

Sacramento Regional Transit

August 20, 2020



Stockton Boulevard Conceptual Plan

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INTRODUCTION



The primary purpose of this project is to develop a high-level corridor plan for Stockton Boulevard that evaluates and addresses the potential for enhancements that would support future Bus Rapid Transit/high-frequency bus service. This plan addresses short-term enhancements that are responsive to the needs of customers today and are also compatible with and supportive of potential changes in the future.

Today, the corridor is primarily served by the 51 bus, SacRT's highest ridership route, which runs between Florin Town Centre and Broadway every 15 minutes. A smaller section of the corridor on the northern end is served by the 38 bus, which runs between Broadway and T Street and serves significantly fewer customers.

This plan discusses existing conditions, provides high-level analysis of operating conditions, and recommends a 3-tiered framework for considering corridor enhancements (Policy & Operational, Minor Capital, and Major Capital).

EXECUTIVE SUMMARY

The primary purpose of this project is to develop a high-level corridor plan for Stockton Boulevard that addresses the potential for Bus Rapid Transit/high-frequency bus service. This plan addresses short-term enhancements that are responsive to the needs of customers today and are also compatible with and supportive of potential changes in the future.

Based on the analysis conducted, the following is a summary of key themes and recommendations.

1. **Enhanced Safety** considerations are a shared interest and priority among SacRT, other governmental agencies, and the business community.
2. **Policy and Operational Initiatives** provide a significant opportunity for enhanced service that meets customers' needs in an affordable and timely manner.
3. **Stop-Level Amenities** are a relatively inexpensive way to improve customer experience, enhance safety, and provide enhancements compatible with larger capital investments in the future.
4. **Partnerships and Coordination** are key to success in this corridor, with an opportunity for SacRT to shape decisions affecting the customer experience and greater community.
5. **Long-Term Potential** exists in the corridor for more intensive development that may warrant more major capital investment; this will require a greater degree of integration between land use, economic development, and transit planning.

METHODOLOGY



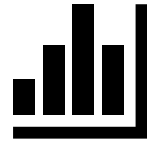
The next section describes the methodology used to conduct analysis and develop the recommendations in the plan.

METHODOLOGY



Existing Plans and Studies Review

- Short and Long-Range Plans
- Service and Design Standards



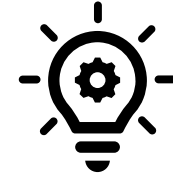
Data Analysis and GIS Visualizations

- Demographics
- Ridership, boarding and alightings by stop
- Transit speed, delay, dwell, and schedule deviation
- Customer fare payment types
- Amenities (shelters, benches) by stop



Onboard Customer Survey (Rt. 51)

- Travel patterns
- Customer priorities
- Satisfaction with current service
- Challenges and barriers



Application of Best Practices

- Gap analysis
- Case studies
- Tiered approach

EXISTING CONDITIONS



This section describes the existing conditions along the corridor to provide context and understanding of the current and longer term transit needs and opportunities. Existing conditions were analyzed within the following five broad categories:

- Existing Studies and Reports
- Demographics
- Land Use
- Customer Satisfaction and Priorities
- Operations

COMMUNITY AND CORRIDOR PRIORITIES

The table below summarizes key themes and priorities addressed in the selection of reports, plans, and studies reviewed as part of this project. This review helped the study team to gain a better understanding of the stated priorities of the community as a whole, and Stockton Boulevard specifically. By recognizing common interests and alignment of goals, SacRT can continue to build strong partnerships that will be necessary for both major and minor investments in the Stockton Boulevard corridor and others.

Organization	Report	Mobility	Safety	GHG/Air Pollution	Economic Development
SacRT	TransitAction Plan	X	X	X	X
SacRT	Short-Range Transit Plan	X	X	X	
SACOG	MTP/SCS, Blueprint	X	X	X	X
City of Sacramento	Stockton Boulevard Corridor Study: Existing Condition Report	X	X		
County of Sacramento	Sacramento County General Plan	X		X	X
Stockton Boulevard Partnership	Annual Report		X		X
Urban Land Institute	Stockton Boulevard		X		X

Previous Work Addressing Stockton Boulevard

Organization	Report	Date	Themes
City of Sacramento	Stockton Boulevard Corridor Study: Existing Condition Report	November 2019	<p>The report identified 3 major priorities for the corridor:</p> <ul style="list-style-type: none"> • Transportation Safety: Stockton Boulevard contains several high-collision intersections. • Mobility: With the highest ridership route in the SacRT system (Route 51), access to bus stops is crucial. • Community: Stockton Boulevard connects many residents and jobs, making it an important local and regional thoroughfare for the city.
Sacramento County	Sacramento County General Plan	2011 (Amended 2017)	Stockton Boulevard is identified in the Plan as a corridor for BRT/ Hi-Bus - Mixed Use Lanes (pre-2030). In general, the Plan discusses the need to invest in transit to provide additional mobility options and improve air quality. It also discusses the intent to concentrate commercial development in areas supported by transit.
Stockton Boulevard Partnership	Annual Report	2018	The Stockton Boulevard Partnership reports on their activities in the corridor, including promoting economic development, advocating for business and property owners, and provision of services and programs, including maintenance, amenities and security.
Urban Land Institute, Advisory Services Program	Stockton Boulevard	2009	ULI, in partnership with the City of Sacramento and the Sacramento Housing and Redevelopment Authority, evaluated the market potential of Stockton Boulevard, with recommendations to reduce blight through enactment of design guidelines and code enforcement, demolish deteriorated motels and other buildings, implement a new streetscape program, and improve public safety in order to transform the corridor's current land uses.

Census Data

Population data was collected and mapped to better understand demographic patterns along Stockton Boulevard compared to Sacramento County as a whole.

Block group data for Sacramento County is from the 2010 Decennial Census and the 2013-2017 American Community Survey 5-Year Estimate. For the purposes of the demographic analysis, block groups were selected using a half-mile buffer along Stockton Boulevard from Florin Road to T Street.

Population Density

Stockton Boulevard Corridor has a higher population density than Sacramento County, and density increased from 2010 to 2017. Specific areas of population growth vary, but some clusters include the east side of Stockton near 14th Avenue and Gerber Road, as well as west of Stockton and south of Fruitridge.

Commuting

The highest share of transit commuters is east of Stockton near 14th Avenue and south of Elder Creek Road. Those block groups also experienced increases in transit commuters from 2010 to 2017. Average commute time is especially long in the block group west of Stockton between 14th Avenue and 21st Avenue.

Census Data

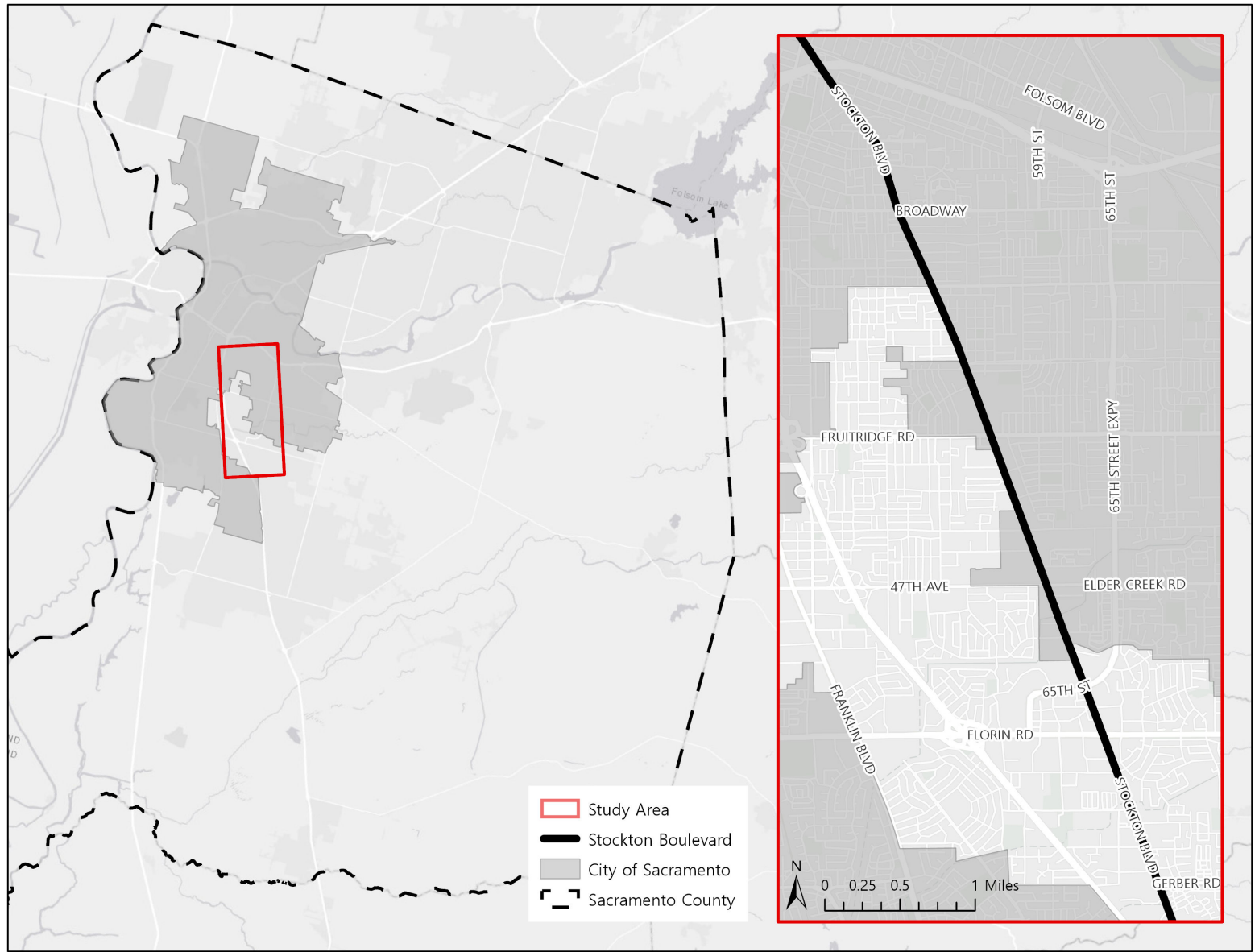
Other Demographic Variables

The area surrounding Stockton Boulevard contains lower-income households compared to the rest of Sacramento County. The 2017 median income of corridor area was \$48,225, compared to \$64,206 for the rest of the county. Poverty is especially concentrated near 12th Avenue, Fruitridge Road, Elder Creek, and Florin Road. There are also higher concentrations of households without vehicles, although no-vehicle households have been declining since 2000 in the corridor, but increasing in the county as a whole.

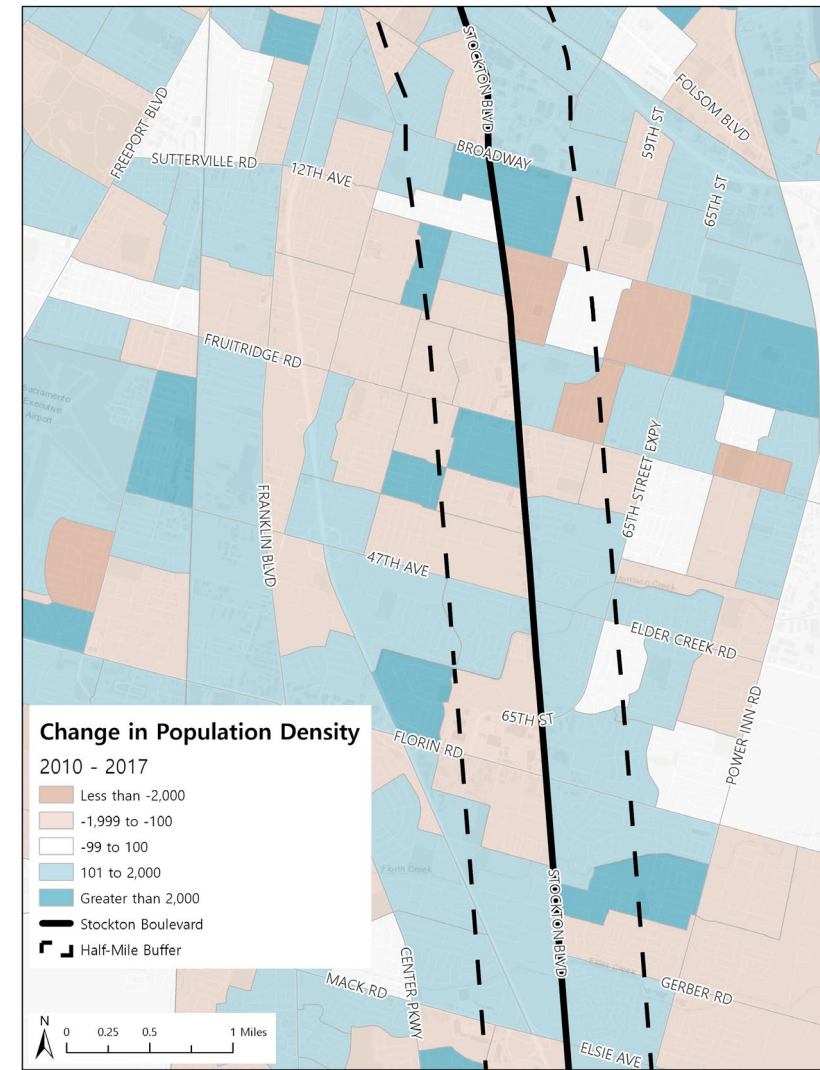
The area surrounding Stockton Boulevard has a much higher density of minority populations than the county, although the minority population declined between 2010 and 2017. The geographic distribution of renters follows a similar pattern. The senior population increased in Stockton Boulevard between 2010 and 2017, with specific concentrations near 12th Avenue and Elsie Avenue.

The following pages consist of demographic maps that visualize key characteristics and trends along Stockton Boulevard.

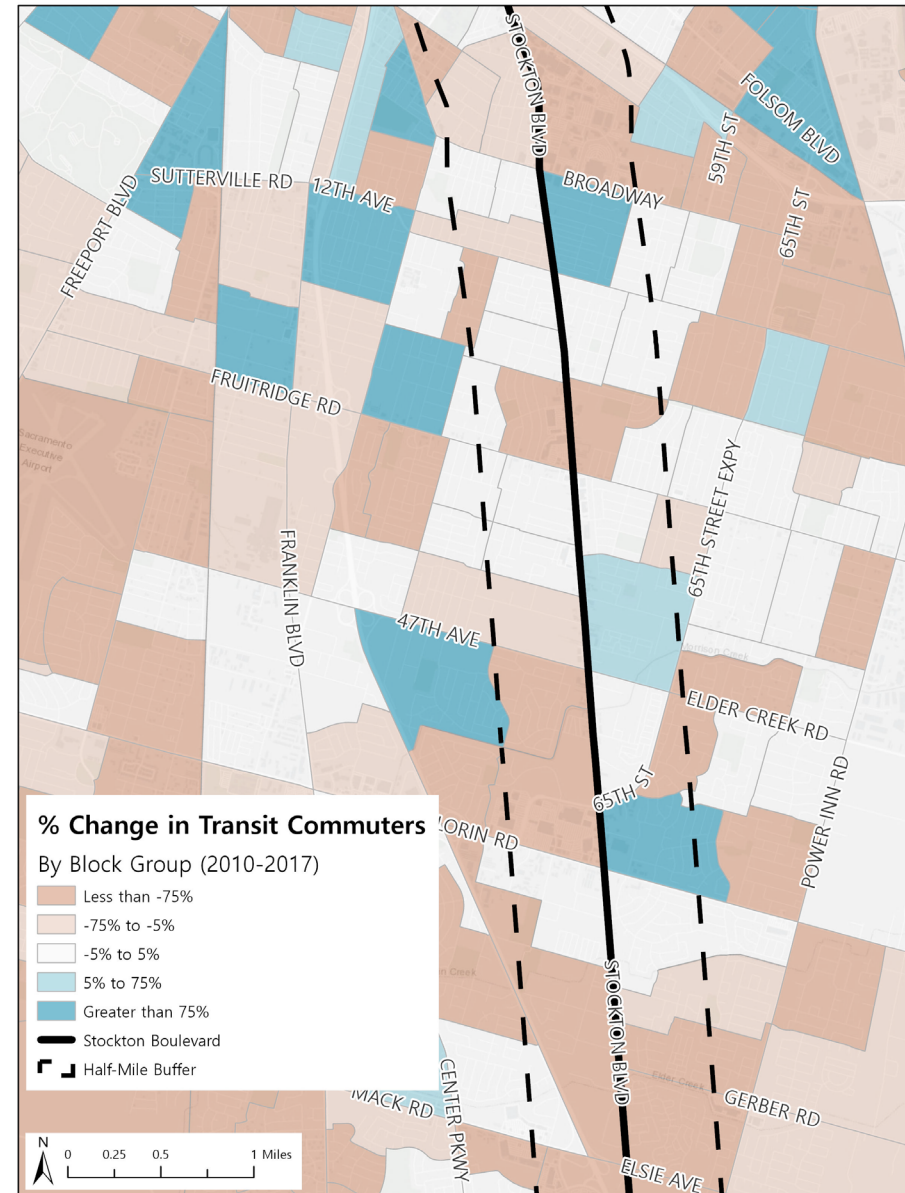
MAPS – STUDY AREA



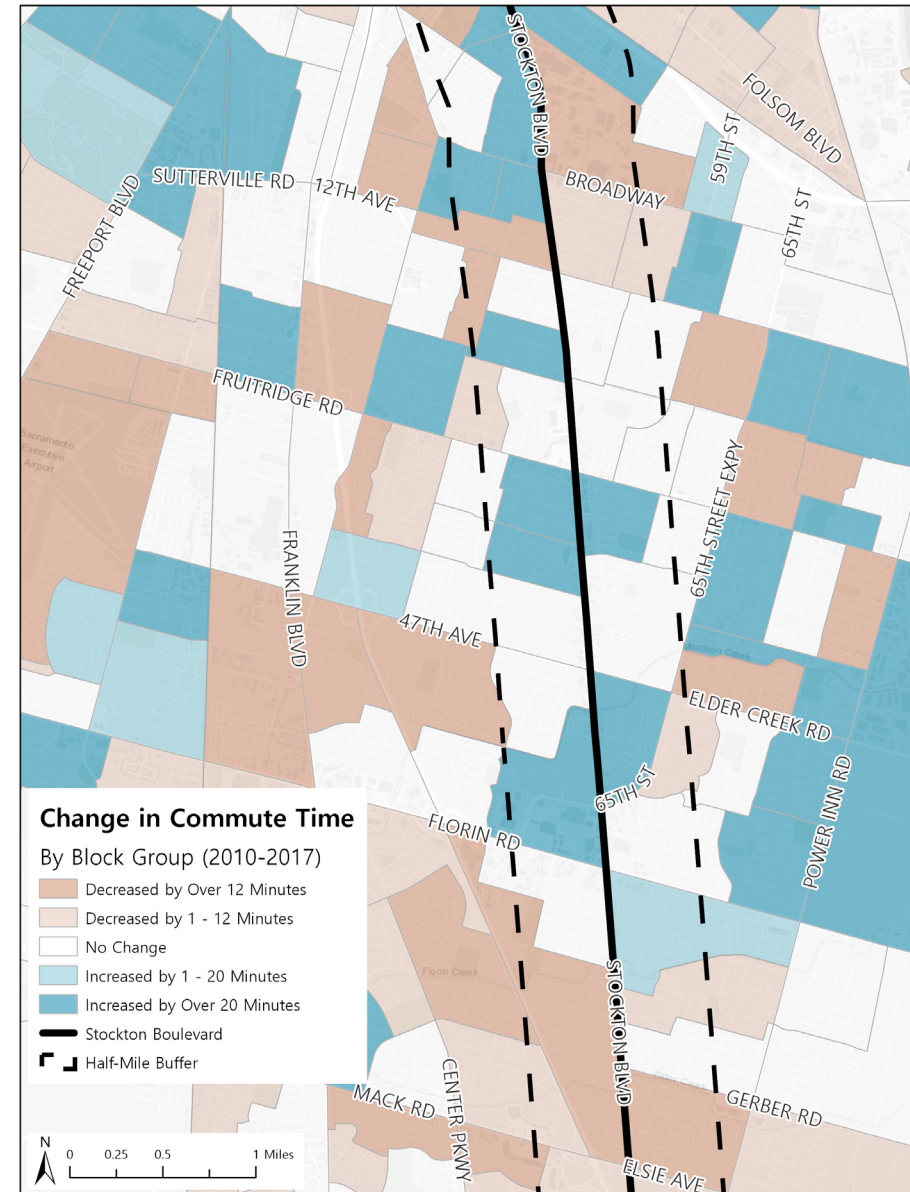
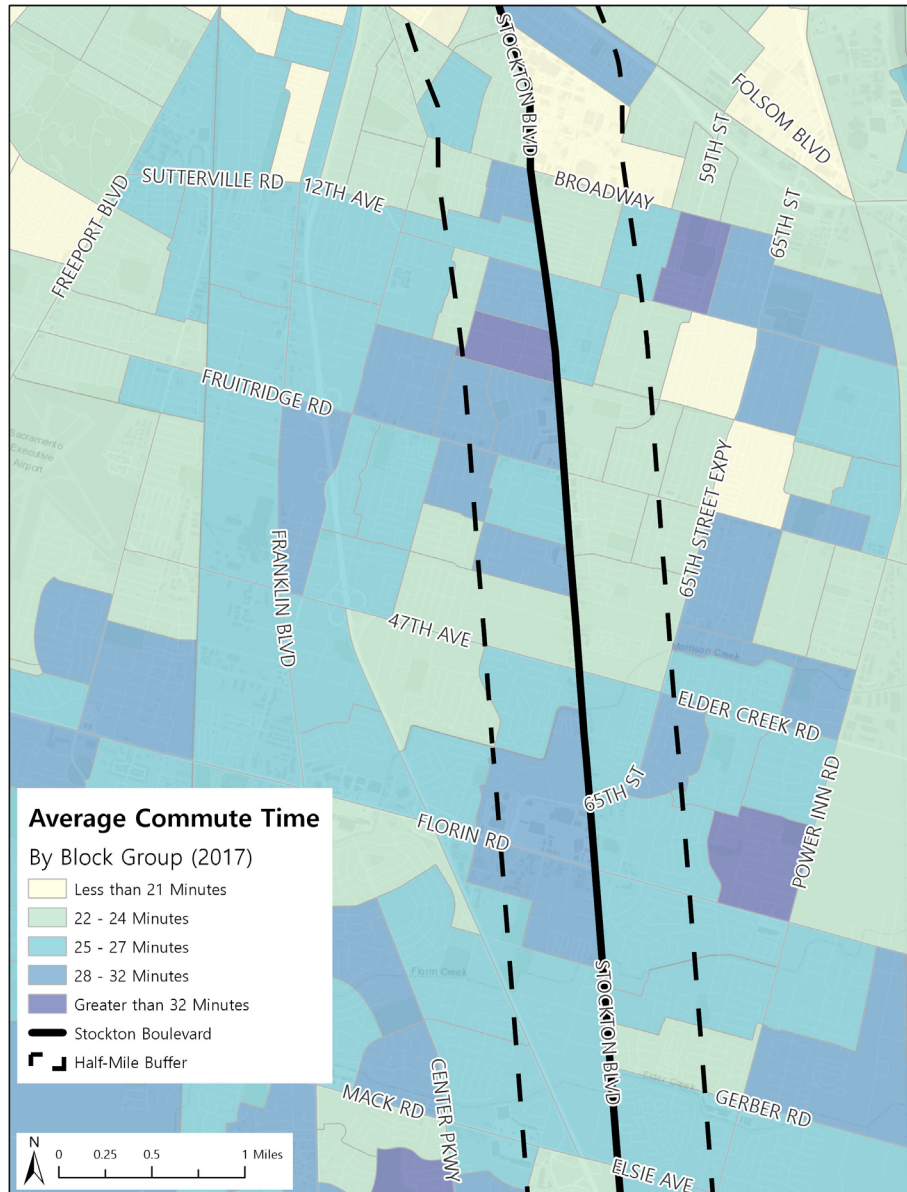
MAPS - POPULATION DENSITY



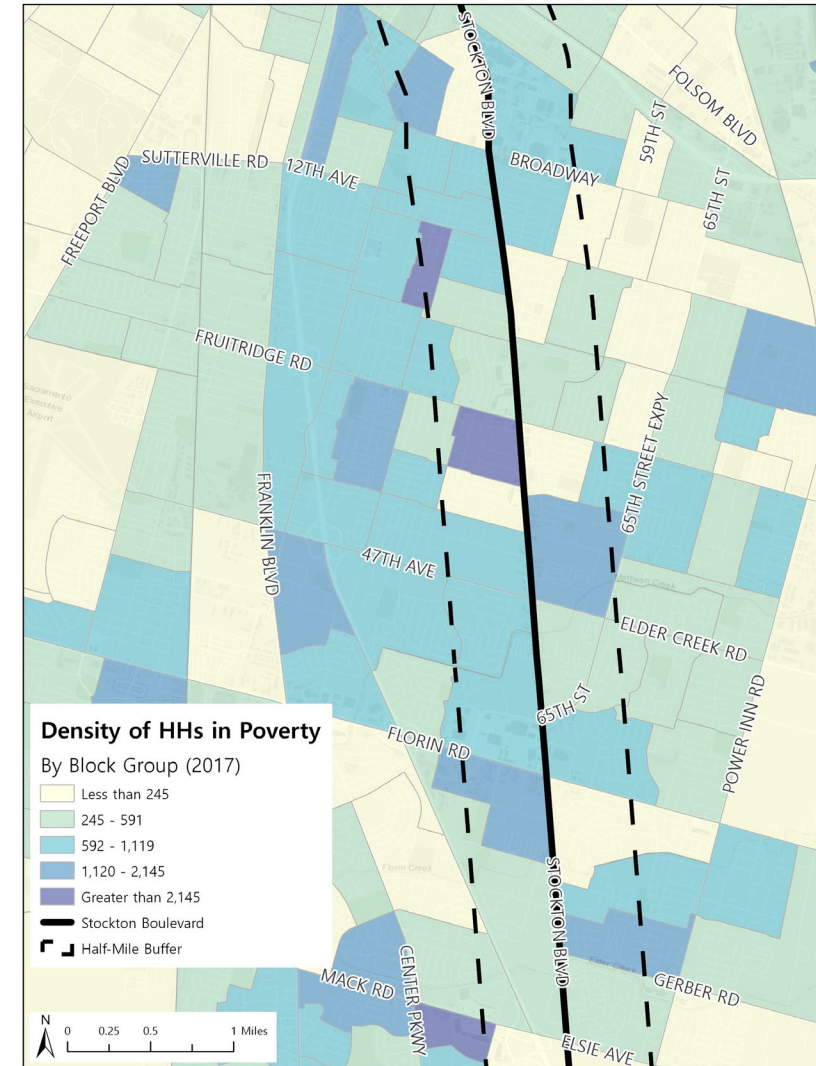
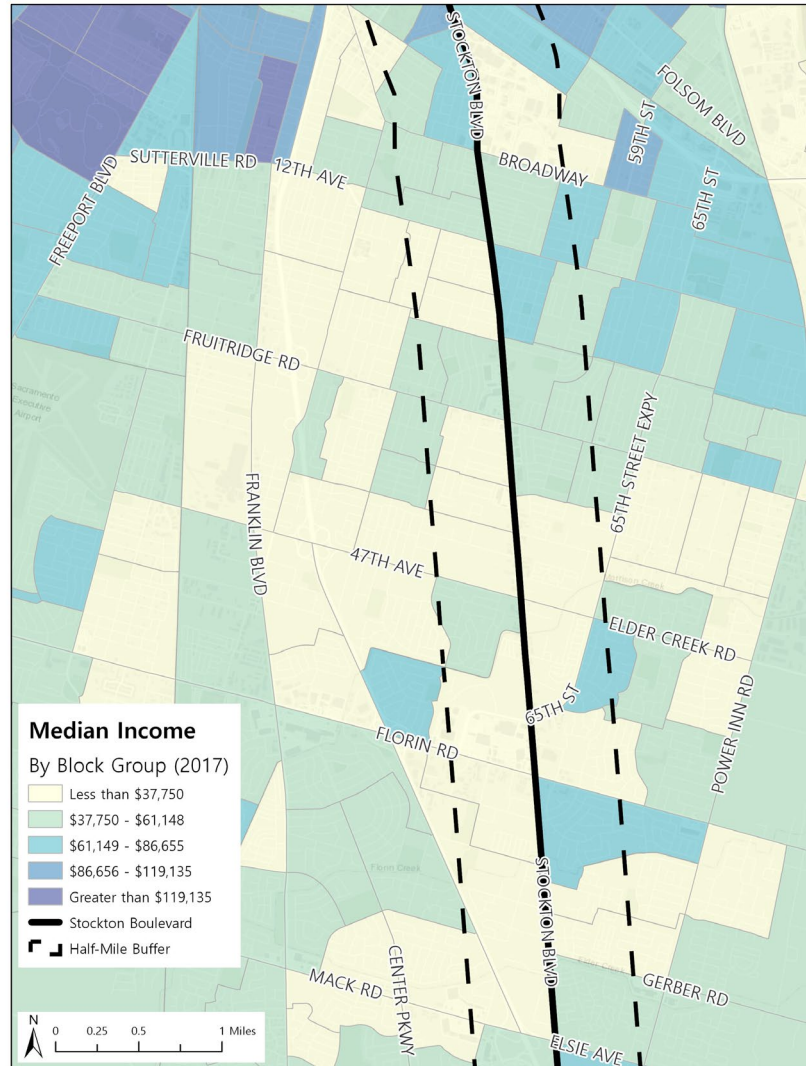
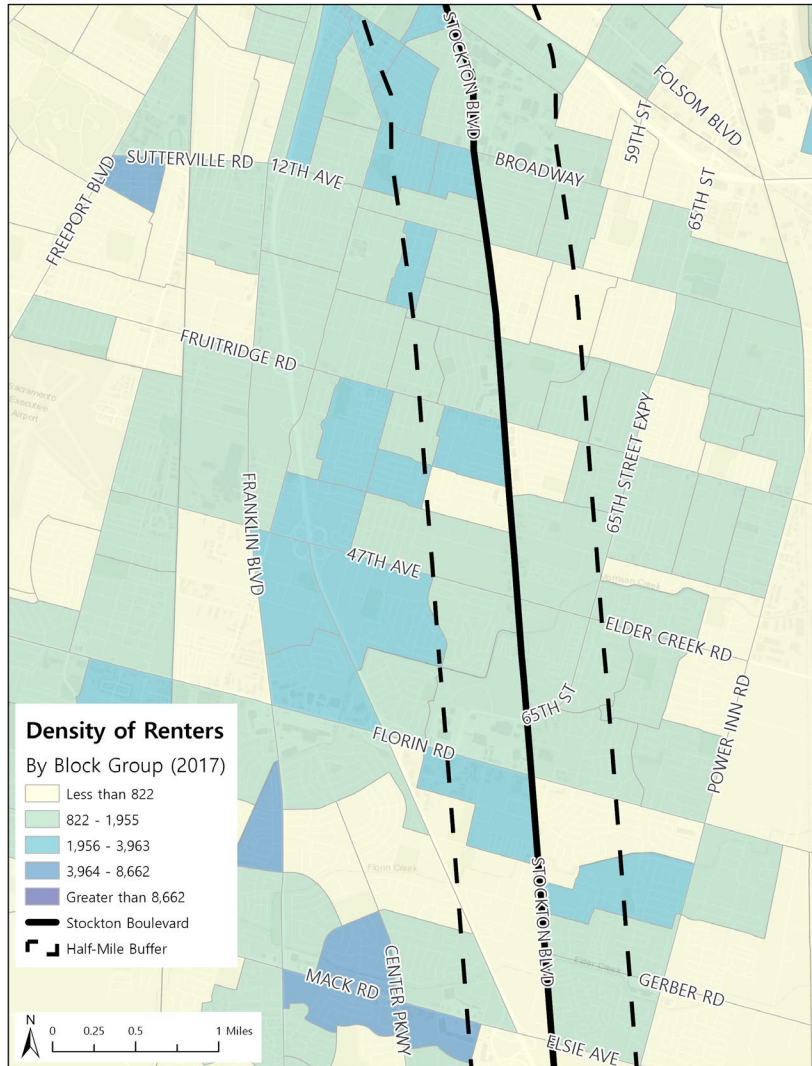
MAPS - TRANSIT COMMUTING



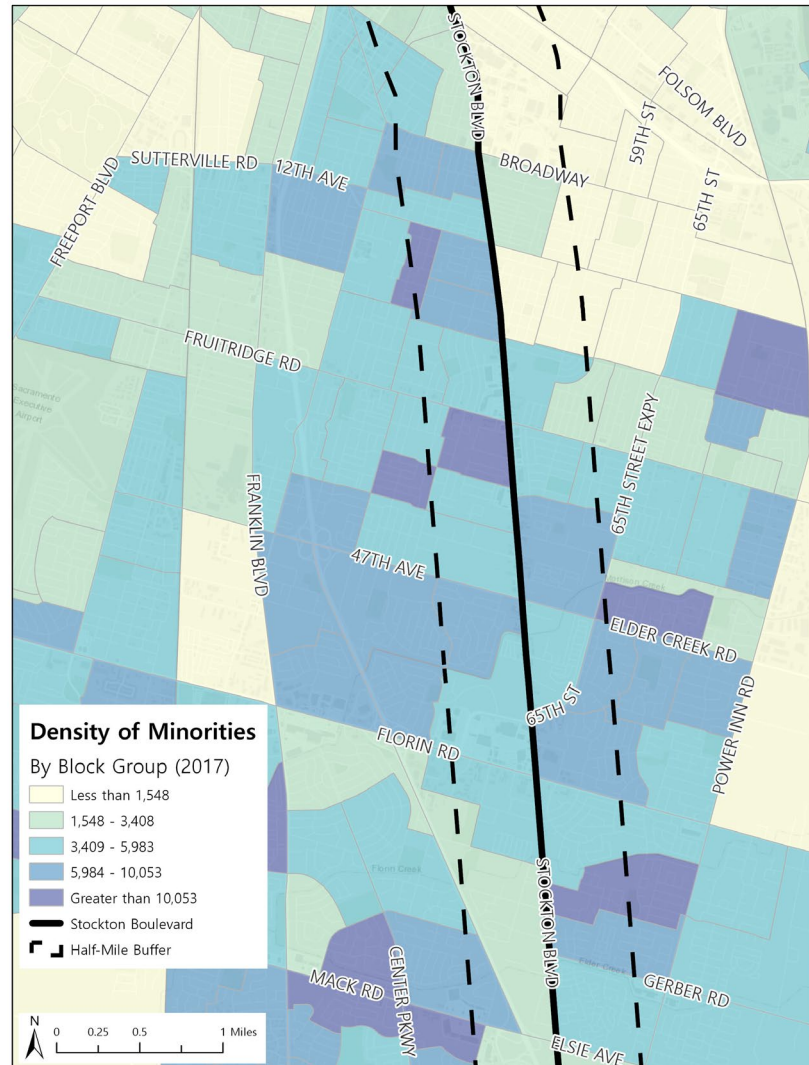
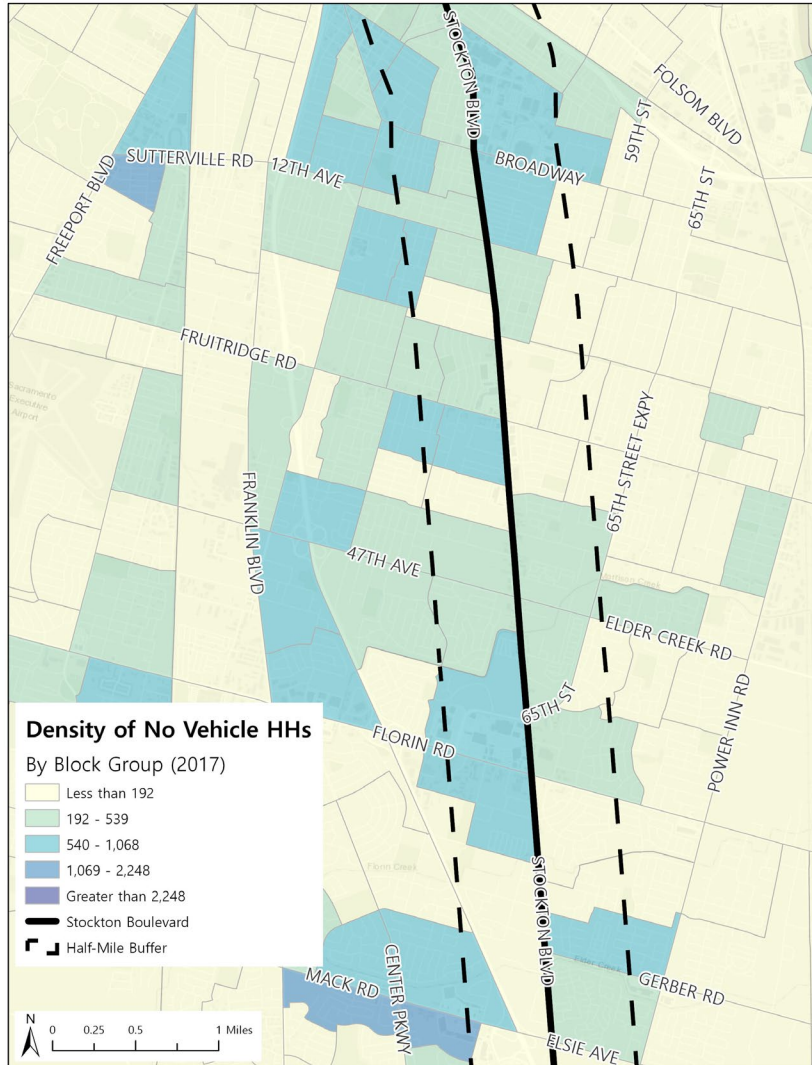
MAPS - COMMUTE TIMES



MAPS - DEMOGRAPHICS



MAPS - DEMOGRAPHICS



LAND USE

The land use along Stockton Boulevard varies from low-density residential, to retail/commercial, industrial, and office uses. The stretch of Broadway between Highway 99 and Stockton Boulevard is mostly retail/commercial and office land uses with some residential areas. From Broadway to Florin Road on Stockton Boulevard is similarly residential, retail/commercial with some light-industrial uses as well. Florin Towne Centre specifically consists of approximately 484,500 square feet of commercial uses with major retailers, banks and a gym. Between the Florin Towne Centre and Mack Road, there is a mix residential, light-industrial, and retail/commercial areas.

The following are major destinations within a 1/2-mile distance of Stockton Boulevard corridor:

Libraries

Southgate Community Library
Valley Hi – North Laguna Library
Colonial Heights Community Library

Parks

Sky Park
Lawrence Park
Colonial Park

4th Ave Park
McClatchy Park
Oak Park Community Center

Medical Centers

Sacramento County Mental Health Treatment Center
University of California Davis Medical Center
Florin Dialysis Center
Sierra Vista Hospital
Kaiser Fund Hospital – South Sacramento
Methodist Hospital of Sacramento

SURVEY DATA

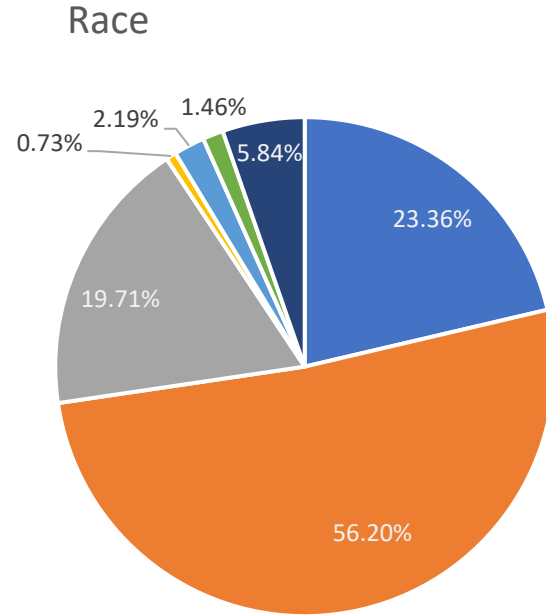
An on-board survey was conducted on January 13 – January 17, targeting 9 SacRT routes of interest for the High Capacity Bus Corridor Study.

The survey included questions about origins and destinations, trip purpose, access (and barriers to access), customer satisfaction with various service characteristics, and priorities.

Of 542 total completed surveys, 137 surveys were completed by customers on Route 51.

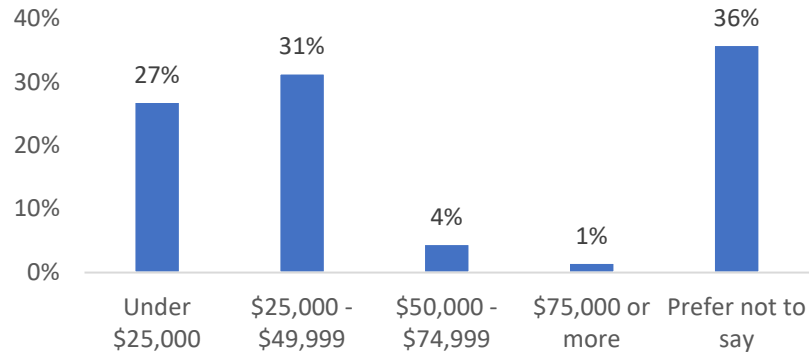
SURVEY DATA – Demographic Information

- White/Caucasian
- Black/African American
- Spanish/Hispanic/Latino
- Asian/Pacific Islander
- American Indian/Alaskan Native
- Other
- Prefer not to say

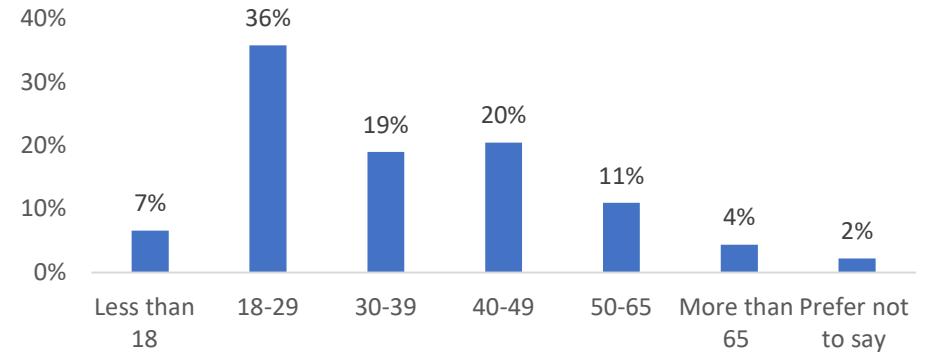


- The majority of respondents identify as Black/African American.
- Over half of respondents make less than \$50,000 per year.
- The highest proportion of respondents are 18-29 years old.

Income

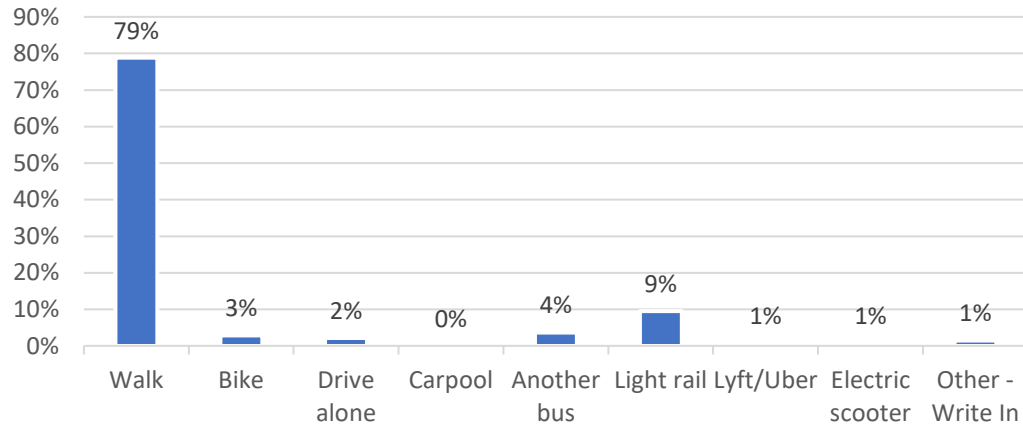


Age

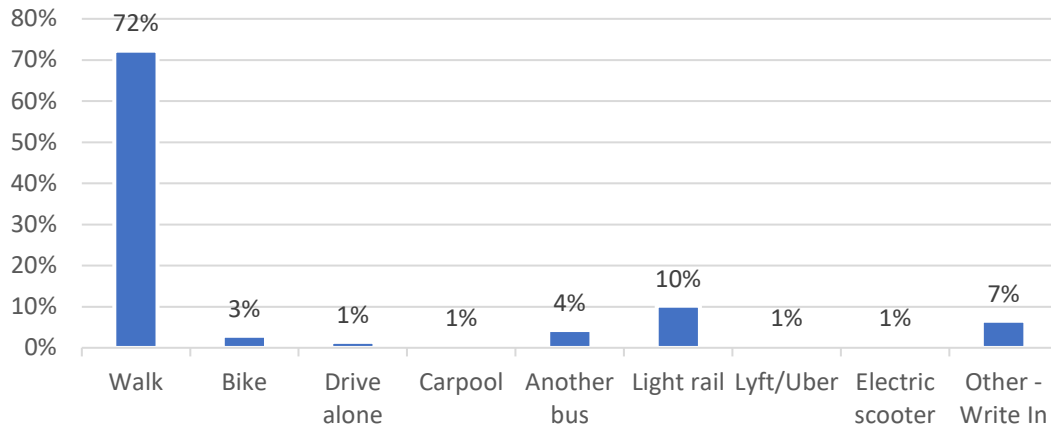


SURVEY DATA – Access

How do you typically get to the bus stop when using this route?

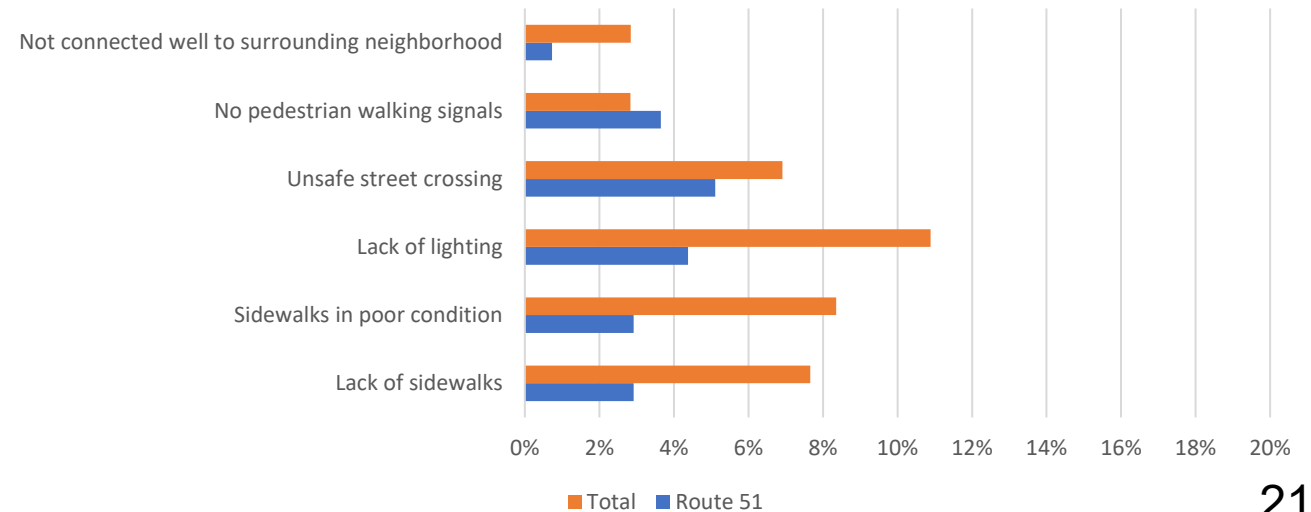


How do you typically get to your final destination when getting off this route?



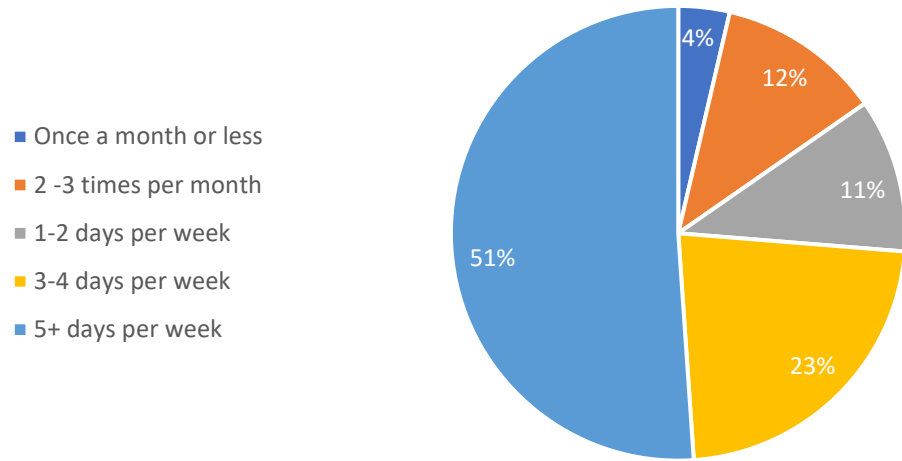
- A vast majority of respondents get to the bus stop and their final destination by walking, followed by the light rail.
- Respondents have few issues with accessing bus stops, especially compared to other bus routes.

Do you experience any issues in accessing transit stops on this route?



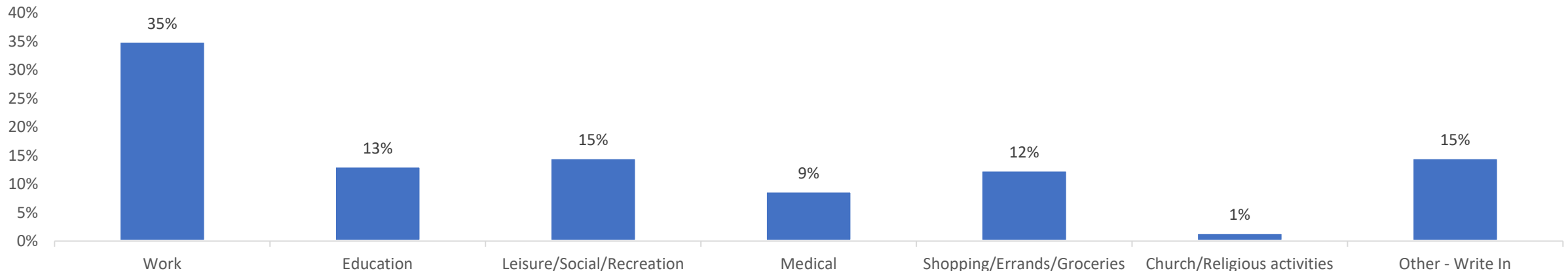
SURVEY DATA – Purpose and Frequency

How often do you ride this route?



- Most respondents ride the bus 5+ days per week.
- 35% use Route 51 to get to work, which is a relatively low proportion compared to industry as a whole. Most of the 15% write-in responses noted that they use Route 51 for all of the purposes listed.

For what primary purpose do you ride this route most frequently?



SURVEY DATA – Satisfaction and Importance

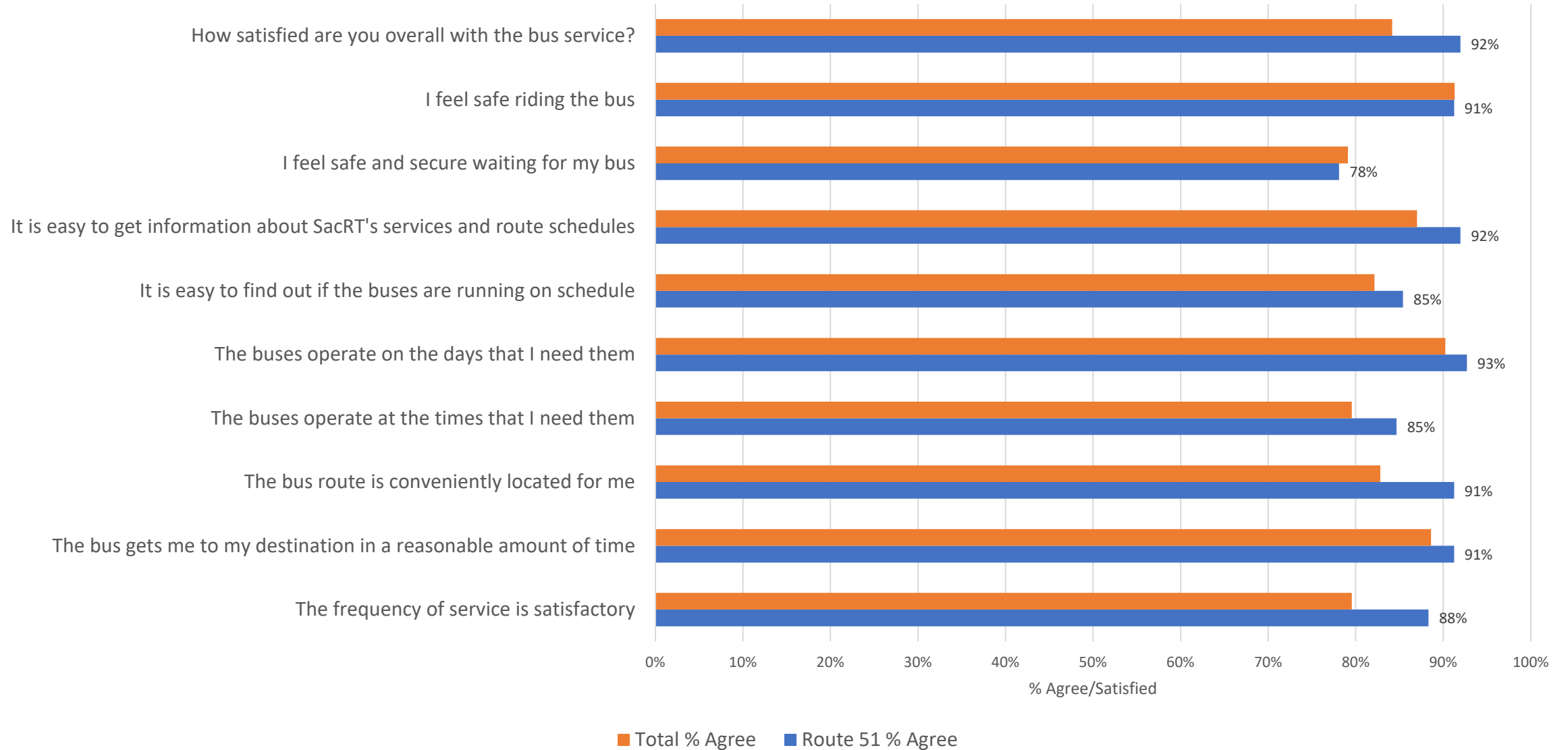
Respondents are generally very satisfied with Route 51, especially compared to respondents on other bus routes.

Top 3 Most Important Areas of Service	Top 3 Most Important Amenities/Features
<ul style="list-style-type: none">• Frequency• Buses arrive on time• Travel time	<ul style="list-style-type: none">• Wi-fi• Benches/shelters at stops• USB charging stations

Bottom 3 Statements (Respondents were least satisfied in these areas)

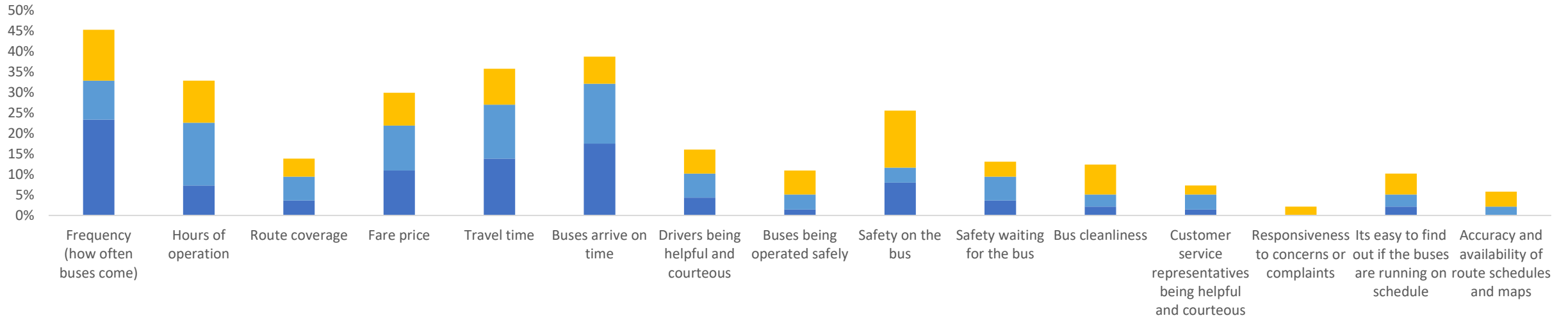
- I feel safe and secure waiting for my bus
- It is easy to find out if the buses are running on schedule
- The buses operate at the times that I need them

SURVEY DATA – Satisfaction Statements

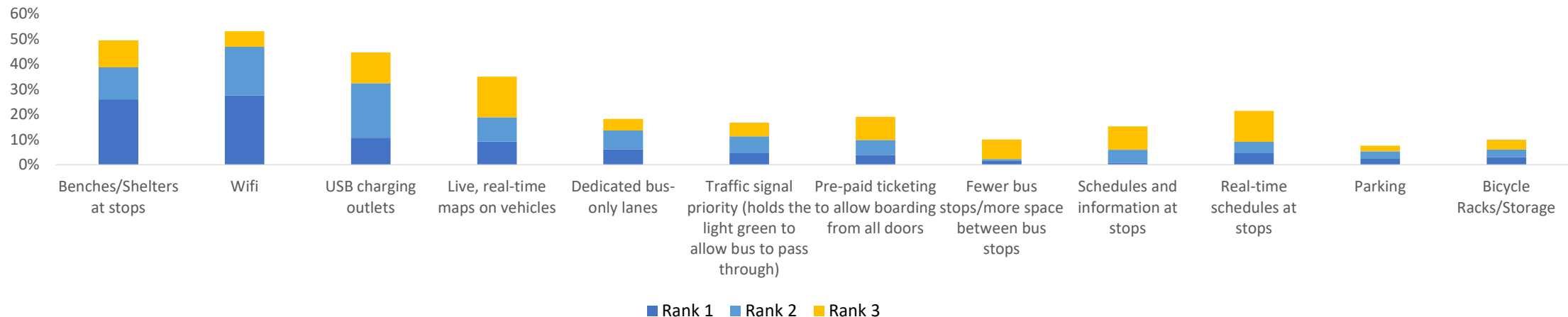


SURVEY DATA – Importance Rankings

What are the top 3 most important areas of service for you as a user of public transportation?



What are the top 3 amenities/features that you feel are most important when providing high-capacity transit?



SURVEY DATA – Net Promoter Score

As part of the survey, we gathered information to calculate the Net Promoter Score (NPS), which is considered a key metric across all industries to gauge word-of-mouth favorability and overall customer experience.

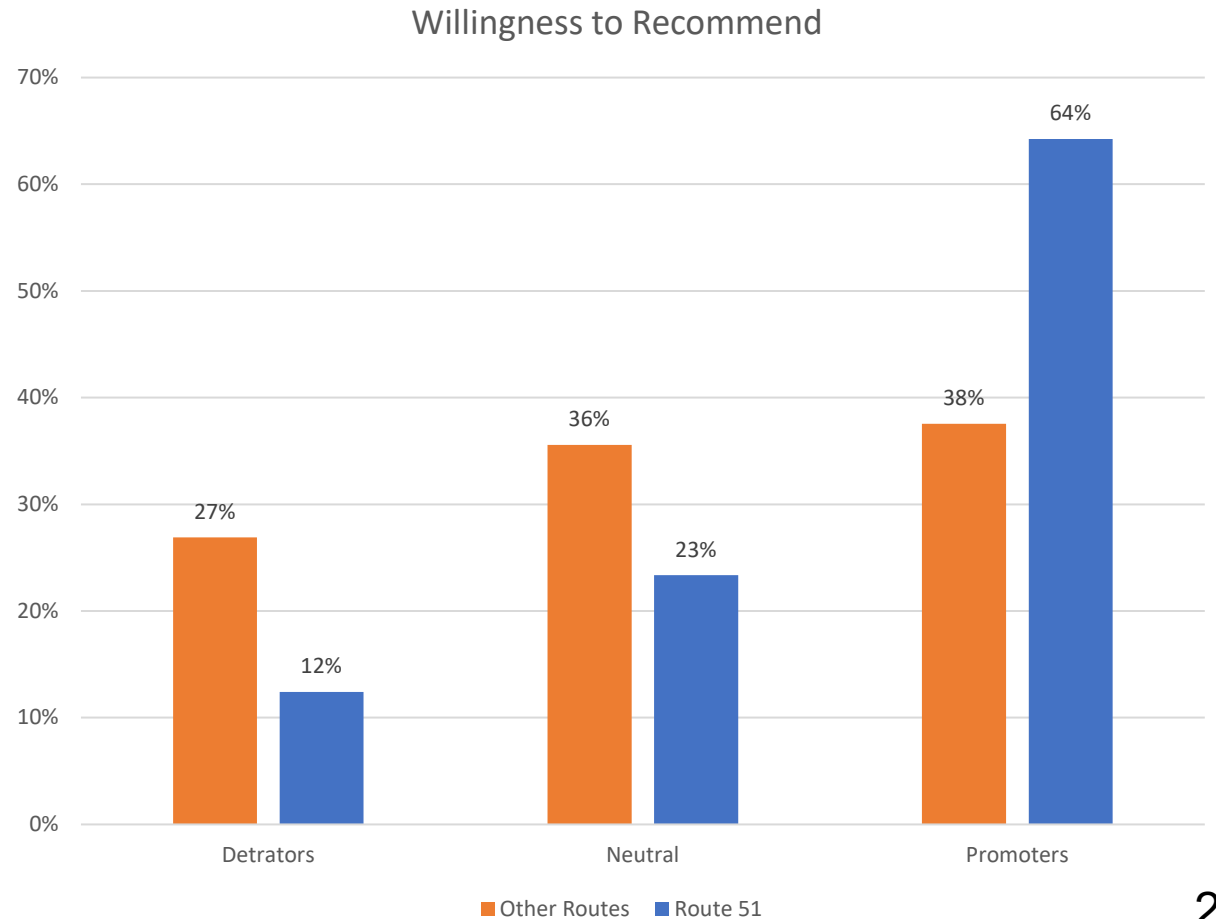
Customers were asked:
“How likely would you be to recommend riding a SacRT bus to a friend or neighbor, on a scale of 0-10?”

0-6 are Detractors
7-8 are Neutral
9-10 are Promoters

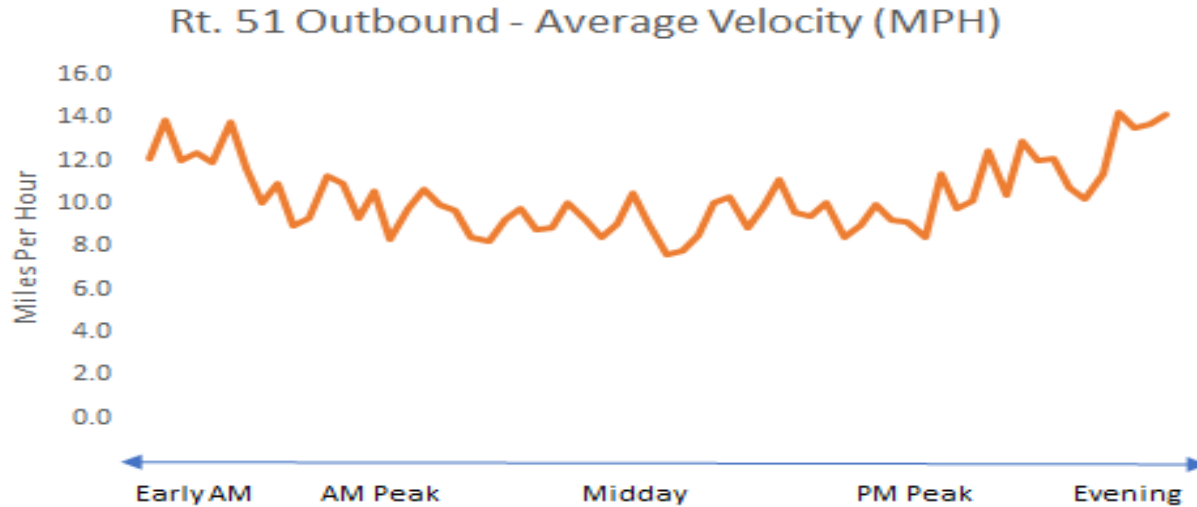
**NPS = % Promoters
minus the % Detractors**

A much higher proportion of Route 51 customers would recommend SacRT than the average of all other routes surveyed.

52% is the NPS for Route 51



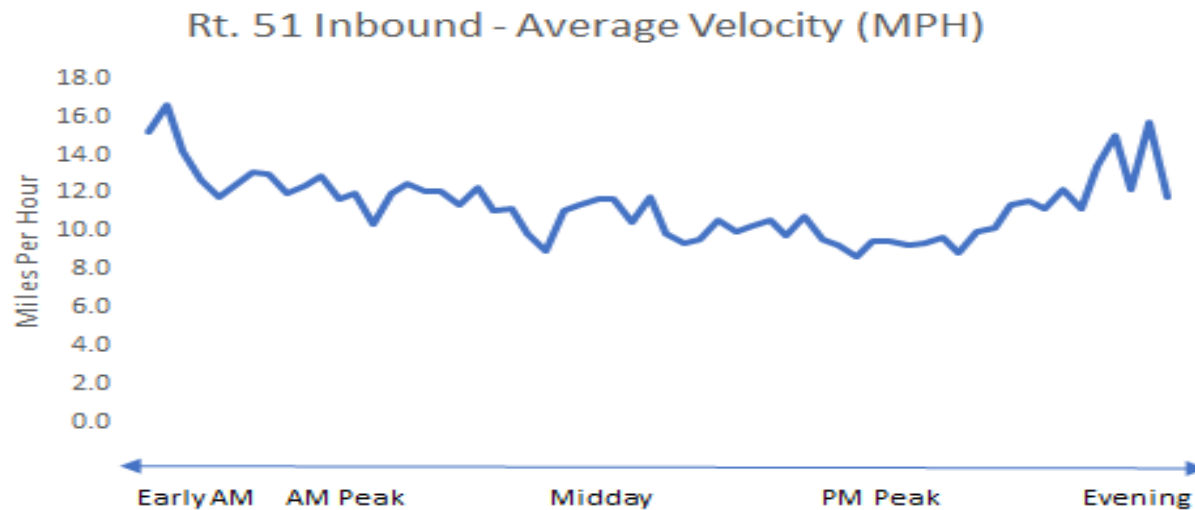
OPERATIONAL DATA - AVG SPEED BY TIME OF DAY



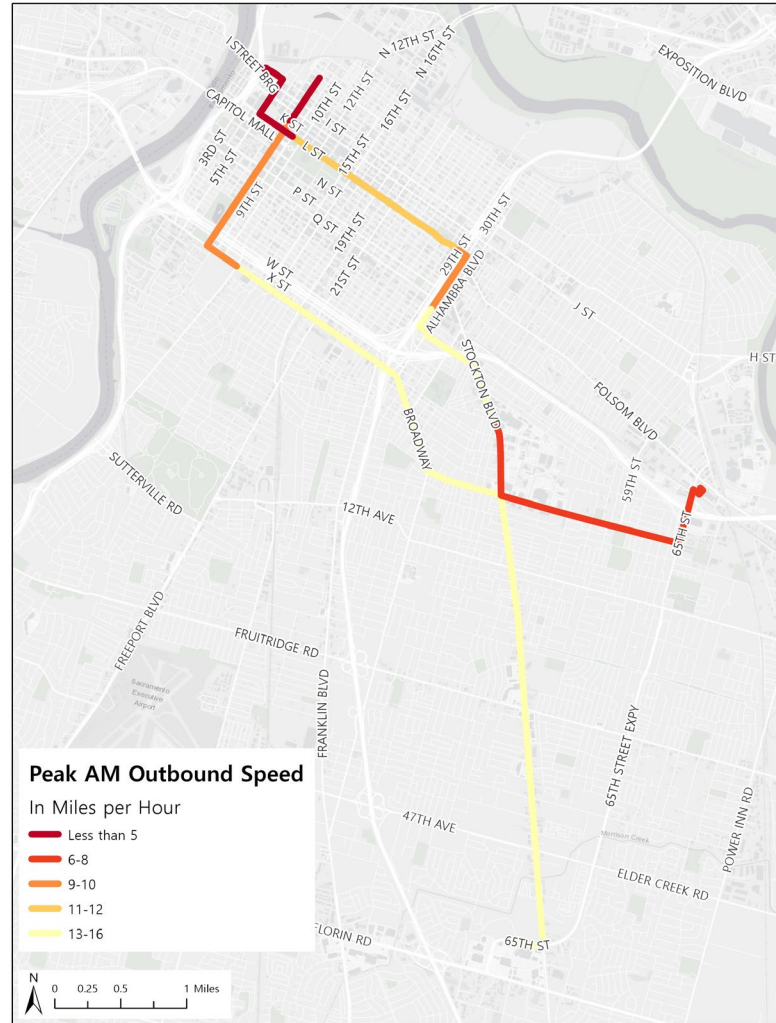
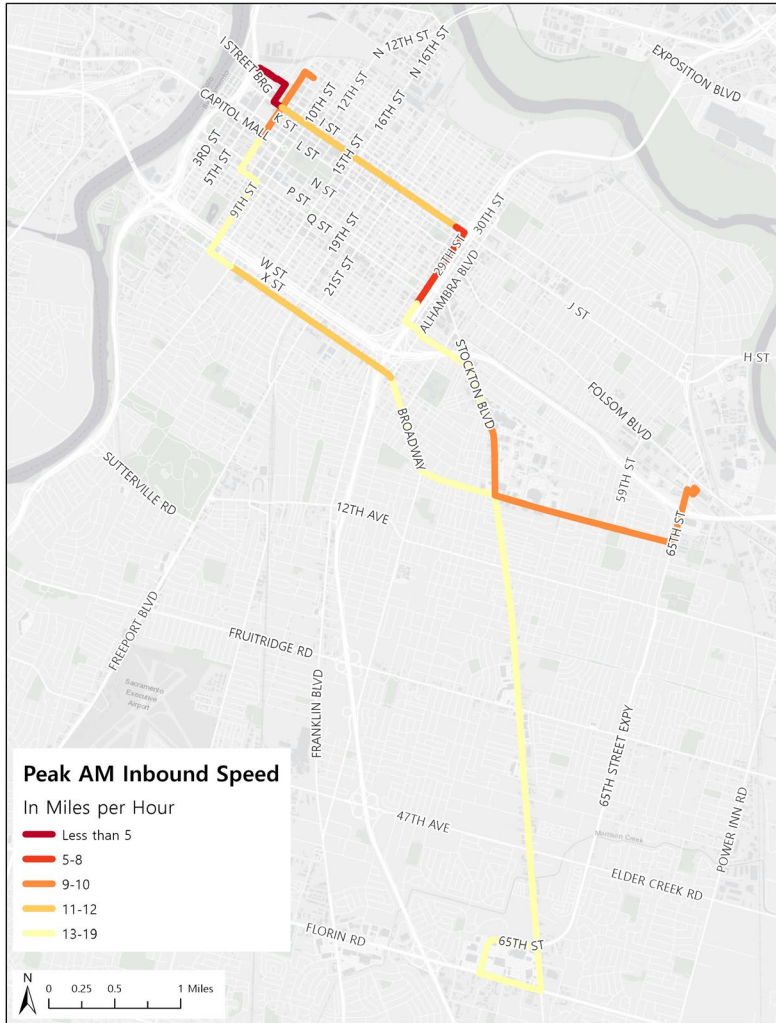
The total average speed is 10.9 miles per hour.

The slowest speed is 7.8 miles per hour on the 1:15/1:30pm trips traveling from Florin Towne Centre into Downtown.

The fastest speed is 16.6 miles per hour on the 6:20am trip from Downtown to Florin Towne Centre.

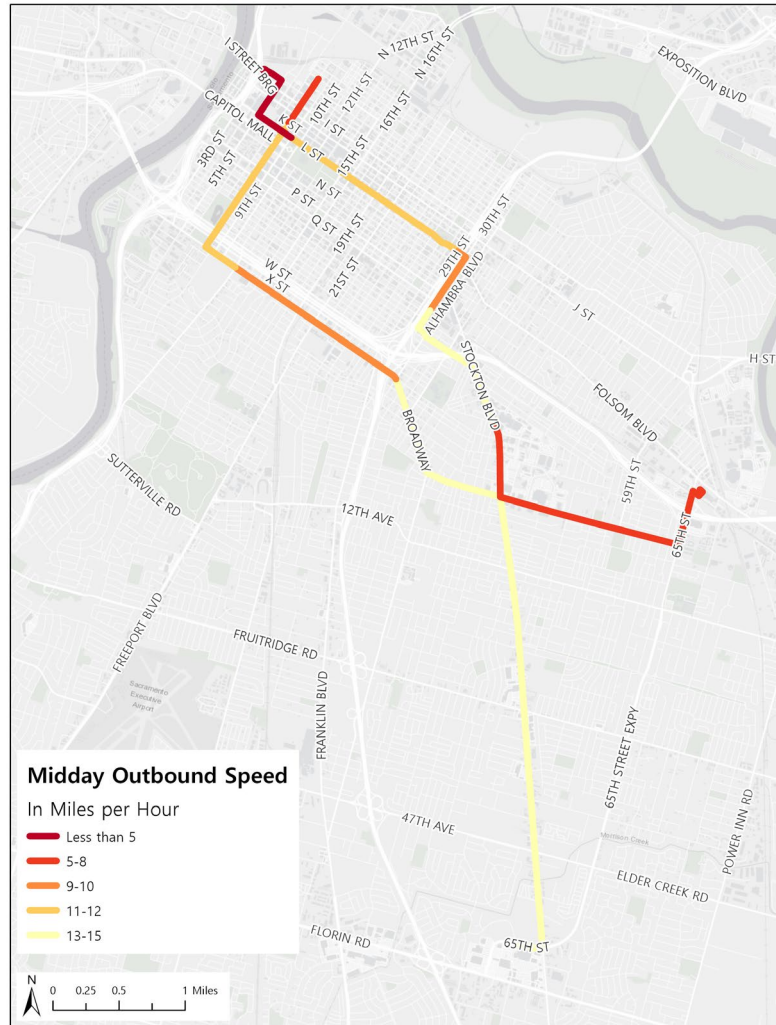
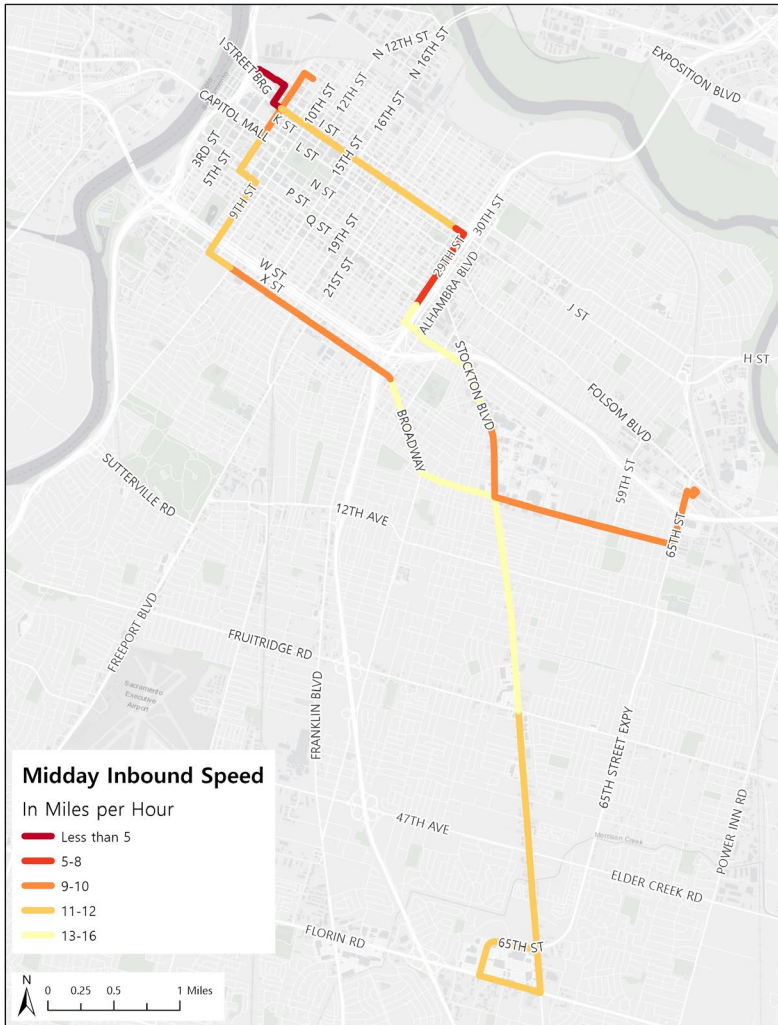


OPERATIONAL DATA - AVG SPEED Peak AM



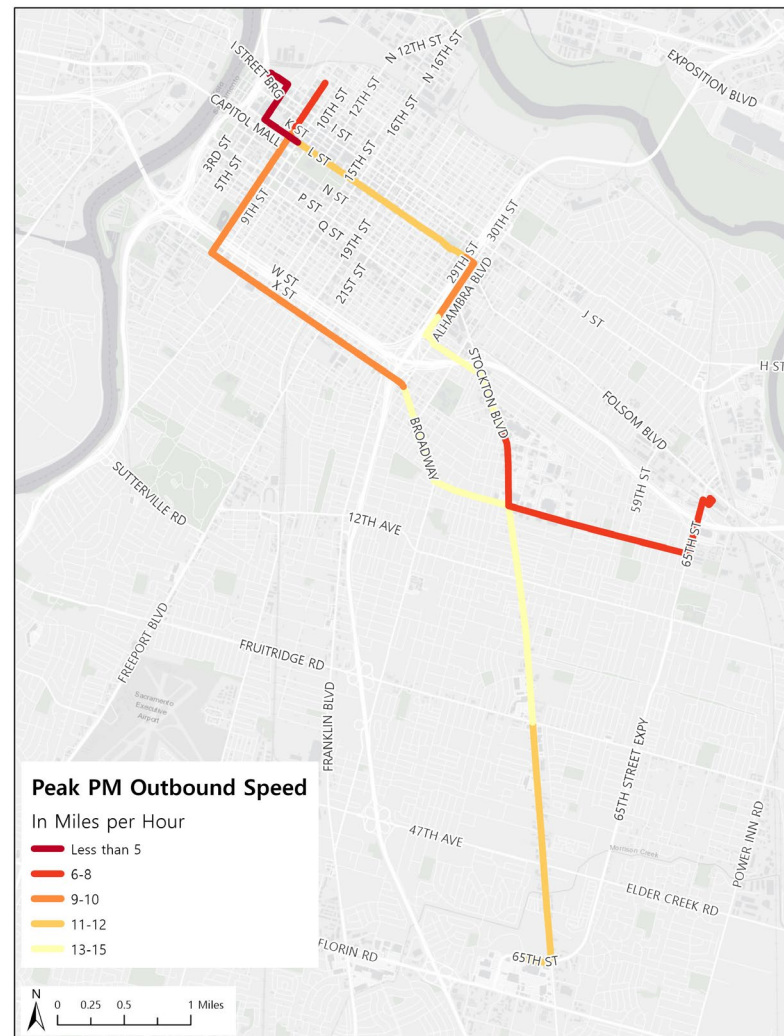
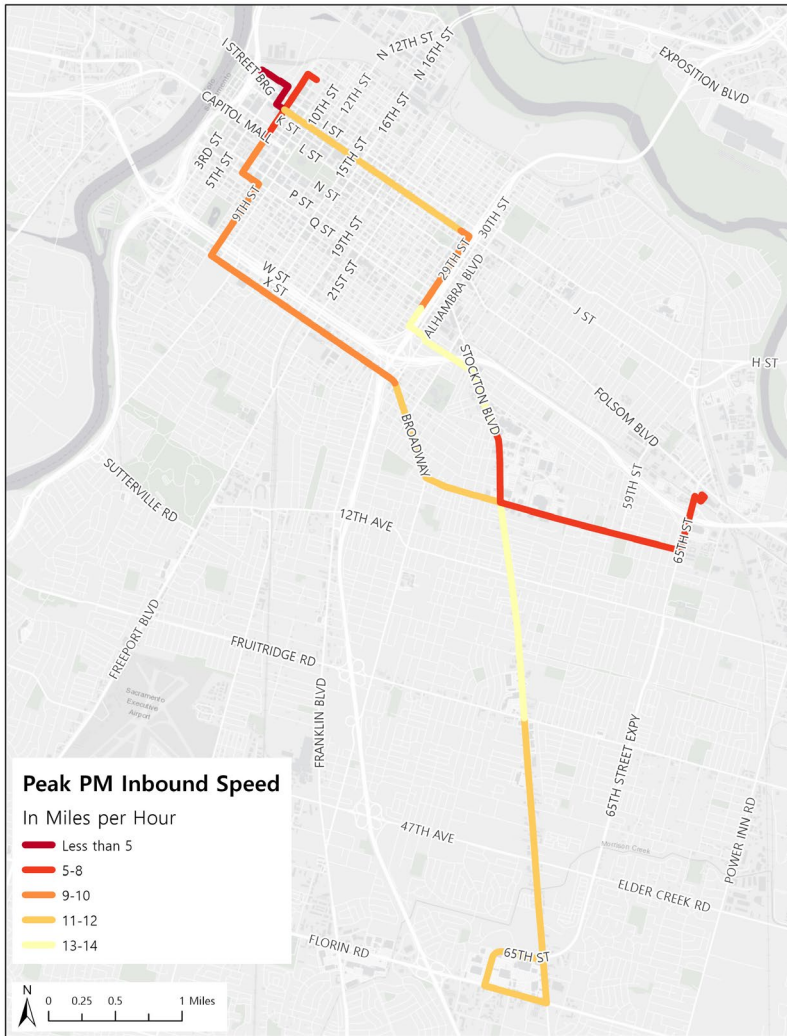
The fastest AM trips are between Florin Road and Broadway.

OPERATIONAL DATA - AVG SPEED Midday



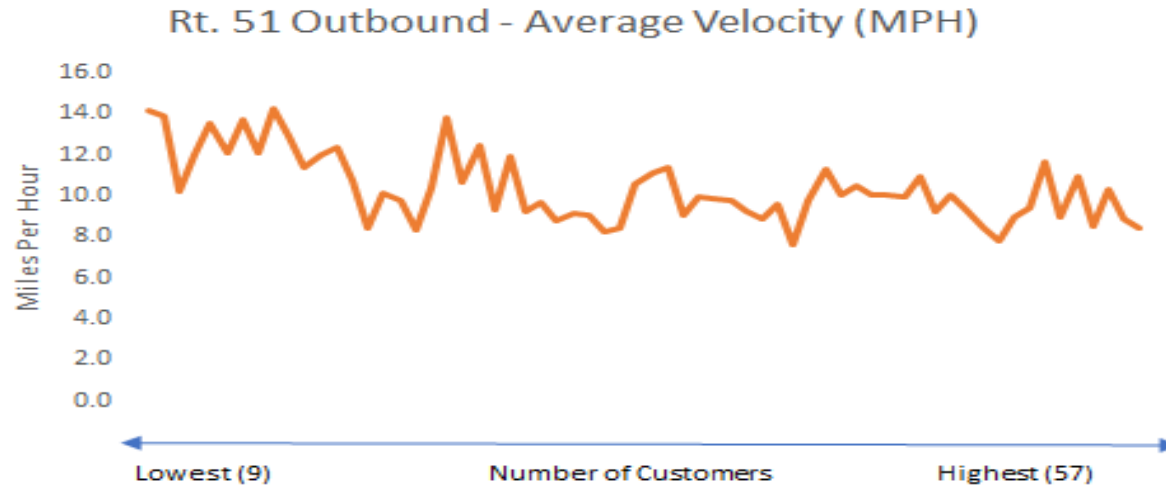
Inbound Midday speeds are slower between Florin Road and Fruitridge Road.

OPERATIONAL DATA - AVG SPEED Peak PM

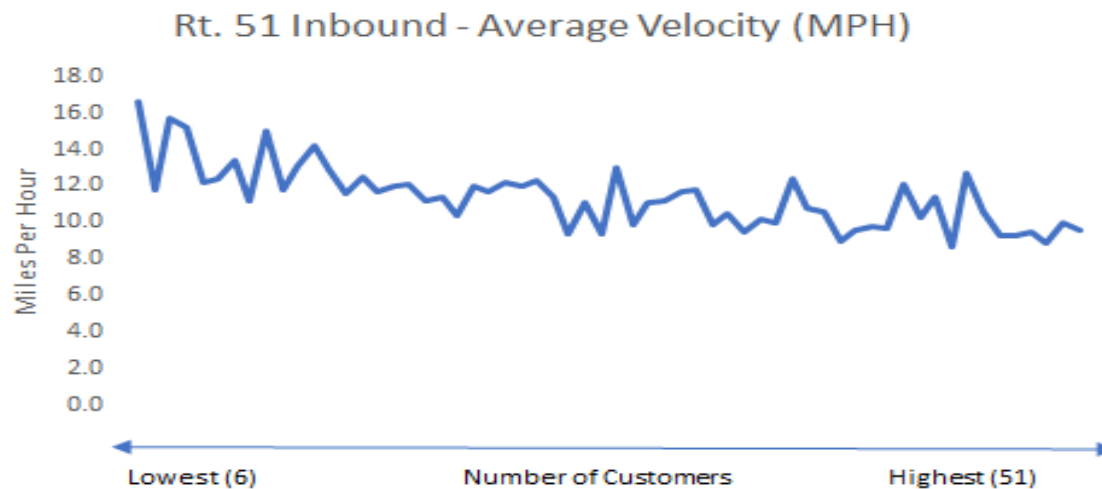


Inbound and Outbound Peak PM speeds are slowest between Florin Road and Fruitridge Road, and north of Broadway.

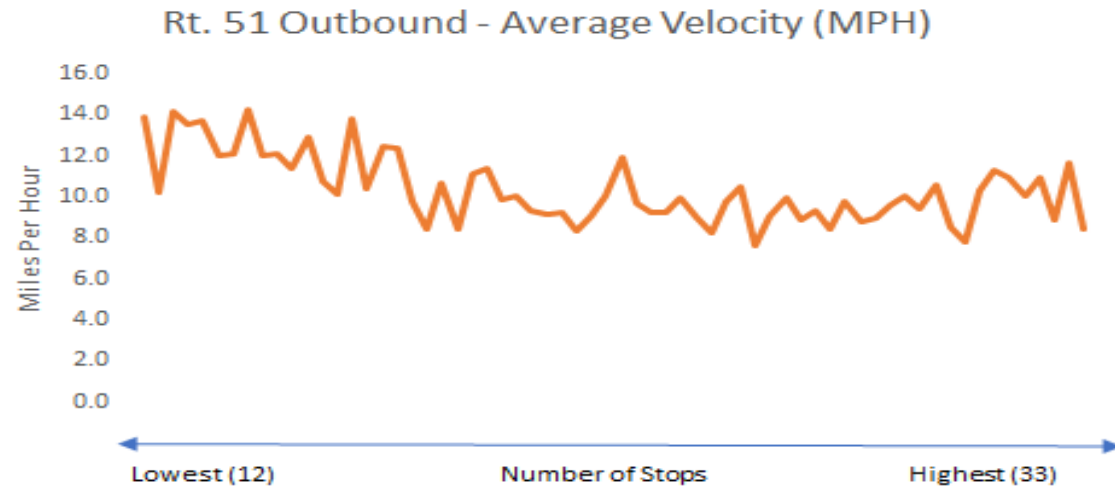
OPERATIONAL DATA - AVG SPEED BY RIDERSHIP LEVELS



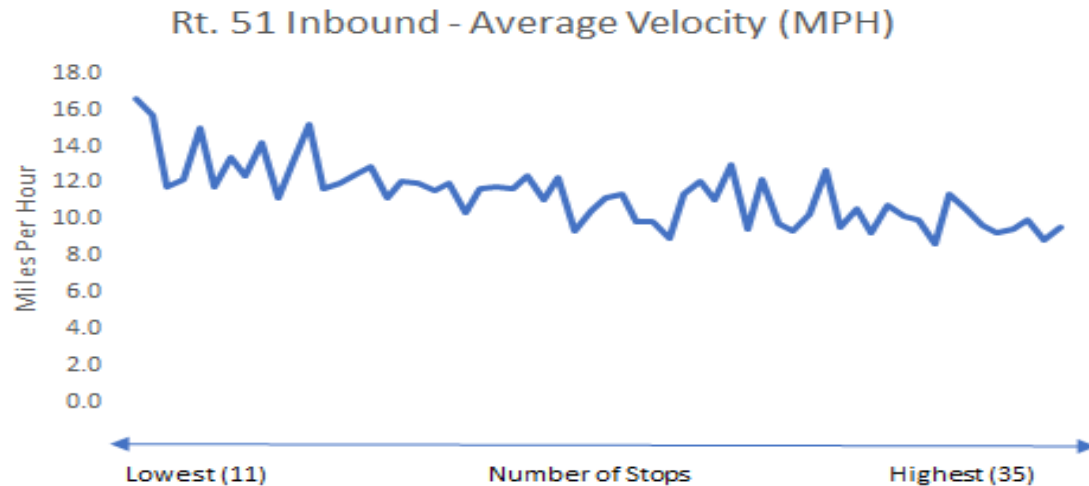
In general, both inbound and outbound speed decreases as ridership levels increase.



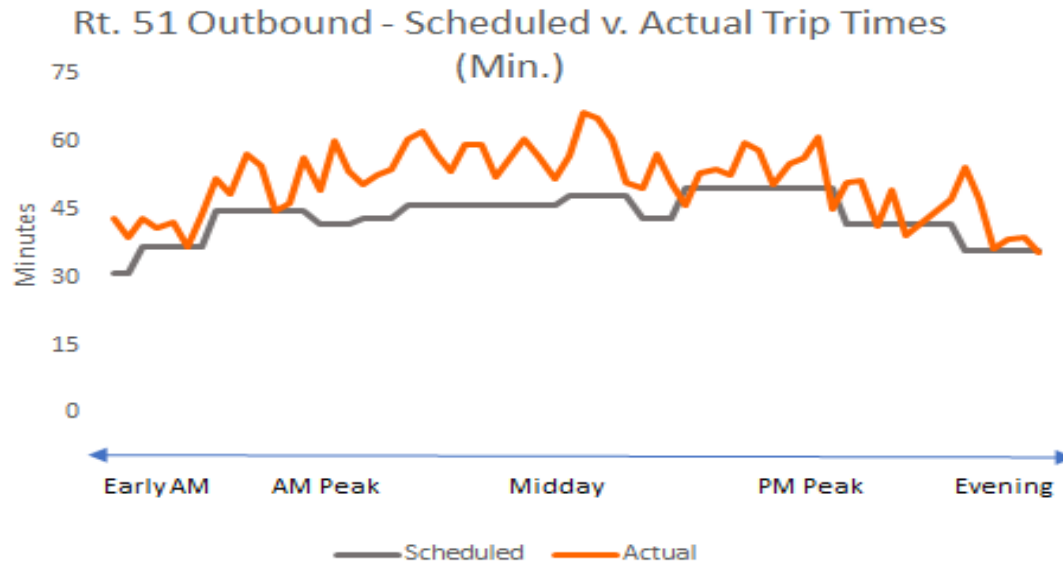
OPERATIONAL DATA - AVG SPEED BY NUMBER OF STOPS



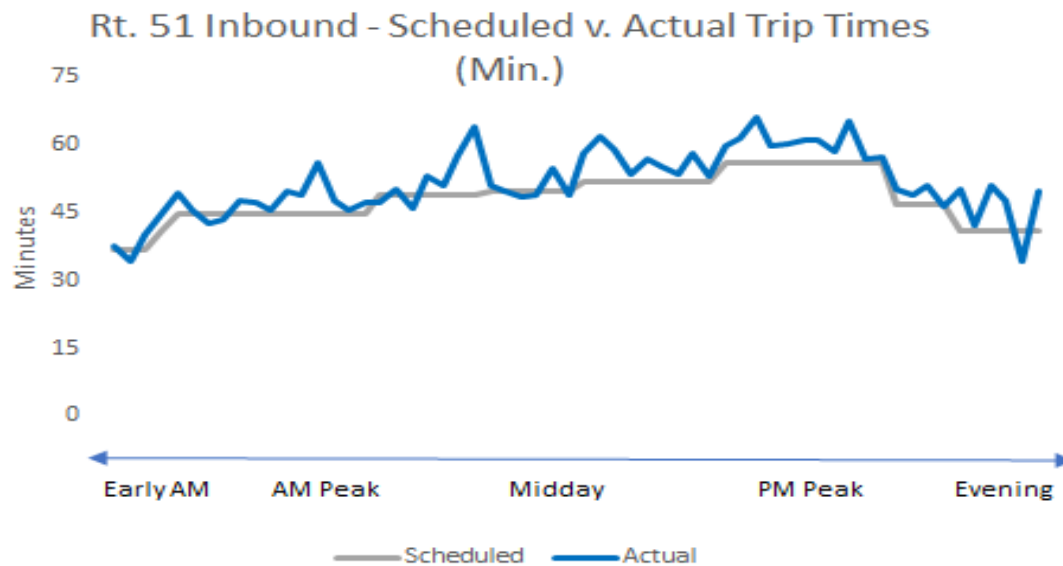
Similarly, inbound and outbound speeds decrease as number of stops increase.



OPERATIONAL DATA - SCHEDULE DEVIATION BY TIME OF DAY

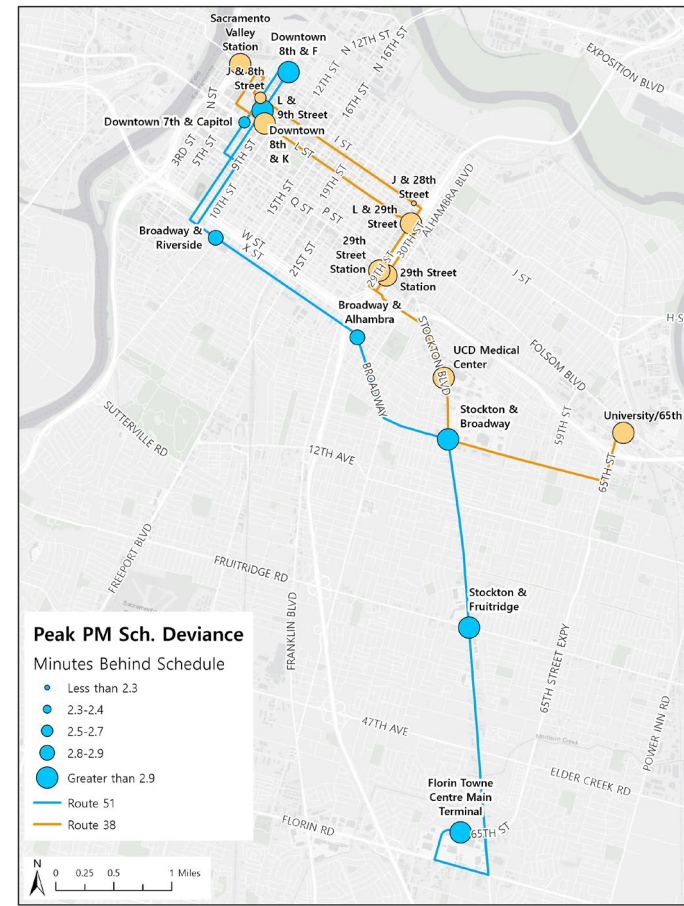
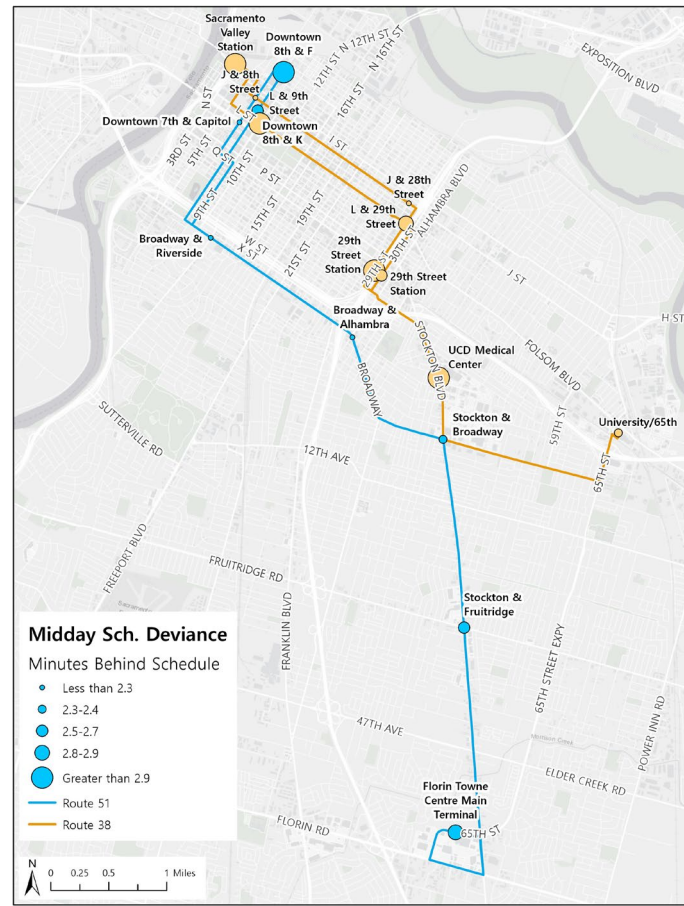
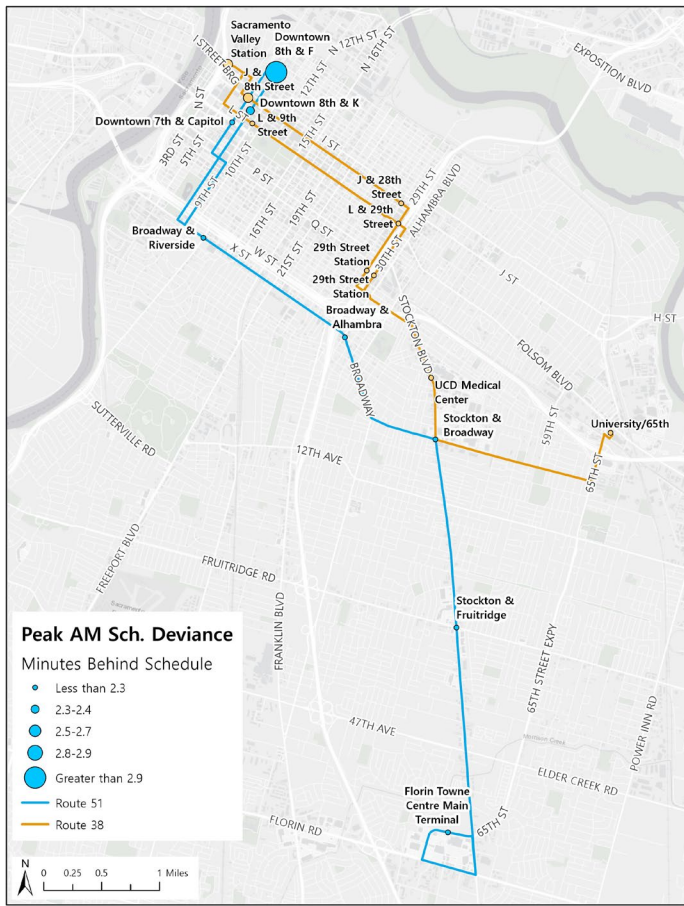


The greatest schedule deviations – shown in the chart as the gap between the gray and orange lines – is during the Midday period for Outbound trips.



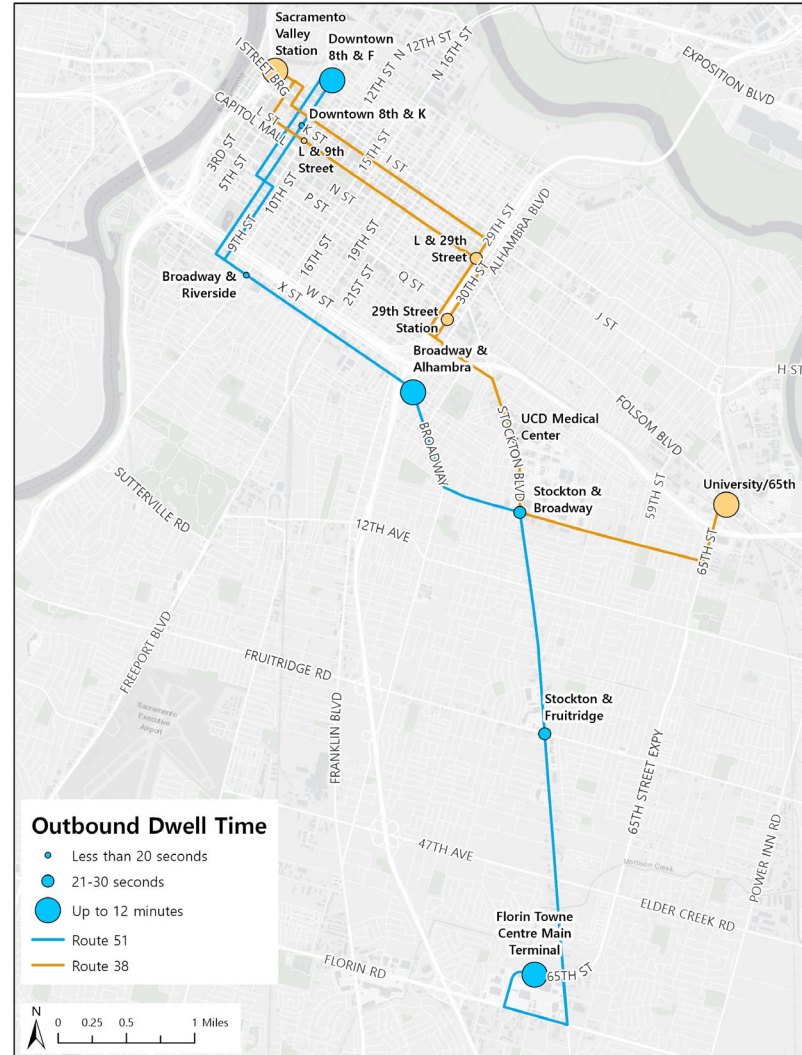
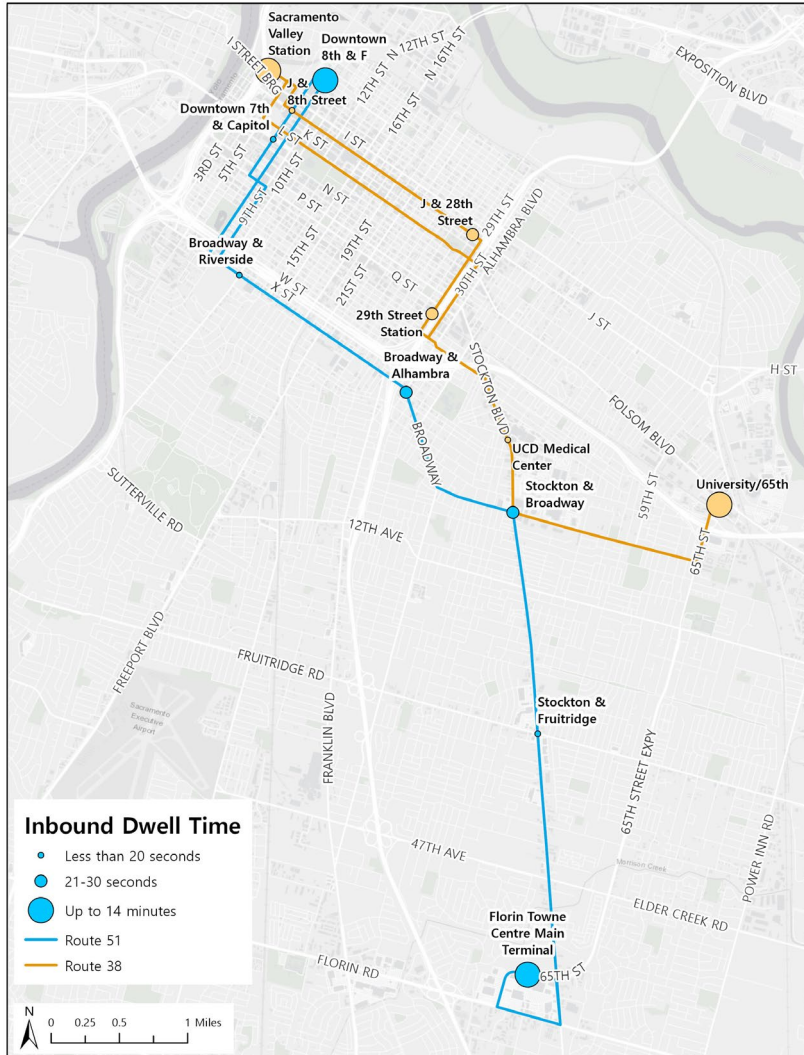
Inbound trip schedule deviation is smaller overall than Outbound trip schedule deviation.

OPERATIONAL DATA - SCHEDULE DEVIATION BY TIME OF DAY



The greatest schedule deviations occur during the Peak PM time period.

OPERATIONAL DATA – Dwell Time

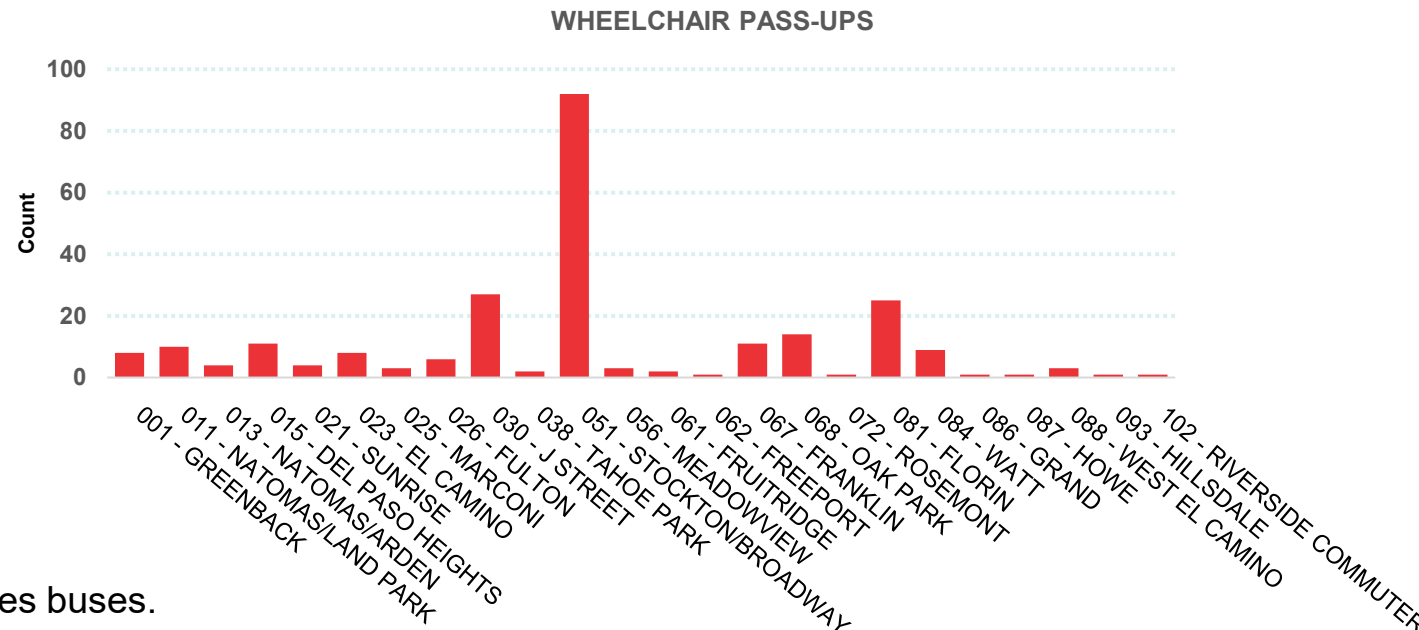
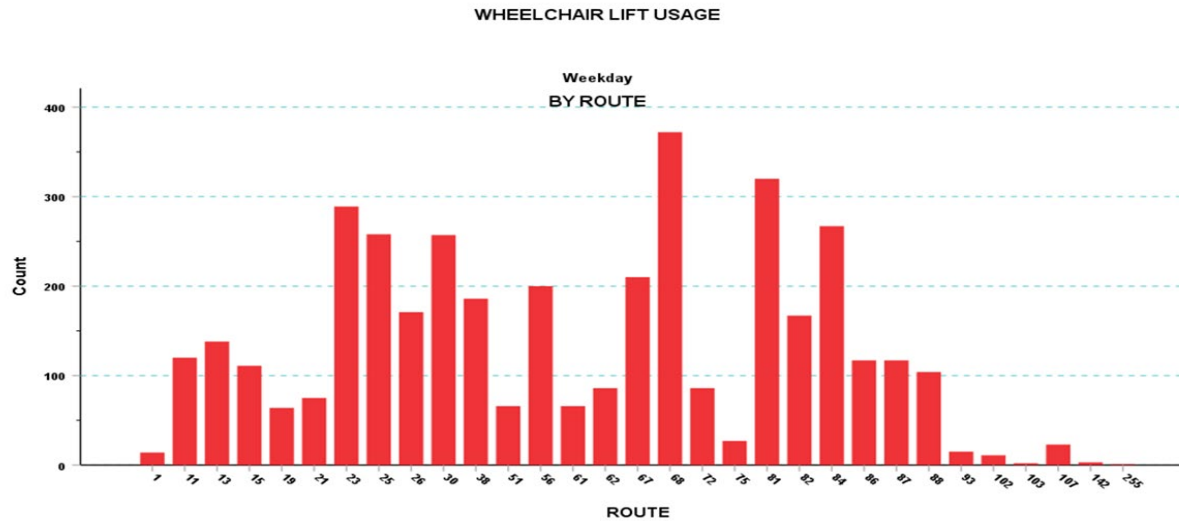


Florin Towne Centre Main Terminal has the longest dwell times along the corridor, followed by Stockton & Broadway.

CUSTOMERS WITH WHEELCHAIRS BOARDING ACTIVITY

Although data may be skewed due to type of bus operating on the route*, fewer customers using wheelchair lifts were recorded on Route 51 than Route 38 and many other routes in the network. Route 51 sees a higher number of pass-ups than other routes due to designated ADA areas being full.

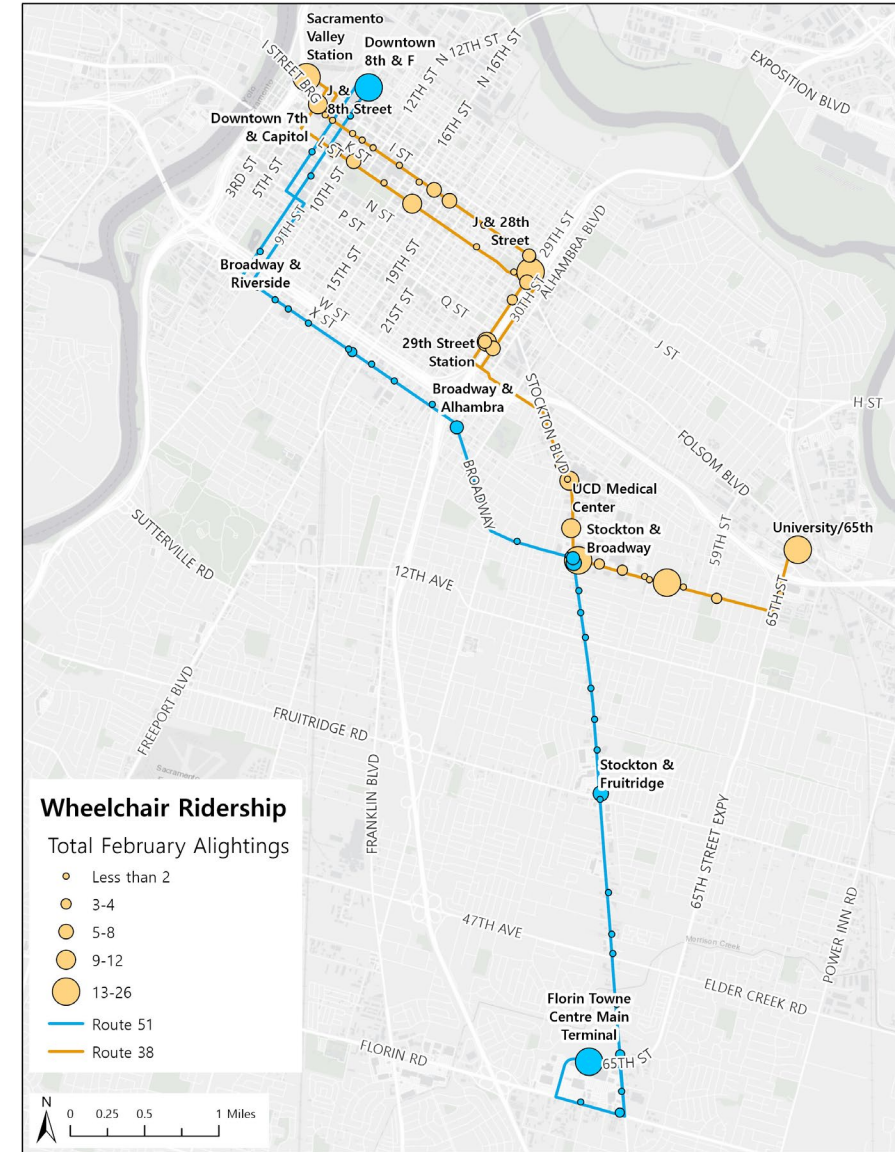
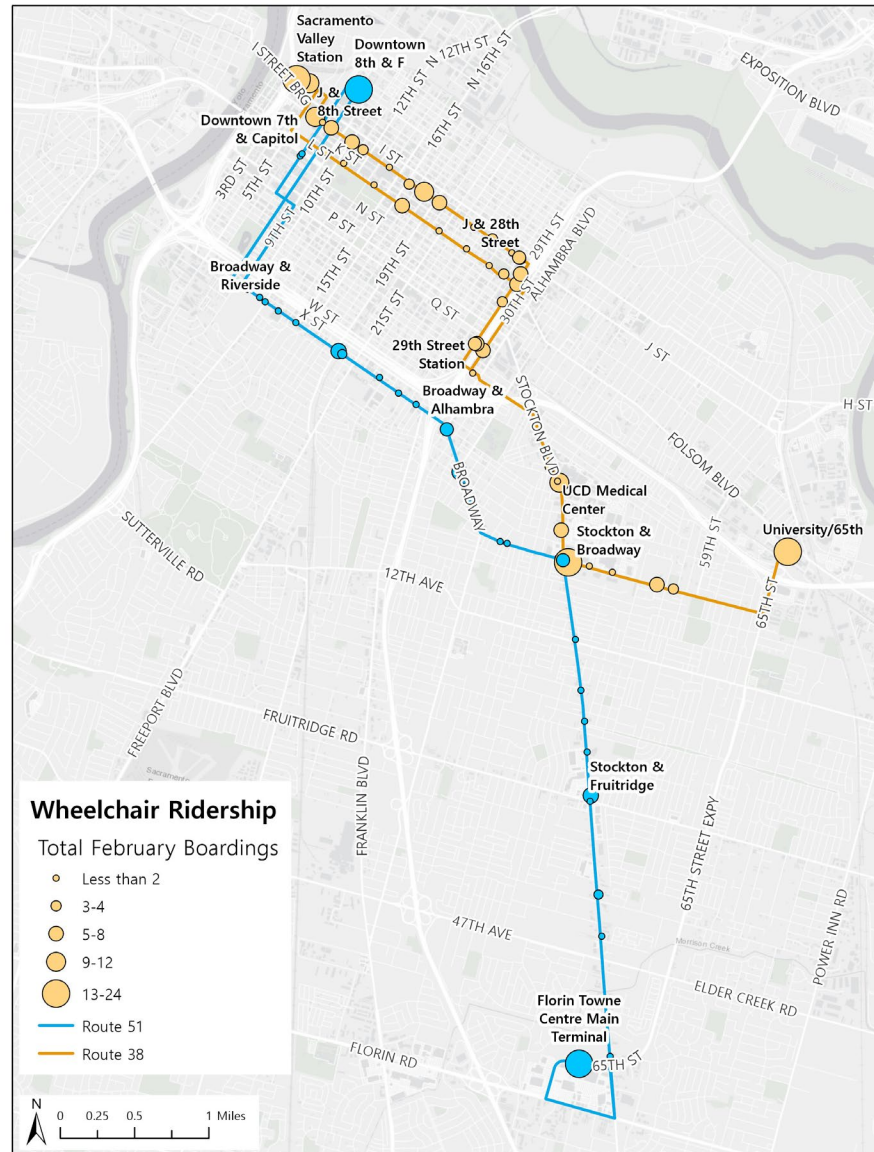
- 66 customers with wheelchairs were recorded boarding Route 51 during the month of February; 18 pass-ups were reported during this period.
- 186 were recorded on Route 38, though many of those were recorded on portions of the route outside of the Stockton Blvd corridor; no pass ups were recorded during this period.



*Wheelchair lift usage may only be counted on the 1500 series buses.

WHEELCHAIR ACTIVITY

UCD Medical Center, Stockton Boulevard, and Florin Towne Centre have the greatest wheelchair alightings and boardings.

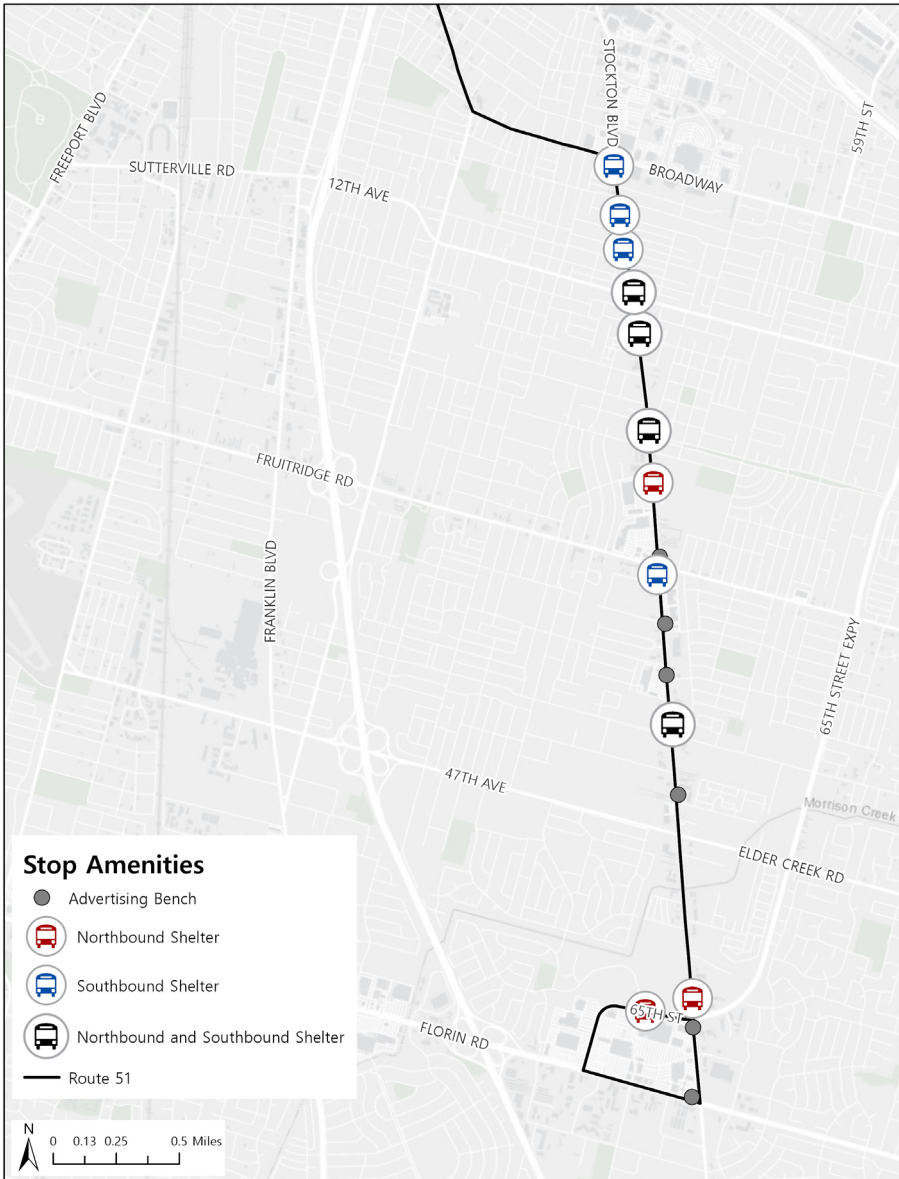


FARE USAGE

Only 15% of customers on the 51 bus pay for their trip in cash, while 2x as many pay using Connect Card taps. This indicates that there is likely less opportunity for SacRT to realize en route travel time savings related to fare payment or significant improvements from any future offboard payment investments.

Fare Type	Feb Riders	% of Total
Connect Card Taps	24,112	30%
Students	17,864	22%
Cash	11,735	15%
Other Prepaid	7,747	10%
ZipPass	5,626	7%
Los Rios	3,845	5%
DHA	3,173	4%
Transfer	2,002	2%
Sr/Disable Monthly	1,321	2%
CSUS	993	1%
Daily pass Swipe	885	1%
Monthly Passes	556	1%
Discount Daily Pass	376	0.5%
Amtrak	139	0.2%
Total	80,374	

BUS STOP AMENITIES



SacRT currently has an advertising contract with Clear Channel for bus shelters and benches. SacRT provides locations for these amenities, and Clear Channel determines whether it will be an ad shelter or bench primarily based on ad salability.

Overall

- 23 bus stops (southbound); 8 have shelters
- 17 stops (northbound); 7 have shelters

Northbound & Southbound Shelters

- Stockton and 13th/14th Avenues
- Stockton and 17th Avenue/San Francisco Boulevard
- Stockton and Perry/21st Avenues
- Stockton and Lemon Hill Avenue

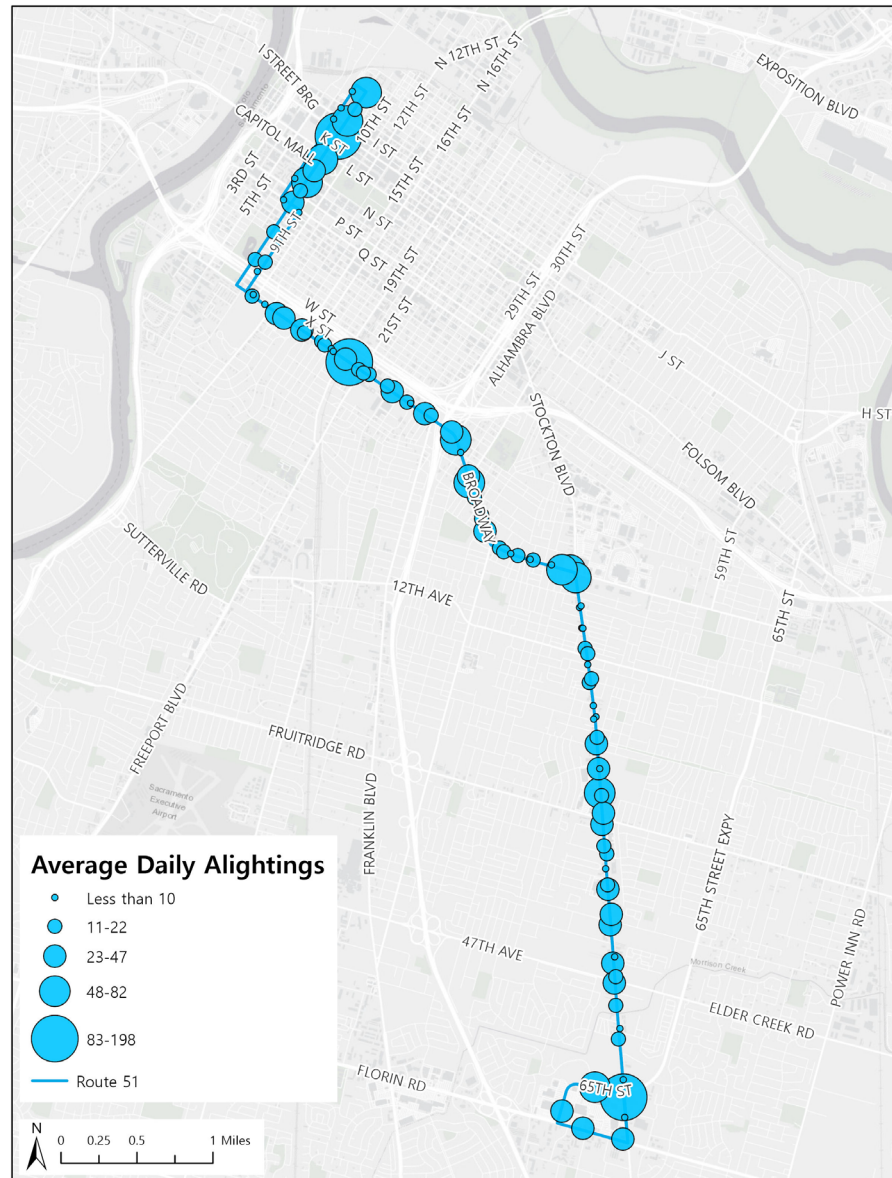
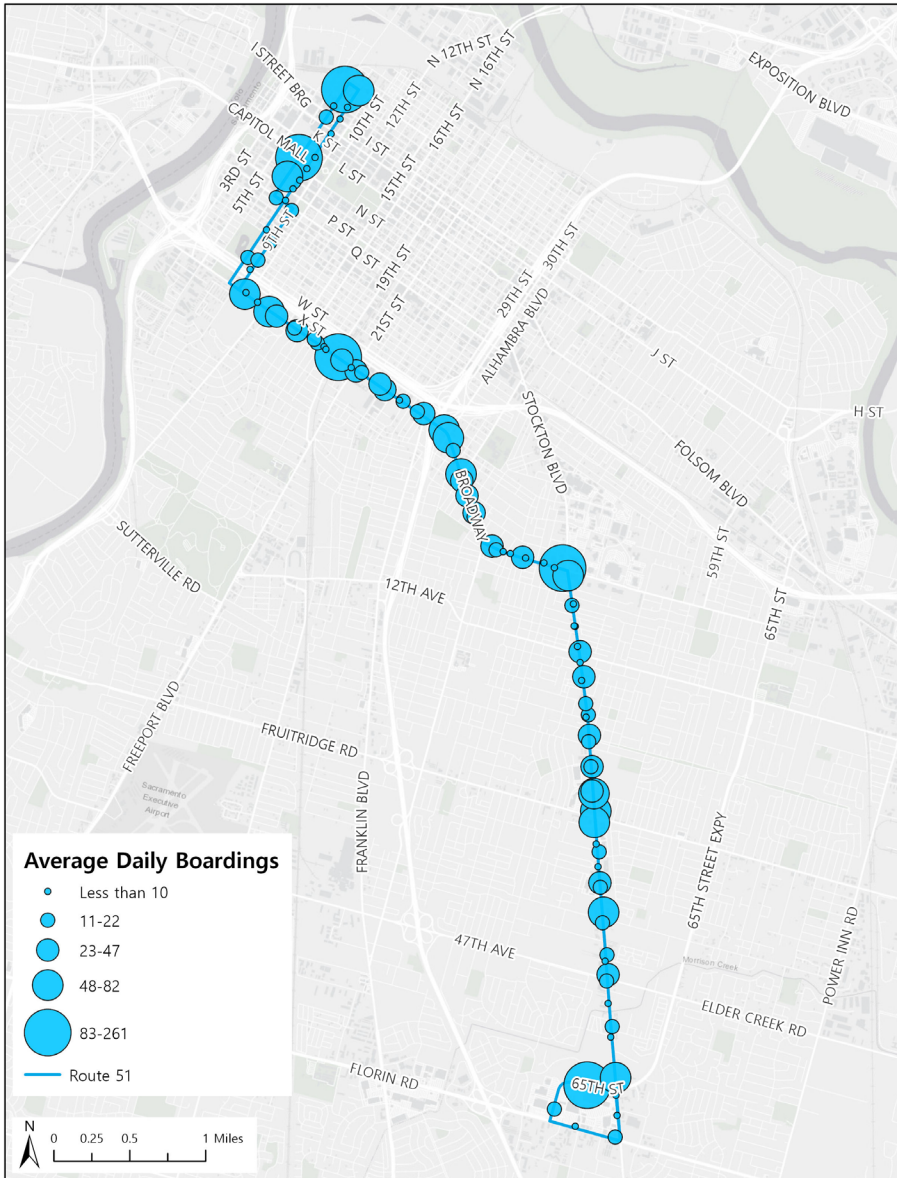
Northbound-Only Shelters:

- 65th Street and Sky Parkway
- Stockton and 65th Street
- Stockton and Lawrence Drive

Southbound-Only Shelters:

- Stockton and Broadway
- Stockton and 9th Avenue
- Stockton and 11th Avenue
- Stockton and Fruitridge Road

RIDERSHIP



The greatest average daily boardings and alightings along Stockton Boulevard occur at 65th Street & Sky Parkway, Stockton & 65th Street, Stockton & Broadway and Stockton & Fruitridge Road.

HIGH-LEVEL OPPORTUNITIES

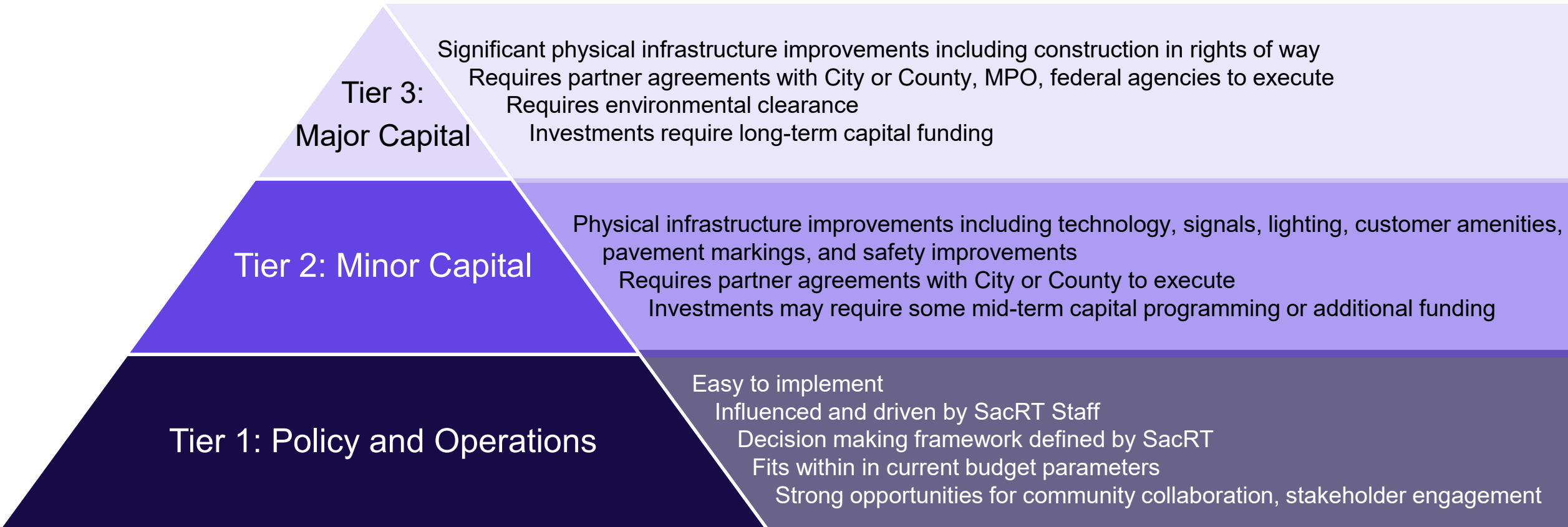


The opportunities identified are designed to link mobility outcomes, transit service, and customer experience into a coordinated vision through partnership with the City of Sacramento and stakeholders in the corridor.

These opportunities align safety and infrastructure investments with City of Sacramento Vision Zero, while optimizing transit operational performance.

Opportunities are defined within a tiered investment strategy.

HIGH-LEVEL OPPORTUNITIES: TIERED INVESTMENT STRATEGY



Recommendations respond to customer feedback from field surveys and observation of physical and operating conditions of the corridor. This framework allows SacRT flexibility and adaptability to pursue strategies that build upon each other in a coordinated fashion to optimize limited resources creating objective triggers of performance and funding for pilots and long-term solutions.

HIGH-LEVEL OPPORTUNITIES

Tier 1: Policy and Operations Opportunities

a. Establish corridor working group with City of Sacramento and community partners and stakeholders. Work towards mutually defined vision of success. Examples may include customer safety, pedestrian safety, and economic development.

g. Develop a comprehensive passenger access and amenities program.

b. Identify and develop operating and capital tactics around priorities defined by customers: Frequency; on-time performance; travel time; and span of service.

h. Evaluate and deploy stop spacing program, with special adherence to pedestrian safety vision of the City of Sacramento.

c. Improve quality of operator training to improve schedule adherence.

i. Develop partnerships with law enforcement, mental health, veteran affairs and ambassador programs for homeless and vagrant population.

d. Increase frequency to 10 minutes (peak or all day).

j. Enhance bus stop cleaning programming.

e. Update and enhance the transit amenity policy with greater objective criteria defining when and what amenities should be installed at bus stops.

k. Align bus stop and station design standards with City of Sacramento Vision Zero investments in the corridor.

f. Enforcement of on-street parking restrictions and turning movements.

l. Deploy skip stop service, minimal stops at: 65th, Fruitridge, Broadway, 21st, Capitol Mall, Downtown.

HIGH-LEVEL OPPORTUNITIES

Recognizing the ridership in the corridor, Stockton does have long term potential as a high capacity transit corridor. Care should be taken to collaborate with community partners to maintain the option for increased investment over time. As a strategy, SacRT should pursue investment strategies that build towards that scale in the future. The following table identifies infrastructure investments that could incrementally create capacity and direction towards arterial or bus rapid transit solutions over the next 20 to 30 years.

Tier 2: Minor Capital Investments	Tier 3: Major Capital Investments
a. Sidewalk and shelter amenity program	a. All-stop level boarding
b. Real time customer information resources at stops	b. All off-board fare collection
c. Improved street lighting at key stops and stations	c. Partial lane dedication
d. Rear door boarding, payment integration	d. Full corridor lane dedication
e. Super stops – level boarding, signage, and branding features at skip stops	
f. Transit Signal Priority	
g. Partial lane dedication in widened areas	
h. Queue by-pass	

CASE STUDY: ACCESSIBLE SHELTERS

Location: San Antonio, TX

Intervention: Covered shelters with comfortable seating, sidewalk connections and ADA accessibility

Actors:

VIA Metropolitan Transit
City of San Antonio
Texas DOT

Description:

VIA uses thresholds for ridership and wheelchair user activity to prioritize stop improvements—giving first priority to highest ridership stops without shelters, followed by stops without sidewalk access or a shelter. Because VIA coordinated bus stop changes with the DOT, shelter foundations and ADA improvements were included and paid for in planned roadway projects.

Cost: ~\$6,000 per shelter

Timeline: 3 years



Source: <https://transitcenter.org/taking-bus-stops-from-sorry-to-superb/>

**Results: 1,000 shelters.
95% of trips now begin at an accessible stop.**

CASE STUDY: BUS BULBS/PLATFORMS

Location: Los Angeles, CA

Intervention: Modular, recycled plastic elevated platforms.

Actors:

City of Los Angeles – Department of Transportation, Bureau of Street Services

Description:

Modular bus platforms were installed on 2 intersections on First Street between Main and Spring in Downtown LA. The platforms allow buses to avoid merging with traffic after stopping and decrease boarding and alighting times.

Ramps were provided to share the platforms with an existing bike lane.

Cost:

Bus platforms: \$20,000 - \$50,000

Timeline: 6 months



Source: <https://la.streetsblog.org/2017/10/18/eyes-on-the-street-bus-platform-pilot-on-first-street-in-dtla/>

Immediate Opportunity

SacRT owns four (4) modular bus stops. SacRT could coordinate with the City of Sacramento to pilot the use of modular bus stops at one or more high-use stops, such as Stockton and Fruitridge. A pilot will allow observation and measurement of impacts on traffic and transit speeds, as well as feedback from customers, operators, and the general community.

CASE STUDY: BUS-ONLY LANE DURING PEAK PERIODS*

Location: Everett, MA

Intervention: AM peak bus-only lane pilot and permanent striping.

Actors:

City of Everett – Planning and Development Department, Public Works Department
MBTA

Pilot Description:

The City of Everett and MBTA created a temporary southbound, AM peak-hour bus lane on Broadway between Glendale Square and Sweetser Circle. Cones were installed from 4AM-9AM. Flashing signs and public work officers were used to enforce bus-only traffic. The pilot helped determine that 12' is an optimal width for a bus lane.

Permanent Lane:

After favorable results in the pilot, the bus-only lane was made permanent through striping and a Transit Signal Priority. Along with the bus-only lane, 2 modular, plastic boarding platforms were added to key intersections. A shared bike lane was included in the final design.

Cost:

Pilot: Labor

Permanent Lane: Striping Cost: \$130,000; Bus Platforms: \$50,000 each

Timeline: 1.5 months

*Based on Stockton Blvd data, PM Peak lanes would be recommended over AM Peak lanes.



Source: <https://www.bostonglobe.com/metro/regionals/north/2016/12/21/everett-hails-bus-only-lane-broadway-success/9wDjozXVlbCkz2ziPf9lJ/story.html>

Results: Travel time was reduced by 20-30% during first week of the pilot. Trips were made more consistent and public feedback was very favorable.

CASE STUDY: QUEUE JUMP LANES

Location: New York, NY

Intervention: Queue jump lanes are short bus lane segments that allow buses to cut ahead of other traffic at signal intersections.

Actors:

MTA

NYC DOT

Description: NYC DOT installed 3 queue jumps along 86th Street in Manhattan, served by route M86.



Source: <https://nyc.streetsblog.org/2015/07/02/eyes-on-the-street-queue-jump-bus-lanes-await-delayed-m86-sbs/>

**Results: Travel time decreased by 10%.
Ridership up by 7%.**

CASE STUDY: OFF-BOARD FARE COLLECTION

Location: Chicago, IL

Intervention: Pre-paid bus boarding pilot during the afternoon peak.

Actors:

CTA

Description:

To improve bus boarding time, the CTA started a pilot program to test off-board fare collection in 4 locations in Chicago. The CTA installed fencing to create a “paid” area, as well as a Ventra vending machine and mobile fare validators.

Cost:

\$77,000 (includes labor, Ventra vending machine, mobile barriers, sandwich boards) + annual costs to enforce fare

Timeline: 3-6 months



Source: <https://activetrans.org/blog/prepaid-bus-boarding-pilot-program-expandsoverlay-contextblog-prepaid-bus-boarding-pilot-program-expands>

Results: 54% reduction in boarding times across the four pilots. 90% of customers who staff surveyed were satisfied with the prepaid process.

CASE STUDY: TRANSIT SIGNAL PRIORITY

Location: AC Transit – Oakland, CA

Intervention: Gives transit vehicles priority at traffic lights. Cost-effective method to improve transit travel time and reliability.

Actors:

AC Transit

ACCMA

San Pablo SMART Corridor

Project Description:

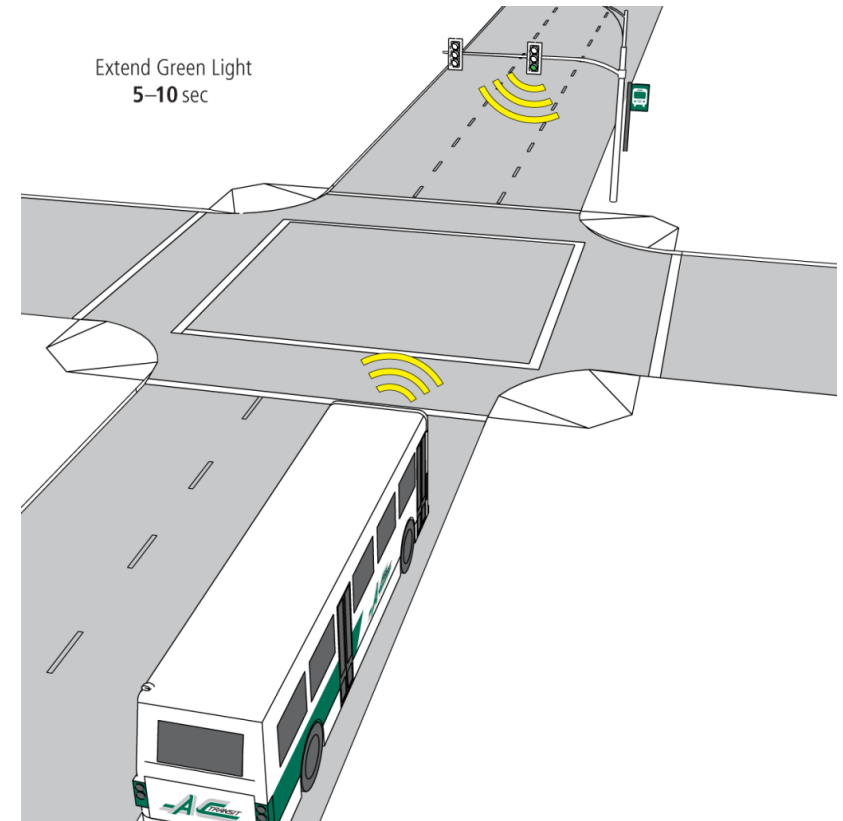
AC Transit installed emitters on 21 buses and ACCMA installed TSP at 62 intersections along San Pablo, a 14-mile corridor. Most bus stops were already far-side, but some were relocated to ensure TSP was utilized correctly.

Cost:

Emitter per bus: \$600

Intersection: \$35,000

Timeline: 18 months for total implementation



Source: http://www.actransit.org/?attachment_id=38122

Results: 9% Time Savings

CASE STUDY: CORRIDOR PREPARATION FOR BRT

Location: Indianapolis, IN

Intervention: Blue Line Bus Rapid Transit

Actors:

IndyGO

Indianapolis MPO

Central Indiana Regional Transportation Authority

Indianapolis Department of Public Works

Description:

The Blue Line is a planned BRT project serving a 24-mile corridor that is currently served by IndyGO's highest ridership route. It will include increased frequency (every 10 minutes), level boarding, proof-of-payment fare collection, and 0.5-1 mile stop spacing. The corridor includes residential and commercial, with some auto-centric commercial portions. Transitioning of the corridor for BRT will be a 10+ year process.

Cost: \$200 million

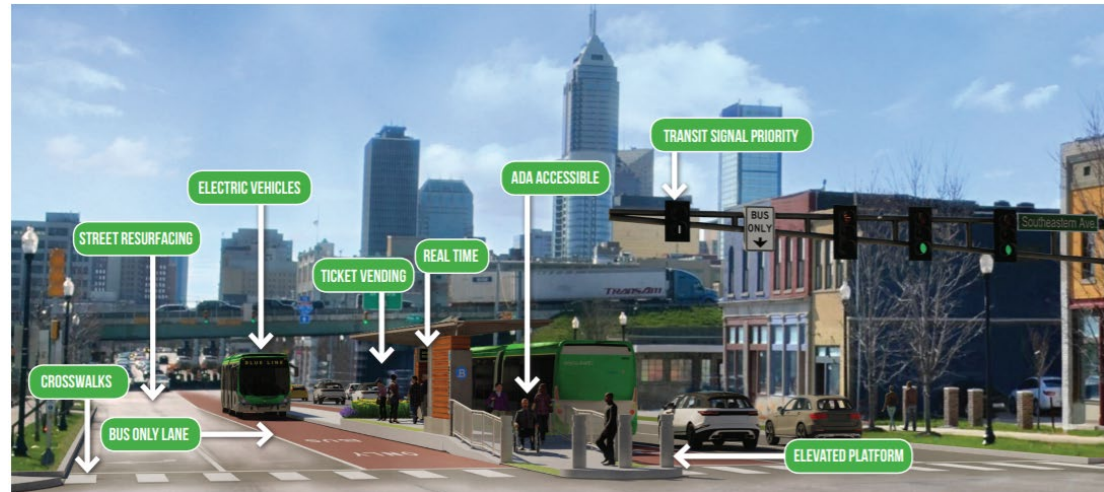
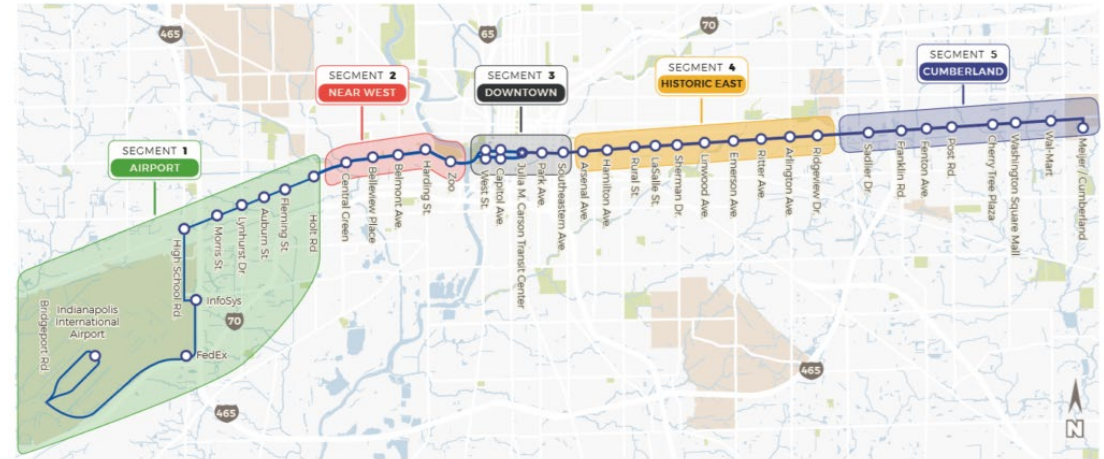
Timeline:

Alternatives Analysis - 2013

5%-10% Design - 2018

30% Design – 2019

Estimated launch - 2025



Expected Results: As much as 30% reduction in travel times. Supports identified TOD nodes and economic development areas.

CASE STUDY: CORRIDOR PREPARATION FOR BRT

Location: Atlanta, GA

Intervention: Campbellton Road Bus Rapid Transit

Actors:

MARTA

City of Atlanta

Description:

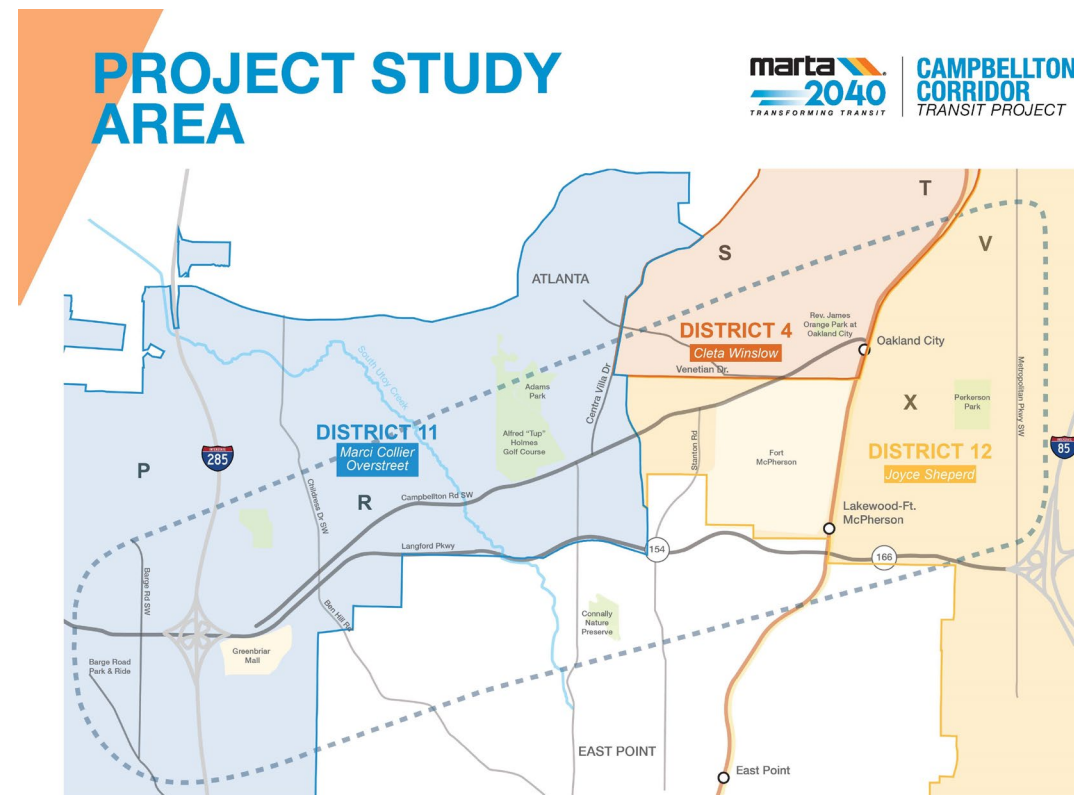
High-capacity transit improvements are planned for a 5.7-mile segment of Campbellton Road, a mixed residential and commercial corridor targeted for redevelopment efforts and currently served by one of MARTA's busiest routes. The project includes evaluation of transit-oriented development and joint-development strategies to spur economic development. MARTA increased frequency of local bus service in 2018 as a precursor to BRT.

Cost: \$125 million

Timeline:

Alternatives Analysis – 2020/2021

Estimated launch – 2031



Expected Results: Economic redevelopment, safety improvements, equity

CASE STUDY: CORRIDOR PREPARATION FOR BRT

Location: Detroit, MI

Intervention: Gratiot Avenue Bus Rapid Transit

Actors:

RTA of Southeast Michigan

Description:

Gratiot Avenue is the 2nd highest priority corridor in the region for BRT and is planned to have increased frequency (10 minutes peak/15 minutes off peak), stations spaced 1-1.5 miles apart, and dedicated lanes. In the interim, they have been able to increase frequency in the corridor through interlining with SMART and DDOT, co-branded buses, skip stops, and expanded span of service. The corridor has experienced a spike in ridership as a result.

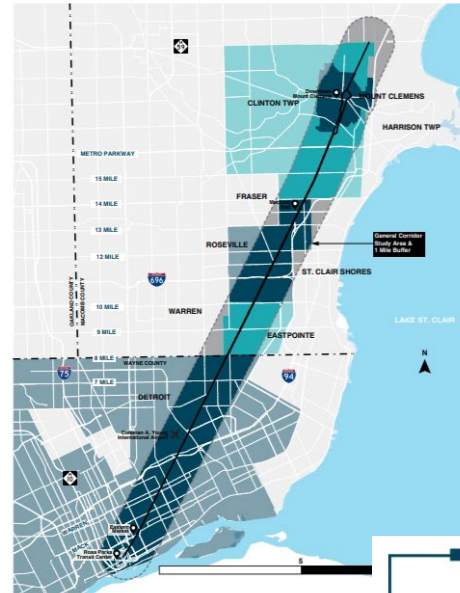
Cost: \$255 million (\$10 million-\$11 million per mile)

Timeline:

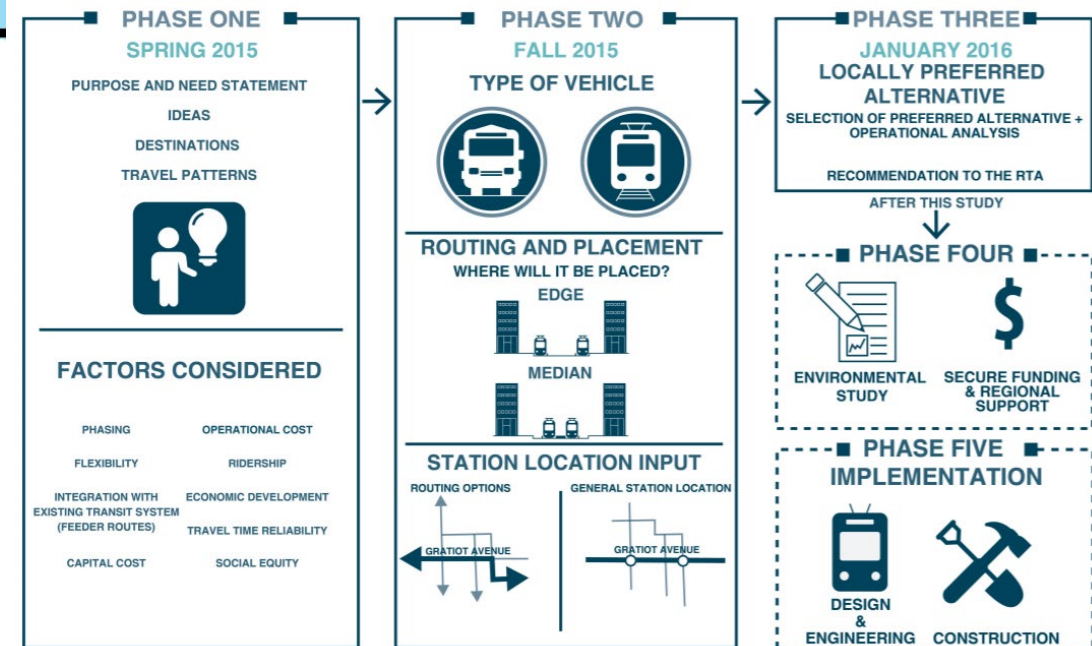
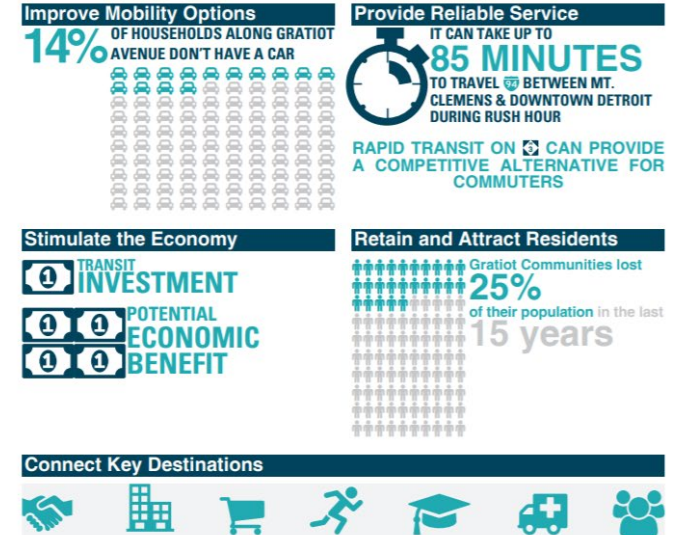
Planning – 2016

Estimated launch - TBD

Study Area



Why Rapid Transit on Gratiot Avenue?



IMPLEMENTATION



An initial opportunity for implementation brings SacRT's Stockton Boulevard strategy into alignment with the City of Sacramento's Vision Zero initiative for the corridor.

The City of Sacramento has conducted analysis to improve pedestrian safety along Stockton Boulevard. This moment creates an opportunity for collaboration with the City, promotes the safety of SacRT customers, and creates opportunities to make customer-focused service improvements.

SacRT should give attention to the recommendations and work in partnership to preserve opportunities for flexibility and future expansion through the relationship in this corridor.

HIGH-LEVEL OPPORTUNITIES – Vision Zero Collaboration

TransPro completed a review of a presentation developed by Nelson Nygaard for the City of Sacramento, which included options under consideration by the City for a segment of the Stockton Boulevard corridor selected for Vision Zero improvements. TransPro reviewed the information in the presentation and cross referenced it with Service and Design standards of SacRT. Following are observations that SacRT may wish to consider in determining its approach to aligning service and investment with the City's Vision Zero initiative on Stockton Boulevard. Resolution of conflicts in standards will give clarity to SacRT in its long-term approach to service in the corridor while working collaboratively with the goals of the City in this segment of Stockton.

Vision Zero Corridor Solutions Impacting SacRT

- **Driveway consolidation** – this should have a positive impact on transit operations, with fewer opportunities for conflict or delays with other vehicles pulling in or out of driveways.
- **Bus stop consolidation** – while this may be possible in some targeted areas, this was one of the lowest rated options by Route 51 customers for high-capacity corridor improvements.
- **Signal cycle changes and infrastructure** - this should be assessed for impact on transit operations, and to extent possible, accommodate priority for transit vehicles at key intersections.
- **Additional pedestrian/bicyclist scale lighting** – while Route 51 customers were less likely to cite issues with lighting than other potential high-capacity corridor routes, these interventions would benefit SacRT customers, who primarily access the stops by walking.
- **More protected crossings** – Route 51 customers cited unsafe crossings as their number one barrier to accessing bus stops, though the percentage reporting this as a barrier was lower than in other corridors.
- **Speed up transit at major intersections** – based on segments of high ridership and highest transit delay, the potential queue jumps at Broadway, 21st, Fruitridge, 47th appear to be in alignment with where SacRT would target improvements.
- **Better bus stop amenities** – Route 51 customers rated benches and shelters at stops as a top priority and investments in permanency of stops can support longer-term high-capacity transit investments.

HIGH-LEVEL OPPORTUNITIES – Vision Zero Collaboration

In addition to overall considerations, a number of specific design-related observations are noted below. As the City of Sacramento makes final determinations regarding design and allocation of street space, it is important that the needs and implications for transit be fully understood.

Shared Bus/Bike Lanes

One of the City of Sacramento's options includes a 13' shared bike and transit facility. Due to the potential conflicts between buses and cyclists that could pose a risk to safety, this type of design should be carefully reviewed by SacRT Operations and Safety Divisions before final determinations made. The only shared lane bike and bus facility speculated in SacRT design guidelines is a shared cyclotrack in one concept of a mid-block bus stop configuration.

Lane Widths

SacRT design guidelines assume 12' lane widths, while the General Purpose (GP) lane width in the City's design work is 11'. Additional design configuration options assume a 10' lane width for various mid-block bus stop, but without a bike facility. This is an element that should also be reconciled before final design.

SacRT design guidelines have clear specifications about parking in lanes for right turn movements, which should be reflected in any City design recommendations.

Queue Jumps

SacRT has queue jump guidelines that require reconciliation with the City's designs on accel lane length, taper, near/far side location, specifications, safety and mobility objectives at each proposed instance. Our recommendation is that SacRT leverage the Complete Streets/Vision Zero opportunity to increase far side operation.

HIGH-LEVEL OPPORTUNITIES – Vision Zero Collaboration

The Vision Zero improvements also provide an opportunity for shared goals and investment in the Stockton Boulevard corridor. Below are opportunities of potential alignment on locations and the share of investment in infrastructure to execute:

- Alignment of SacRT's standard for midblock crossing with proposed instances by the City in the study area
- For future skip stop, ART-like service, or stops with all door boarding – consider special branding of stop signage infrastructure (update standard accordingly)
- Potential alternative configuration for mid-block bus stop and bike/ped facility spacing
- Floating transit island between bus/GP lane and bike/ped facility appears to align with one of the City's proposed options with features for configurations with on-street parking
- Alignment of City's accommodations of parallel berth requirements for 40' & 60' vehicles

IMPLEMENTATION: POLICY AND OPERATIONS

Opportunity	Cost Range	Timeframe	Partners Needed	Potential Revenue Sources	Next Actions	Trigger Conditions
Establish a clear purpose and vision for Stockton Blvd. Corridor	<\$25,000	<6 months	City of Sacramento, SACOG, Sacramento County	General fund; 5307; STP Funds	Convene working group	<ul style="list-style-type: none"> Condition met
Define and prioritize corridor in the context of the SacRT network	<\$25,000	<6 months	City of Sacramento, SACOG, Sacramento County	General fund; 5307; STP Funds; CMAQ	Complete High-Capacity Transit Study	<ul style="list-style-type: none"> Capital Program Plan High-Capacity Transit Study
Prioritize customer and stakeholder tactics	<\$25,000	<6 months	City of Sacramento, corridor stakeholders	General fund	Develop tactics for addressing findings of Rt. 51 customer survey	<ul style="list-style-type: none"> Customer Satisfaction Survey Results (ongoing)
Improve quality of operator training for schedule adherence	<\$25,000	<6 months	None	General fund	Meet w/ Ops staff to update training	<ul style="list-style-type: none"> Condition met
Increase frequency to 10 minutes (peak or all day)	\$140,000-\$380,000	<6 months	None	General fund; 5307; STP Funds	Continue to monitor customers per revenue hour	<ul style="list-style-type: none"> Several months of increased customers per revenue hour

IMPLEMENTATION: POLICY AND OPERATIONS

Opportunity	Cost Range	Timeframe	Partners Needed	Potential Revenue Sources	Next Actions	Trigger Conditions
Update and enhance the transit amenity policy with greater objectivity for amenities	<\$25,000	<6 months	City of Sacramento, corridor stakeholders	General fund; 5307; STP Funds	Review bus amenities policy in alignment with customer priorities	<ul style="list-style-type: none"> Condition met
Enforcement of on-street parking restrictions and turning movements	<\$25,000	Ongoing	City of Sacramento	N/A	Observe areas of corridor with highest delay to identify any enforcement issues; discuss with City	<ul style="list-style-type: none"> Ongoing
Deploy skip stop service, minimal stops at: 65th, Fruitridge, Broadway, 21st, Capitol Mall, Downtown	Varies – potential to be revenue neutral if reduce headways on non-skip stop trips	12-24 months	None	General fund; 5307; STP Funds	Develop list of priority stops for targeted boardings and alightings	<ul style="list-style-type: none"> Increases in proportion of customers traveling between major stops (or within .25 mile of major stops)

IMPLEMENTATION: MINOR CAPITAL

Opportunity	Cost Range	Timeframe	Partners Needed	Potential Revenue Sources	Next Actions	Trigger Conditions
Super stops – level boarding, signage, and branding features at skip stops	Modular bus platforms (free – already owned by SacRT)	6 months-1 year	City of Sacramento, corridor stakeholders	For additional stops: General fund; Capital Grants; 5339	Meet with City of Sacramento and corridor stakeholders to identify pilot location(s)	<ul style="list-style-type: none"> Condition met
Queue by-pass	\$2,000 - \$400,000 (if existing roadway can be re-purposed with signage and striping vs. completely new construction)	Pilot – 6 months Permanent – 1-2 years	City of Sacramento	STP Funds; General fund; CMAQ	Meet with City of Sacramento and corridor stakeholders to identify pilot location(s) in conjunction with modular bus stops	<ul style="list-style-type: none"> Conditions met for pilot Pursue permanent solution if pilot successful
Transit Signal Priority	Depending on technology Intersection: \$2,500-\$40,000 Bus: \$50-\$2,500	1-2 years	City of Sacramento	General fund; Capital Grants; 5339	Meet with City of Sacramento to discuss TSP priorities and SacRT Ops to discuss onboard vehicle technology needs	<ul style="list-style-type: none"> Peak hour bus volume of 10-15 buses/hour and/or 400-600 customers/hour

IMPLEMENTATION: MAJOR CAPITAL

Opportunity	Cost Range	Timeframe	Partners Needed	Potential Revenue Sources	Next Actions	Trigger Conditions
Partial lane dedication	\$50,000-\$100,000 per mile	Pilot – 6 months to 1 year Permanent – 2 years minimum	City of Sacramento	STP Funds; General fund; CMAQ; Small Starts (less competitive for partial lanes)	Work with City of Sacramento to pilot application in conjunction with modular bus stops	<ul style="list-style-type: none"> • Conditions met for pilot • Pursue permanent solution if pilot successful
Full corridor lane dedication	\$50,000-\$100,000 per mile	5-10 years	City of Sacramento	STP Funds; General fund; CMAQ; Small Starts	See above	<ul style="list-style-type: none"> • Shared vision of BRT in the corridor • Momentum on redevelopment that is transit-friendly

IMPLEMENTATION: MAJOR CAPITAL

Opportunity	Cost Range	Timeframe	Partners Needed	Potential Revenue Sources	Next Actions	Trigger Conditions
Off board fare collection	Fare collector/validator machines: \$25,000-\$35,000 per TVMs: \$3M-\$8M (total estimated for corridor)	1-2 years	City of Sacramento	STP Funds; General fund; CMAQ	Identify systemwide goals and strategy for offboard fare payment	<ul style="list-style-type: none"> Investment in “Super Stops” (see page 59)
Level boarding	Permanent bus bulbs: \$40,000-\$80,000 depending on site constraints and length and width of extension	1-2 years	City of Sacramento	STP Funds; General fund; CMAQ	Test location(s) and outcomes through pilot installation of modular bus stops	<ul style="list-style-type: none"> Successful pilot of modular bus stops

CONCLUSION

Partnerships and coordination are key to success in this corridor, with an opportunity for SacRT to shape decisions affecting the customer experience and greater community. As the entity with primary responsibility for right-of-way, the City of Sacramento is an especially critical partner in efforts to enhance transit service along Stockton Boulevard, and there is opportunity to leverage the shared interest in enhanced safety and mobility for users of the corridor. The following recommendations address the immediate opportunities for increased coordination between the City of Sacramento and SacRT.

- 1. Programmatic/Operating Agreement/Memorandum of Understanding** – This would formalize how SacRT and the City of Sacramento engage with one another as partners in the corridor. For example, this agreement could address standards for investment, how the City is engaged before SacRT makes major operational changes in this corridor, how SacRT would be engaged before the City makes major changes to the right-of-way, and other key elements affecting the corridor. Early and clear definitions of success for both partners will assure long-term success for safe mobility throughout the corridor.
- 2. Pedestrian Safety Enhancements** – Unsafe street crossings and lack of lighting were identified in the customer survey as barriers to customers accessing transit in this corridor, while safety waiting for the bus was one of the lowest rated areas of satisfaction. Customers also rated amenities like benches, Wi-Fi, and USB charging outlets as being most important to their experience. Improving the environment in the vicinity of major stops and crossings would benefit SacRT as well as support the City’s Vision Zero goals. Recommended areas of focus and shared investment include:
 - Stockton and 65th St
 - Stockton and Broadway
 - Stockton and Fruitridge
- 3. Demonstration Project Opportunities** – As a high-ridership transit corridor, there are opportunities to test enhancements like bus bulbs and queue jumps as pilots, allowing the City and SacRT to evaluate whether any improvements to customer experience, mobility, or safety warrant further investment in more permanent solutions. SacRT has 4 modular bus stops ready to deploy. These could be deployed for several months at stops such as Stockton/Fruitridge and Stockton/Broadway. In general, data suggests that enhancements to the corridor between Stockton/Fruitridge and Florin Towne Centre would have the biggest impact on customers based on the combination of existing ridership levels and level of delay.

APPENDIX: POTENTIAL SEGMENTS FOR BUS-ONLY LANES

Location: Between Florin and Fruitridge

Purpose: To overcome peak delays, particularly in the afternoon, a dedicated lane in this segment will expedite bus travel time and boarding at key loading and unloading areas. This segment of the corridor experiences the most consistent amount of schedule deviation.

Potential Applications: SacRT and the City of Sacramento can collaborate on a full dedication of the segment or initially start with afternoon peak segments via a pilot using temporary lane marking, signage, and soft barriers.

Location: North of Broadway, in the Central Business District (CBD)

As Stockton links into the traditional grid of the CBD, bus speeds reduce significantly with increased stops, cross streets, traffic signals, and vehicular and pedestrian traffic. This segment offers SacRT the potential to explore lane dedication in downtown Sacramento and serve as a pilot for other vehicles operating in the downtown.

Potential Applications: Identifying one segment of the downtown routing on the 1-way pair of 8th and 9th Streets offer a highly visible pilot application to test and collect safety, speed and other relevant data to inform future bus only applications in the system.

Additional Benefits:

- Increase visibility of transit service in the corridor
- Influence calming of motorized vehicle traffic in the remaining general purpose lanes
- Expedite boarding and alighting at congested stops such as Stockton & Fruitridge and Stockton and Broadway
- Works best in tandem with signal priority or preemption. Initial lane dedication investment sets the stage for a higher tier infrastructure investment



Dedicated Curbside Bus Lane

Source: <https://nacto.org/publication/urban-street-design-guide/street-design-elements/transit-streets/dedicated-curbside-offset-bus-lanes/>



Dedicated Offset Bus Lane

Source: <https://nacto.org/publication/urban-street-design-guide/street-design-elements/transit-streets/dedicated-curbside-offset-bus-lanes/>