will cover East County Transit. This SCT Link ZEB Plan only covers services operated by SCT Link in south Sacramento County.

- There are few (if any) viable and tested FCE vehicles comparable to SCT Link's fleet (currently, no motorcoaches, no cutaways, and one FCE van in development).
- SCT Link's small fleet would translate to low hydrogen fuel demand resulting in a more expensive per-bus cost compared to BEBs
- While SCT Link's site is currently not set up for either BEB or FCE bus fueling, hydrogen fueling on-site would require more challenging changes to vehicle flow, upgrades to the facility, and construction of fueling infrastructure. Offsite fueling opportunities in the South Sacramento region are currently insufficient.
- Nonetheless, FCE vehicles could likely fit operationally with SCT Link's service profile due to their longer ranges and shorter refueling times and could be feasible when smaller vehicle profiles become available, and if hydrogen costs come down in the future. Because the ICT plan is a living document, the plan will provide guidance and considerations for potential FCE replacements should they become a more viable option in the future.

SCT Link's operations were modeled first at the route, then run, and finally vehicle assignment level to understand how much "fuel" is consumed by each vehicle over the course of the day. This process is shown in Figure 9-22.

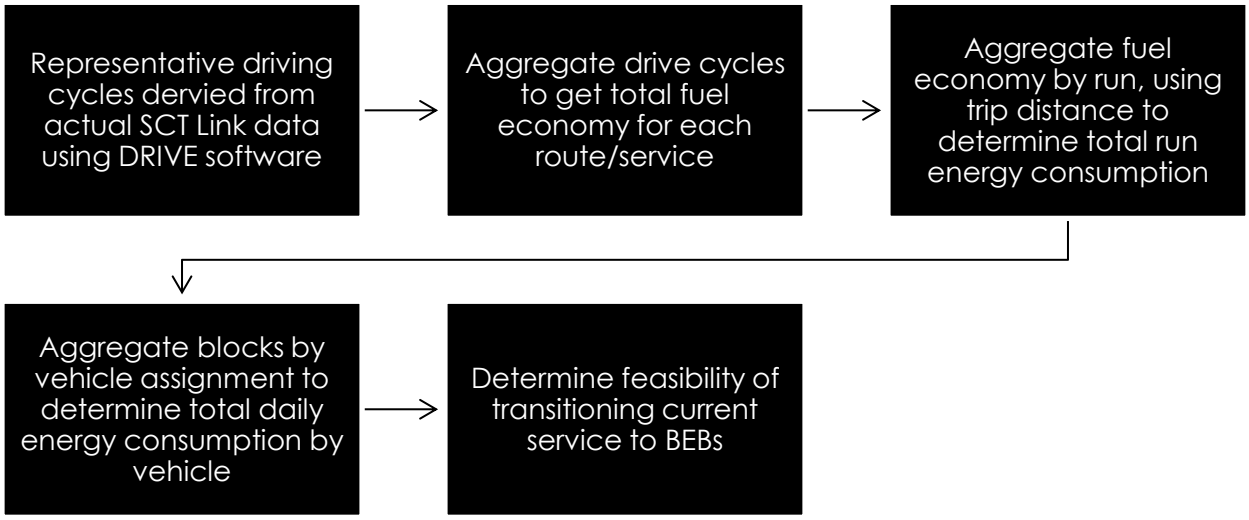


Figure 9-22: ZEBDecide energy modeling process

Modeling results for each service type are shown below. Due to interlining, Delta Route and Hwy 99 trips are merged for measures of electrification success. For each service, the criteria for determining if a service can be successfully replaced by a BEB is whether the state of charge (SOC) of the battery remains ≥20% after completing its scheduled service. The outputs of the modeling include the average fuel efficiency and driving range for each BEB equivalent. Results for each service at the vehicle assignment level are shown in Figure 9-23, and Table 9-15 summarizes the average fuel efficiency and driving range for each vehicle and service type.

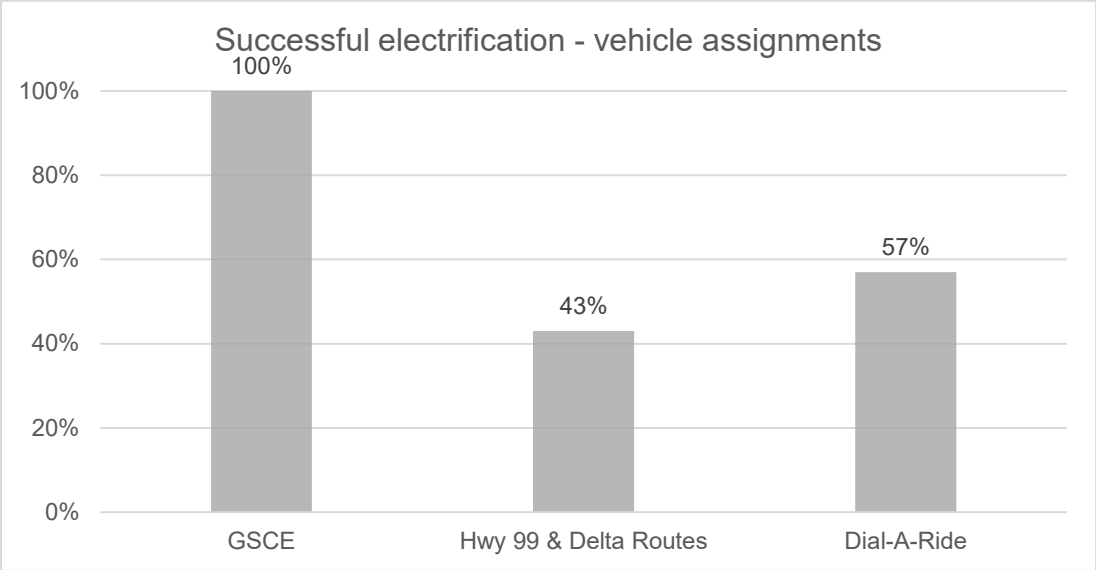


Figure 9-23: Successful electrification of SCT Link services

Table 9-15: Average fuel efficiency and driving range for SCT Link services

Vehicle type	Average BEB fuel efficiency	Average BEB driving range	Average and maximum driving range for current SCT Link operations
Motorcoach	2.15 kWh/mi	200 miles	167 – 205 miles
Cutaway (Hwy 99)	1.23 kWh/mi	78 – 105 miles	140 – 200 miles
Cutaway (Delta Route)	1.01 kWh/mi	95 – 135 miles	155 – 185 miles
Cutaway (DAR)	1.08 kWh/mi	89 – 130 miles	89 – 125 miles

9.6.1.2 Summary and Fleet Recommendations

The modeling results are mixed, showing that while GSCE commuter services can be replaced with BEBs on a 1:1 basis with a 100% success rate, services operated by cutaways cannot be converted to BEBs on that same basis. Further, the service changes presented in Section 9.2 need to be incorporated into the ZEB planning so that future services changes from the SRTP can be completed by BEBs as well.

Following discussions with SCT Link staff, a recommended fleet composition was developed that assumes that future technology improvements, such as battery electric (BE) cutaways with larger batteries and enhanced efficiencies for longer driving ranges, will be available and will meet SCT Link's service delivery requirements. The ZEB planning efforts also incorporate the fleet expansion needed to operate the new services proposed in the SRTP in Table 9-10 from Section 9.2, which increases the fleet size by two

cutaways for a total of twenty-one (21) vehicles beginning in FY26-27. Table 9-16 summarizes the preferred ZEB fleet composition to satisfy the ICT regulation.

Table 9-16: ZE fleet composition incorporating SRTP service plan

Vehicle type	Service(s)	ZEB type	Battery size required	Quantity	Change from current quantity	Comments
Motorcoaches	GSCE	BEB (in-depot charging)	544 kWh	3	N/A	Overnight charging at the depot.
Cutaways	Hwy 99, Delta Route (and future Delta on-demand service), DAR	BEB (in-depot charging)	250 kWh	18	+2	Current available battery size is ~120 kWh. According to modeling, only 43% of daily service can be completed using BE cutaways for Hwy 99/Delta and 53% for DAR. This plan assumes that technology will improve enough (a battery size of at least 250 kWh with efficiencies below 1 kWh/mi) to complete service by the time BE cutaways need to be procured.

9.6.1.3 Power Demand Modeling and Charging Profile

The subsequent step is to estimate the power capacity at the transit facility to meet the energy demand for charging an all-BEB fleet to identify the required utility upgrades. A number of operational factors were incorporated into the power modeling, including:

- Charging/recharging time window: Stantec assumed all buses start charging overnight and can charged during the day between blocks, i.e., charging can occur during out-of-service times. This input is the service schedule of vehicle pull-out and pull-in times for a representative day and according to the blocking and scheduling changes made during fleet composition refinement;
- 120 kW in-depot chargers for motorcoaches (Charger Output in Equation 1) with three plug-in connections each operate in parallel (i.e., two plug-ins charging vehicles simultaneously);
- 60 kW in-depot chargers for cutaway vehicles (Charger Output in Equation 1) with three plug-in connections each operating sequentially;
- A 90% charger efficiency (Eff. in Equation 1);

- A 25% contingency factor to account for the restrictions of onboard charging equipment that limit the maximum power capacity from the chargers (Contingency in Equation 1);
- Assuming negligible time passes between when a bus enters the facility and is connected to a charger and starts charging;
- Smart charging software will be implemented to optimize the charging times and guarantee all vehicles will be charged and ready for service;
- The modeling revealed that only a portion of the demand-response vehicles (around 57%) can complete their daily service with the currently available vehicle models with a (battery size of 120 kWh). Therefore, to estimate the power requirements for a 100% successful service, we assumed that cutaway vehicles will be available with batteries that are 250 kWh in capacity; and
- Charging during peak hours (5 – 8 pm) is avoided according to SMUD rates (Table 9-17)[61].

Table 9-17: Summer Electric Schedule BEV from SMUD

Charge Type	Rate	TOU Period
Off-Peak	$0.1209/kWh	12:00 am to 12:00 pm
Mid-Peak	$0.1671/kWh	12:00 pm to 5:00 pm 8:00 pm to 12:00 am
Peak	$0.2941/kWh	5:00 pm to 8:00 pm

Using the technical specifications and assumptions from the charging equipment, the charging hours (hours of charging required per block) that are required based on the daily energy demand were calculated using Equation 1 for each vehicle type.

Equation 1: Hours of charging needed to serve daily energy demand

$$Hrs.Charging = \left[\left(\frac{kWh}{day} * \frac{1}{Charger\ Output\ kW}\right) * \frac{1}{eff.}\right] * (1 + Contingency)$$

Equation 1 was applied to the daily energy demand calculated for all blocks and vehicle assignments. The total charge time per block per vehicle was then used to develop a vehicle charging schedule (i.e., hours during the day that each bus needs to charge in order to have enough energy to go into service at the time specified by the service or dispatching schedule).

The number of hours each charger needs to be online provides the power requirement, and the cumulative number of connected chargers at a specific hour represents the total power required at each hour of the day. For example, if 6 chargers with a maximum capacity of 60 kW are connected at the same time for one hour, the power demand during this hour is 360 kW (6*60 kW).

The power modeling provides the following outputs:

- The maximum number of chargers that need to be connected at each hour of the day

[61] https://www.smud.org/en/Rate-Information/Time-of-Day-rates/Time-of-Day-5-8pm-Rate/Rate-details

- Representative daily charging schedule
- Maximum power requirements

Figure 9-24 displays the charging schedule and daily power requirements at SCT Link's facility once the short-range transit recommendations are implemented and a total fleet of twenty-one (21) vehicles has been adopted. The estimated maximum power required at the facility is 420 kW.

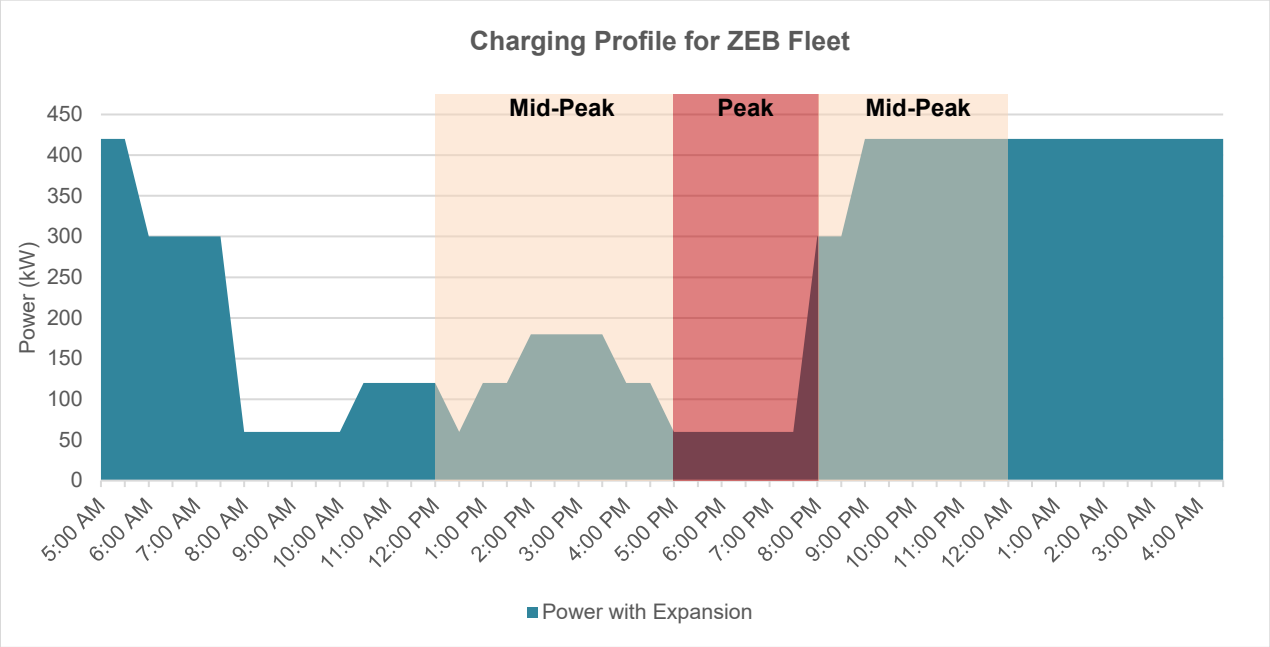


Figure 9-24: SCT Link charging profile and power requirements

The charging profile and total number of online chargers will vary if using a different charging management strategy, but the analysis shown here ensures that a high demand service day for SCT Link can be achieved under a maximum power demand of 420 kW. The recommended charging strategy for SCT Link is to operate no more than four 60-kW and one 120-kW chargers simultaneously.

Table 9-18 summarizes the count of electric vehicles, charging equipment, and power requirements that are needed to achieve the full electrification of the fleet that can be used to coordinate efforts with SMUD. Each 120-kW charging station will be operating at 480-V 3-Phase and drawing 144 A. The 60-kW chargers will draw 72 amps at 480 V 3-Phase.

Table 9-18: Summary of maximum power demand and total energy requirements for 100% electric fleet

Type of Vehicle	Total Vehicles	Active Vehicles	Power rate of DCFC[62]	Total number of DCFC units	Charger to Dispenser Ratio	Total No. of Dispensers	Max Power (kW)
Cutaways	18	15	60 kW	5	3	15	300

[62] Direct Current Fast Charger (DCFC).

Type of Vehicle	Total Vehicles	Active Vehicles	Power rate of DCFC[62]	Total number of DCFC units	Charger to Dispenser Ratio	Total No. of Dispensers	Max Power (kW)
Motorcoaches	3	2	120 kW	1	3	3	120
Total	**21**	**17**	**n/a**	**6**	**n/a**	**18**	**420**

9.6.2 ZEB Fleet Procurement Schedule/Outlook

Table 9-19 presents the fleet forecast through 2040, outlining vehicle replacements in accordance with ICT purchase requirements and SCT Link's existing fleet replacement schedule. Currently, the County retires cutaways after four years and motorcoaches after nine years. Stantec recommends that the County increase the useful life targets for both vehicle types (seven years for cutaways and twelve (12) years for motorcoaches) to: 1) align with FTA useful life benchmarks[63] and best practices from peer agencies who operate similar vehicle types in similar (rural) environments, 2) extend the investment period in more expensive vehicle assets (BEBs vs. fossil fuel buses), 3) reflect the fact that BEBs have fewer maintenance needs and should therefore have longer lifespans, and 4) reflect the fact that SCT Link's duty cycles and usage of vehicles is relatively light, given that spans of service are short and service operates mainly on weekdays.

Furthermore, Table 9-20 presents the phasing strategy for the charging equipment needed to accommodate the operations of the vehicles as forecasted in this procurement strategy. For example, one 60-kW charger with three dispensers is to be installed in 2025 to accommodate the three ZE cutaways slated for acquisition between 2026 and 2027. The schedule proposed below aims to spread out infrastructure purchases and installations over time; if the County is able to prioritize capital investments and acquire more chargers in a given year, then the timeline can be accelerated. Moreover, the County should plan for electrical upgrades that may require construction to occur once, allowing future installation of chargers with electrical wiring and other supporting modifications already complete.

[63] https://www.transit.dot.gov/sites/fta.dot.gov/files/2021-11/TAM-ULB-CheatSheet.pdf, 10 years for cutaways, and 14 years for motorcoaches/over-the-road buses.

Table 9-19: Fleet forecast through 2040

FLEET FORECAST		Useful life	FY20-21	FY21-22	FY22-23	FY23-24	FY24-25	FY25-26	FY26-27	FY27-28	FY28-29	FY29-30	FY30-21	FY31-32	FY32-33	FY33-34	FY34-35	FY35-36	FY36-37	FY37-38	FY38-39	FY39-40
Cutaways	Replace		3	3	3	4	3	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-
	Expansion		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Retire	4 yrs.	(3)	(3)	(3)	(4)	(3)	(3)	(3)	(4)	(3)	(3)	(3)	(4)	-	-	-	-	-	-	-	-
Total Gasoline Cutaways			16	16	16	16	16	16	15	13	10	7	4	-	-	-	-	-	-	-	-	-
ZEB Cutaways	Replace		-	-	-	-	-	-	1	2	3	3	3	4	1	2	2	3	3	3	4	1
	Expansion		-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Retire	7 yrs.	-	-	-	-	-	-	-	-	-	-	-	-	(1)	(2)	(2)	(3)	(3)	(3)	(4)	(1)
Total ZEB Cutaways			-	-	-	-	-	1	3	5	8	11	14	18	18	18	18	18	18	18	18	18
Motorcoaches	Replace		-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
	Expansion		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Retire	9 yrs.	-	-	-	(1)	-	-	-	(1)	-	(1)	-	-	(1)	-	-	-	(1)	-	-	-
Total Diesel Motorcoaches			3	3	3	3	3	3	3	3	3	2	2	2	1	1	1	1	-	-	-	-
ZEB Motorcoaches	Replace		-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	1	-	-	-
	Expansion		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Retire	12 yrs.	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Total ZEB Motorcoaches			-	-	-	-	-	-	-	-	-	1	1	1	2	2	2	2	3	3	3	3
Total ZEB vehicles	Total		-	-	-	-	-	1	3	5	8	12	15	19	20	20	20	20	21	21	21	21
Total ZEB Percentage	%ZEB		0%	0%	0%	0%	0%	5%	14%	24%	38%	57%	71%	90%	95%	95%	95%	95%	100%	100%	100%	100%
CARB Regulation	%ZEB		-	-	-	-	-	25%	25%	25%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
ZEB purchase percentage	%ZEB		**0%**	**0%**	**0%**	**0%**	**0%**	**25%**	**50%**	**40%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 9-20: Infrastructure implementation through 2040

	Infrastructure						
	2025	2027	2028	2029	2030	…	2040
60 kW chargers with 1:3 plugs	1	1	1	1	1		-
Cumulative 60 kW Chargers	1	2	3	4	5		5
No. of Plugs for Cutaways	3	3	3	3	3		-
Cumulative plugs for Cutaways	3	6	9	12	15		15
120 kW chargers with 1:3 plugs	-	-	-	1	-		-
Cumulative 120 kW Chargers	-	-	-	1	1		1
No. of Plugs for Coaches	-	-	-	3	-		-
Cumulative plugs for Coaches	-	-	-	3	3		3

9.6.3 Greenhouse Gas Impact Analysis

Reductions in greenhouse gas emissions (GHG), both upstream and tailpipe, are one of the key advantages of transitioning to ZE technologies. Based on the ZEBDecide modeling of GHGs, after implementing all the service changes recommended in the SRTP (and thus increasing annual revenue hours), SCT Link's current fossil fuel fleet would emit ~1,800 tons of GHG in a year[64]. In contrast, the future BEB fleet will only emit ~260 tons of GHG annually. While tailpipe emissions are entirely eliminated, residual GHGs result from the carbon-intensity of California's electric grid, which includes sources like natural gas burning.

As modeled, a completely BEB fleet can reduce SCT Link's carbon footprint by ~1,540 tons annually. Table 9-21 shows the annual emissions of the fleet by vehicle type and Table 9-22 shows a summary and average emissions per vehicle. However, as the California grid gets greener and transitions to relying on renewable sources like wind and solar, the potential carbon reductions for SCT Link will continue to improve directly proportionally.

Table 9-21: Annual emissions in tons of CO_2 per year for SCT Link's fleet by vehicle type

	Zero Emissions		Diesel/gasoline	
	Motorcoaches	**Cutaways**	**Motorcoaches**	**Cutaways**
Fleet tailpipe emissions (ton CO_2/year)	-	-	174	335
Upstream emissions[65] (ton CO_2/year)	45	218	63	1,230
Total Ton CO_2/year	**45**	**218**	**237**	**1,566**

Table 9-22: Summary of annual emissions for SCT Link's fleet

	Fleet emissions (Ton CO_2/year)	**Emissions per vehicle (Ton CO_2/vehicle/year)**
BEB fleet	263	27
Diesel/gasoline fleet	1,803	166
Difference	**1,540**	**139**
	85%	**84%**

On average, implementing BEBs reduces the annual emissions by 85% when compared to the conventional diesel/gasoline fleet (Figure 9-25).

[64] All GHG calculations are presented in tons (not metric tons) of CO_2 equivalent, which is calculated using the short-term 20-year global warming potential of CO_2, methane, black carbon, and particulate matter.
[65] Upstream emissions are generated while producing the fuel (diesel, gasoline, or electricity) and during the transportation/transmission process.

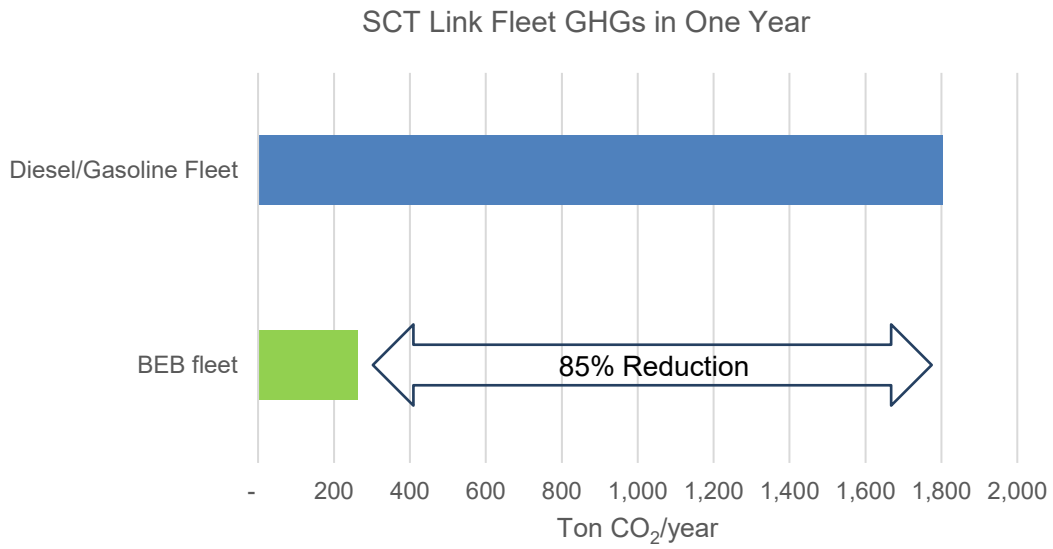


Figure 9-25: Comparison of SCT Link's current fleet emissions to BEB fleet

Using the EPA GHG equivalent calculator[66], we used the annual emissions that will be displaced by the BEB fleet to create relative comparisons to the benefits. As presented in Figure 9-26, implementing a BEB fleet will eliminate emissions equivalent to removing over 3.8 million miles driven by an average gasoline-powered car or the annual electricity use by 300 homes. This is equivalent to carbon sequestered by ~25,000 tree seedlings grown for ten years or ~1,800 acres of forest in one year.

Removing **3,822,597 miles** driven by an average gasoline-powered car

Reducing the equivalent of **300 homes' electricity use** for one year

Reducing the need for **25,464 tree seedlings** grown for 10 years to capture carbon emissions

Reducing the need for **1,822 acres of forest** to capture carbon emissions

Figure 9-26: Equivalent benefits if implementing a BEB fleet at SCT Link

[66] Greenhouse Gas Equivalencies Calculator | US EPA

9.6.4 Facility Modifications to Support ZEBs

This section outlines the proposed facility modifications for BEB implementation to SCT Link's bus operations and maintenance facility. The master plan concept (Figure 9-27) proposes a combination of floor or wall-mounted dispensers for buses parked against the interior wall and overhead, powered reel dispensers for the vehicles tandem parked towards the interior of the space; motorcoaches are proposed for exterior charging. Fortunately, the facility has sufficient space for this charging equipment, avoiding reductions in parking space while retaining flexibility since a considerable amount of physical infrastructure can be placed along the perimeter interior walls of the vehicle storage and maintenance space. Possible expansion into the adjoining suite was considered but not explored further, as all equipment can be accommodated in the current footprint and not expanding would minimize costs.

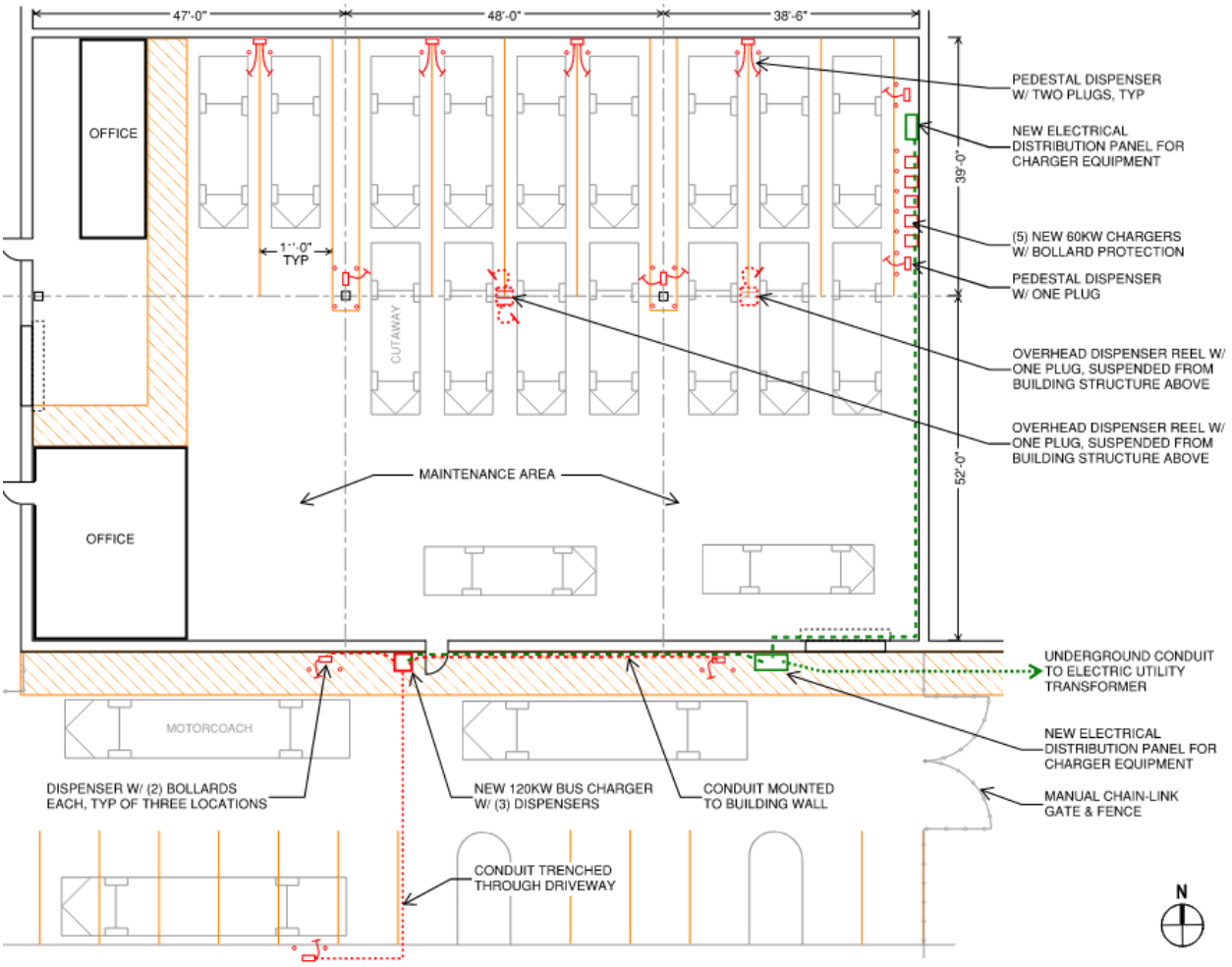


Figure 9-27: Site Plan Concept for SCT Link, 140 Enterprise Court, Suite B, Galt

The existing service cycle can be maintained and is not required to be changed for BEB implementation. Since the liquid fueling system used by the SCT Link is currently offsite, there are no considerations for phasing out this equipment and for the phased improvements it can be relatively simple to install the new infrastructure required for BEBs. As operators currently fuel the vehicles at the offsite location, work rules do not preclude operators from 'fueling' and as such, it's anticipated operators would be responsible for plugging in buses for recharging (or bus servicers, depending on when the bus needs to be charged).

Note that since the facility will require new electrical service connections from SMUD, the utility will likely require that a service study be performed to identify any transmission or distribution system upgrades that may be needed to support the additional power demands. While the additional electric demand due to the BEB fleet deployment is not large relative to what might be experienced at larger transit agencies, it will be up to SMUD to determine if the local power distribution system has the excess capacity to serve SCT Link's new charging loads as well as any other planned loads in the area. The recommendations below in Section 9.6.4.1 are focused on infrastructure upgrades that are to be located on the agency's property and do not include any system upgrades that the utility service study may identify. The extent and timing of the system upgrades required by the utility will determine the net cost to the agency.

9.6.4.1 *Proposed Maintenance Facility Modifications*

The following summarizes the proposed improvements for the ground-mounted charging dispensers:

- A new 500 kVA transformer and 1,500 A switchboard to provide adequate additional power to the facility, along with associated equipment pads and bollards.
- A new 400 kW generator with 200 gallons of onsite diesel fuel storage (or 1,250 gallons of liquid propane gas, LPG) in order to support 100% bus service for one day. The quantity of fuel maintained on site will depend on the anticipated utility outage duration and the availability of fuel deliveries. The current estimate assumes fuel needed for one day of outage. Alternatively, the generator could be fueled using pipeline natural gas if infrastructure is readily available near the facility.
- A minimum of five 60 kW vehicle chargers with a 1:3 charger-to-dispenser ratio to serve a maximum of 15 active (in revenue service) BE cutaways. A mix of dispenser types are proposed. Most can be pedestal or wall mounted with either one or two plugs as required. At least two cutaway buses will need to be served by overhead, powered reel dispensers due to the tandem parking configuration.
- One 120 kW vehicle charger with a 1:3 charger-to-dispenser ratio to serve a maximum of three motorcoaches. Charger is proposed to be located outside the building adjacent to the parking for the coaches. Dispensers can either be wall or pedestal mounted.
- Additional facility improvements/modifications required:
    - Equipment pads and associated bollard protection around chargers, dispensers, and electrical equipment.
    - Power main feeder and sub feeders
    - Communication system panel/distribution cabinet and conduits to each charger
    - Plan assumes that all service conduit connecting the charger cabinets to the dispensers will be above ground with the exception of one dispenser for coaches.
    - Pavement replacement/repair for trenching associated with electrical distribution where new electrical service and switchboard will be allocated.
- Minimal modifications are required to the building. Support framing will be required for the overhead mounted powered dispenser reel(s) based on final equipment selection.

9.6.4.1.1 Phasing of Charging Equipment

Given the proposed phasing strategy of vehicle acquisition, the charging equipment should be set in place prior to the arrival of each BEB procurement. As described in Section 9.6.1.3, the total number of active

charging modules and plug-in dispensers were modeled to minimize the power requirements at the facility. The final number of charging modules, as well as the phasing strategy (see Figure 9-28 for schematic of the recommended phasing of BEB deployment at the facility), will depend on the final manufacturer selection. In this schematic, equipment in Area A would be installed first (transformers and related electrical equipment), while equipment in Area B would be installed subsequently.

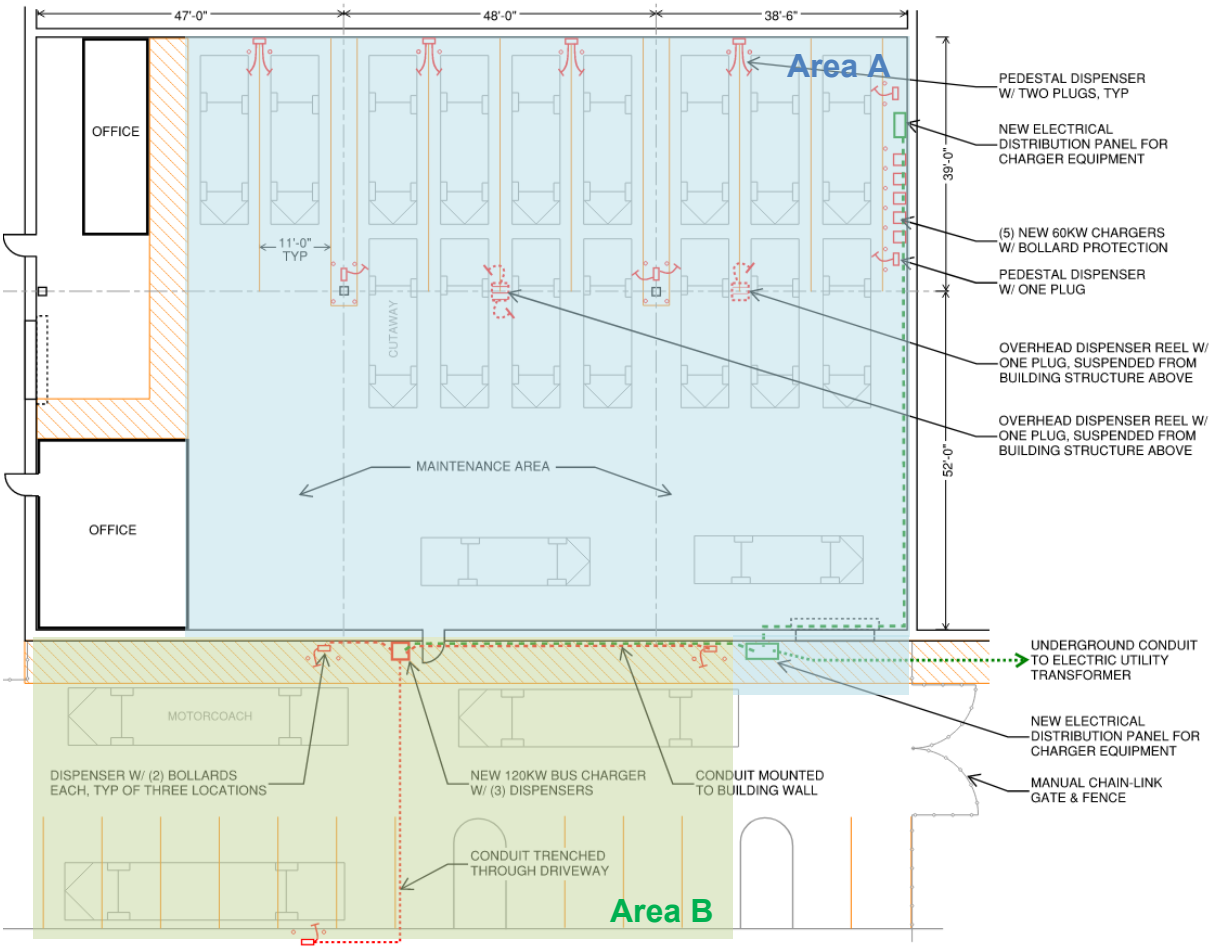


Figure 9-28: Phasing of Site Plan Concept for SCT Link

Table 9-23 provides a summary of the total number of ZE vehicles at SCT Link's facility at key years of acquisition.

Table 9-23: Summary of Fleet Phasing Strategy

	Cumulative ZEB Quantity									
	2026	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2037**	**2040**
ZEB Cutaways	1	3	5	8	11	14	18	18	18	18
ZEB Motorcoaches	-	-	-	-	1	1	1	2	3	3
Total ZEBs	**1**	**3**	**5**	**8**	**12**	**15**	**19**	**20**	**21**	**21**

The supporting infrastructure equipment will need to be in place prior to the vehicles arriving. Therefore, based on the ZEB vehicle count, while minimizing operational disruptions due to construction, the

equipment phasing strategy was designed as described in Table 9-24. The equipment phasing strategy was divided into two main phases depicting the modifications to Areas A and B from Figure 9-28.

Table 9-24: Charger equipment requirements per year

Phase No. and Description		Const. Year	Power Cabinets		Plug-In Connections		Max. Power (kW)
			To be installed	Cumulative	To be installed	Cumulative	
Phase A-1	Indoor facility modifications to accommodate power main feeder and sub feeders. First installation of charging equipment for cutaways	2025/ 2026	1 (60 kW)	1	3 in Area A	3	60
Phase A-2	Charging equipment installation	2027	1 (60 kW)	2	3 in Area A	6	120
Phase A-3	Charging equipment installation	2028	1 (60 kW)	3	3 in Area A	9	180
Phase B	Underground conduit and connection of outdoor charger to main feeder. Installation of chargers for motor coaches and cutaways	2029	1 (60 kW) 1 (120 kW)	5	3 in Area A 3 in Area B	15	360
Phase B-1	Charging equipment installation	2030	1 (60 kW)	6	3 in Area A	18	420

For each phase, Table 9-24 lists charging equipment specifications for generic charger manufacturers with power capacity of at least 120 kW for the coaches and 60 kW for cutaways. It is assumed that the years associated with the phases in the table are to extend to the end of the calendar year.

9.6.4.1.2 Grid Connection Upgrades

Power is supplied to the SCT Link facility from SMUD through a pad mounted service transformer located near the southeast corner of the adjacent industrial building (160 Enterprise Court). The transformer provides power to an external switchboard located on the northeast corner of 140 Enterprise Court. Feeders from the switchboard provide power to distribution panels located serving loads in SCT Link's spaces.

Since the existing transformer was sized to meet the anticipated loads of the existing mixed-use buildings, and that it is serving multiple customer accounts, it is anticipated that SMUD will install a new, dedicated transformer to provide the future BEB charging demands. A dedicated transformer will provide the necessary capacity for the new chargers and allow for separate metering, and a separate service account, for the bus charging functions. Furthermore, a separate service will allow SCT Link to take advantage of any available rates that are more advantageous for electric vehicle charging.

The extent of upgrades necessary on SMUD's side of the transformer will need to be determined by the utility based on an analysis of the local power distribution system. Since the SCT Link facility is in a commercial area and there is a large distribution line along Pringle Avenue just south of the building, we anticipate that the utility system upgrades would not be significant. If upgrades to the SMUD system are necessary, the cost may be covered by the utility based on the additional electricity that they will be selling to SCT Link for BEB charging. However, it could be expected for the County to pay for the required utility upgrades either through a direct fee or through a monthly facility services charge.

Typically, SMUD will perform a service study twelve to eighteen months prior to the new service start so they can include the most up to date information on anticipated new loads from all their customers in the area. The extent and timing of the system upgrades will determine the net cost to the agency. The required

information for SMUD to start looking into the required upgrades are presented in Table 9-18 and Table 9-20 of Section 9.6.1.3.

9.6.4.1.3 Communication Infrastructure

Infrastructure for data communications within a smart charging system will include IP Ethernet wiring between each charger and its associated dispensers, as well as between each charger and a local data switch. The actual wiring will be conventional Cat 5E or Cat 6 Ethernet cable between devices. As the maximum length allowed for Ethernet is 100 meters or 328 ft., the dispensers cannot be too distant from their respective charger. Though longer distances are possible with fiberoptic cable, the DC power cables that need to run parallel with the Ethernet cables begin to have problems with voltage drop beyond this distance, so 328 ft. is a recommended limit.

Once the Ethernet lines from each charger are routed back to the facility's data switch, the data can be contained within SCT Link's local network and managed directly by the agency. Alternately, the data can be routed to a cloud-based system—as needed to provide smart-charging and data aggregation—that is managed by a third party and/or is provided by the charger manufacturer. However, this would likely require coordination and approval of security and access, as it would necessitate outside entities operating within SCT Link's local network, at least at some level.

9.6.4.1.4 Fire Protection Considerations

With the implementation of BEBs, fire protection and life-safety concerns can be significant. However, due to the relatively new advent of these associated technologies, building and fire protection codes have not specifically addressed most of these concerns. National Fire Protection Association 855 'Standard for the Installation of Stationary Energy Storage Systems' is a standard that can potentially be applied to BEB storage, but this particular standard is excessive relative to the capacity of the batteries onboard buses. For indoor storage and charging of vehicles, the need for enhanced fire protection systems has not been determined as a baseline requirement for BEB implementation and would be at the discretion of the local fire marshal and the local building officials. The need for additional fire sprinkler capacity has not been assessed as a part of this report.

Furthermore, all modifications to the facility should be reviewed with the local AHJs, in particular the fire marshal. Fire truck access to the site and hydrant access is not proposed to be modified for BEB implementation. In summary, no fire protection system modifications appear to be required for minimal BEB implementation but further consultation with the fire department should be conducted by SCT Link.

9.6.4.2 Fall Protection and Safety Infrastructure Considerations

Fall protection systems are recommended for any vehicle maintenance and inspection shop. Given that SCT Link's facility does not currently have a fall-arrest system in the facility, new equipment is recommended to safely access the rooftop of buses for potential battery inspection and maintenance. However, depending on SCT Link's specific fleet of cutaway and coach buses, battery systems may not ultimately be located on the roof of the vehicles so fall protection may not be a high priority for BEB implementation.

9.6.4.3 Backup Planning

Transit agencies need to consider the portion of service (and thus of their BEB fleet) that will be deployed or operated during grid-outage conditions. This percentage will require backup power to charge for the anticipated emergency period.

Most agencies deploying BEBs in California have deployed generator systems using fossil fuels, mostly diesel-fired generators. Figure 9-29 shows an example of a mobile generator at LA Metro's Division 13 Bus Operations and Maintenance Facility in Los Angeles. Additional facility space will need to be allocated for such a backup generator in addition to emergency fuel storage (if desired).

Figure 9-29: Backup mobile diesel generator at LA Metro Division 13, Los Angeles, CA.

Based on Stantec's estimates, Table 9-25 illustrates the size of the generator needed to maintain 100% of revenue service for one average weekday. The level of service that is desired, percentage of all normal runs, as an example, sets the requirement for the size of the generator required at the charging site.

Table 9-25: Estimated fuel consumption for back-up generation.

Generator Capacity (kW)	Charging Energy (kWh/day)	Fuel consumption (gal/day)	
		Diesel	LPG
400	2,000	200	1,250

Fuel consumption values are assuming operation on one fuel type only.

If SCT Link wishes to operate for more days during an emergency, the size of generator will stay the same, but the required quantity of fuel will scale linearly. The total amount of fuel required to be stored onsite will depend on the anticipated duration of the utility electrical outage and the amount of time required to get a fuel delivery of diesel or liquid petroleum gas (LPG), as well as on environmental regulations and local policies.

For the purposes of the transition recommendations, Stantec considered the use of one 400 kW generator with storage capacity for 200 gallons of diesel in order to serve one revenue day at 100% service levels.

Adequate space is available on-site for either a new permanent generator or accommodations for a mobile generator. The area in the south-east corner could be a potential option for the generator. If a permanent generator is installed, bollards should be installed surrounding the entire electrical equipment yard, but if a mobile generator is chosen as the preferred method of backup power, then the protective elements should be installed in a manner to allow a mobile generator to be parked near the switchboard to minimize the connection cable distance.

A permanent generator on-site will require an additional permit by the Sacramento Metropolitan Air Quality Management District (AQMD) and will have annual limitations on the durations it is allowed to run. However, a temporary mobile generator that has been certified by the CARB would not require a permit by the AQMD but will have further restrictions on when they can be used such as actual or imminent blackouts. Under any scenario, SCT Link should consider close coordination with both the AQMD and CARB in part of any plan to install a generator at the facility.

Another backup or resiliency strategy that transit agencies transitioning to BEBs explore is the deployment of solar photovoltaic (PV) arrays on elements such as rooftops of buildings. We estimated that the building rooftop of the SCT Link facility has room for approximately 250 kW of PV panel capacity. The idea is that energy generated passively from the PV array through solar energy can be used to charge vehicles and thus offset some of the energy costs from the grid.

As the majority of bus charging is likely to occur overnight, the procurement of a battery electric storage system (BESS) is necessary to store the energy produced during the day (by the PV array) to be able to offset overnight charging demand. Implementing a PV + BESS system requires a very high capital investment and in Stantec's experience with other similar transit agencies, the cost of a BESS is recovered only 20+ years after purchase, past the life expectancy of the system, because the benefit is so small due to the low levels of energy typically consumed by a fleet SCT Link's size. Furthermore, the expected electricity rate from SMUD will economically favor relying more on the grid given that the rate is structured to support the charging of electric fleets by eliminating demand charges and having off-peak hours with lower electricity costs that match the availability of vehicle charging during off-peak hours. Another option is to sell the unused solar PV back to the utility grid. However, proposed changes to SMUD's Net Metering program for PV systems will make it more challenging to make this approach cost effective. Should the building owner elect to install a PV array, a structural analysis of the roof structure will be required to confirm the carrying capacity and suitability for supporting a PV array. Overall, we recommend against implementing solar PV and a BESS system for BEB charging; however, these considerations do not preclude the use of solar PV to offset building utilities, for example.

9.6.5 High Level Capital Investment Requirements

The technical considerations for ZEB presented in this report considers a gradual transition to 100% ZE revenue vehicle operations by 2040 in alignment with ICT regulations. The transition follows the purchase schedule presented previously in Section 9.6.2, Table 9-19. To minimize the financial burden, it is assumed that all vehicles will operate for their full useful design life:

- 7 years for cutaways
- 12 years for commuter coaches

Capital expenses modeled for the BEB fleet consist of fleet acquisition, extended vehicle warranties, vehicle charging infrastructure, vehicle overhaul and battery replacement costs. Vehicle overhauls for BEBs were assumed to include two battery replacements for motorcoaches, in line with current operating practice of ZEBs in other jurisdictions. While the first battery replacement would be covered by an extended warranty purchased with the vehicle during initial procurement, we included a subsequent out-of-warranty battery replacement to capture a more conservative approach and preempt battery degradation and range reduction. We assumed that the second (out of warranty) battery replacement would occur into the tenth

year of the life span for coaches (no battery replacements were assumed for cutaways given the short 7-year lifespan). The infrastructure costs consist of the conversion and modifications required for the SCT Link facility. This includes outfitting the base with the charging infrastructure required to operate the ZEBs.

While electricity/fuel costs are not part of the capital expenses, Stantec's calculations–based on the expected blended SMUD rate and the fleet operational profiles–concluded that the average price of electricity will be 14.4¢ per kWh that can translate to an average of 16¢ per mile for cutaways and 35¢ per mile for coaches.

9.6.6 Assumptions and Inputs

Table 9-26 presents a brief description, as well as the sources for the cost inputs for the transition to ZEBs.

Table 9-26: Summary of capital cost inputs for SCT Link

Cost categories	Description	Inputs for ZEB Fleet
1. Bus purchase price	Bus purchase price for every year between 2022 and 2040 including extended warranty cost. Considers only the replacement of a conventional vehicles (diesel or gasoline) with its equivalent battery electric bus.	Purchase prices in 2022 with a price trend based on market projections: $1,500,000 for E-coaches $234,500 for E-cutaways Sources include CalDGS and MBTA/CalAct
2. Battery replacement and/or diesel midlife overhaul	Non-ZE: Transmission overhaul ZE: Replacement of batteries after expiration of extended warranty coverage (past 500,000 miles or 12 years)	Battery: $255 per kWh in 2032 and a price trend was applied based on market assessment
3. Infrastructure Modification Costs	Includes equipment, installation, testing, civil and electrical work, as well as contractor's fees and escalation factors, backup resiliency, and electrical upgrades	Cost estimations from similar equipment specifications. Includes charging equipment, transformer, switchboard, generator set and diesel fuel storage with piping

Table 9-27 presents the detailed infrastructure modification at each implementation year as detailed in Section 9.6.2 to accommodate the scheduled purchase of battery electric buses between 2026 and 2040.

Table 9-27: Detailed Infrastructure Modification Cost Estimates for the ZE Fleet

Equipment	2025	2027	2028	2029	2030
Transformer	$112,000	$-	$-	$-	$-
Switchboard	$72,000	$-	$-	$-	$-
Feeders (Transformer to Switchboard)	$30,000	$-	$-	$-	$-
Generator	$293,000	$-	$-	$-	$-
Diesel fuel storage for generator	$20,000	$-	$-	$-	$-
Generator controls	$65,000	$-	$-	$-	$-
Feeder (Switchboard to Generator)	$36,000	$-	$-	$-	$-
Ductbank	$20,000	$-	$-	$-	$-
Charger Cabinet (120 kW)	$-	$-	$-	$122,000	$-
Remote dispenser (ground mounted)	$75,000	$75,000	$75,000	$150,000	$75,000
Charger Cabinet (60 kW)	$74,000	$74,000	$74,000	$74,000	$74,000
Demolition for outdoor underground conduit	$-	$-	$-	$10,000	$-
Communications and feeders	$17,000	$-	$-	$-	$-

Equipment	2025	2027	2028	2029	2030
Site improvements	$43,000	$-	$-	$-	$-
Allowance for escalation to midpoint of construction	30%	42%	54%	60%	63%
Totals (cost total * 1+escalation)	**$1,114,000**	**$212,000**	**$229,000**	**$570,000**	**$243,000**

9.6.7 Summary of Capital Cost Estimations

The cost of implementing a ZEB fleet transition scenario is presented in Table 9-28 and Figure 9-30 considering only capital expenses. The ZEB transition has a total cumulative capital cost of $11,731,000. Note that the cumulative capital expense presented in this section does not capture the cost of operating or purchasing diesel vehicles that will continue during the transition period. The financial assessment does not consider any rebates, grants, credits, or other alternative funding mechanisms. Therefore, there may be several opportunities to offset the cost of investment for this ZEB fleet.

Table 9-28: Capital Investment for the ZEB Fleet Transition Plan

	ZEB Fleet Capital Investment (2022-2040)
Fleet Acquisition	$9,272,000
Battery Replacement	$91,000
Infrastructure	$2,368,000
Total	*$11,731,000*

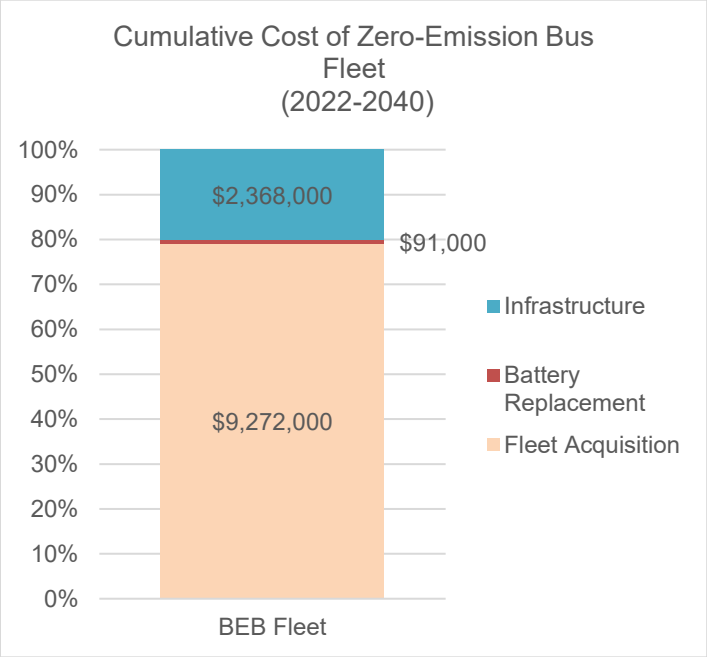


Figure 9-30: Breakdown of Capital Investment for the ZEB Fleet Transition Plan

Figure 9-31 and Figure 9-32 present the yearly capital cost cash flow and the cumulative cost for the ZEB Fleet between 2022 and 2040, respectively.

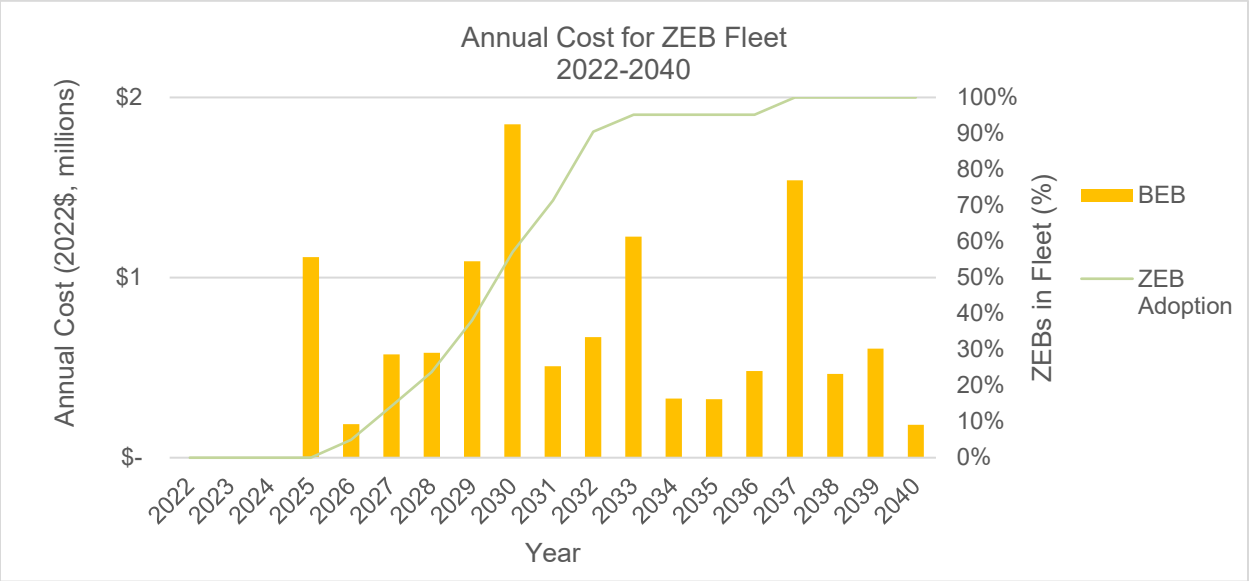


Figure 9-31: Annual Capital Cost for ZEB Fleet

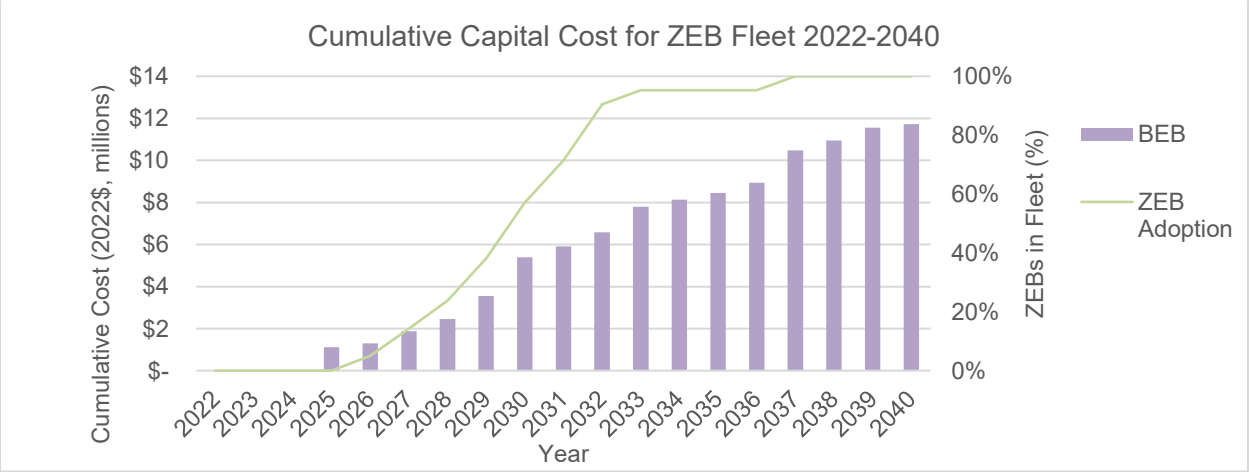


Figure 9-32: Cumulative Cost for ZEB Fleet (based capital phasing as presented in Table 9-23 and Table 9-24)

9.7 Zero-Emission Bus Operational Recommendations

This section provides guidance and strategies for various operational and planning requirements when implementing BEBs.

9.7.1 Operator Needs

As BEBs have different components and controls than conventional buses, BEB performance also differs. Operators should understand how to maximize BEB efficiency and have practice on operational best practices prior to BEB deployment for revenue service. Operations staff should also be briefed on expected

range and limitations (such as variability in energy consumption from HVAC under different weather conditions) as well as expected recharging times and procedures.

BEB operators should be able to understand battery State of Charge (SOC), remaining operating time, estimated range, and other system notifications as well as become familiar with the dashboard controls and warning signals. In addition, operators should be familiar with the correct procedures when a warning signal appears.

Driving habits also have a significant effect on BEB energy consumption and overall performance and range (i.e., fuel economy can vary significantly between operators). Operators should become knowledgeable on the principles of regenerative braking, mechanical braking, hill holding, and roll back. Operators should be trained on optimal driving habits including recommended levels of acceleration and deceleration that will maximize fuel efficiency. Another option is to implement a positive incentive program that encourages operators to practice optimal driving habits for BEBs through rewards like priority parking in the employee lot, certificates, or other incentives. The Antelope Valley Transit Authority (AVTA) in Lancaster, California (an early adopter of BEBs) has a program of friendly competition between operators where, for instance, the operator with the best monthly average fuel economy (the lowest kWh per mi) gets one month of a preferred parking spot in the employee lot.

Finally, BEBs are much quieter than internal combustion engine buses. Operators should be aware of this and that pedestrians or people around the bus may not be aware of its presence. Due to the vehicle's lack of noise, some operators can forget to turn off the bus after parking; operator training should include a processes to verify the bus is not running when they park.

9.7.2 Planning, Scheduling, and Runcutting

BEBs may not have the ability to complete a full block or assignment, particularly if there have been extensive traffic delays. Rather than a relief operator coming in a shuttle vehicle, it may be necessary to bring out a fresh bus for the balance of the day's run with the initial operator returning to the garage with the first bus. However, this situation could be mitigated if battery technology improves with a greater capacity/range without an excess gain in vehicle weight.

As such, blocking and runcutting for plug-in BEBs (without on-route charging or midday charging) will need to account for a rather limited range, especially with cutaways. Training for the scheduling and planning team will also be needed so that they understand the importance of scheduling BEBs to the correct blocks. Training should account for scheduling during operation of a mixed fleet (where diesel or gasoline vehicles can be assigned to longer runs).

Other key considerations for BEB scheduling and planning include the fact that the usable energy of the battery is 80% of the total battery size (e.g., a 440-kWh battery has a usable capacity of 352 kWh).

Non-revenue tests during vehicle commissioning should be conducted in different parts of SCT Link's service area to understand actual range and fuel economy, especially on longer routes, routes with topography variations, and with simulated passenger loads and HVAC testing.

In the long term, it is also important to plan for battery capacity degradation, as most BEB battery warranties specify the expected end of life capacity is 70% to 80% of the original capacity over six-twelve years. SCT Link will need to rotate buses so that older buses are assigned to shorter blocks and newer buses are assigned to longer blocks. Transit agencies can improve battery outcomes through efforts like avoiding full charging and discharging events, avoiding extreme temperature exposures (to the extent possible given an agency's service area), and performing regular maintenance on auxiliary systems that consume energy.

9.7.3 Maintenance Needs

Early data suggests that BEBs may require less preventative maintenance than their diesel counterparts since they have fewer moving parts; however, not enough data currently exists to provide detailed insights into long-term maintenance practices for large-scale BEB deployments in North America. One early finding is that spare parts may not be readily available, so one maintenance consideration is to coordinate with the original equipment manufacturers (OEMs) and component manufacturers to develop adequate spare parts inventories and understand lead times for spare parts. This spare parts coordination effort is important to plan and implement at the outset so that ongoing BEB maintenance can be completed without interruption.

Safety in dealing with high voltage systems should be a first priority in maintenance preparation. All maintenance personnel in the garage, whether conducting servicing, inspection, or repairs and including those in other routines (e.g., plugging and unplugging BEBs) must be educated on the characteristics of this technology. One essential component is the provision and mandate of additional Personal Protective Equipment (PPE) beyond that which is required by automotive garage workplace legislated standards or SCT Link's current policies. Examples of such apparel include high voltage insulated work gloves, flame retardant clothing, insulated safety footwear, face shields, special insulated hand tools, and grounding of apparatus that staff may be using. Also, procedures in dealing with accident and injuries must be established with instructions and warning signs posted.

In terms of preventative maintenance, BEB propulsion systems are more efficient than internal combustion engines and thus can result in less wear and tear. Without the diesel engine and exhaust, there are 30% fewer mechanical parts on a BEB. BEBs also do not require oil changes and the use of regenerative braking can help to extend the useful life of brake pads. Early studies from King County Metro show that the highest percentage of maintenance costs for BEBs came from the cab, body, and accessories system. It is recommended that SCT Link require OEMs to provide a list of activities, time interval, skills needed, and required parts for each preventative maintenance task for BEBs.

Many current BEBs also contain on-board communication systems, these provide detailed bus performance data and report error messages assisting maintenance personnel in quickly identifying and diagnosing maintenance issues.

9.7.4 Workforce Training

Ensuring SCT Link's workforce is sufficiently prepared for the introduction of ZEBs is of vital importance to make sure that service continues to operate smoothly and without interruption. Presented in this section are high-level training considerations, specifically for operations and maintenance staff/technicians. Also presented is a workforce training schedule based on guidance from OEM recommendations from the statewide contract procurement for ZEBs and the phased ZEB procurement schedule presented in Section 9.6.2. The recommendations are based on information provided by OEMs from the DGS Statewide Contract for Zero-Emission Buses and is meant to be only a general guide to training requirements. It is also important to note that close collaboration with the transit operator will be required to fully develop and execute the training.

With a focus on safety, it is highly recommended that all local fire and emergency response departments be given training as the layout, componentry, safety devices, and other features on the new technology. This should reoccur every few years. In the example workforce training schedule below, this training is provided every other year, but the specific frequency can be dependent on agency discretion. In addition, agencywide orientation to familiarize the agency with the new technology should also be conducted prior to the first BEB deployment.

Although not specifically training, dry runs on each route should be done with the ZEBs to validate range and identify opportunities for coasting and adjustment to the vehicle's acceleration profile. In turn, changes in timing points may be necessary or beneficial for all parties. This should be done with planning staff on board and schedules should be adjusted as appropriate. In tandem, based on having several vehicle types particularly during transition, dispatching training and instructions to staff on parking routines will be necessary.

In summary, the minimum required training recommendations based on the DGS Statewide Contract for ZEBS are as follows for operators and maintenance technicians:

- BEB Operator training (total 56 hours)
    - Operator drive training (four sessions, four hours each)
    - Operator vehicle/system orientation (20 sessions, two hours each)
- BEB Maintenance technician training (total 304 hours)
    - Preventative maintenance training (four sessions, eight hours each)
    - Electrical/electronic training (six sessions, eight hours each)
    - Multiplex training (four sessions, each session consisting of three eight-hour days)
    - HVAC training (four sessions, four hours each)
    - Brake training (four sessions, four hours each)
    - Energy Storage System, lithium-ion battery and energy management hardware and software training (six sessions, eight hours each)
    - Electric drive/transmission training (six sessions, eight hours each)
    - Operator training as above as maintenance technicians will also need to drive the vehicles

Operator training will need to occur prior to the deployment of BEBs, in accordance with the phasing schedule. Additionally, training should be provided for staff involved in related functions like facility maintenance, tow truck providers, and utility service works.

9.7.5 Charging Needs

Smart charging refers to software, artificial intelligence, and switching processes that control when and how much charging occurs for BEBs. These are based on factors such as time of day, number of connected BEBs, and State of Charge (SOC) of each BEB. Use of such systems requires chargers that are capable of being controlled as well as a software platform that can effectively aggregate and manage these chargers. A best practice is to select chargers where the manufacturers are participants in the Open Charge Point Protocol, a consortium of over 50 members focused on bringing standardization to the communications of chargers with their network platform.

A simple example of smart charging is if buses A, B and C return to the bus yard and all have an SOC of about 25%, all have 440 kWh battery packs, and all are plugged in in the order they arrived (A, B, C, though within a few minutes of each other). Without smart charging, they would typically get charged sequentially based on arrival time or based on SOC, with A getting charged first in about 2.2 hours, then B would be charged after 4.4 hours, and C about 6.6 hours. But if bus C is scheduled for dispatch after three hours, it would not be adequately charged.

But by implementing smart charging, the system would 'know' that bus C is to be dispatched first and therefore is placed first in priority, charging first in 2.2 hours, and would be ready in time for its 'hour three' rollout.

Another implementation is to mitigate energy demand when possible. For example, if two buses are each connected to their own 150 kW charger and they both need 300 kWh of energy and if the buses do not need to be dispatched for five hours, the system will only charge one bus at a time, thus generating a demand of only 150 kW, while still fully charging both buses in four hours. However, if both buses need to be deployed in two hours, the system will charge both simultaneously as needed to make rollout.

Well-planned and coordinated smart charging can significantly reduce the electric utility demand by timing when and how much charging each bus receives. Estimations on the ideal number of chargers is critical to the successful implementation of smart charging strategies.

There are several offerings in the industry for smart charging, charger management, and fleet management from companies some examples include ViriCiti, I/O Systems, AMPLY Power, and Siemens. Additionally, the charger manufacturers all have their own native charge management software and platforms. These platforms have management functionality and integration that often exceeds the abilities of the other platforms providing data and functionality similar to that of the third-party systems, particularly in the yard when BEBs are connected to the chargers. However, the third-party platforms provide more robust data streams while the BEBs are on route, including real-time information on SOC and usage rates. These platforms can cost well over $100 per bus per month, depending on the number of buses, and type of package procured.

9.7.5.1 Fleet Tracking Software

Software like Fleetwatch provides agencies with the ability to track vehicle mileage, work orders, fleet maintenance, consumables, and other items. However, with more complex technologies like BEBs, it becomes crucial to monitor the status of more components on the bus such as the batteries and fuel consumption to track performance and understand how to improve efficiency. Many OEMs offer fleet tracking software. While AVL and APCs will continue to play important roles in operations planning, tracking fuel consumption and fuel economy will start to form important key performance metrics for fleet management as well as help inform operations planning (by informing operating, among other elements).

The screenshot below is an example of New Flyer's tool (New Flyer Connect 360; Figure 9-33), but other OEMs also offer similar tools (like ViriCiti) all depending on an agency's preference.

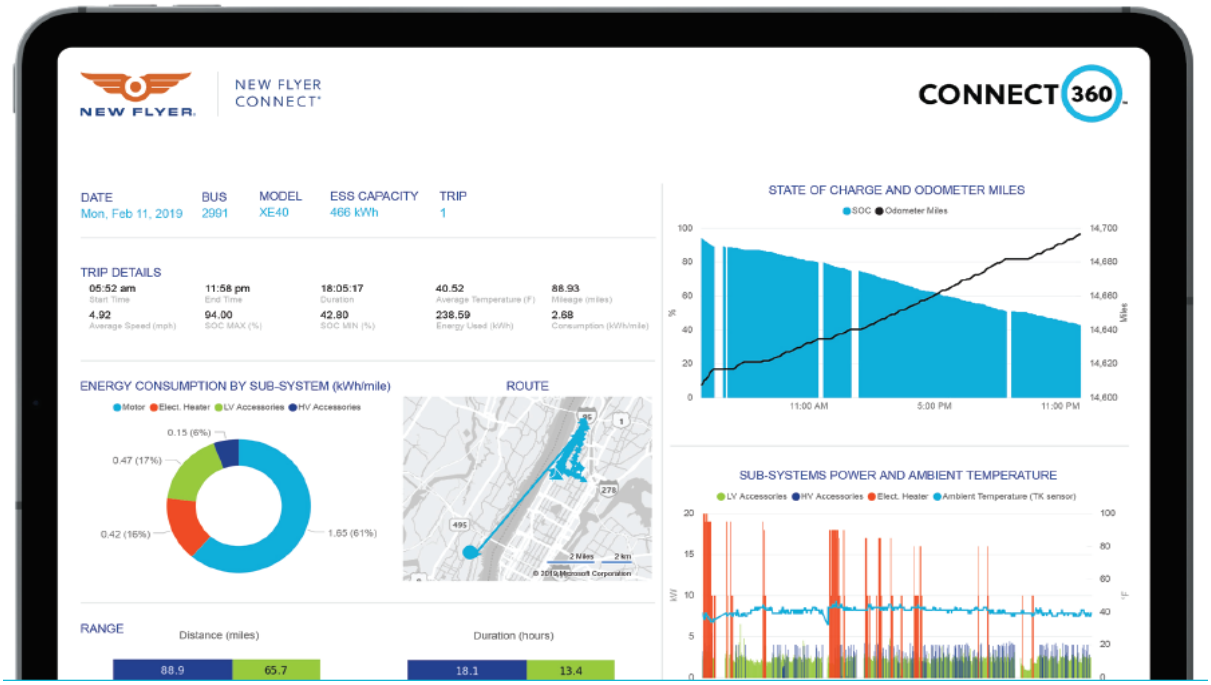


Figure 9-33: Example of New Flyer Connect 360.[67]

At a minimum, the fleet tracking software should track a vehicle's SOC, energy consumption, distance traveled, hours online, etc. Tracking these key performance indicators (KPIs) can help compare a vehicle's performance on different routes, under different ambient conditions, and even by different operators.

When looking at other transit agencies, AVTA operates a 100% BEB fleet of over 50 vehicles[68], and collects and reports the following information at its monthly board meetings:

2. ZEB vs. non-ZEB miles traveled
3. ZEB vs. non-ZEB maintenance cost per mile
4. ZEB vs. non-ZEB fuel/energy costs by month ($ per kWh vs. $ per gallon)
5. ZEB vs. non-ZEB fuel/energy cost per mile
6. Average fuel consumption/fuel economy per month
7. Total ZEB vs. non-ZEB fuel and maintenance costs per month
8. Mean distance between failures
9. ZEB vs. non-ZEB fleet availability

[67] https://www.newflyer.com/tools/new-flyer-connect/
[68] California's AVTA Becomes 1st North American Transit Agency to Hit 100% Electric Goal - Zero Emissions - Metro Magazine (metro-magazine.com)

The Toronto Transit Commission (TTC) is currently testing BEBs from three different OEMs and is tracking the following KPIs for its BEBs to compare with its internal combustion buses (Figure 9-34).

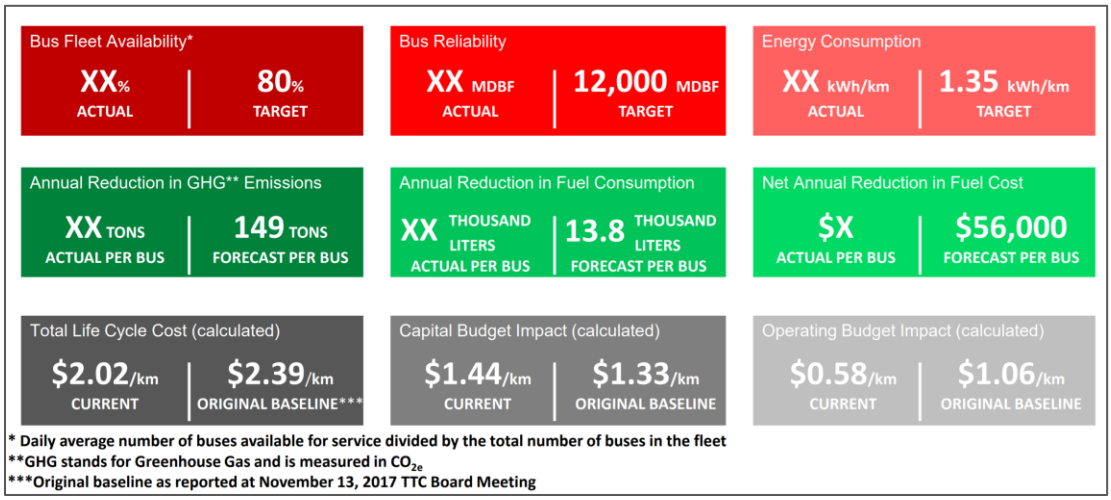


Figure 9-34: Example of TTC eBus KPIs.

All BEB equipment should be connected to SCT Link's current or future data collection software, networks, and integrated with any existing data collection architecture. All data should be transmitted across secure VPN technology and encrypted.

Beyond the BEB itself, charger data should be collected as well, such as the percentage of battery charge status and kWh rate of charge. Furthermore, it will be important for SCT Link to track utility usage data from SMUD to understand energy and power demand and costs.

9.7.6 Battery Degradation

Battery degradation is unavoidable due to battery use and charging/recharging cycles. The magnitude and rate of degradation can be controlled by the user to some extent.

Following the recommendations of the manufacturer becomes especially important to preserve the battery life. This includes charging the battery to a maximum of 90% SOC and not allowing the battery to go below 10% SOC. Furthermore, avoiding fast charging can help expand the lifespan of the batteries (below 300 kW), which will be the case for SCT Link according to the charging equipment recommendations detailed in Section 9.6.

Nevertheless, natural battery degradation will always occur, and vehicle manufacturers are offering extended warranties in their purchase agreements to account for battery degradation of 20% of its nameplate capacity. While the first battery replacement would be covered by an extended warranty purchased with the vehicle during initial procurement, we included cost information for a subsequent out-of-warranty battery replacement to capture a more conservative approach and preempt battery degradation and range reduction. We assumed that the second (out of warranty) battery replacement would occur into the tenth year of the life span for coaches (no battery replacements were assumed for cutaways given the short 7-year lifespan). Battery replacements for cutaways are also assumed to be available but might not be necessary to go beyond the warranty given the short utilization cycle that cutaways will have at SCT Link (7 years).

9.7.7 Procurement Guidance

Currently, SCT Link operates a fleet of motorcoaches and cutaways, and this same fleet composition will be carried over through the ZEB transition. BEB options for these vehicle types are more limited, and by extension procurement options are more limited as well.

For motorcoaches, only MCI is producing BE motorcoaches. They currently have two options available with one more in development. Of the two available, only the D45 CRTe LE has been Altoona-tested[69]. However, modeling was completed assuming a 544-kWh battery size, which necessitates the purchase of the J4500 CHARGE model. Because the first motorcoach purchase is not until 2030, our modeling assumptions were that the J4500 CHARGE model will be Altoona-tested by that date. Apart from the battery size and the standard features of these vehicles, SCT Link should specify two rear-mounted charging ports accepting a minimum charging rate of 120 kW (200 ADC) at 750 VDC or greater via SAE J1772 to maximize flexibility when parking and charging the vehicles.

Options for cutaways are more limited, but there is a clear and growing need for more ZE cutaways with larger batteries and longer ranges as more agencies that operate in rural settings and demand-response services. Currently, two BE cutaways are on the market but neither have been Altoona-tested. Again, our modeling assumed that Altoona testing will be completed prior to any SCT Link procurements. The assumptions also included that battery capacity will improve enough to meet the needs of SCT Link's service. This assumption is likely due to the growing number of ZE cutaways on the market in the past few years, improved efficiencies in batteries and fuel efficiency, and market response to a growing demand for cutaways with larger batteries and longer ranges. This section discusses currently available options that come the closest to this goal to provide SCT Link with guidance when the time to procure the first BE cutaway comes.

The Lightning Systems E450 Shuttle Bus has a 129-kWh battery with a range of up to 120 miles. The vehicle is eligible for a $60,000 incentive per vehicle under the HVIP program[70]. Another cutaway available for a $60,000 HVIP voucher is the GreenPower EV Star+ with a battery size of 118 kWh and stated range of up to 150 miles[71]. Finally, the Optimal-EV S1LF is a low-floor cutaway with a 113-kWh battery and 125-mile range. The vehicle utilizes Proterra's battery management system. Currently, only the GreenPower EV Star+ is listed in the CalACT/MBTA Purchasing Cooperative, but as more agencies begin to purchase BEBs, it is expected that more vehicles are added. Similar to the motorcoaches, SCT Link should specify two rear-mounted charging ports accepting a minimum charging rate of 60 kW (200 ADC) at 480 VDC or greater via SAE J1772 to maximize flexibility when parking and charging the vehicles.

In addition to cutaways, SCT Link may wish to explore passenger vans, such as the Ford eTransit van, which is not a cutaway, but can be outfitted to accommodate six ambulatory passengers with one wheelchair position, four ambulatory passengers with two wheelchair positions, or three ambulatory passengers with three wheelchair positions. Finally, to enhance the accessibility of SCT Link's vehicles, it is recommended that SCT Link purchase BE cutaways that are low floor.

These vehicles are summarized in Table 9-29.

[69] https://www.altoonabustest.psu.edu/bus-list.aspx
[70] https://californiahvip.org/vehicles/lightning-systems-lev110e-bus-ford-e-450-with-lightning-powertrain/
[71] https://californiahvip.org/vehicles/greenpower-ev-star-plus/

Table 9-29: Summary of vehicle options

Vehicle type	ZEB type	Make and model	Battery size (kWh)	Range (miles)	Notes	Example Vehicle Photos
Motorcoach	BE	Motor Coach Industries J4500 CHARGE	544	230+	Eligible for $120,000 HVIP voucher. Interoperable with charging equipment from Siemens, Chargepoint, ABB, and Heliox.	
Cutaway	BE	Lightning Systems E450 Shuttle Bus	129	120	Eligible for $60,000 HVIP voucher. Supports both Level 2 and DC fast chargers.	
	BE	GreenPower EV Star+	118	150	Eligible for $60,000 HVIP voucher. Supports both Level 2 and DC fast chargers.	
	BE	Optimal-EV S1LF	113	125	Low-floor vehicle with ADA-compliant entry ramp. Uses Proterra battery management systems. Supports both Level 2 and DC fast chargers.	
Passenger Van	BE	Lightning Systems Electric Zero Emission Transit Passenger Van	80-120	140-170	Eligible for $45,000 HVIP voucher. Low-floor vehicle and CARB certified Uses Proterra battery management systems. Supports both Level 2 and DC fast chargers.	

9.7.8 Potential Funding Sources

As a clear cost driver for transit agencies, funding the ZE transition will require external financial aid. Due to the long timeframe over which buses will be procured and infrastructure will be constructed, it is imperative that the County constantly monitor existing funding and financing opportunities and is aware of when new sources are created. Below are major current programs available for ZEB transition (Table 9-30).

Table 9-30: Grants and potential funding options for ZEB transition

Fund/Grant	Level of government	Description	Available Funding/Applicability/Information	Average/ Example Award Amounts
Low or No Emission Program (Low-No Program)	Federal/FTA	Low-No provides competitive funding for the procurement of low or no emission vehicles, including the leasing or purchasing of vehicles and related supporting infrastructure. This has been an annual program under the FAST Act since FY2016 and is a subprogram of the Section 5339 Grants for Bus and Bus Facilities. There is a stipulation for a local match.	For FY 2022, FTA announced availability of over $1.1 billion for Low-No, funding. In FY 2021, the FTA awarded $182 million to 49 projects for the Low-No program.	Average: $3,169,674 Median: $3,017,280 In 2020, the Antelope Valley Transit Authority (AVTA) received over $6 million to assist in the purchase of ZEBs[72][73]
Buses and Bus Facilities Program (5339)	Federal/FTA	Grants applicable to rehabbing buses, purchase new buses, and invest and renovate related equipment and facilities for low or no emission vehicles or facilities. Requires a 20% local match.	FY 2022, FTA announced availability of $372 million in Bus and Bus Facility grants.	Average: $4,503,500[74] [75] The JPA in Merced County ("The Bus") was awarded $2 million for ZEB electric buses and associated charging equipment in FY19.
Urbanized Area Formula Grants (5307)	Federal/FTA	5307 grant funding makes federal resources available to urbanized areas for transit capital and operating assistance. Eligible activities include capital investments in bus and bus-related activities such as replacement, overhaul and rebuilding of buses. The federal share is not to exceed 80% of the net project cost for capital expenditures. The federal share may be 90% of the cost of vehicle-related equipment attributable to compliance with the Clean Air Act.	Typically, the metropolitan planning organization (MPO) or another lead public agency is the direct recipient of these funds and distributes these to local transit agencies based on TIP allocation. Agencies can allocate these funds for the purchase of ZEBs.	The Alameda Contra Costa Transit District (AC Transit) has allocated $979,000 in 5307 funds in the MTC's 2021 Draft TIP to assist in the purchase of 10 ZEBs.
Better Utilizing Investments to Leverage Development (BUILD)	Federal/USDOT	Formerly TIGER, BUILD is a discretionary grant program aimed to support investment in infrastructure. BUILD funding supports planning and capital investments in roads, bridges, transit, rail, ports, and intermodal transportation. A local match is required.	FY 2022 provided $1.5 billion in BUILD grants, with a stipulation requiring 50% of funding for projects in rural areas.	Average: $16,891,781 Median: $20,000,000[76][77]
Hybrid and Zero-Emission Truck and Bus Voucher	State/CARB	Voucher program created in 2009 aimed at reducing the purchase cost of zero-emission vehicles. A transit agency would decide on a vehicle, contact	$569.5 million in funding for the 2021-2022 year will be distributed in several waves with different opening dates. Program becomes oversubscribed quickly.	Voucher incentives depend on vehicle type. Smaller vehicles, like cutaways are eligible for

[72] Average and median 2020 award amounts. Award amounts for 2019 ranged from $356,000 to a maximum of $7,000,000
[73] https://www.transit.dot.gov/funding/grants/fiscal-year-2020-low-or-no-emission-low-no-bus-program-projects
[74] https://mtc.ca.gov/sites/default/files/_S4_Draft%202021%20Tip%20Publication%20Report-transit.pdf
[75] https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/5339_Bus_and_Bus_Facilities_Fact_Sheet.pdf
[76] https://www.transit.dot.gov/funding/grants/urbanized-area-formula-grants-5307#:~:text=Program%20Overview,and%20for%20transportation%2Drelated%20planning.
[77] https://www.transportation.gov/BUILDgrants, https://www.transportation.gov/sites/dot.gov/files/2020-09/BUILD%202020%20Fact%20Sheets-.pdf

Fund/Grant	Level of government	Description	Available Funding/Applicability/Information	Average/ Example Award Amounts
Incentive Program (HVIP)		the vendor directly, and then the vendor would apply for the voucher.		$60,000-85,000.[78] Heavy duty buses are eligible for $100,000+.[79]
Carl Moyer and AB 923	State/CARB	Funding to help procure low-emission vehicles and equipment. Transit buses are eligible for up to $80,000 funding.	The Sacramento AQMD is currently not accepting projects for Carl Moyer guidelines, but typically has annual intake windows.	Average: $29,578.02[8081]
Caltrans Transportation Planning Grants – Adaptation Planning Grants	State/California Transportation Commission	The overarching goal of this grant program is to support planning actions at local and regional levels that advance climate change adaptation efforts on the transportation system, especially efforts that serve the communities most vulnerable to climate change impacts. The program awarded $6 million in FY 2019-20 funds in May 2019. There is a grant minimum of $100,000 and maximum of $1 million. An 11.47% minimum match is required and may be in the form of an eligible in-kind contribution (e.g., staff time from the primary applicant counts as cash match).	The programs could fund planning that furthers the state goal of reducing GHG emissions.	Average Sustainable Transportation Planning Grant FY 2020-2021: $254,300[82]
Caltrans Transportation Planning Grants - Strategic Partnership Grants	State/California Transportation Commission	The FY 2020-21 cycle made $4.5 million available to identify and address statewide, interregional, or regional transportation deficiencies on the State highway system in partnership with Caltrans. The program's transit component funds planning projects that address multimodal transportation deficiencies with a focus on transit.	The programs could fund planning that furthers the state goal of reducing GHG emissions. MPO or RTPA must be primary applicant.	Grant minimum: $100,000; maximum: $500,000[83]
State Transportation Improvement Program (STIP)	State/Caltran744 s	The STIP is a program of formula funds adopted by the California Transportation Commission by April of each even year (i.e., 2020, 2022, 2024).	The ZEB Fleet Replacement project could compete for STIP funding but only for FY 2022 and beyond and in even years only.	Distributed via a formula for a variety of projects. 2020 STIP included $569 million in available funding[84]
Sustainable Transportation Equity Project (STEP)	State/CARB	A new pilot that takes a community-based approach to overcoming barriers to clean transportation. Two different grant types: Planning and Capacity Building Grants (up to $1.75 million for multiple grantees) and Implementation Grants (up to $17.75 million for between one and three grantees).	The application window closed as of August 31, 2020. It still has not been announced if there will be additional funding for future years.	$1.75 million available for Planning and Capacity Building grants, $17.75 million available for Implementation grants. Award amounts ranged from

[78] https://californiahvip.org/vehicle-category/medium-duty-bus/
[79] https://californiahvip.org/vehicle-category/transit-bus/
[80] Average award amount for South Coast AQMD on-road vehicle projects between 2008 and 2019
[81] https://ww3.arb.ca.gov/msprog/moyer/ab923/ab923.htm, https://www.baaqmd.gov/funding-and-incentives/funding-sources/carl-moyer-program
[82] https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/final-2021-award-listcopya11y.pdf
[83] https://www.grants.ca.gov/grants/strategic-partnerships/
[84] https://catc.ca.gov/-/media/ctc-media/documents/programs/stip/2020-stip/2020325-2020-stip-resolution-a11y.pdf

Fund/Grant	Level of government	Description	Available Funding/Applicability/Information	Average/ Example Award Amounts
		Lead applicant must be a CBO, federally-recognized tribe, of local government representing a public transit agency.		$184,000 to a maximum of over $7 million[85]
Low Carbon Transit Operations Program (LCTOP) and Transit and Intercity Rail Capital Program (TIRCP)	State/CARB/Caltrans	5% and 10% of the annual Cap and Trade auction proceeds fund these programs. These programs fund projects that support new or expanded bus and rail services, improve multimodal facilities and can include equipment, fueling, maintenance and other costs. Projects must reduce GHG emissions. LCTOP is formula funding transit agencies commonly used for operations and TIRCP is a competitive program.	Many agencies are already recipients of these funds and can use these funds to purchase ZEBs and related equipment.	LCTOP average: $912,840 LCTOP median: $193,572 TIRCP average: $6,027,500 TIRCP median: $6,225,500[8687]
SB1 State of Good Repair	State/Caltrans	SGR funds are formula funds eligible for transit maintenance, rehabs, and capital programs – agencies receive yearly SB1 SGR funding through their MPO, based on population and farebox revenues.	Agencies can decide to devote its portion of SB 1 funds to ZEB transition.	Average: $560,197 Median: $104,210[8889]
Clean Transportation Program	State/California Energy Commission	The California Energy Commission's Clean Transportation Program provides funding to support innovation and acceleration of development and deployment of zero-emission fuel technologies. A local match is often required.	The Clean Transportation Program provides up to $100 million annually for a variety of renewable and alternative fuel transportation project throughout the state, including specific projects for heavy-duty public transit buses. Agency should continue to monitor program website for when relevant funding opportunities open.	In 2021, between $4 million and $6 million were awarded to the following transit agencies to assist with zero-emission transit fleet infrastructure deployment: Anaheim Transportation Network ($5 million), LADOT ($6 million), Sunline Transit ($5 million), and North County Transit District ($4 million)[9091]
SB1 Local Partnership Program (LPP)	State/California Transportation Commission	The LPP includes both a formulaic and competitive program to distribute funds to local and regional transportation agencies to further projects that improve transit and rail, aging infrastructure, and	SB1 created the LPP and continuously appropriates $200 million annually to local and regional transportation agencies that are within jurisdictions with voter approved taxes, tolls, or	Maximum formulaic funding amount: $37,506,000[9293]

[85] https://ww2.arb.ca.gov/news/grant-awards-announced-new-195-million-pilot-funding-equitable-clean-transportation-options
[86] LCTOP average and median award amount from FY 2019-20 Awarded Project List; TIRCP 2020 average and median award amounts for ZEB-related projects (purchasing of vehicles and charging infrastructure). Overall average 2020 award amount was $29,411,765 and median $12,100,000
[87] https://dot.ca.gov/programs/rail-and-mass-transportation/low-carbon-transit-operations-program-lctop, https://calsta.ca.gov/subject-areas/transit-intercity-rail-capital-prog
[88] Average and median award amounts from FY2020-21 approved project list
[89] https://dot.ca.gov/programs/rail-and-mass-transportation/state-transit-assistance-state-of-good-repair
[90] https://www.energy.ca.gov/programs-and-topics/programs/clean-transportation-program
[91] https://www.energy.ca.gov/media/4983
[92] FY2020 formulaic funding: https://catc.ca.gov/-/media/ctc-media/documents/programs/local-partnership-program/adopted-resolution/2020-lpp-formulaic-funding-distribution-and-adopting-resolution-g-20-34-a11y.pdf, FY2020 competitive funding recipients have not yet been released.
[93] https://catc.ca.gov/programs/sb1/local-partnership-program

Fund/Grant	Level of government	Description	Available Funding/Applicability/Information	Average/ Example Award Amounts
		more. Funds are distributed to eligible agencies through a 60% formulaic component and 40% competitive component.	fees which are dedicated solely for transportation improvements.	
Solutions for Congested Corridors Program (SCCP)	State/California Transportation Commission	The SCCP includes programs with both formula and competitive funds. Funding is available to projects that make specific performance improvements and are a part of a multimodal comprehensive corridor plan designed to reduce congestion in highly traveled corridors by providing more transportation choices for residents, commuters, and visitors to the area of the corridor while preserving the character of the local community and creating opportunities for neighborhood enhancement projects.	Improvements to transit facilities are eligible projects. Cycle 2 funding of $500 million covers two years (FY2022 and FY2023). To submit a LPP/SCCP application, exact expenditures and when the funds will be used is required, as well as which project phase they will be used for.	NA; total estimated funding: $500,000,000 for FY2022 and 2023[94]
Affordable Housing and Sustainable Communities Program (AHSC)	State/Department of Housing and Community Development	The AHSC Program funds land use, housing, and transportation projects to support development that reduces GHG emissions. The program provides both grants and loans that reduce GHG emissions and benefit disadvantaged communities through increasing accessibility via low-carbon transportation. The program prioritizes rural innovation projects, and distributed over $700 million in total funding for FY19-20 and FY20-21.	Sustainable transportation infrastructure projects, transportation-related amenities, and program costs (including transit ridership) are eligible activities. Agencies can use program funds for assistance in construction or modification of infrastructure for ZEB conversion as well as new vehicle purchases.	Maximum award amount is not to exceed $30 million per project. Average: $7,757,862 Median: $7,557,513[9596]
SMUD Commercial Electric Vehicle (EV) Programs	State/SMUD	SMUD offers rebates to purchase EVs and chargers to facilitate the conversion to zero-emissions. To participate in the program, SMUD's Electrical Service Requirements must be followed (T017 and T004), and all EV chargers on site must be recorded separately through a SMUD EV data meter.	There is no limit to project size, but incentives are limited to 20 of each type per project (i.e., 20 vehicles and 20 chargers). Only permanently installed electric vehicles service equipment (EVSE) are eligible for incentives. This means that the vehicle or EVSE Project must demonstrate adequate assurances of both physical and contractual permanence prior to receiving an incentive.[97]	Incentives range by vehicle class, from $750-$15,000. Rebates range by charger type, $500 for Level 1, $4,500 for Level 2. Transformer and panel upgrades also qualify for rebates.
VW Environmental Mitigation Trust Funding	State	VW's settlement provides nearly $130 million for zero-emission transit, school, and shuttle bus replacements. Transit may be eligible for up to $65 million.	Applications are open for transit agencies and funding for transit buses is still available. The grant is a one-time deal. Applications are processed on a first come, first serve basis and	Maximum: $400,000 per FCEB and $180,000 per BEB, $160,000 per shuttle bus (assume cutaway), maximum

[94] https://www.grants.ca.gov/grants/solutions-for-congested-corridors-program/
[95] Average award amount for FY18-19 transportation projects, https://www.hcd.ca.gov/grants-funding/active-funding/ahsc/docs/award%20listing%20form%20-%20posting.pdf
[96] https://www.hcd.ca.gov/grants-funding/active-funding/ahsc.shtml, https://sgc.ca.gov/programs/ahsc/docs/20180731-Update-Fact%20Sheet-AHSC.pdf
[97] https://www.smud.org/-/media/Documents/Going-Green/PDFs/Commercial-EV-Program-Manual-Feb-2022.ashx; https://www.smud.org/en/Going-Green/Electric-Vehicles/Business

Fund/Grant	Level of government	Description	Available Funding/Applicability/Information	Average/ Example Award Amounts
			will be considered for funding if eligible and while project funds are available. As of January 2021, according to the CTE, California's solicitation for transit and shuttle buses remains open on a first-come, first-served basis until all funds have been committed. Currently, this program has approximately $10 million of available funding.	of $3,250,000 total funding per agency[9899]
Low Carbon Fuel Standard (LCFS credits)	N/A	LCFS credits are not necessarily funding to be applied for; rather, they are offset credits that are traded (through a broker) to reduce operating costs.	Once ZEBs are acquired and operating, agencies can collect LCFS and 'sell' them to reduce operating costs of ZEBs. Both hydrogen and electricity used as fuels are eligible for LCFS credits.	Credit prices range, but average credit price between 2016 and 2019 was between $65 and $200 per credit Average: $10,000 per vehicle[100101]
Congestion Mitigation and Air Quality (CMAQ)	SACOG	The CMAQ Program provides funds to states for transportation projects designed to reduce traffic congestion and improve air quality, particularly in areas of the country that do not attain national air quality standards.	Projects that reduce criteria air pollutants regulated from transportation-related sources, including ZEBs.	Typical awards range from $300,000 to approximately $2 million.
Sacramento Emergency Clean Air Transportation (SECAT) Program	Regional (SACOG and Sac Metro Air District)	This incentive program, while currently closed (re-opening unknown), has provided regional agencies incentives to fund the procurement of zero-emission vehicles.	About $4 million was made available for the 2021 application, which was open between March 29 and May 28, 2021.[102]	$100,000 per heavy-duty vehicles is available for a maximum of $500,000 per applicant

[98] http://vwbusmoney.valleyair.org/documents/FAQ.pdf
[99] http://vwbusmoney.valleyair.org/
[100] https://www.srectrade.com/markets/lcfs/california, Assuming 40,000 miles/year at $100 per credit per 2018 amendments.
[101] https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard
[102] http://www.airquality.org/businesses/incentive-programs/secat-program/

In December 2021, the FTA released a Dear Colleague letter outlining new requirements for Low-No and Bus and Bus Facility Grant Applications. The letter details the requirement for a Zero-Emission Fleet Transition plan in response to amendments in the statutory provisions for these programs as part of the Bipartisan Infrastructure Law. The FTA Zero-Emission Fleet Transition plan includes six major elements, presented in Table 9-31. Moving forward, to qualify for these funding opportunities, a transit agency must include a transition plan with these elements. Many of these elements are similar to the ones required in the ICT mandate, which can aid California agencies in preparing the FTA transition plan.

Table 9-31: FTA Zero-Emission Fleet Transition Plan requirements

Element	Description
1: Long-Term Fleet Plan and Application Request	Demonstrate a long-term fleet management plan with a strategy for how the applicant intends to use the current application and future acquisitions.
2: Current and Future Resources to Meet Transition	Address the availability of current and future resources to meet costs for the transition and implementation
3: Policy and Legislative Impacts	Consider policy and legislation impacting relevant technologies.
4: Facility Evaluation and Needs for Technology Transition	Include an evaluation of existing and future facilities and their relationship to the technology transition.
5: Utility Partnership	Describe the partnership of the applicant with the utility or alternative fuel provider.
6: Workforce Training and Transition	Examine the impact of the transition on the applicant's current workforce by identifying skill gaps, training needs, and retraining needs of the exiting workers of the applicant to operate and maintain ZEVs and related infrastructure and avoid displacement of the existing workforce.

10 SHORT-RANGE TRANSIT FINANCIAL PLAN

This section describes the financial plan that monetizes the service and capital plans for the short-range transit planning horizon. In general, the five-year financial plan forecast assumes sufficient operating and capital funding to expand service levels, cover future capital needs, and expand staffing and/or services.

10.1 Operating Costs

To project operating costs, past budgets were analyzed for each line item to understand cost trending. Working with County staff, each line item from the most recent budget (FY22-23) was reviewed and forecasted based on observed trends and best estimates of future conditions.

For example, most line items were projected to remain constant, in line with previous budgets, for items like auditor services, Connect Card charges, and other administrative costs. The largest cost drivers are the proposed expanded revenue hours and miles, which were estimated as per Section 9.2.6, multiplied by the County's contract annual rate with the operator. Apart from these costs and fixed monthly costs which are expected to grow as in the operator contract, the only decreasing trend anticipated is spending on COVID-19 equipment, like bus operator guards. We anticipated that costs would be one-third of the FY22-23 budget and carried forward; this is for contingency. Finally, East County costs were projected to remain flat until service is terminated in FY25-26.

Table 10-1 provides the key cost inputs for costs per revenue hours and the fixed monthly costs, while Table 10-2 summarizes the annual revenue hours of the proposed five-year service plan.

Table 10-1: Operating costs per revenue hour and fixed monthly costs.

	FY23-24	FY24-25	FY25-26	FY26-27	FY27-28
Monthly fixed rate	$62,253.67	$64,121.28	$66,051.14	$68,045.50	$70,106.68
Cutaway hourly service cost	$44.00	$45.32	$46.69	$48.10	$49.55
Motorcoach hourly service cost	$57.65	$59.38	$61.17	$63.02	$64.92

Table 10-2: Estimated annual short-range revenue hours by mode.

	FY23-24	FY24-25	FY25-26	FY26-27	FY27-28
GSCE	2,287	2,287	2,632	2,632	2,632
Galt DAR (*actual hours will vary because of demand-response nature of this service*)	11,353	11,535	11,535	12,055	12,055
Hwy 99	8,395	8,858	8,858	16,633	17,717
Delta demand response (*actual hours will vary because of demand-response nature of this service*)	2,415	5,020	5,522	6,074	6,682
Amador Transit/East County	1,063	1,063	-	-	-
Total Revenue Hours	25,513	28,763	28,547	37,394	39,085

The projected operating expenses are shown in Table 10-3, and splits out the contract costs for the South County and East County services, as well as the County's administrative costs (overhead).

Table 10-3: Estimated annual operating costs for South County and East County service.

	FY22-23 (baseline)	FY23-24 (Yr 1)	FY24-25 (Yr 2)	FY25-26 (Yr 3)	FY26-27 (Yr 4)	FY27-28 (Yr 5)
South County Service						
O&M Contract	$1,895,371.00	$2,000,297.60	$2,203,220.90	$2,326,734.21	$2,817,537.95	$2,981,677.28
County DOT Admin	$483,815.12	$483,815.12	$640,220.72	$640,220.72	$640,220.72	$640,220.72
Subtotal	$2,379,186.12	$2,484,112.72	$2,843,441.62	$2,966,954.93	$3,457,758.67	$3,621,898.00
East County Service						
O&M Contract	$95,308.14	$95,308.14	$95,308.14	$-	$-	$-
County DOT Admin	$23,785.74	$23,785.74	$23,785.74	$-	$-	$-
Subtotal	$119,093.88	$119,093.88	$119,093.88	$-	$-	$-
Grand Total	**$2,498,280.00**	**$2,603,206.60**	**$3,025,185.19**	**$2,966,954.93**	**$3,457,758.67**	**$3,621,898.00**

Overall, the first year of the plan expects a roughly 4% increase in operating costs compared to the FY22-23 budget, while the implementation of a larger demand-response service that can better capture demand from the Delta in FY24-25 sees a 16% increase in operating costs compared the FY22-23 budget. The largest increases in service—proposed 30-minute frequencies on the Hwy 99 service—are predicted to grow operating expenses by 28% in FY26-27 compared to the baseline. We note that the County's approved budget in FY21-22 was $6.5 billion, and the FY27-28 budget would constitute less than 1% of the County's total budget from FY21-22.

10.2 Capital Costs

The major capital costs for the timeframe of the SRTP are replacement vehicles (both fossil fuel and ZE) and the acquisition of equipment for the transition to ZE vehicles. As per CARB's ICT regulation, small agencies like SCT Link must begin acquiring ZE vehicles in 2026. Table 10-4 highlights the replacement capital costs of vehicles, as well as the infrastructure needed to support ZE vehicle. Further cost information for the timeframe of the ZE transition through 2040 is captured in Section 9.6.5, and the full fleet replacement schedule can be found in Section 9.6.2 and Table 9-19.

Table 10-4: Capital Investment for the Transition to a Zero Emission Fleet

Capital Item	FY23-24 (Yr 1)	FY24-25 (Yr 2)	FY25-26 (Yr 3)	FY26-27 (Yr 4)	FY27-28 (Yr 5)
Fossil Fuel Cutaway (low floor)	$592,000	$444,000	$444,000	$296,000	$296,000
Fossil Fuel Motorcoach	$646,000	$-	$-	$-	$646,000
ZE Vehicle	$-	$-	$187,000	$362,000	$354,000
ZEB Infrastructure (chargers, etc.)	$-	$1,114,000	$-	$212,000	$229,000
Total	**$1,238,000**	**$1,558,000**	**$631,000**	**$870,000**	**$1,525,000**

10.3 Potential Funding and Revenue Sources

Sacramento County relies on a number of funding sources to pay for capital and operations expenses, as described further below.

10.3.1 Fare Revenues

Fare revenues has historically made up 11-13% of operating funds expended, averaging between $220,000-$250,000 annually, based on NTD reporting. Due to the pandemic, with both ridership losses and suspension of fare collection, the farebox recovery ratio declined to about 9% in FY19-20, or nearly $190,000.

As ridership recovers, SCT Link should continuously monitor farebox revenue to ensure that it aligns with ridership. As well, several agencies across California have reduced fares in an effort to lure riders back, particularly as of April 2022 with the increasing costs of gasoline. Taken together, it is prudent for SCT Link to keep fares at their current levels, and as such, it is not expected that farebox revenue will contribute more than the historical 10-13% of operating costs.

Nonetheless, as SCT Link invests in service expansion in the future and as ridership grows, SCT Link should explore options for fare changes to ensure that fare levels are aligned with service levels and keep pace with the cost of delivering service and regional practices as recommended in Goal B3.

Overall, farebox revenue will continue to play a small, yet important role, in SCT Link's revenue.

10.3.2 Transportation Development Act Funding

Transportation Development Act (TDA) funding is the main source of SCT Link's revenue for operations, as well as capital. The TDA provides two major sources of funding for public transportation: the Local Transportation Fund (LTF), which has been in existence since 1972, and the State Transit Assistance (STA) fund, which was instituted in 1980.

Both LTF and STA funding require a minimum of 10% farebox recovery ratio for eligibility, but Sacramento County operators are permitted by the state to combine costs and revenues to calculate a region-wide ratio to the benefit of smaller operators, like the County.

Historically, the TDA has contributed to over 70% of SCT Link's operating expenses, and 100% for capital expenditures. SCT Link receives TDA funding both from the region (through SACOG) and from the City of Galt.

The SRTP assumes that TDA funding in the form of LTF and STA from SACOG and the City of Galt will continue to be provided to SCT Link commensurate with its needs and planned service levels.

10.3.3 FTA 5311 Funding

A key formula-based funding program from the FTA, Section 5311 funds are dedicated to rural operators for operating and capital expenditures. Historically, the County has received $275,000-$320,000 annually to fund operations.

10.3.4 Other Funding and Surplus

Due to the COVID-19 pandemic, the federal government appropriated funds through different legislative packages aimed at providing transit agencies with infusions of cash for operations. Several of these programs, such as the CARES Act and CRRSAA have provided SCT Link with surplus budgets so that

requests for traditional funding through the TDA, for example, are lower than in past years. While the pandemic-related funding will provide SCT Link with operating revenue in the near time, SCT Link has built up reserves of funding from LTF and STA.

SCT Link should first expend its pandemic-related funding, and then use surplus to fund service expansion as proposed in the service plan of the SRTP. If possible, SCT Link could also use some of the funding for capital expenditures, specifically related to the transition to ZE vehicles.

Nonetheless, SCT Link will need to ensure that the proposed service plan expansion can be funded regardless of surplus, or at least look to other sources of funding to apply to. Funding mechanisms related to ZE transition are discussed in Section 9.7.8, while below are listed other potential funding programs for the County to investigate further.

Enhanced Mobility of Seniors & Individuals with Disabilities – Section 5310.[103] Focused on transportation coordination programs with non-profits, 5310 formula funds address the transportation needs of older adults and people with disabilities when the transportation service provided is unavailable, insufficient, or inappropriate to meeting these needs. Funds are apportioned based on each state's share of the population for these two groups. Formula funds are apportioned to direct recipients; for rural and small urban areas, through the state department of transportation, while in large urban areas, a designated recipient is chosen by the governor. The County could explore coordinating with volunteer ride programs, for instance, to determine whether 5310 funding could be a source of revenue.

Innovation Grant Programs. The FTA supports the US Department of Transportation's Smart Cities initiative by providing funding through several programs, like Enhancing Mobility Innovation[104], Integrated Mobility Innovation[105], and Mobility on Demand Sandbox Program[106]. These programs provide funding to transit agencies to foster the adoption of innovative technology to improve accessible and equitable transportation. Examples of projects include real-time vehicle tracking, modernization of fare payment, and deployment of microtransit systems.[107] The County should explore these programs as it relates to the modernization recommendations of the SRTP, particularly with respect to microtransit transition from a traditional dial-a-ride demand-response/on-demand service, to a modern microtransit demand-response/on-demand service.

10.4 Financial Plan – Cash Flow

Based on the financial modeling of operating costs and potential revenues from different sources, Table 10-5 provides an annual projection of cash flow for the plan years. Revenue sources assume funding from the current sources of the County's revenues, including STA and LTF, FTA 5311, and from the City of Galt. It also includes carryover revenue from unspent monies from prior years. According to the analysis and projections, SCT Link should have sufficient revenue and reserves to fund this plan over the coming four years, but will need to seek grant funding ahead year 5 of the plan or identify increases to traditional revenue sources, like STA and LTF.

[103] https://www.transit.dot.gov/funding/grants/enhanced-mobility-seniors-individuals-disabilities-section-5310
[104] https://www.transit.dot.gov/research-innovation/enhancing-mobility-innovation
[105] https://www.transit.dot.gov/IMI
[106] https://www.transit.dot.gov/research-innovation/mobility-demand-mod-sandbox-program
[107] https://www.transit.dot.gov/research-innovation/fy20-accelerating-innovative-mobility-aim-project-selections

Table 10-5: Projected Cash Flow

	Plan Year 1 FY23-24	Plan Year 2 FY24-25	Plan Year 3 FY25-26	Plan Year 4 FY26-27	Plan Year 5 FY27-28
Operations					
Operating costs	$1,990,679	$2,095,606	$2,298,529	$2,326,734	$2,817,538
County Admin costs	$507,601	$507,601	$664,006	$640,221	$640,221
Total Operations (a)	$2,498,280	$2,603,207	$2,962,536	$2,966,955	$3,457,759
Capital					
Buses	$1,238,000	$444,000	$631,000	$658,000	$1,296,000
Facility modifications, including chargers	$-	$1,114,000	$-	$212,000	$229,000
Total Capital (b)	$1,238,000	$1,558,000	$631,000	$870,000	$1,525,000
Grand Total (a + b)	**$3,736,280**	**$4,161,207**	**$3,593,536**	**$3,836,955**	**$4,982,759**
Revenue					
Revenue from fares, grants, etc. (c)	$2,542,000	$2,600,000	$2,699,000	$2,753,000	$3,991,571
Reserve revenue (d)	$5,725,165	$4,530,885	$2,969,679	$2,075,143	$991,188
Total Revenue (c + d)	**$8,267,165**	**$7,130,885**	**$5,668,679**	**$4,828,143**	**$4,982,759**
Net Total	**$4,530,885**	**$2,969,679**	**$2,075,143**	**$991,188**	**$-**

11 NEXT STEPS

With this SRTP and ZEB plan, SCT Link's next steps include adopting this plan, and begin implementing the plan, particularly preparing for recommended service changes and identifying funding sources for the transition to ZEBs.

By SCT Link championing the recommendations proposed here, this will lead to more transportation opportunities and regional mobility, as well as healthier and more sustainable communities.

APPENDIX A: COMBINED COMMENTS FROM DELTA OUTREACH

Combined Comments from all Delta Outreach Activities

- “One of the buses should link to the nearest Bay Area city because it has a BART station”
- “I would ride but I’m worried about COVID.”
- “I would ride it, if it went to my house on the Delta Loop*”
- “There isn’t service to the islands.”
- “I have late doctor appointments and would like to see later services”
- “I didn’t know we had a bus out here.”
- “I would like to see longer routes.”
- “One of the routes should go to Rio Vista, Lodi or Fairfield”
- “I would like to the see Route 12** running again. I liked that it took me to Food 4 Less”
- “I’d like to ride it to my doctor’s office in Vacaville.”
- “I would like to see more service on the weekends and past 6 pm”
- “I would like to see a route the Bay Area”
- “Where do I find more information?”
- “Delta Service is perfect! It takes you everywhere!”
- “I want a route that takes me to BART”
- “We need service on the Delta Loop, there is none and many people live there”
- “I like that the Delta Route links all the cities”
- “I prefer the option that doesn’t make me walk so much because my leg hurts when I walk too much”
- “I don’t ride the bus because you have to call a number and I don’t speak English”
- “I’d like a way to get to other counties”
- “The school bus doesn’t pass by our house located in the Walnut Grove anymore and I would like to see it pass by again so I can send my kids to school on the bus”
- “I don’t know how to find out about the bus”
- “I don’t know anything about public transit”
- She would like to see a bus that goes directly to Kaiser Permanente at the Elk Grove Promenade.
- He would like to see more buses that run late.
- Queiro ver servicio mas tarde que las 4 para mis citas de doctor en Kaiser, "I want to see service later than 4 for my doctor appointments at Kaiser "
- "Amtrak now serves commuters from Lodi to Sac. A shuttle serving Isleton and Rio Vista with connections to the Antioch BART station and the Lodi Amtrak station during actual commute hours would be outstanding. Right now, it's impossible to adequately commute to SF or SAC via SCT."
- "Although I don't ride SCT Link, I do know that the residents need a direct link to Sacramento on a daily basis. It would be great to have weekend services for those who do not have a car. I think the carsharing would definitely improve the mobility especially on weekends."
- "Public transit options for commuters from Isleton/Delta area to jobs in Sacramento. Not everyone is employed at local businesses or retired."
- "Are they bringing back the 4:20 delta trip? Direct buses to Promenade Kaiser"
- "Delta route - I want a 5:20 pm schedule"
- The lack of transportation from the Delta region to more populated city centers is hobbling opportunities for work, social interaction, and recreation for young people especially. It’s also undermining tourism and investment in the Delta region. "
- "Would like to see a fixed schedule to send his kids to school. Would also like service run by his house in the delta loop again"

- "Having a direct option to be dropped off at a connector station in Elk Grove would be nice (and not having to go through Galt). "
- "Would like to see service got to my doctor's office in Fairfield"
- "I live out in the country in Isleton, CA and I don't drive, would be nice to get transit pick me up from my home on Tyler Island Bridge Rd. Isleton CA"
- "Galt is very far from my house. Isleton or the loop would be better"
- "Horas mas flexible. Mas transito en Isleton y queiro saber mas de el schedule, mas paradas tambien," "More flexible hours. More traffic in Isleton and I want to know more about the schedule, more stops too "
- "More and longer routes"
- "Until they provide a lot more time slots and stops I will continue to use my own car."
- "Could you send a transport to and from Ox Bow Marina"
- "Queiro ver halgo como el routa 12 de nuevo," "I want to see something like route 12 again"
- "I live east of Power Inn Rd. There are no bus routes east of Power Inn Rd. The Vineyard area is fast growing, thousands of homes to be built in the next couple of years and no transit options for this area. Think about that please. "
- "Weekend service"
- "More CHP to help make sure our roads are safe which they no longer are."
- "Safety"
- "I was not informed as to what services are available. The card I got in the mail was helpful and I will review what is available now. It would be nice if a scheduled bus was available and making stops at Wimpy's, Walnut Grove, and Locke with destinations of Elk Grove, Galt, and Lodi on a regular basis with early morning departures and afternoon returns. This would help with shopping, banking, and other sorts of appointments in the region and perhaps save fuel. I seems to me if there was a lot of awareness that the service might be justified as people come to be able to plan trips and take care of their business without driving. "
- "Easier access to bus info. I just moved here, and need more info on how, when and where, I can ride the bus out of Isleton, to Sacramento, and surrounding areas."
- "I think there should be later service fir those working late and working in rural areas like a neighborhood shuttle"
- "Delta Route perfect. It takes you everywhere."
- "It's all good! Never rode it"
- “I like how it is”

APPENDIX B: COMMUNITY SURVEY—INSTRUMENT AND FINDINGS

See attached survey instrument and findings.

SCT Link Survey (English)

SCT Link needs your help! Please take a few minutes to complete this survey to provide feedback on SCT Link's services. All responses will be confidential. Thank you!

Please tell us **the top three (3) places you travel to most often** in the Sacramento region. Please be as specific as possible (e.g., downtown Sacramento, Kaiser Hospital, Cosumnes River College, etc.).

* 1. First place you travel to most often in the Sacramento region:

* 2. How often do you travel there?

* 3. Second place you travel to most often in the Sacramento region:

* 4. How often do you travel there?

* 5. Third place you travel to most often in the Sacramento region:

* 6. How often do you travel there?

Please tell us about the SCT Link services you use.

* 7. If you currently ride the Delta route, how do you travel when it's not operating (like on weekends)?

- ( ) I don't ride the Delta route.
- ( ) I get a lift from a friend or family member.
- ( ) I use a taxi or Uber or Lyft.
- ( ) I drive my own car.
- ( ) Other. Please describe.

* 8. If you currently ride the Galt-Sacramento Commuter Express, what changes could make you ride more often, or make it easier for you to ride? **Please choose no more than three (3).**

- [ ] I don't ride the Galt-Sacramento Commuter Express.
- [ ] Fewer bus stops.
- [ ] Improved reliability.
- [ ] Service on weekends.
- [ ] Later trips.
- [ ] Earlier trips.
- [ ] Other (please specify)

* 9. If you currently ride the Highway 99 Express, what changes could make you ride more often, or make it easier for you to ride? **Please choose no more than three (3).**

- [ ] I don't ride the Highway 99 Express.
- [ ] More frequency during the midday (9am - 4pm).
- [ ] More frequency during peak hours (7-9am; 4-6pm).
- [ ] Service on weekends.
- [ ] Service after 7pm on weekdays.
- [ ] Other (for example, would you like it to include service to different locations? please specify)

* 10. If you currently ride Dial-a-Ride, what changes could make you ride more often, or make it easier for you to ride? **Please choose no more than three (3).**

- [ ] I don't use Dial-a-Ride.
- [ ] Service on Sundays.
- [ ] Service after 6:30pm on weekdays.
- [ ] Service after 4pm on Saturdays.
- [ ] More service outside of Galt.
- [ ] Other (please specify)

* 11. We are looking to improve mobility options for the Delta. Would you use any of these services? Please review each of the options, and then rank your preferences from most preferred (1) to least preferred (4).

Carsharing - SCT Link could provide a fleet of cars (possibly electric cars) that customers in the Delta could reserve and then use to get around.

Microtransit - on demand, meaning that customers would reserve a trip ahead of time (via phone or app), like Dial-a-Ride, but a wider service area.

Fixed schedule - SCT Link could offer trips to different parts of the County on different weekdays. For example, SCT Link could offer direct trips from the Delta to downtown Sacramento on Tuesdays and Thursdays, and trips to Galt on Mondays, Wednesdays, and Fridays. Customers would call SCT Link to reserve a trip on the specific day for the destination they want.

	Monday	Tuesday	Wednesday	Thursday	Friday
Service To / From	Galt	Downtown Sacramento	Galt	Downtown Sacramento	Galt
Schedule	Call to schedule pick up/drop off times				

*This is an **example** of a fixed schedule for **demonstration purposes only**.*

Volunteer incentive - SCT Link could offer mileage reimbursement to compensate ADA-certified passengers' friends and neighbors for providing them with transportation assistance.

12. Do you have any other comments on how to improve SCT Link services? Please share them here.

The next questions are about you so we can understand more about the diverse communities served by SCT Link. Please skip any questions that you feel uncomfortable answering and move on to the next question.

13. Do you have access to a car?

- Yes
- No

14. Which community do you live in?

- Galt
- Lodi
- Elk Grove
- Isleton
- Ryde
- Walnut Grove
- Other (please specify)
- Locke
- Courtland
- Hood
- Sacramento
- Herald

15. What is your approximate total annual household income?

- ○ Less than $20,000
- ○ $20,000 to $39,999
- ○ $40,000 to $59,999
- ○ $60,000 to $79,999
- ○ $80,000 or more
- ○ Don't know/Prefer not to say

16. You are

- ○ Non-Hispanic White
- ○ Hispanic/Latinx
- ○ African-American/Black
- ○ Prefer to self-describe
- ○ Asian/Pacific Islander
- ○ Multiracial
- ○ Prefer not to say

SCT Link Survey (Spanish)

SCT necesita su ayuda! Tómese unos minutos para completar esta encuesta y brindar comentarios sobre los servicios de SCT Link. Todas las respuestas serán confidenciales. ¡Gracias!

Indíquenos cuáles son **los tres (3) lugares principales a los que viaja con más frecuencia** en la región de Sacramento. Sea lo más específico posible (por ejemplo, centro de Sacramento, Kaiser Hospital, Cosumnes River College, etc.).

* 1. Primer lugar que visita mas en la area de Sacramento:

* 2. Con qué frecuencia viajas allí?

* 3. Segundo lugar que visita mas en la area Sacramento:

* 4. Con qué frecuencia viajas allí?

* 5. Tercer lugar que visita mas en la area de Sacramento:

* 6. Con qué frecuencia viajas allí?

Porfavor cuéntenos de los servicios de SCT Link que usted usa.

* 7. Si utiliza la ruta Delta, cómo viaja cuando no está en funcionamiento (como los fines de semana)?

- ( ) Yo no ultilizo la ruta Delta.
- ( ) Me da raite un amigo o miembro de familia.
- ( ) Uso taxi o Uber o Lyft.
- ( ) Yo manejo mi propio carro.
- ( ) Otra opción. Por favor especifica.

* 8. Si viaja en el expreso de cercanías Galt-Sacramento, qué cambios podrían hacer que viaje con más frecuencia o que le resulte más fácil viajar? **Por favor elija hasta tres (3).**

- [ ] Yo no ultilizo el expreso de cercanías Galt-Sacramento.
- [ ] Meno altos de autobus.
- [ ] Confiabilidad mejorada.
- [ ] Servicio en los fines de semana.
- [ ] Viajes posteriores.
- [ ] Viajes anteriores.
- [ ] Otra opcion. Por favor especifica.

* 9. Si usa el Highway 99 Express, qué cambios podrían hacer que viaje con más frecuencia o que sea más fácil para usted viajar? **Por favor elija tres (3).**

- [ ] Yo no viajo por el Highway 99 Express.
- [ ] Más frecuencia durante el mediodía (9am – 4 pm).
- [ ] Más frecuencia durante las horas pico (7 – 9 am; 4 – 6 pm).
- [ ] Sevico en fines de semana.
- [ ] Sevicico despues de las 7 pm entre semana.
- [ ] Otra opcion (por ejemplo, le gustaría que incluyera servicio a diferentes ubicaciones? Por favor especifica.)

* 10. Si usa el sistema Dial-a-Ride, qué cambios podrían hacer que viaje con más frecuencia o que le resulte más fácil hacerlo? **Por favor elija tres (3).**

- [ ] Yo no uso Dial-a-Ride.
- [ ] Servicio los domingos.
- [ ] Servicio despues de las 6:30 entre semana.
- [ ] Servicio despues de 4pm los sabados.
- [ ] Mas servicio afuera de Galt.
- [ ] Otra opicion (Por favor especifica).

* 11. Buscamos mejorar las opciones de movilidad para el Delta. ¿Utilizaría alguno de estos servicios? Revise cada una de las opciones y luego clasifique sus preferencias de la más preferida (1) a la menos preferida (4).

Coches compartidos: SCT Link podría proporcionar una flota de coches (posiblemente coches eléctricos) que los clientes del Delta podrían utilizar para desplazarse.

Microtransporte: a pedido, lo que significa que los clientes reservarían un viaje con anticipación (por teléfono o aplicación), como Dial-a Ride, pero con un área de servicio más amplia.

Horario fijo: SCT Link podría ofrecer viajes a diferentes partes del condado en diferentes días de la semana. Por ejemplo, SCT Link podría ofrecer viajes directos desde el Delta al centro de Sacramento los martes y jueves y viajes a Galt los lunes, miércoles y viernes. Los clientes llamarían a SCT Link para reservar un viaje en el día específico para el destino que desean.

	Monday	Tuesday	Wednesday	Thursday	Friday
Service To / From	Galt	Downtown Sacramento	Galt	Downtown Sacramento	Galt
Schedule	Call to schedule pick up/drop off times				

*This is an **example** of a fixed schedule for **demonstration purposes only**.*

Incentivo para voluntarios: SCT Link podría ofrecer un reembolso de millas para compensar a los amigos y vecinos de los pasajeros certificados por la ADA por brindarles asistencia con el transporte.

12. ¿Tiene algún otro comentario sobre cómo mejorar los servicios de SCT Link? Por favor compártelos aquí.

Las siguientes preguntas son sobre usted para que podamos comprender más sobre las diversas comunidades a las que presta servicios SCT Link. Omita cualquier pregunta con la que no se sienta cómodo al responder y pase a la siguiente pregunta.

13. Tiene acceso a un coche?

- Si
- No

14. En qué comunidad vive?

- Galt
- Lodi
- Elk Grove
- Isleton
- Ryde
- Walnut Grove
- Locke
- Courtland
- Hood
- Sacramento
- Herald
- Otra opcion (Por favor especifica).

15. ¿Cuál es su ingreso familiar total anual apropiado?

- Menos de $20,000
- $20,000 a $39,000
- $40,000 a $59,999
- $60,000 a $79,999
- $80,000 o mas
- No se/Prefiero no decir

16. Eres

- Afroamericano
- Asiano/ Isleño del pacific
- Blanco (No Hispano)
- Hispano/Latino
- Multirracial
- Prefiero no decir
- Otra opcion (Por favor especifica).

Memo

To: Mikki McDaniel, Sacramento County Department of Transportation

From: Cheryl Croshere, 50 Corridor Transportation Management Association

CC: David Verbich, Stantec
Kayla Nick-Kearny, AIM Consulting

Date: February 7, 2022

Re: South County Transit Link Resident Survey - Summary
Sacramento County Short Range Transit Plan

Background

The purpose of this memo is to summarize responses and findings from the SCT Link survey conducted in the Delta community in January 2022. The survey was created online in SurveyMonkey, offering two versions: one in English and one in Spanish, included here as Attachments A and B. Unique links to each of the surveys were included in a bilingual postcard sent to 2,584 households in the Delta region, distributed across three ZIP codes, as shown in Table 1. A copy of the postcard is included here as Attachment C. It was mailed on Friday, January 7 and arrived in residential mailboxes by Tuesday, January 11.

Table 1

ZIP Code	Number of Households
95641	1,211
95680	64
95690	1,309
Total	**2,584**

The project team sent emails and text messages about the survey to project and SacDOT databases. Flyers advertising the survey were also posted on SCT Link buses and in bus shelters. Hard copies of the surveys were made available at several locations in the community.

Members of the project team conducted ridealongs on the Delta route on Thursday, January 13 in order to increase response rate of those riding that route in particular. The survey remained live for 17 days, from January 10 to January 26. It received a total of 56 responses, including 47 in English and 9 in Spanish.

Where respondents travel most often.

The first series of questions asked respondents to list three places they travel to most often in the Sacramento region. Each write-in option was followed by a question about how often they travel to that place.

Overwhelmingly, destinations were shopping and grocery stores, in particular:

- Wal Mart
- Raley's
- Sam's Club
- Laguna Boulevard in Elk Grove
- Costco

Other specific destinations included medical and government centers:

- Kaiser Elk Grove
- Sutter Downtown Sacramento
- Courthouse
- Consulate

Of all destinations listed, Table 2 shows the seven that received the most listings:

Table 2

Rank	Destination	Frequency
1	Elk Grove [a]	30
2	Galt [b]	21
3	Downtown Sacramento [c]	15
4	Lodi	14
5	Rio Vista	7
6	Midtown Sacramento [d]	7
7	Florin Road [e]	6

[a] Includes the following coded responses:
- Elk Grove - 14
- Kaiser - 11 (5 specified Elk Grove or South Sacramento Kaiser)
- Laguna Boulevard retail - 4
- Cosumnes River College area - 1.

[b] Includes the following coded responses:
- Galt - 14
- Walmart, Galt - 5
- Raley's Galt - 2.

[c] Includes Sutter Hospital Downtown, which received one response.

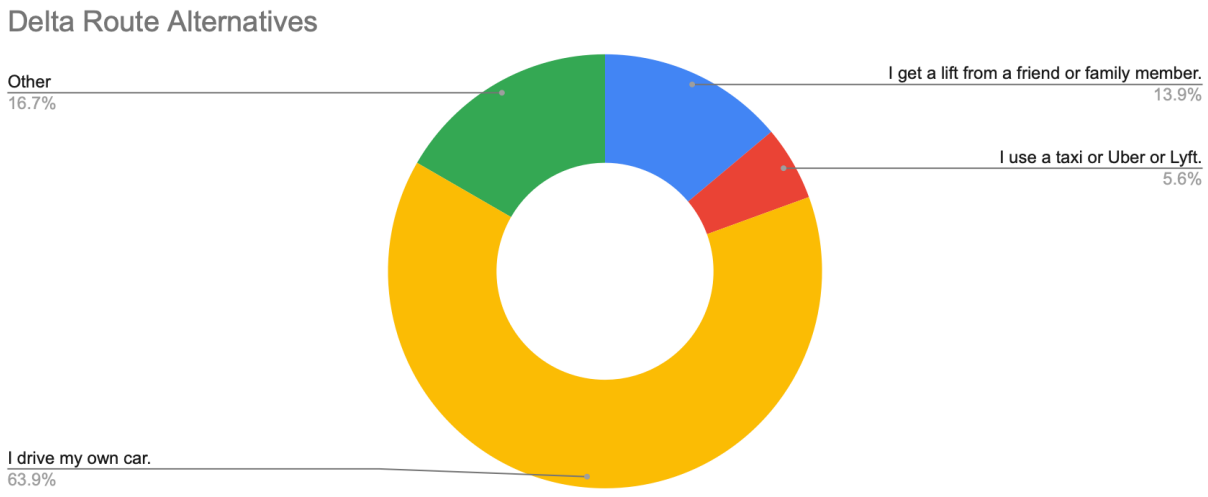
[d] Includes the following coded responses:
- Midtown Sacramento - 5
- Sac State - 1
- UC Davis Medical Center - 1.

[e] Included the following responses:
- Florin Road - 2
- Florin-Perkins Road and Florin Road - 1
- Western Dental on Florin Road - 1
- Nugget at Florin - 1
- Bel Air Florin Road - 1.

Delta Route

Question 7 asked respondents that ride the Delta route how they travel when it's not operating. While 13 of 49 respondents said that they do not ride the Delta route, of those that do ride the Delta route, almost two-thirds said they drive their own car when it's not operating, as shown in Figure 1. Almost 14 percent of Delta riders said they get a lift from a friend or family member, and six percent said they use a taxi, Uber, or Lyft. Seventeen percent chose "Other." Many of those that responded "Other" said they simply don't travel when the Delta route is not in operation.

Figure 1

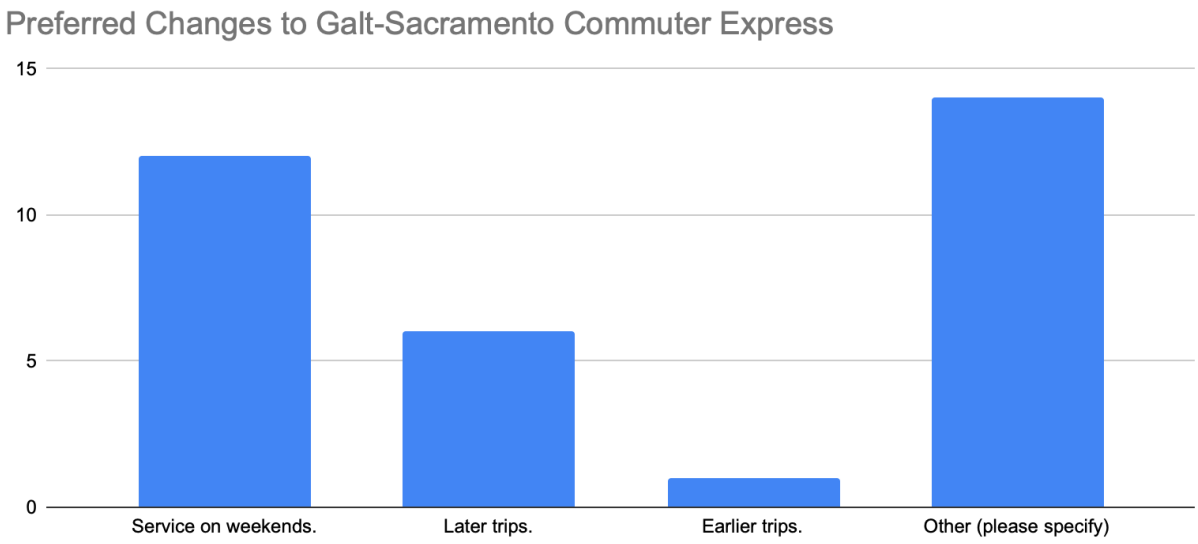


For example, one respondent wrote, “Wait until bus runs.” Another wrote, “We don’t travel on the weekends or holidays. I don’t like to depend on anyone else, so if the Delta is not operating, we postpone our errands.”

Galt-Sacramento Commuter Express

Question 8 asked respondents that ride the Galt-Sacramento Commuter Express what changes could make them ride more often or make it easier for them to ride. While 31 respondents said they don’t ride the Galt-Sacramento Commuter Express, 21 said they do and offered their preferred changes to improve the service, as shown in Figure 2. Respondents could choose up to three options. Service on weekends received 12 supportive responses. Later trips received six. Improved reliability received two supportive responses, and earlier trips just one. Fourteen respondents chose “Other,” writing in their comments.

Figure 2



Several of these comments suggested that the route could better serve their needs. For example, one respondent suggested only stopping at shops or doctors offices. Another said I don’t ride it because it doesn’t take me where I need to go. I take the Etran off of Laguna to go downtown for work, and I often go to Elk Grove to go grocery shopping and other errands.” One respondent, a Walnut Grove resident, said they didn’t know how to get to Galt without driving their car. “If I’m going to drive to Galt,” they wrote, “I might as well just drive directly to Elk Grove, Galt, or Lodi as needed.”

A couple responses suggested additional service. One suggested renewing the noon bus. Two respondents said they enjoy the service as is. Finally, one respondent suggested making the service safer, offering that “the crime makes me not ride it.”

Highway 99 Express

Question 9 asked respondents that ride the Highway 99 Express what changes could make them ride more often or make it easier for them to ride. Over half of respondents (31 of 48) said they don't ride the route, but of the 17 that do, they selected up to three potential improvements, as shown in Figure 3. Service on weekends received 8 supportive responses. Evening service after 7pm on weekdays received five supportive responses, more frequent service during the midday received four, and more frequent service during the peak hours received three. Finally, nine respondents chose "Other," writing in their suggested improvements.

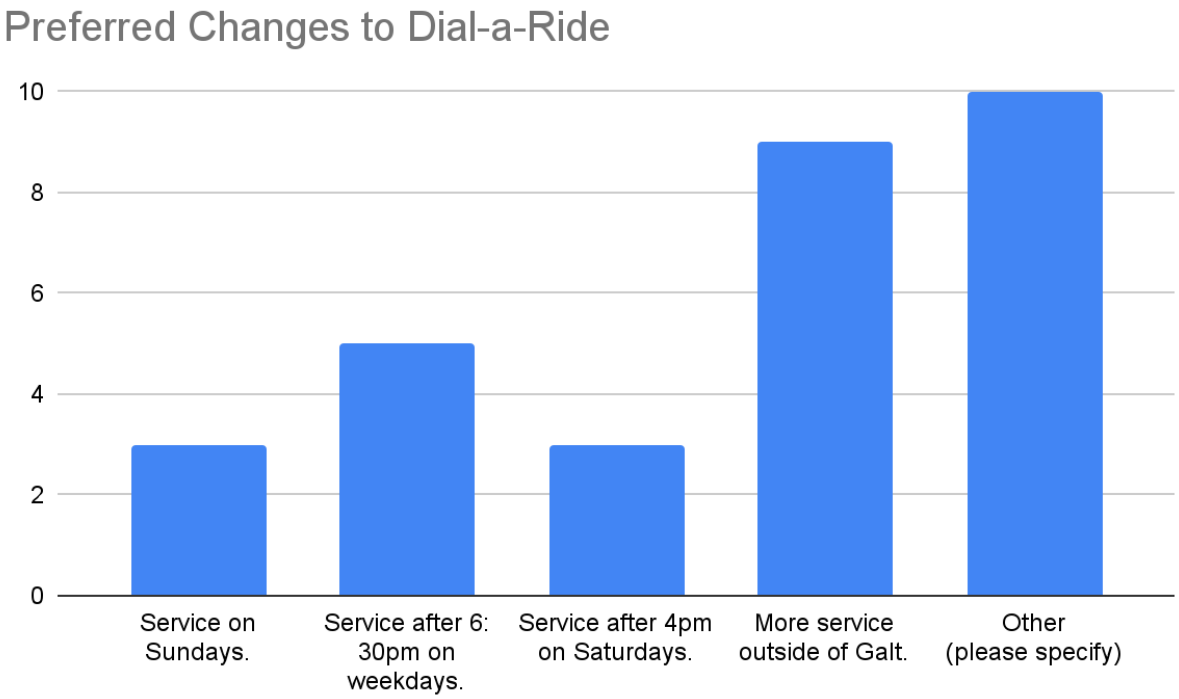
Figure 3

A few of these responses indicated that the Highway 99 Express route could better serve their needs. For example, one respondent said simply, "Service to different locations." Another was more specific: "Extended Lodi service to shopping at lower Sac/Kettleman Road AND Costco shopping at Reynolds Ranch Road." One respondent said improved safety would make them ride more.

Dial-a-Ride

Question 10 asked respondents that use dial-a-ride what changes could make them ride more often or make it easier for them to ride. Nineteen people responded that they use dial-a-ride and selected up to three options for improving the service, as shown in Figure 4. More service outside of Galt received nine supportive responses. Service on Sundays, service after 6:30pm on weekdays, and service after 4pm on Saturdays all received between three and five supportive responses. Ten respondents chose "Other," and wrote in their comments. Their comments reflected a desire for extended service. For example, "service a Sacramento." Another wrote, "mas lugares" (more destinations). Another suggested service to Lodi.

Figure 4



New Mobility Options

Question 11 asked respondents to rank four mobility options for the Delta region, from 1 (most preferred) to 4 (least preferred). Table 3 includes the four options, their descriptions, and the weighted average of their scores from respondents.

Table 3

New Mobility Option	Description	Weighted Score [a]
Carsharing	SCT Link could provide a fleet of cars (possibly electric cars) that customers in the Delta could reserve and then use to get around. Three individuals - Green Raiteros - stand to the right of a white shared car.	2.63
Microtransit	On demand, meaning that customers would reserve a trip ahead of time (via phone or app), like Dial-a-Ride, but a wider service area. A light blue and yellow micro transit bus is parked with its doors open.	2.92
Fixed Schedule	SCT Link could offer trips to different parts of the County on different weekdays. For example, SCT Link	2.80

	could offer direct trips from the Delta to downtown Sacramento on Tuesdays and Thursdays, and trips to Galt on Mondays, Wednesdays, and Fridays. Customers would call SCT Link to reserve a trip on the specific day for the destination they want. An example of a schedule with service to Galt and downtown Sacramento.	
Volunteer Incentive	SCT Link could offer mileage reimbursement to compensate ADA-certified passengers' friends and neighbors for providing them with transportation assistance. Two women are seen through the open doors of a vehicle. One appears to be helping the other get in or out of the vehicle.	1.66

[a] The answer choice with the largest average ranking is the most preferred choice. The average ranking is calculated by summing the product of each ranked position weight by the response count for that ranking and dividing the sum by the number of total responses. Weights were assigned as follows:

- #1 choice = weight of 4
- #2 choice = weight of 3
- #3 choice = weight of 2
- #4 choice = weight of 1

As shown, Microtransit received the highest average ranking. Eighteen respondents gave microtransit first rank and another 18 gave it second rank. Fixed schedule was a close second to microtransit, with an average ranking of 2.80. Fourteen respondents gave fixed schedule first rank and another 18 gave it second rank. It's worth noting that there was a difference between respondents to the English language survey and the Spanish language survey on this question. While 42 people responded to the English version and only nine to the Spanish version, the Spanish language respondents had a stronger preference for the fixed schedule option. Among respondents to that version of the survey, fixed schedule received a weighted score of 3.22 compared to 2.78 for microtransit. English language respondents preferred microtransit, with a weighted score of 2.95 compared to fixed schedule with 2.71.

Other Suggestions for Improved Service

Question 12 asked respondents to share any other comments they had on how to improve SCT Link services. Twenty-seven wrote in their comments.

Some offered support for existing services:

- "Delta Route perfect. It takes you everywhere."
- "I like how it is."

Some offered additional support for the new mobility options offered in the previous question:

- "Would like to see a fixed schedule to send my kids to school. Would also like service run by my house in the delta loop again."

- "It would be great to have weekend services for those who do not have a car. I think the carsharing would definitely improve the mobility especially on weekends."

Some requested better information about SCT Link services:

- "Easier access to bus info. I just moved here, and need more info on how, when and where, I can ride the bus out of Isleton, to Sacramento, and surrounding areas."

Some expressed interest in improved frequency or extended service hours:

- "Are they bringing back the 4:20 delta trip?"
- "Delta route - I want a 5:20 pm schedule."
- "Queiro ver halgo como el routa 12 de nuevo. (I want to see something like route 12 again.)"
- "More and longer routes."
- "Weekend service."
- "I think there should be later service for those working late and working in rural areas like a neighborhood shuttle."
- "Until they provide a lot more time slots and stops I will continue to use my own car."
- "Queiro ver servicio mas tarde que las 4 para mis citas de doctor en Kaiser." ("I want to see service later than 4 for my doctor appointments at Kaiser.")

Many offered specific destinations or areas they'd like to have access to:

- "Direct buses to Promenade Kaiser."
- "Would like to see service got to my doctor's office in Fairfield."
- "Having a direct option to be dropped off at a connector station in Elk Grove would be nice (and not having to go through Galt)."
- "Horas mas flexible. Mas transito en Isleton y queiro saber mas de el schedule, mas paradas tambien." ("More flexible hours. More traffic in Isleton and I want to know more about the schedule, more stops too.")
- "It would be nice if a scheduled bus was available and making stops at Wimpy's, Walnut Grove, and Locke with destinations of Elk Grove, Galt, and Lodi on a regular basis with early morning departures and afternoon returns. This would help with shopping, banking, and other sorts of appointments in the region and perhaps save fuel. It seems to me if there was a lot of awareness that the service might be justified as people come to be able to plan trips and take care of their business without driving."
- "Galt is very far from my house. Isleton or the loop would be better."
- "I live out in the country in Isleton and I don't drive. Would be nice to get transit pick me up from my home on Tyler Island Bridge Rd."
- "Could you send a transport to and from Ox Bow Marina?"
- "I live east of Power Inn Rd. There are no bus routes east of Power Inn Rd. The Vineyard area is fast growing, thousands of homes to be built in the next couple of years and no transit options for this area. Think about that please."
- "Amtrak now serves commuters from Lodi to Sac. A shuttle serving Isleton and Rio Vista with connections to the Antioch BART station and the Lodi Amtrak station during actual commute hours would be outstanding. Right now, it's impossible to adequately commute to SF or SAC via SCT."

- "The lack of transportation from the Delta region to more populated city centers is hobbling opportunities for work, social interaction, and recreation for young people especially. It's also undermining tourism and investment in the Delta region."
- "Public transit options for commuters from Isleton/Delta area to jobs in Sacramento. Not everyone is employed at local businesses or retired."

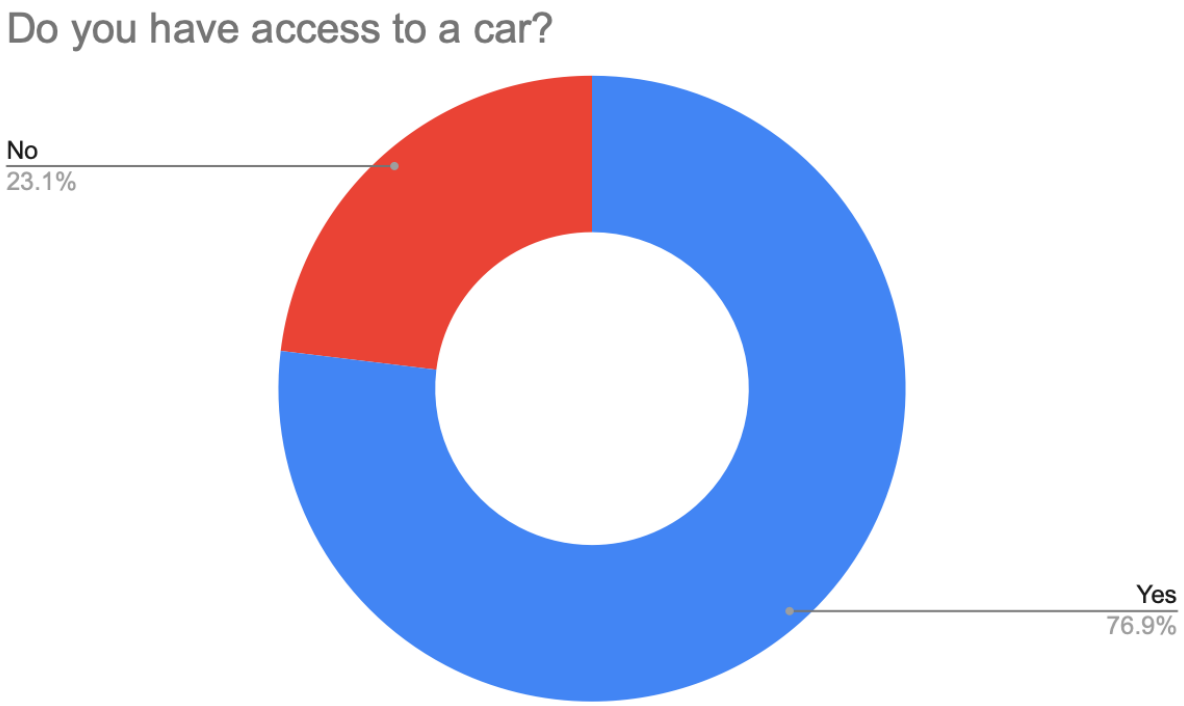
Finally, a couple of respondents expressed a desire for better security:

- "Safety"
- "More CHP to help make sure our roads are safe which they no longer are."

Respondent Demographics

Question 13 asked respondents if they have access to a car. As shown in Figure 5, more than three-quarters of respondents do have access to a car. Fifty-two of the 56 respondents answered this question.

Figure 5



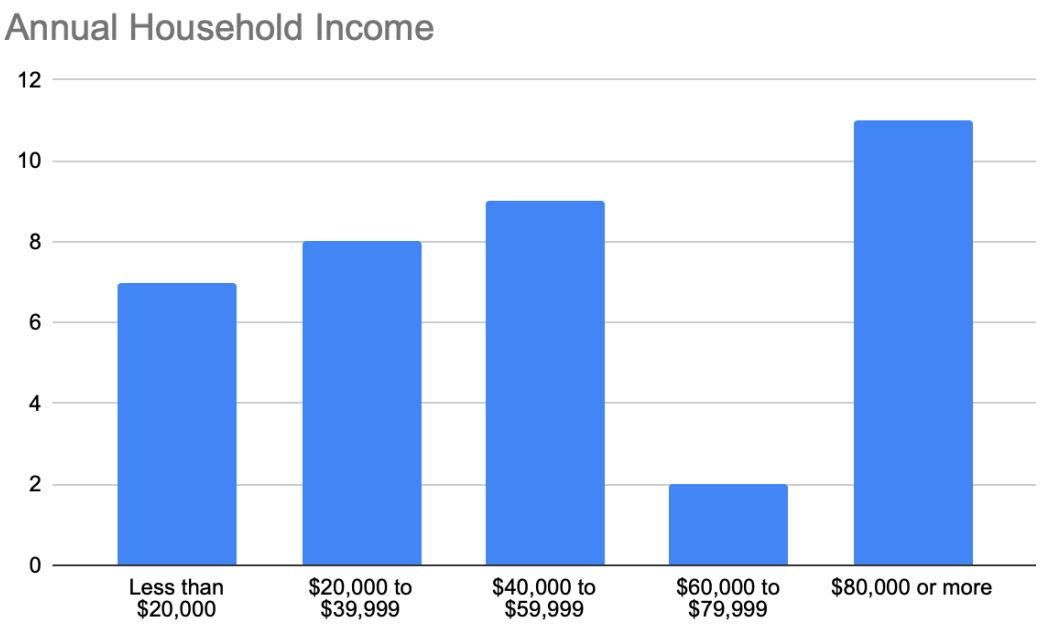
Question 14 asked respondents which community they live in. All 56 respondents answered this question. The Delta communities of Isleton, Walnut Grove, and Galt had the highest representation, as shown in Table 4.

Table 4

Community	Survey Respondents
Isleton	24
Walnut Grove	16
Galt	7
Sacramento	6
Elk Grove	1
Other ("I travel to each city.")	1
Rio Vista	1
Total	**56**

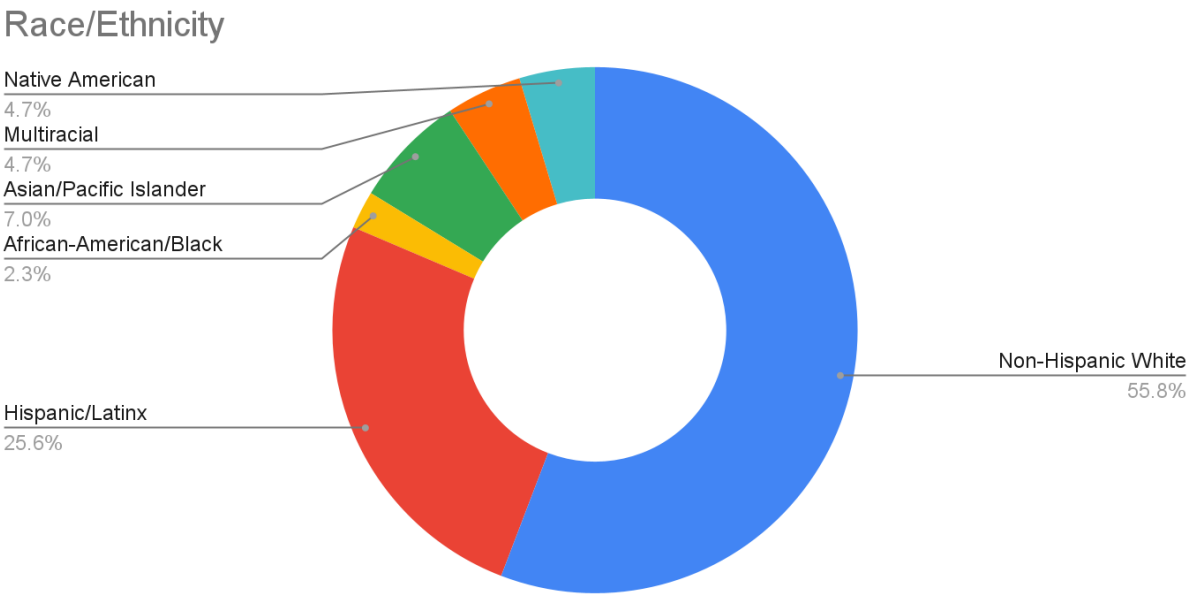
Question 15 asked respondents to report their annual household income. Thirty-seven of the 56 respondents answered this question. As shown in Figure 6, the respondents represented a range of incomes, with a notable lack of representation in the range of $60,000-$79,999.

Figure 6



Finally, question 16 asked respondents to report their race/ethnicity. Forty-three of the 56 respondents answered this question. As shown in Figure 7, almost 56 percent of those that answered the question identified as non-hispanic white, while more than 25 percent identified as hispanic/latinx. Another 7 percent identified as Asian/Pacific Islander and 5 percent each identified as Native American and multiracial. Just over two percent identified as African American/Black.

Figure 7



APPENDIX C: FULL LIST OF ORIGINS AND DESTINATIONS

Origin (based off the respondents self-identified community from question 14) and destination data from SCT Link Survey are aggregated below. 1-6. Questions 1,3, and 5 asked for the "First (second, third) place you travel to most often in the Sacramento region?" and questions 2, 4, and 6 asked the respondent to indicate "How often do you travel there?"

Origin Community and Destination	Less than 3 days a week	3-5 days a week	More than 5 days a week	Totals
Elk Grove				
Elk Grove	2			2
Sam's Club Stockton Blvd	1			1
Galt				
Cosumnes River College	1			1
Downtown Sacramento		4		4
Elk Grove		1		1
Galt		1		1
Galt Village	1			1
Laguna, Elk Grove	1			1
Lodi		1		1
Isleton				
Antioch	1			1
Delta Shores	1			1
Downtown Sacramento	6	1		7
Elk Grove	2			2
Florin	3			3
Folsom	1			1
Galt	4			4
Galt Village	1	2		3
Isleton		1		1
Kaiser - Elk Gove	2			2
Kaiser - South Sacramento	1			1
Kaiser - Vacaville	1			1
Laguna, Elk Grove	1			1
Lodi	7			7
Midtown Sacramento	1			1
Rio Vista	1	5		6
South Sacramento	3			3
Suisun City	1			1
Walnut Gove		1		1

Origin Community and Destination	Less than 3 days a week	3-5 days a week	More than 5 days a week	Totals
West Sacramento	1	1		2
Sacramento				
Carmichael	1			1
Downtown Sacramento	1	2		3
Elk Grove	1	1		2
Florin	1			1
Kaiser - South Sacramento	1			1
La Rivera	1			1
Midtown Sacramento	1			1
Natomas			1	1
North Sacramento			1	1
Rancho Cordova			1	1
South Sacramento			1	1
Vineyard				
Elk Grove	1			1
Florin		1		1
Folsom	1			1
Walnut Grove				
Delta Shores	1	1		2
Downtown Sacramento	4	2		6
East Sacramento		1		1
Elk Grove	1	4		5
Florin	1		1	2
Galt		3		3
Galt Market	1			1
Galt Village	1	1		2
Granite Bay			1	1
Isleton		1		1
Kaiser - Elk Gove	1			1
Kaiser - South Sacramento	4			4
Laguna, Elk Grove	3			3
Lodi		3		3
Midtown Sacramento	1	1		2
Rio Vista		1		1
Roseville	1			1

APPENDIX D: CONCEPT SITE PLANS

See attached site plan.

Stantec

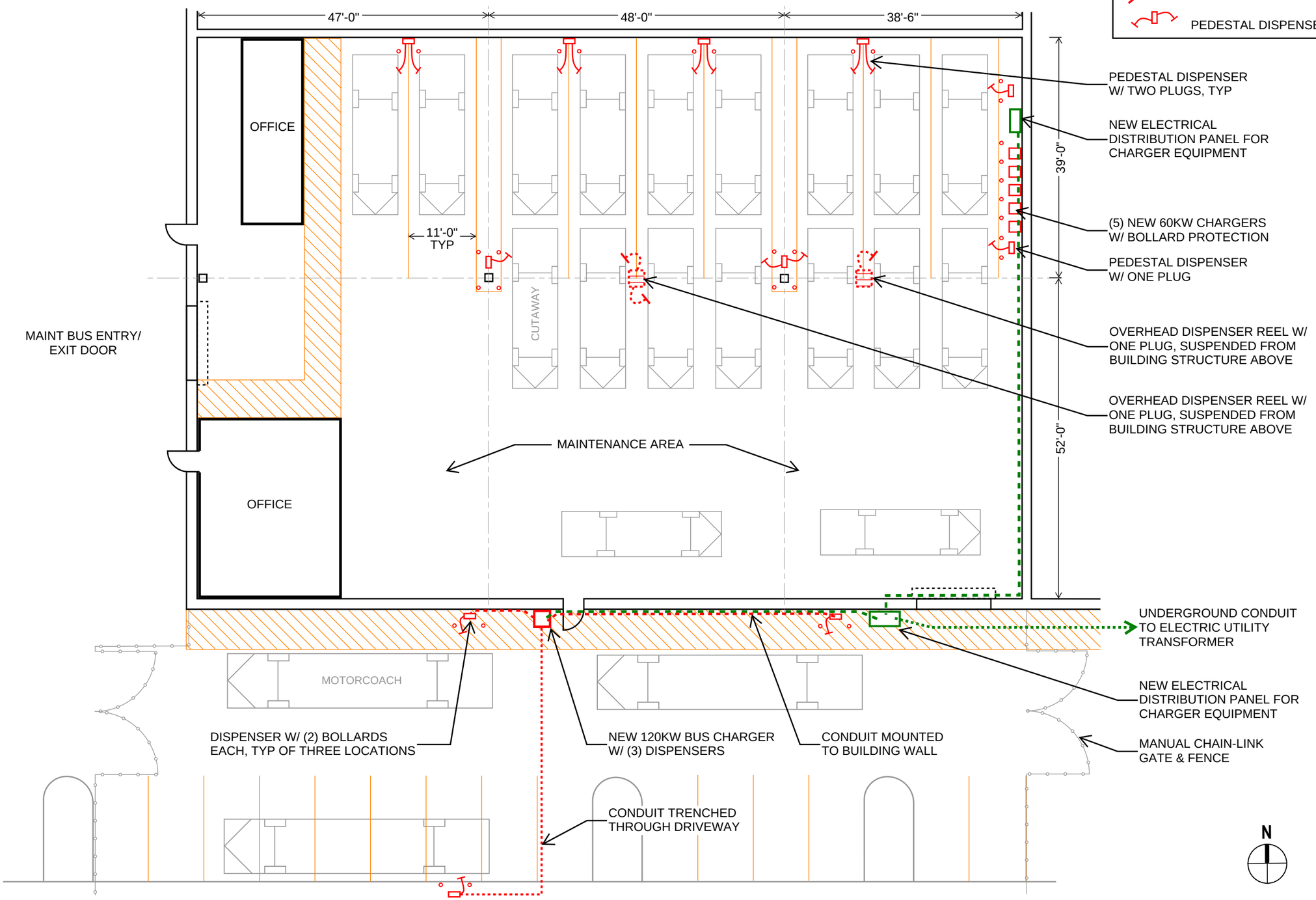
Stantec Proj No.
2073016040

GENERAL NOTES:

1. CHARGING AND EQUIPMENT LAYOUT SHOWN IS CONCEPTUAL AND FOR PLANNING PURPOSES ONLY.
2. PROPOSED LAYOUT MAINTAINS EXISTING PARKING CONFIGURATIONS AT THE FACILITY.
3. DISPENSER LOCATIONS ASSUME CUTAWAY VEHICLES WILL BE AVAILABLE AND PROCURED WITH CHARGING PORTS ON BOTH SIDES OF THE REAR OF THE VEHICLE.
4. DISPENSERS SHOULD NOT EXCEED ~330' OF CABLE DISTANCE FROM CHARGER CABINET TO STAY WITHIN STANDARD COMMUNICATION CABLING LIMITATIONS.
5. PROPOSED LAYOUT UTILIZES 1:3 RATIO OF CHARGERS TO DISPENSERS WITH A MIX OF SINGLE, DUAL, WALL/PEDESTAL, AND OVERHEAD DISPENSERS. MORE DISPENSER LOCATIONS ARE SHOWN THAN ARE NECESSARY TO PROVIDE MULTIPLE OPTIONS FOR DISPENSER LOCATIONS.
6. ALL ELECTRICAL DISTRIBUTION INSIDE THE BUILDING TO BE EXPOSED CONDUIT MOUNTED TO EXISTING WALLS OR UNDERSIDE OF ROOF STRUCTURE.

LEGEND

- NEW UNDERGROUND CONDUIT
- NEW ABOVEGROUND CONDUIT
- NEW ELECTRICAL SERVICE EQUIPMENT
- NEW ELECTRICAL SERVICE CONDUIT
- EXISTING PARKING STRIPING
- OVERHEAD MOUNTED POWERED REEL DISPENSER W/ 1 OR 2 PLUGS
- PEDESTAL DISPENSER W/ 1 OR 2 PLUGS



SCT LINK FACILITY
140 ENTERPRISE CT., SUITE B, GALT, CA

BATTERY ELECTRIC BUS FLEET
CONCEPTUAL CHARGING EQUIPMENT PLAN

DATE:
04/23/22

DWG:

1.0

N

SCALE: 1/6" = 1' - 0"
DRAWING IS FULLSIZE AT 11x17