



Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study

FINAL REPORT

JANUARY 2024

Funding Provided by Caltrans Sustainable Transportation Planning Grant Program

Kimley»Horn





Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study



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Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study



OVERVIEW

Santa Cruz Metropolitan Transit District (METRO), supported by a Caltrans Sustainable Transportation Planning Grant, conducted a Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study (Project) aimed to improve the quality of service and accessibility of METRO's core intercity routes between Santa Cruz and Watsonville.

Project Need

Prior to the implementation of Reimagine METRO Phase 1 in December 2023, 3,300 people, or 20% of all transit riders in Santa Cruz County, took one of the routes between Santa Cruz and Watsonville (69A, 69W, 71, and 91X) every weekday and depended on these services to access jobs and key community facilities. These riders experienced up to 30 minutes of delay each trip because of traffic congestion and signals and have spent more than 20 minutes each trip waiting at bus stops. As a result, bus travel times were approximately twice as long as vehicle travel times.

Robust community engagement was an integral component of the Project and community feedback on desired improvements was instrumental in shaping the Project and defining the recommended improvements. Over the span of 15 months, METRO worked with the community, operators, and stakeholders to identify solutions aimed at making these routes faster, more reliable, and easier to access.

Recommended Improvements

The recommended improvements include replacing the bus routes between Santa Cruz and Watsonville (69A, 69W, 71, and 91X) with two new rapid routes and implementing transit supportive strategies along each of the rapid routes. The proposed rapid routes follow a similar alignment to Route 1 and Route 2 implemented in Phase 1 of the Reimagine METRO project, which went effect in December 2023. The rapid routes also take advantage of the bicycle, pedestrian, and transit improvements the County of Santa Cruz is constructing along Soquel Avenue and will also benefit from the Santa Cruz County Regional Transportation Commission's Highway 1 Bus on Shoulder projects.

A review of the existing conditions along the rapid routes identified both stop and route challenges. A toolkit of industry best practices was used to develop transit supportive strategies to improve the efficiency, reliability, and customer access of the proposed rapid routes. Each of the following identified strategies was assessed to determine how well it met defined Project goals and performance measures:

Transit-Supportive Strategies

Enhanced
Bus Stop
Amenities

Relocation/
Consolidation
of Rapid Bus Stops

Bus Bulbs
and Transit
Islands

Transit
Signal
Priority

Enhanced
Pedestrian
Crossings

Queue
Jumps

Road and
Intersection
Improvements

Intersection Improvements

Downtown Santa Cruz Front Street
and River Street Transit Lane

Water/Soquel/Morrissey
Intersection Improvements

Soquel Queue Jumps

Freedom Boulevard and Lincoln
Street Traffic Signal

Improvement Benefits

The recommended strategies are expected to increase the number of people within a quarter mile of a high quality bus stop by 15% and reduce travel time by up to 40%.

Implementing the strategies is expected to cost \$24.1 million, \$7.5 million of which METRO has already secured through grant funding. Opportunities to implement strategies as part of upcoming projects, such as the Pacific Station Redevelopment, are also being explored.

This Final Report summarizes the Project and includes an overview of existing conditions and public and stakeholder engagement. The Final Report also details the recommended transit supportive strategies and provides a funding and implementation plan.



Final Report





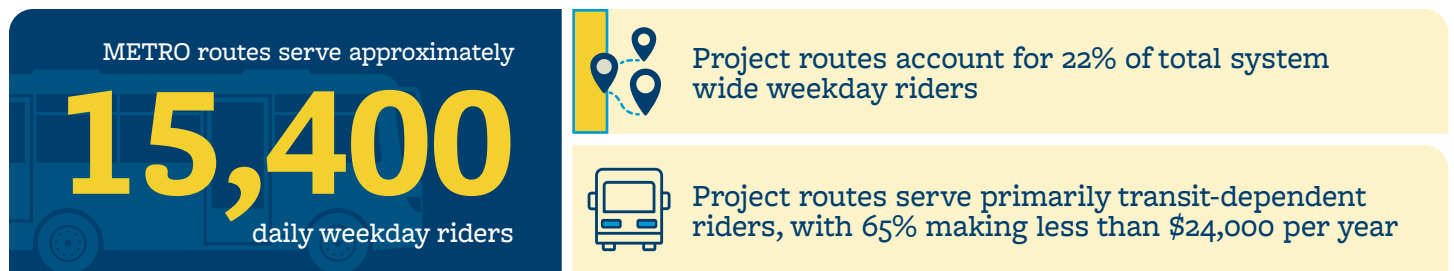
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EXISTING CONDITIONS

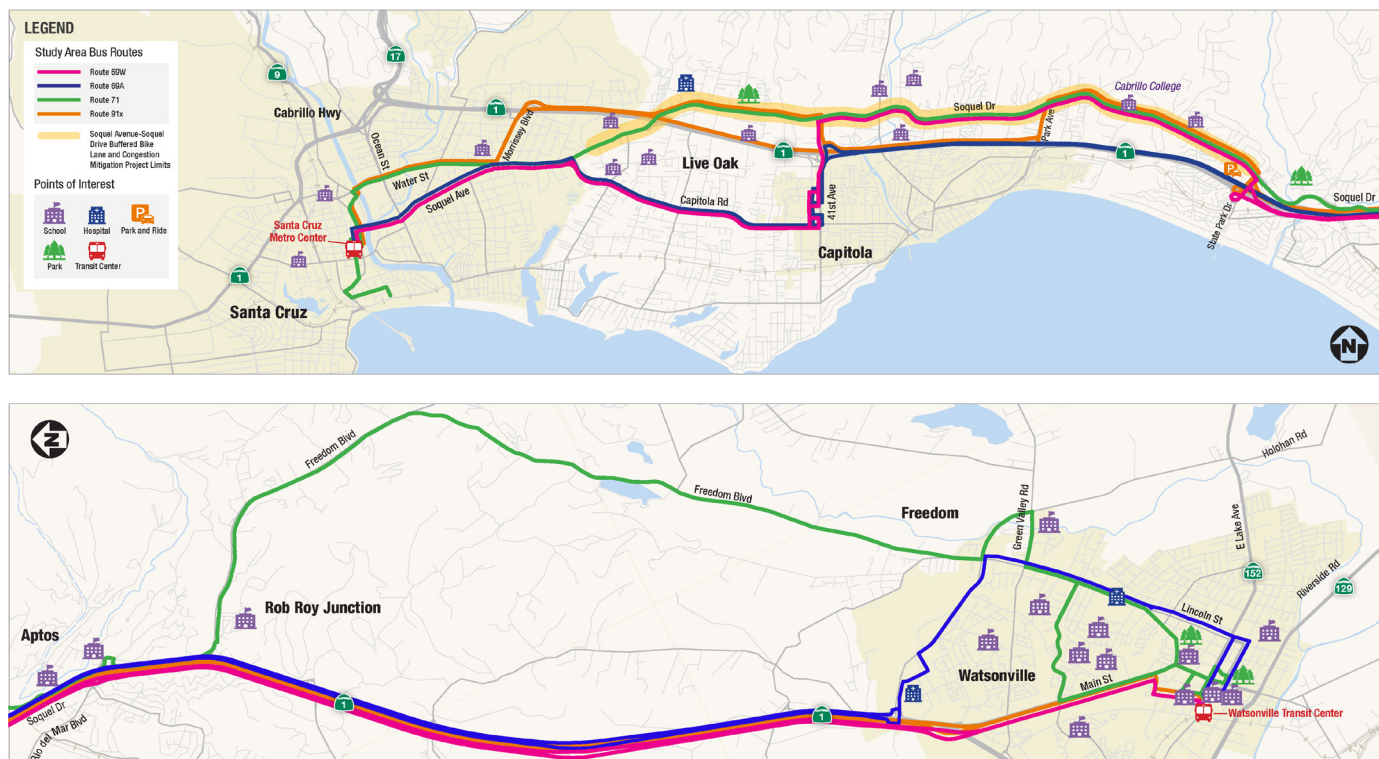
Field visits, data analysis, and operator input informed the evaluation of existing conditions along the four Project routes that connect the Cities of Santa Cruz and Watsonville – 69A, 69W, 71, and 91X (**Figure 1**). These routes utilize surface streets, including Soquel Drive, Freedom Boulevard, Lincoln Street, 41st Avenue, Capitola Road, and Water Street, as well as Highway 1. In addition to connecting the Cities of Santa Cruz, Capitola, and Watsonville, these routes also connect major destinations, such as Dominican Hospital, Santa Cruz County Health Services, Cabrillo College, Capitola Mall, and several K-12 schools.

Between September and December 2022, METRO collected Automatic Passenger Count (APC) data on all routes to determine the ridership activity by route and stop. Based on the collected APC data, METRO routes serve approximately 15,400 daily weekday riders. Project routes account for half of all non-University of California, Santa Cruz (UCSC) ridership in the system and are some of the most productive routes in METRO's network accounting for 22% of the total systemwide weekday riders. A prior METRO survey of riders also found that these routes serve primarily transit-dependent riders, with 65% making less than \$24,000 per year.



The full Existing Conditions Report is included in **Appendix A: Existing Conditions Report**.

Figure 1: Existing Route Alignment





Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study



Field Visits

A bus stop inventory through visual field observations was completed in December 2022 to determine the existing conditions of the 232 bus stops serving the four Project routes.

Field observations identified:



**Missing amenities
at bus stops**

>75% without transit wayfinding information,
lighting, trash cans, and bike racks

69% without shelters

31% without benches



**Improper location
of bus stops**

50% near-side or mid-block



**Signal coordination
issues**



**Lack of protected
crosswalks**

42% do not have a crosswalk
within 100ft



**Areas of congestion
and delay**

Data Analysis

A quantitative analysis of existing bus travel speeds and variability was performed using Computer-Aided Dispatch/Automatic Vehicle Location (CAD/AVL) data gathered by METRO between June 9 and June 22, 2022 and September 24 and October 7, 2022. The analysis identified segments with low speeds and/or high variability which demonstrate the greatest need and provide the best opportunity for improvements.

The total travel time on each route between Santa Cruz and Watsonville was grouped into the three main elements of travel time: 1) free flow, 2) moving delay, and 3) dwell time. The analysis focused on moving delay (where the bus is being delayed by factors such as congestion or traffic signals) and dwell time (when the bus is at a stop including the time the bus is delayed waiting for a gap in traffic to exit the stop) that can be reduced through transit priority treatments or stop optimization.

The analysis identified several segments with degraded bus speeds, most notably around Downtown Santa Cruz, Santa Cruz Transit Center, Capitola Mall, Green Valley Road and Airport Boulevard, Downtown Watsonville, and Watsonville Transit Center. The analysis also found that dwell times comprise up to 40% of total bus travel time. Given the significant moving delay, dwell time, and travel time variability along the existing routes, bus travel times are typically much longer than vehicle travel times. **Table 1** compares bus and vehicle end-to-end travel times.

Table 1: End-to-End Travel Time Comparison

	Northbound (minutes)		Southbound (minutes)	
	AM	PM	AM	PM
Vehicle Travel Time	55	32	29	43
Route 69A*	67	62	56	68
Route 69W*	67	60	55	68
Route 71*	77	75	69	85
Route 91X*	50	49	39	52

*September/October 2022 travel times



Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study

Operator Input

The Project team met with METRO's bus operators to understand the challenges they encounter on the Project routes. Their insights helped inform the recommended improvements. The bus operators identified specific intersections and locations where they frequently experience delays due to infrastructure deficiencies (such as traffic signals and turn lanes) or vehicular congestion.

The bus operators shared recommendations to improve operations, including promoting the mobile SplashPass to help passengers quickly board buses and reduce dwell time. The bus operators also believe signage, transit information, and translated materials would assist riders with understanding how to use the system.

Relevant Transportation Plans and Projects

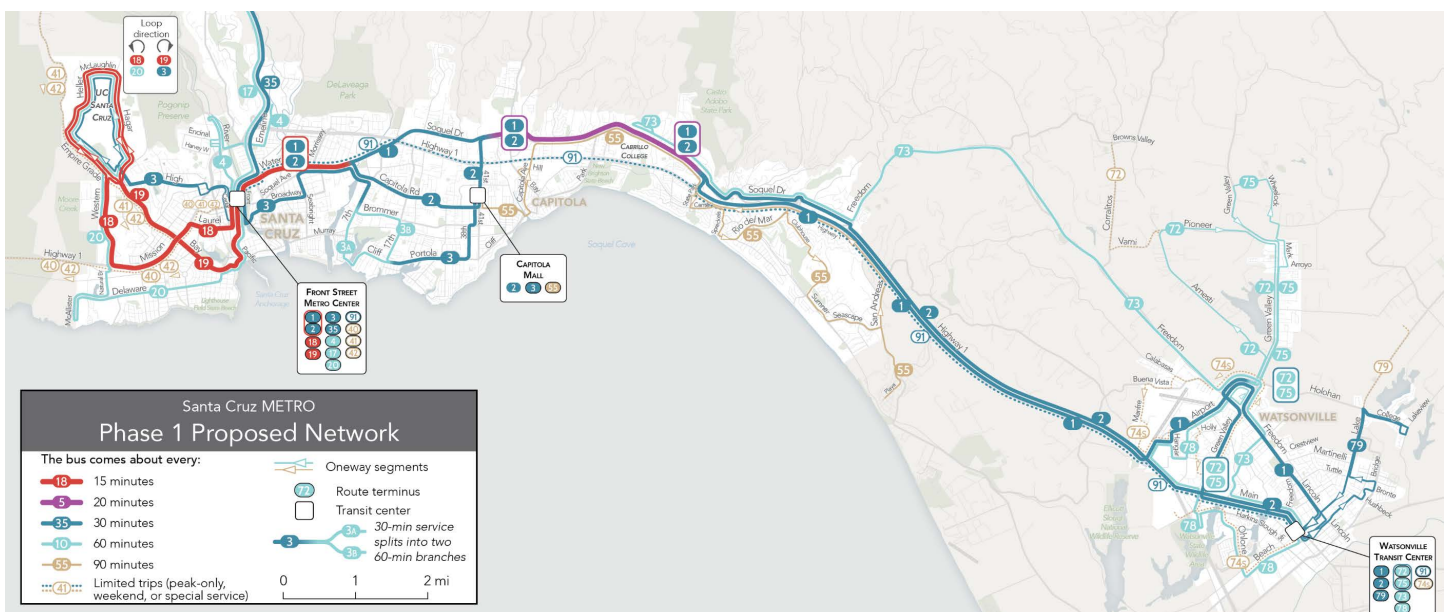
The Project considered other transportation planning, design, and construction projects taking place along the Project corridor and considered how these projects could be leveraged to advance the implementation of the Project and further improve mobility.

The **Reimagine METRO (Figure 2)** project developed a Bus Network Reimagining Plan for both the near-term and long-term, which includes the implementation of the proposed rapid routes (Route 1 and Route 2) starting in December 2023. The proposed rapid routes travel on Highway 1 between Rio Del Mar Boulevard and Airport Boulevard and will benefit from the ongoing implementation of **Santa Cruz County Regional Transportation Commissions (SCRTC)'s Highway 1 Bus on Shoulder Projects**.

The Project will benefit from bicycle, pedestrian, and transit improvements currently being implemented along 5.6 miles of Soquel Drive, from La Fonda Avenue to State Park Drive, as part of the **County of Santa Cruz's Soquel Avenue-Soquel Drive Buffered Bike Lane and Congestion Mitigation Project**. The improvements include constructing 2.7 miles of buffered and 2.4 miles of protected bike lanes on each side of the street, upgrading 22 intersections with Adaptive Traffic Signals (ATS) and Transit Signal Priority (TSP), closing 2,500 feet of sidewalk gaps, enhancing 10 mid-block crossings with the installation of Rectangular Rapid Flashing Beacons (RRFB), and upgrading 100 ADA ramps to meet current standards.

The **Pacific Station Relocation** project provides the opportunity to advance transit supportive strategies identified along River Street and Front Street. This area is currently being configured as a temporary transit center while the new transit center is being constructed.

Figure 2: Reimagine METRO Phase 1 Service Map



Source: Santa Cruz METRO Reimagine Metro Project Website



Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study



Public and Stakeholder Engagement

The public engagement plan for the Project included strategies and activities to reach a broad cross section of the community in the Project area including bus riders, residents, businesses, advocacy groups, and disadvantaged communities. The plan included two rounds of public outreach as well as extensive stakeholder engagement with agency partners and interested and affected parties.

Public Outreach Round 1



The first round of public outreach occurred between January and February 2023 and focused on identifying corridor needs and opportunities. A full report of the first round of public outreach is included in **Appendix B: Round 1 Public Engagement Summary**.

Outreach included:

comprehensive project website

+ online and paper community survey

+ online interactive mapping tool

+ 6 in-person pop-up events, supported by Regeneración Pajaro Valley, at major transit and community hubs in Santa Cruz and Watsonville

292

survey responses received

55%

live along or near the corridor

67%

depend on bus as their primary mode of travel

61%

ride Project routes several times a week

The top three improvements desired by survey respondents were:



Shorter wait times for the bus to come



Bus goes more places



More reliable travel time

Other key themes heard from the public were related to service reliability, frequency, bus shelter design, better apps and information on the website, dedicated lanes for buses, and requests to bring back route 91.



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Public Outreach Round 2



The second round of public outreach occurred between September and October 2023 and presented proposed transportation improvements to the public for input. A full report of the second round of public outreach is included in **Appendix C: Round 2 Public Engagement Summary**.

Outreach included:

project website



online and paper community survey



7 in-person pop-up events, supported by Regeneración Pajaro Valley, mostly at the Santa Cruz and Watsonville Transit Centers



virtual public meeting

133

survey responses received

422

Project website visits

76%

live along or near the corridor

77%

depend on bus as their primary mode of travel

56%

ride Project routes several times a week

The top three improvements that would encourage transit use and enhance user experience were:



Improved experience at bus stops that have better amenities like shelters, lighting, seating, and signage



Buses running more frequently



Faster trips due to proposed relocation/consolidation of bus stops, transit signal priority improvements, and dedicated transit lanes

If all the proposed improvements were implemented, respondents noted:

>50%

would expect to take transit as often as they currently do

45%

would take transit more often





Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study



Stakeholder Engagement

A technical working group (TWG) comprising of the following was formed to review and provide feedback. The TWG met three times throughout the project.

- Caltrans
- City of Capitola
- City of Santa Cruz
- City of Watsonville
- County of Santa Cruz
- Ecology Action
- Santa Cruz Regional Transportation Commission

METRO also met with the following jurisdictions to share information about the Project, solicit feedback, and gain support:

JUN 29, 2023:
County of Santa Cruz

JUN 29, 2023:
City of Santa Cruz

OCT 2, 2023:
Bicycle/Pedestrian Advisory
Committee (BPAC)

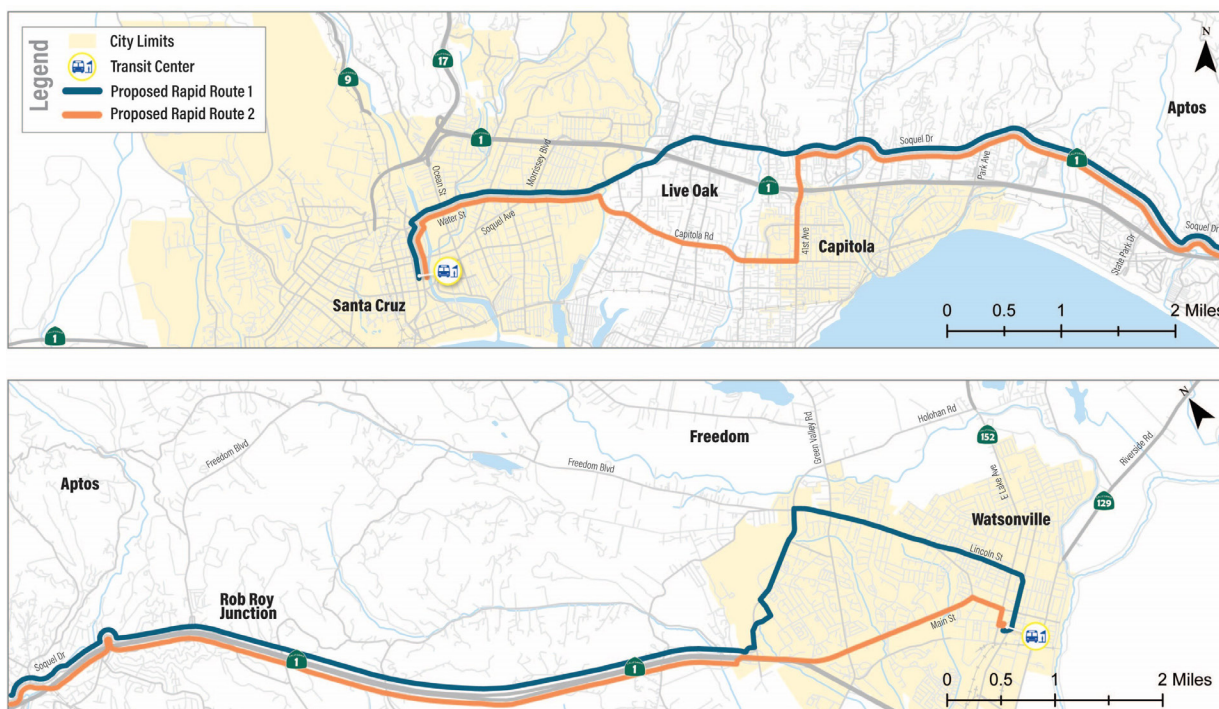
OCT 19, 2023:
Santa Cruz County Regional
Transportation Commission's
Interagency Technical Advisory
Committee (ITAC)

TRANSIT SUPPORTIVE STRATEGIES

The visual field observations, data analysis, operator input, and outreach identified the need for new and improved transit routes between Santa Cruz and Watsonville and identified areas with the greatest need and/or opportunity for improvements.

Two alignments for rapid service between Santa Cruz and Watsonville (**Figure 3**) are proposed. The proposed alignments target increased ridership, travel time reductions, speed improvements, access to key destinations, and consistency with the Reimagine METRO project.

Figure 3: Proposed Rapid Route Alignment





Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study



To further enhance the quality of service for transit-dependent riders and also attract “choice” riders, transit supportive strategies were identified to address stop and route challenges along the proposed rapid routes.

- **Stop challenges** include:
 - Lack of bus stop amenities (e.g.: missing benches)
 - Non-optimal bus stop locations (e.g.: near-side)
 - Bus stop accessibility (e.g.: lack of crosswalks)
- **Route challenges** include:
 - Segments with slow bus speeds
 - High variability in bus travel time
 - Or both

Using a toolkit of industry best practices, recommendations were developed to improve the efficiency, reliability, and customer access of the proposed rapid routes. Each of the proposed strategies aligned with at least one of the Project goals:



Faster and more reliable buses



Safer access to bus stops



Improved bus stop amenities

The proposed strategies were evaluated against performance measures for each goal including on-time performance, trip time, wait time, user delay, coverage, accessibility, ridership, bicycle and pedestrian safety, and user experience. These proposed strategies result in:

15%

increase in the number of people within a quarter mile of a high-quality bus stop which includes a shelter, bench, lighting, and is accessible by crosswalk and sidewalk

SANTA CRUZ

WATSONVILLE

40%

faster travel time from
Santa Cruz to Watsonville



29%

faster travel time from
Watsonville to Santa Cruz

Appendix D: Speed and Reliability Improvement Strategies and Recommendations Methodology Memorandum provides additional details on the development and evaluation of the transit supportive strategies.

Although the project did not consider any improvements to local service, the Project team did review the local bus stops and proposed changes to confirm appropriate spacing (1,000 ft) and location. The proposed local bus stop placement is presented in **Appendix E: Local Bus Stop Improvements**.



ENHANCED BUS STOP AMENITIES





EFFECTS OF IMPROVEMENTS ON:

On Time Performance	Trip Time		Wait Time	User Delay	Coverage
-	-		-	-	Number of people within 1/4-mile of a high quality bus stop* increases by 15% from 44,842 to 51,495.
Accessibility	Ridership	Ped/Bike Safety	User Experience at Stops	Operation and Maintenance Costs	Estimated Capital Cost
Sidewalk improvements, benches, and shelters increase usability of bus stops.	Enhanced amenities are expected to increase ridership.	Sidewalk improvements and lighting improve the safety of those accessing and waiting at bus stops.	Improves consistency of user experience; enhanced user comfort.	Medium maintenance cost for additional amenities.	\$10,505,000

*high quality bus stop includes shelter, bench, and lighting, and is accessible by crosswalk and sidewalk

Description

- Install additional bus stop amenities to improve the comfort and safety of riders.
- Amenities may include bus shelters, benches, pedestrian-scale lighting, trash cans, wayfinding, branding, transit information signage, bike racks, and sidewalk improvements.

Category	Quantity
 Bus Stop Access	Bench: 51 Shelter: 53 Lighting: 45
 Bus Stop Amenities	Locations with new sidewalks to access bus stops: 7

Key Implementation Considerations

- Requires detailed survey and design to identify space available for improved amenities.
- Recommend developing a consistent shelter, bench, wayfinding, and branding program to deploy at upgraded stops.
- Real-time transit information would require communications to bus stops.
- Lighting improvements would require coordination with local agencies.

LEGEND

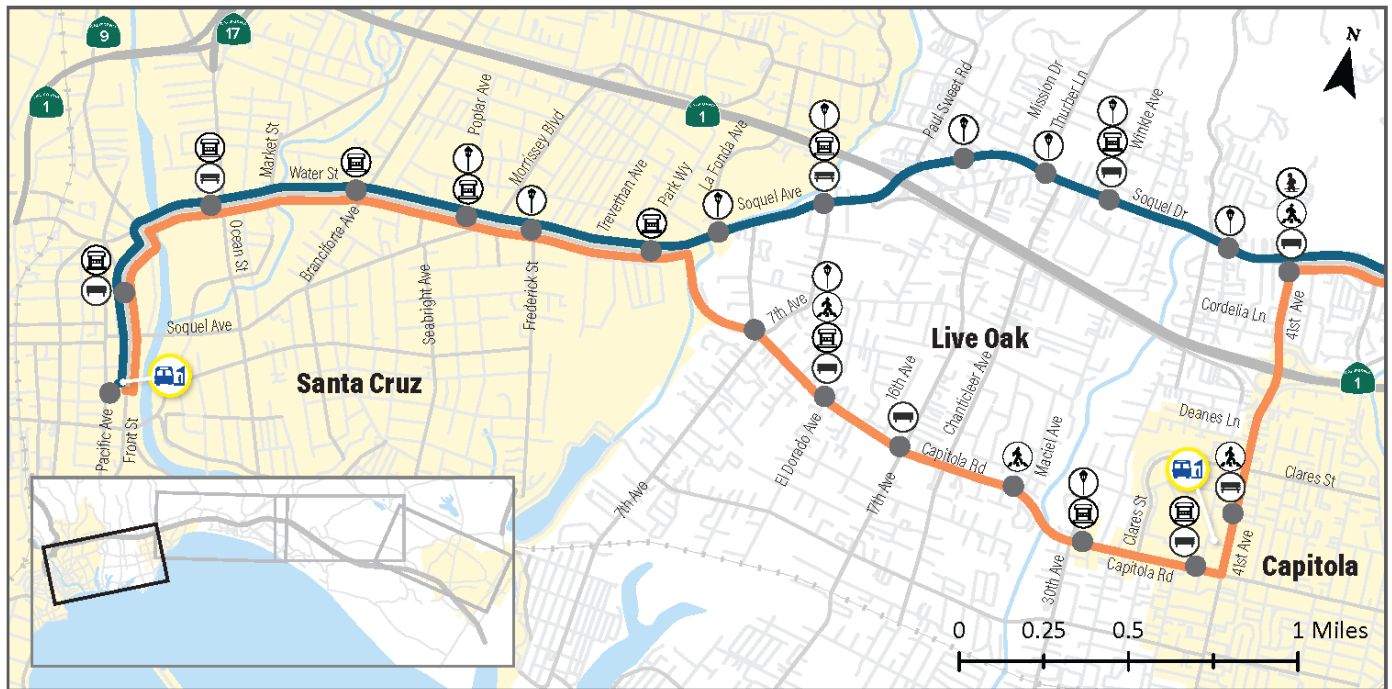
Benefits with little to no trade-offs for all users	Benefits, but with minor trade-offs for some users	Benefits, but with greater trade-offs for some users	Does not have significant effect
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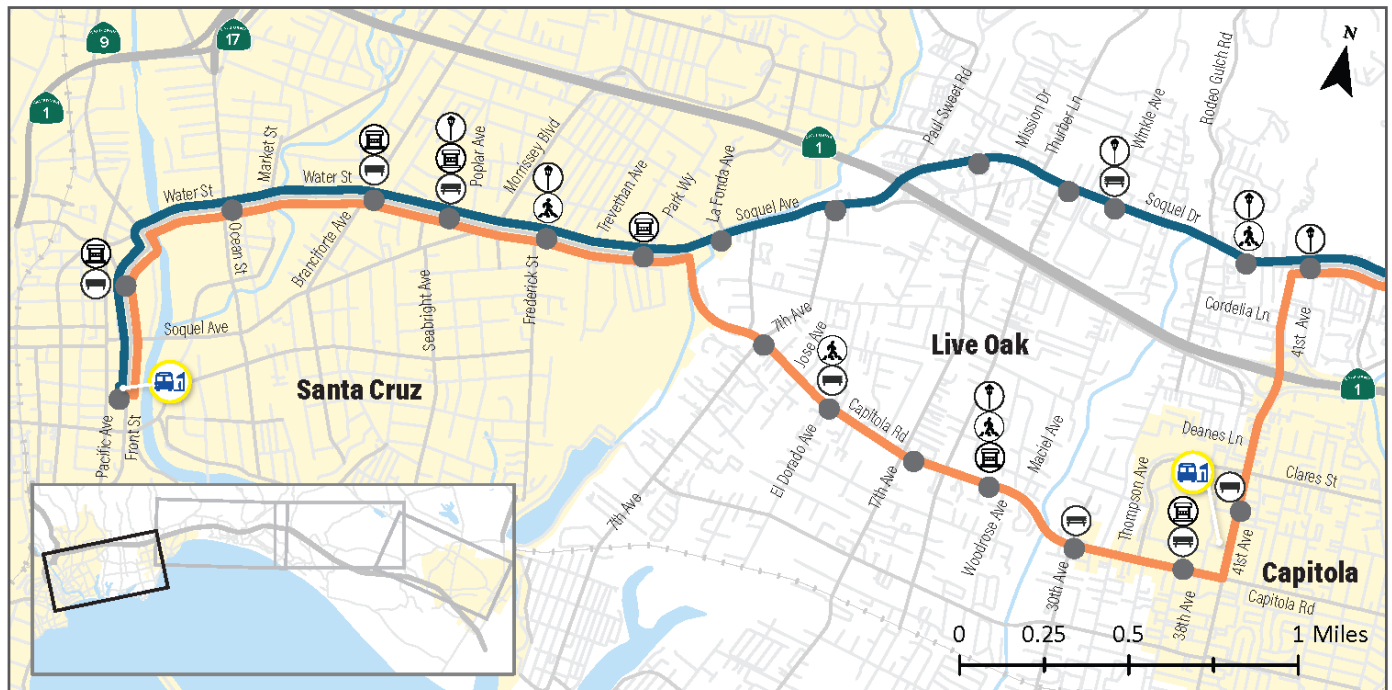
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Bus Stop Amenity Needs - Santa Cruz to Capitola



Northbound



Southbound

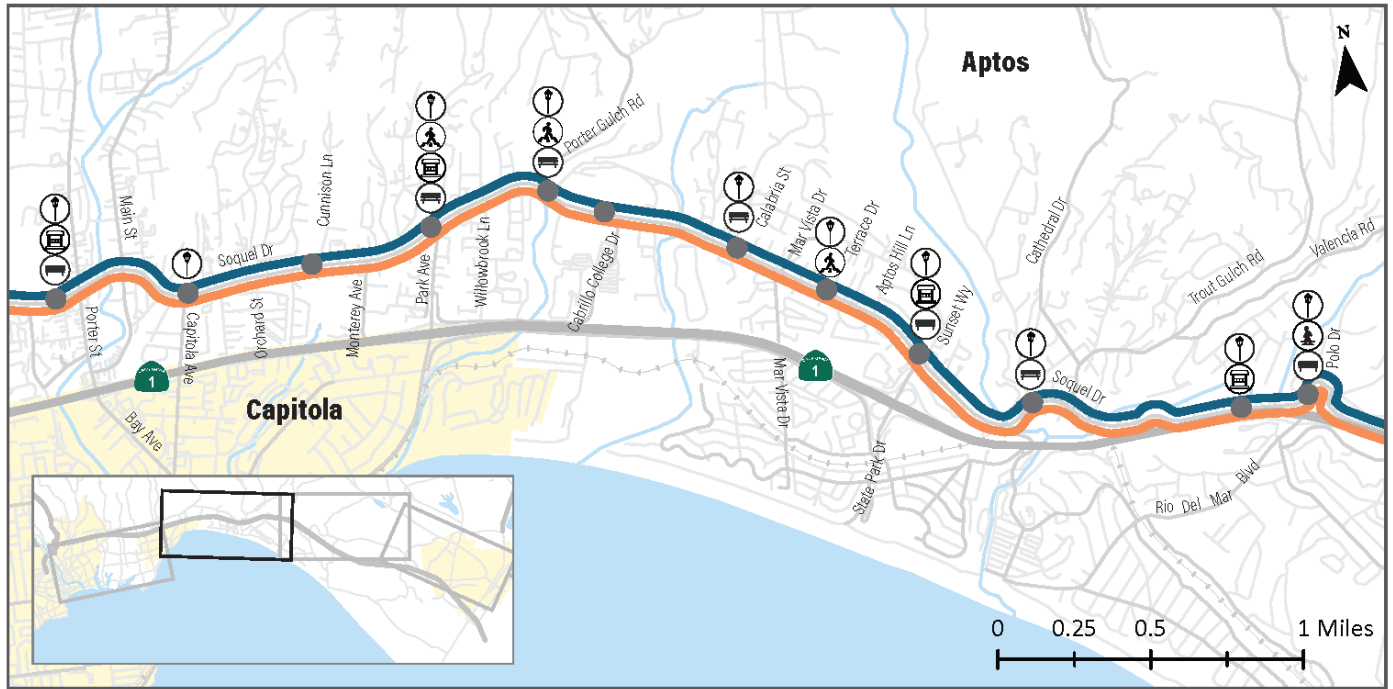
Legend	City Limits	Transit Center	Bench Needed
	Proposed Rapid Route Alignment 1	Shelter Needed	Crosswalk Needed
	Proposed Rapid Route Alignment 2	Sidewalk Needed	Lighting Needed
	Rapid Stop (Proposed Location Shown)		



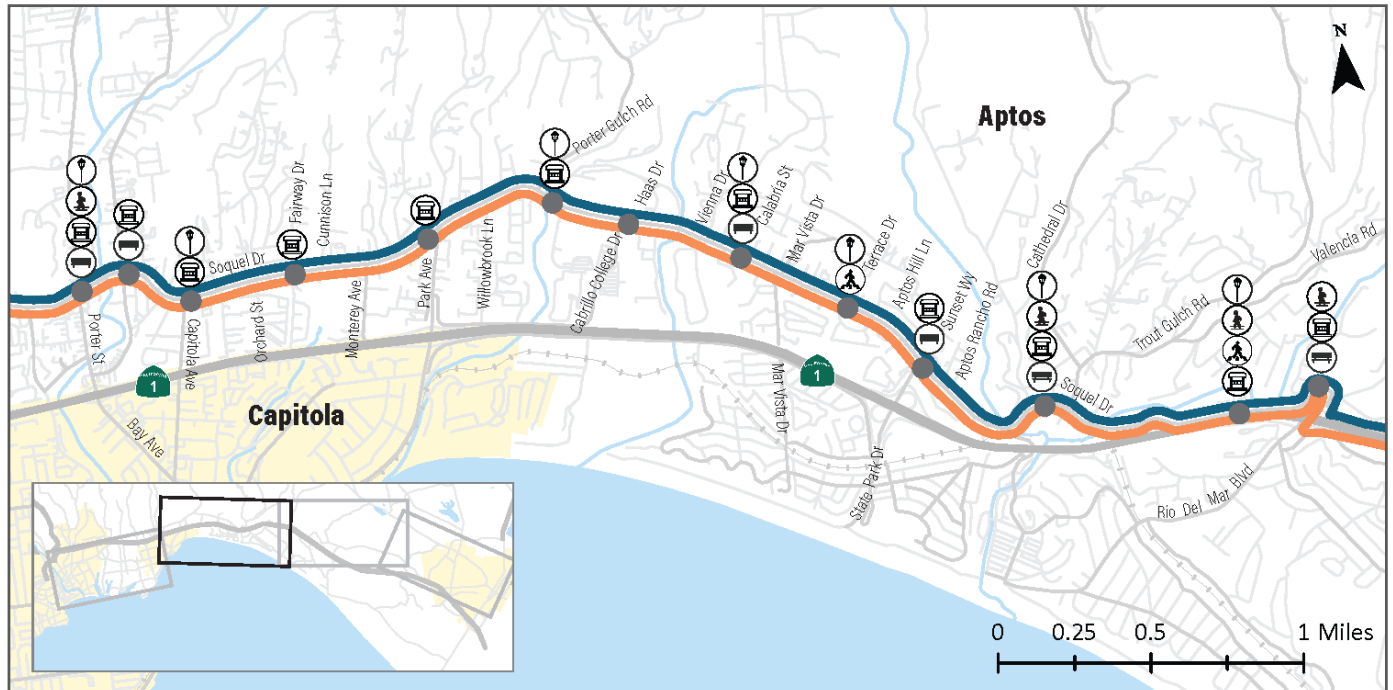
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Bus Stop Amenity Needs - Capitola to Aptos



Northbound



Southbound

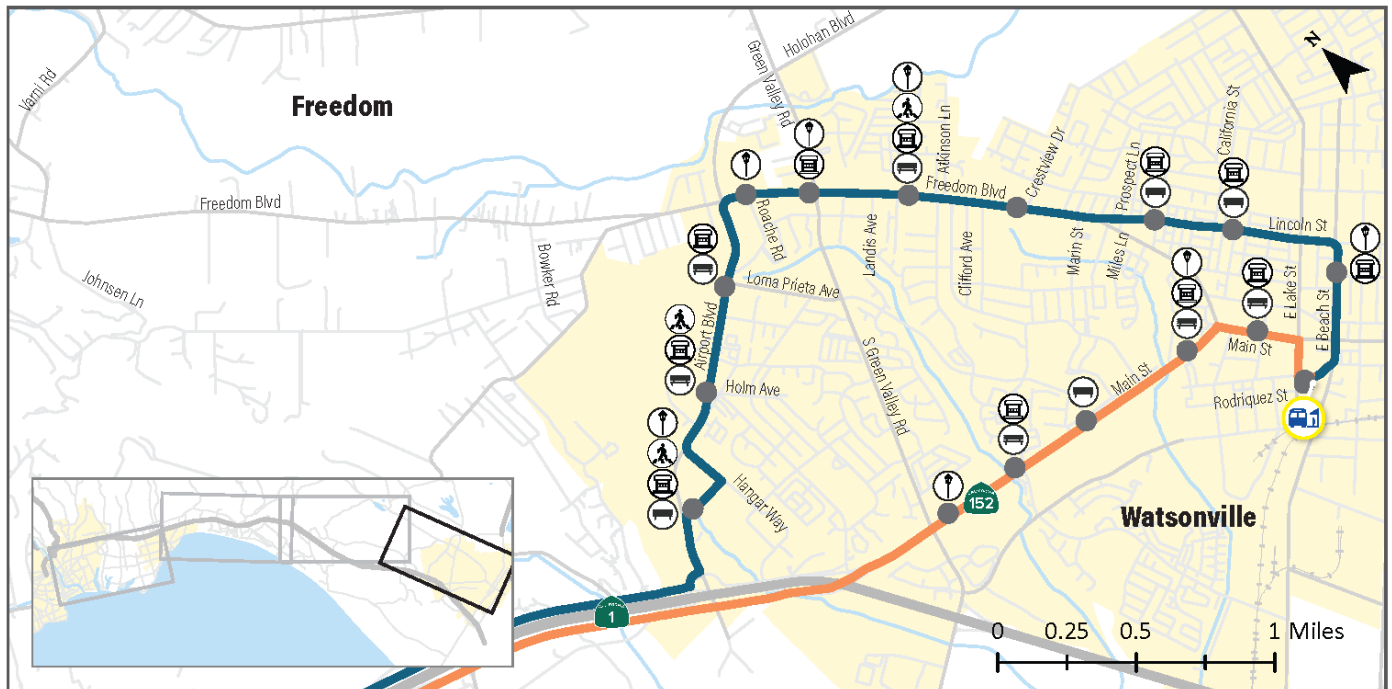
Legend	City Limits	Transit Center	Bench Needed
	Proposed Rapid Route Alignment 1	Shelter Needed	Crosswalk Needed
	Proposed Rapid Route Alignment 2	Sidewalk Needed	Lighting Needed
	Rapid Stop (Proposed Location Shown)		



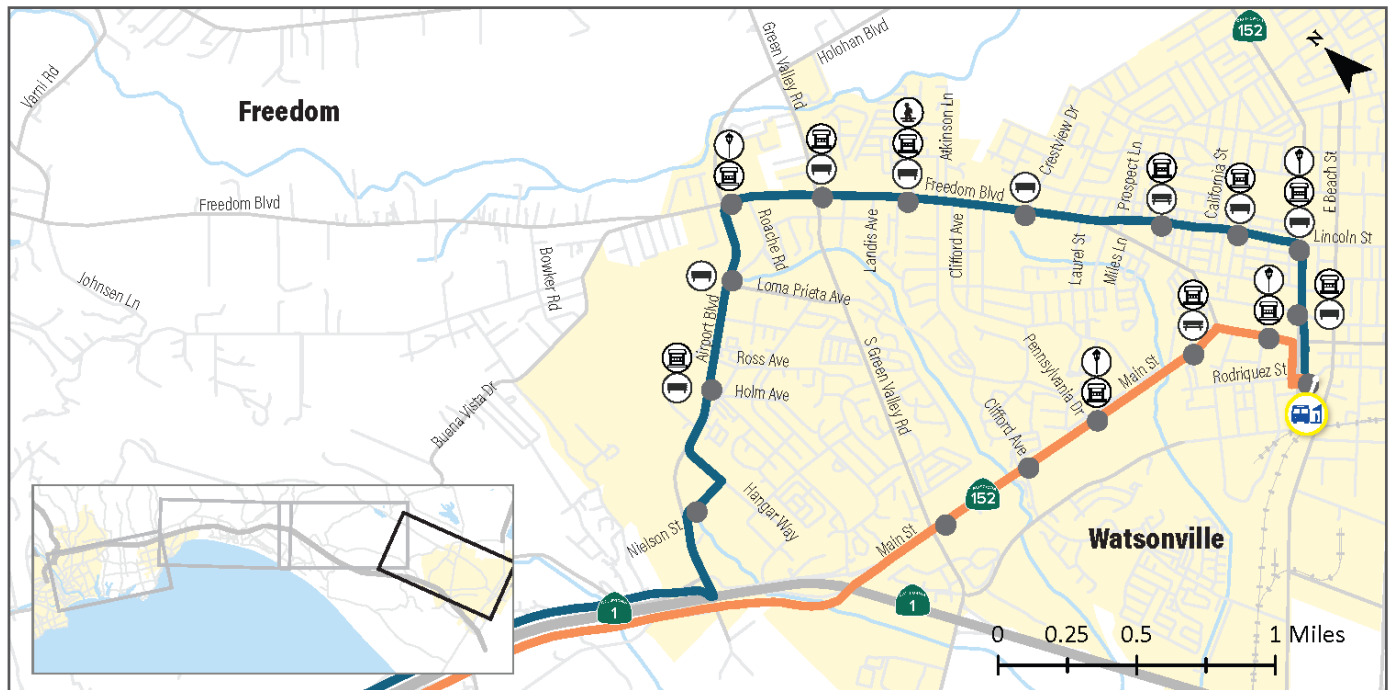
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Bus Stop Amenity Needs - Freedom to Watsonville



Northbound

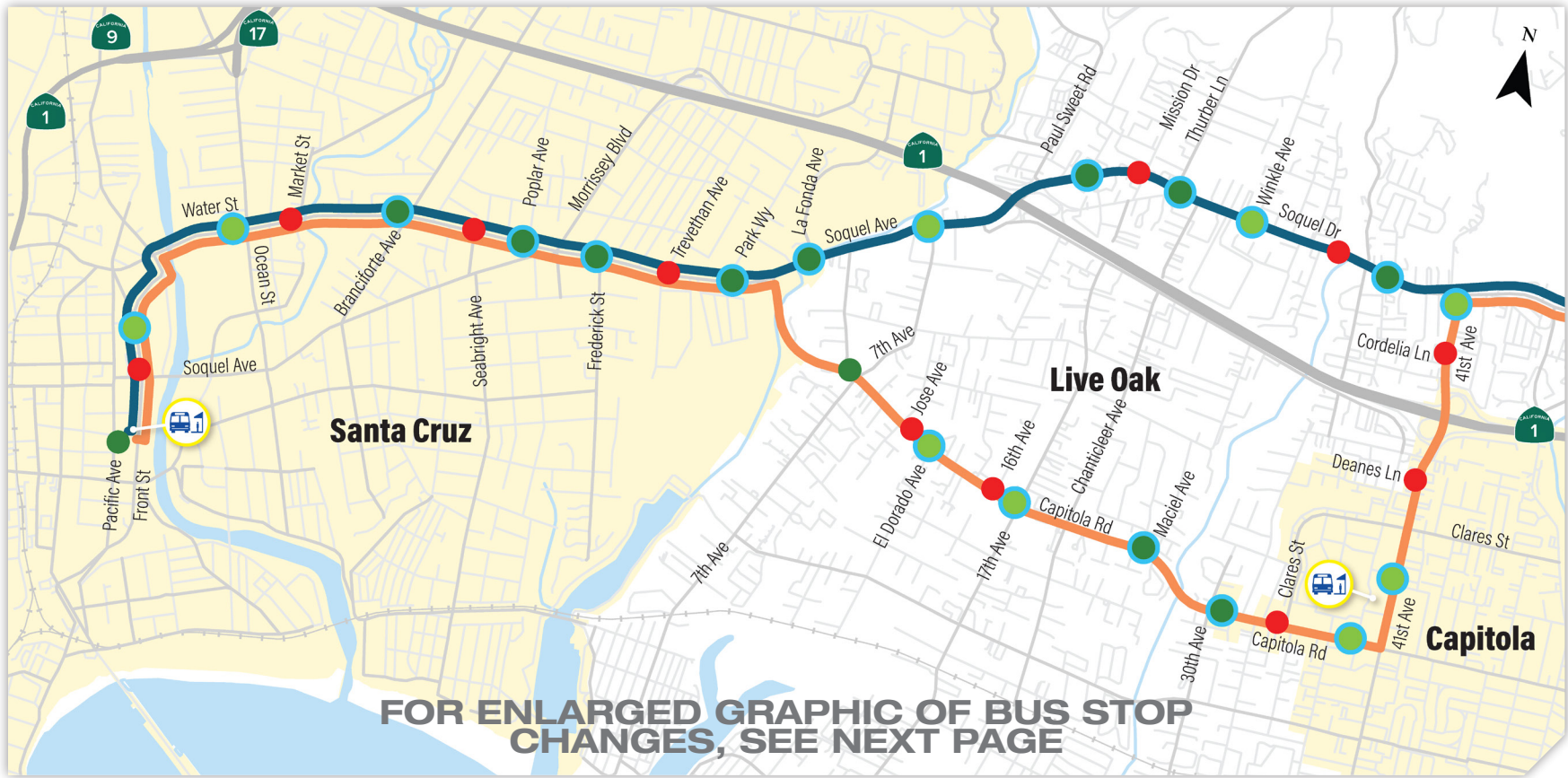


Southbound

Legend		City Limits		Transit Center		Bench Needed
		Proposed Rapid Route Alignment 1		Shelter Needed		Crosswalk Needed
		Proposed Rapid Route Alignment 2		Sidewalk Needed		Lighting Needed
		Rapid Stop (Proposed Location Shown)				



RELOCATION/CONSOLIDATION OF RAPID BUS STOPS



FOR ENLARGED GRAPHIC OF BUS STOP CHANGES, SEE NEXT PAGE

EFFECTS OF IMPROVEMENTS ON:

On Time Performance	Trip Time		Wait Time	User Delay	Coverage
Bus stops cause a high degree of variability in travel time as buses wait for passengers to load and then try to merge back into traffic. Optimizing stop placement reduces that variability.	Reduction in number of stops reduces amount of dwell time and time bus is waiting to merge back into traffic. Relocating bus stops to far-side reduces amount of time stopped at red lights. Reduces peak period northbound travel time on either route by 7-13 minutes per trip. Reduces peak period southbound travel time on either route by 8-14 minutes per trip.		Reduced variability and faster travel time allows for more frequent service for the same cost.	Fewer, well positioned bus stops reduce conflicts between buses and other road users and reduces delay for bus riders.	Number of people within 1/4-mile of a high quality bus stop* increases by 15% from 44,842 to 51,495.
Accessibility	Ridership	Ped/Bike Safety	User Experience at Stops	Operation and Maintenance Costs	Estimated Capital Cost
Stops are further apart, requiring a longer walk for some users. However, the bus will come more frequently to the stops provided.	Quicker, more reliable and frequent service is expected to attract additional riders.	By relocating bus stops to the far-side of intersections, pedestrians and cyclists crossing the street are more visible to drivers, reducing risk of collisions.	Consolidation of stops allows for all stops to be upgraded with additional amenities (see enhanced bus stop amenities fact sheet).	Reducing the number of stops lowers operations and maintenance costs.	\$715,000

*high quality bus stop includes shelter, bench, and lighting, and is accessible by crosswalk and sidewalk

Description

- Move stops from near-side of intersections (before the light) to far-side of the intersections (after the light). This improves pedestrian visibility and allows buses to travel through the green light before stopping.
- Relocate/add/remove stops to ensure evenly spaced stops to provide better coverage.
- Remove closely spaced or low ridership stops to reduce dwell time at stops and improve reliability.
- Stops are within 1,000 feet of each other in several locations along the corridor, resulting in high delay for the bus at stops and re-entering traffic; increased to 1/3 mile (~1,760ft) to achieve stop spacing that balances access, travel time, and reliability.

Category	Quantity		
Bus Speed and Reliability	Existing Stops to Remain: New/Relocated Stop: Stop Identified for Removal:	NB	SB
		27	31
Bus Stop Access		23	20
		24	26

Key Implementation Considerations

- Requires detailed survey and design to identify space available for relocated bus stops. Proposed locations for new/relocated bus stops with limited right of way may limit amenities that can be provided.
- May require modifications to the curb, sidewalk, landscaping, and other features to accommodate the relocated stops.
- Recommended to conduct outreach to adjacent businesses where stops are proposed to be added/removed.
- Will require City approval for bus stop relocations.
- Recommended to conduct outreach to mobility-impaired and senior communities to assess implications on stop accessibility.
- Will require outreach campaign to notify riders of stop changes prior to implementation.

LEGEND

Benefits with little to no trade-offs for all users	Benefits, but with minor trade-offs for some users	Benefits, but with greater trade-offs for some users	Does not have significant effect
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RELOCATION/CONSOLIDATION OF RAPID BUS STOPS



Northbound

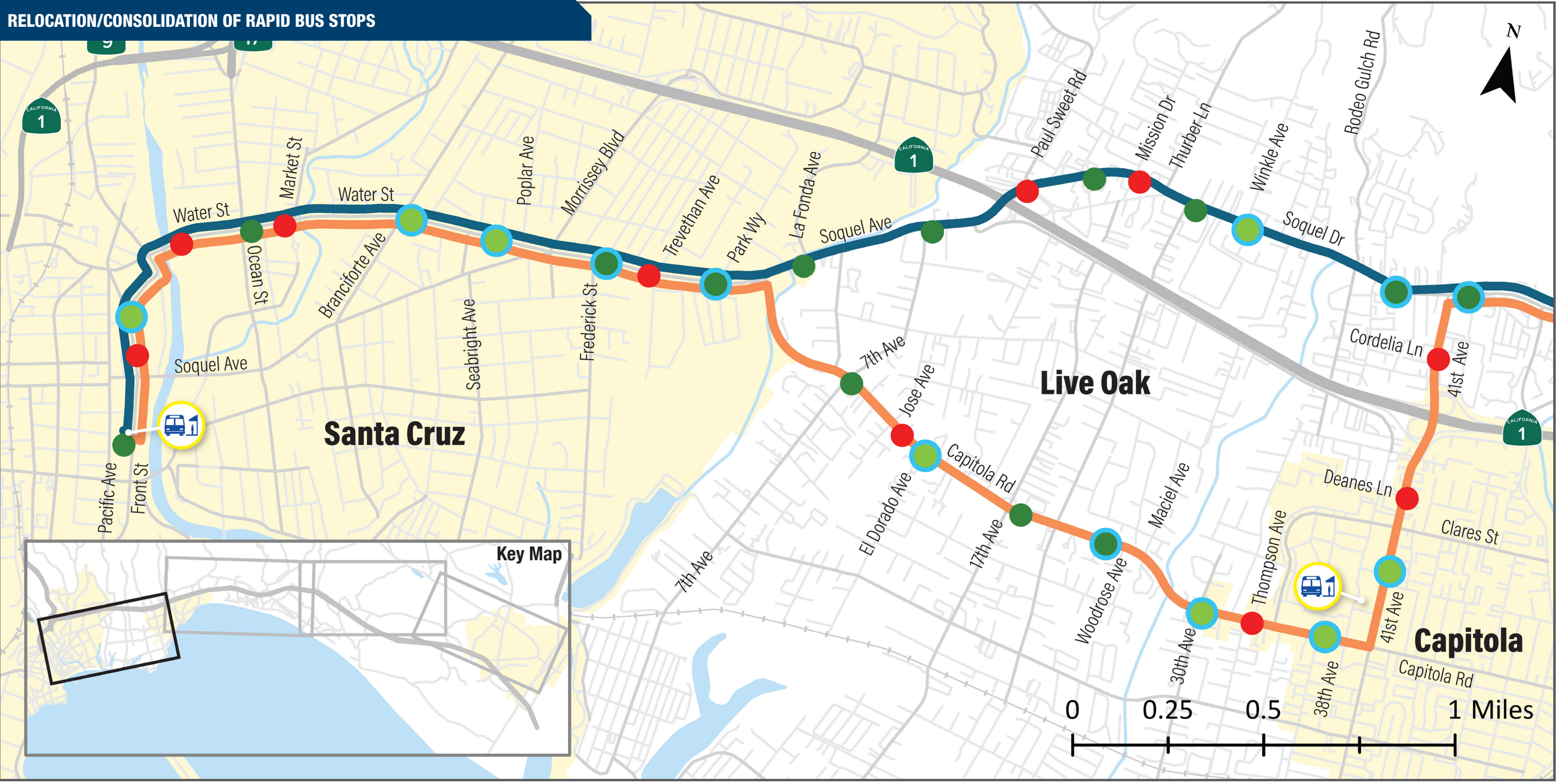
Legend

- City Limits
- Transit Center
- Proposed Rapid Route Alignment 1
- Proposed Rapid Route Alignment 2

- Existing Stop to Remain
- New/Relocated Stop (Proposed Location Shown)
- Stop Identified for Removal
- Stop Requiring Amenity Upgrades



RELOCATION/CONSOLIDATION OF RAPID BUS STOPS



Southbound

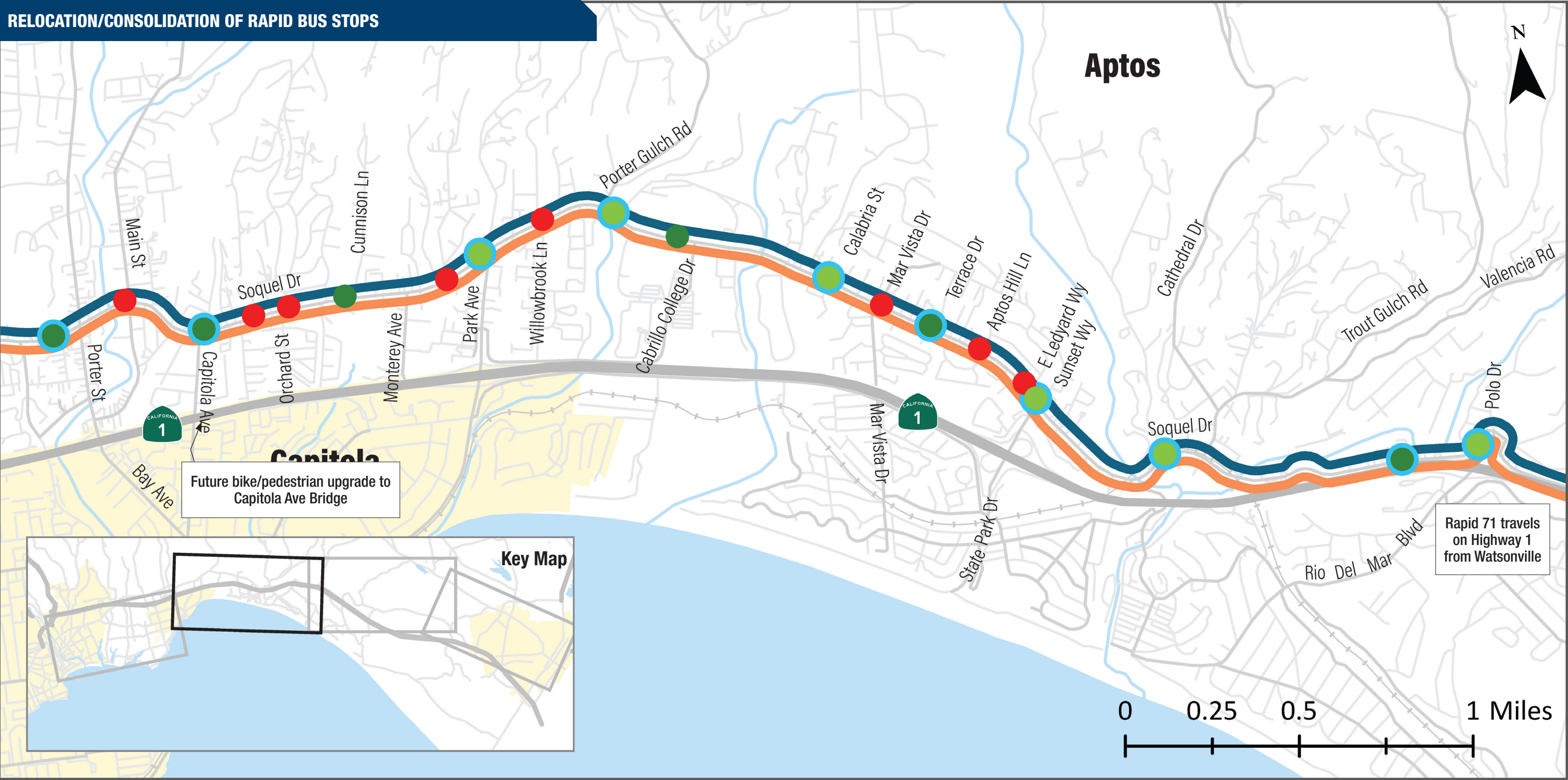
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- City Limits
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- Proposed Rapid Route Alignment 1
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- Existing Stop to Remain
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RELOCATION/CONSOLIDATION OF RAPID BUS STOPS



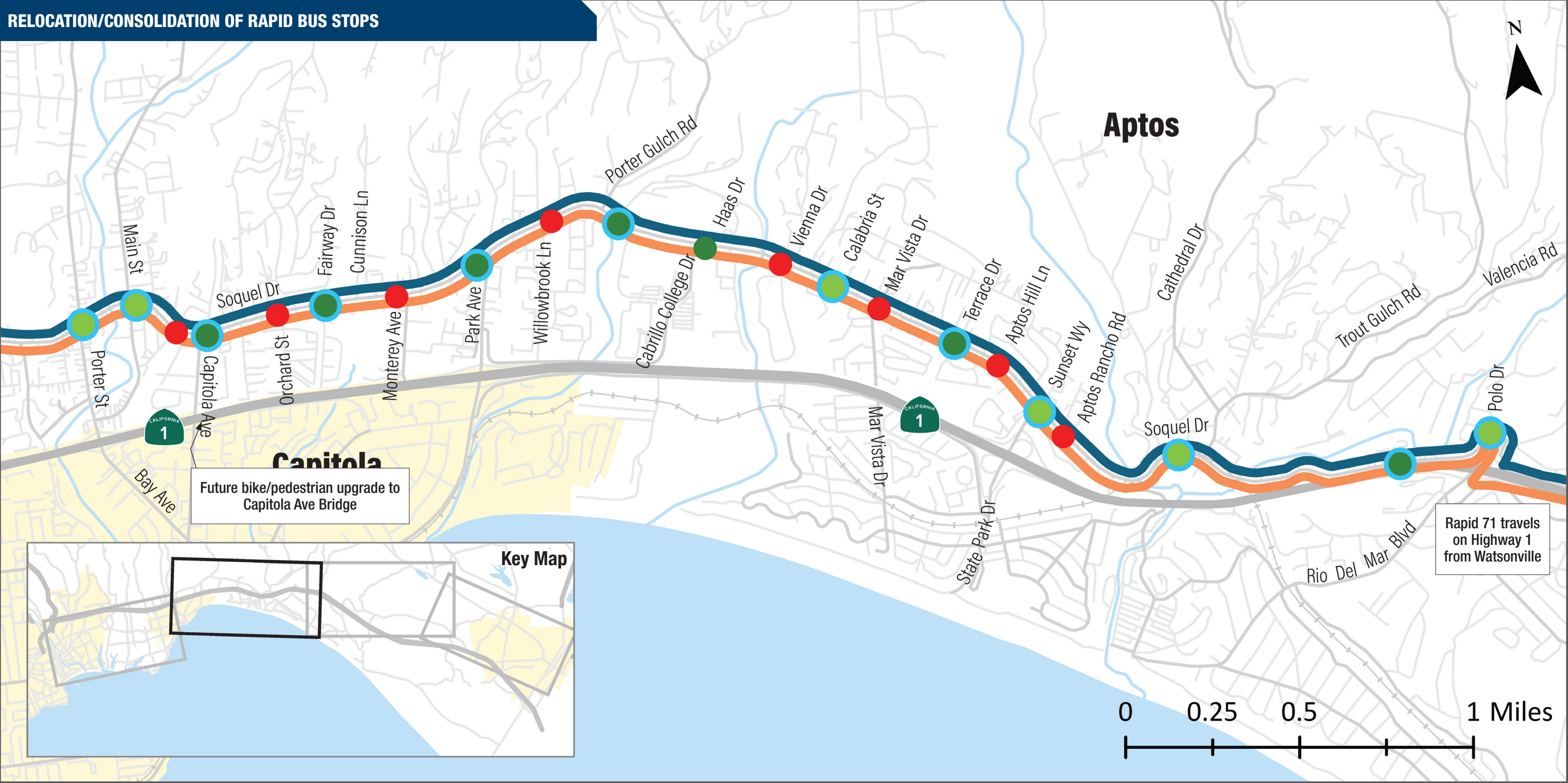
Northbound

Legend

City Limits	Existing Stop to Remain
Transit Center	New/Relocated Stop (Proposed Location Shown)
Proposed Rapid Route Alignment 1	Stop Identified for Removal
Proposed Rapid Route Alignment 2	Stop Requiring Amenity Upgrades



RELOCATION/CONSOLIDATION OF RAPID BUS STOPS



Southbound

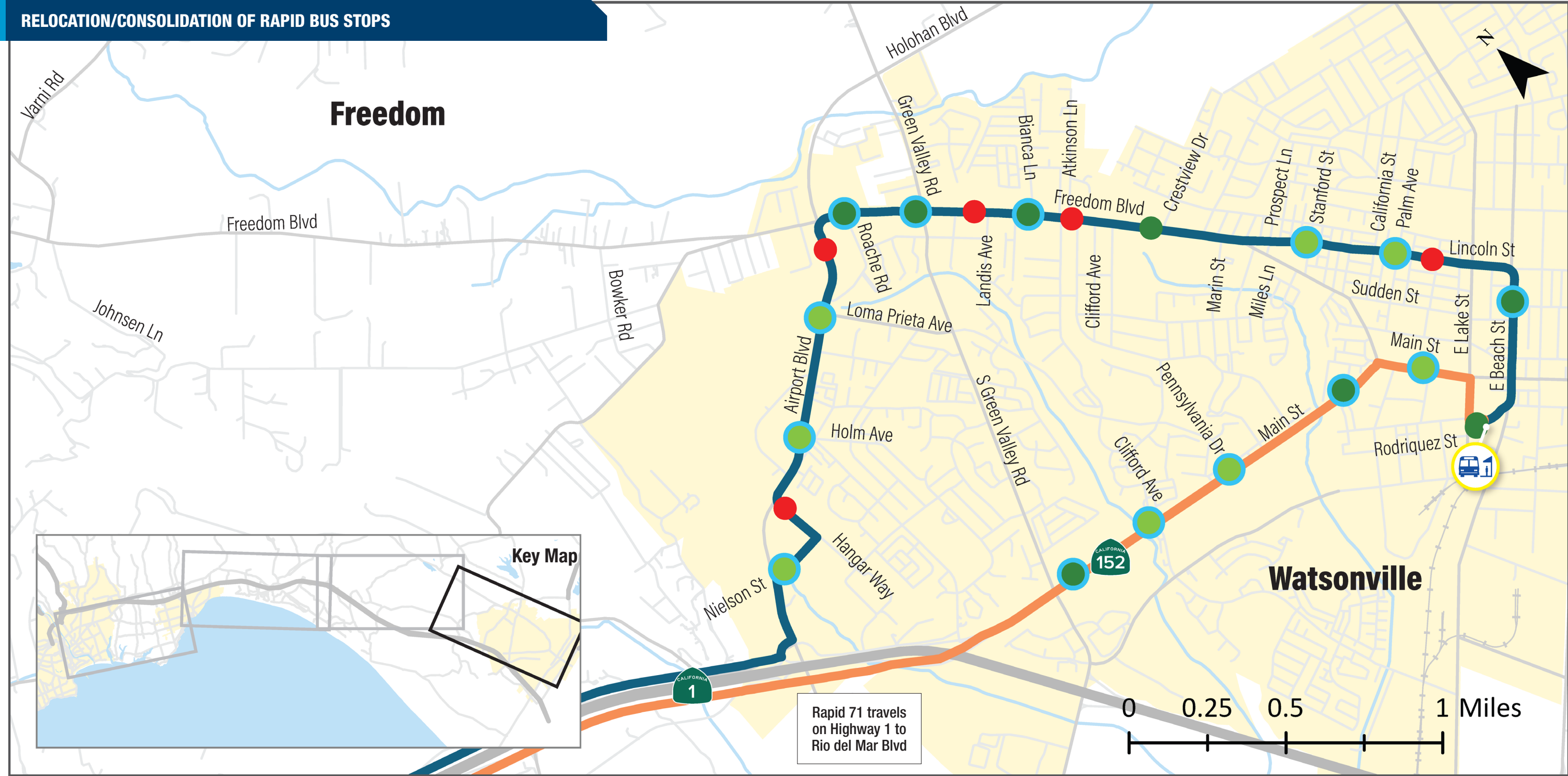
Legend

- City Limits
- Transit Center
- Proposed Rapid Route Alignment 1
- Proposed Rapid Route Alignment 2

- Existing Stop to Remain
- New/Relocated Stop (Proposed Location Shown)
- Stop Identified for Removal
- Stop Requiring Amenity Upgrades



RELOCATION/CONSOLIDATION OF RAPID BUS STOPS



Northbound

Legend

City Limits

Transit Center

Proposed Rapid Route Alignment 1

Proposed Rapid Route Alignment 2

Existing Stop to Remain

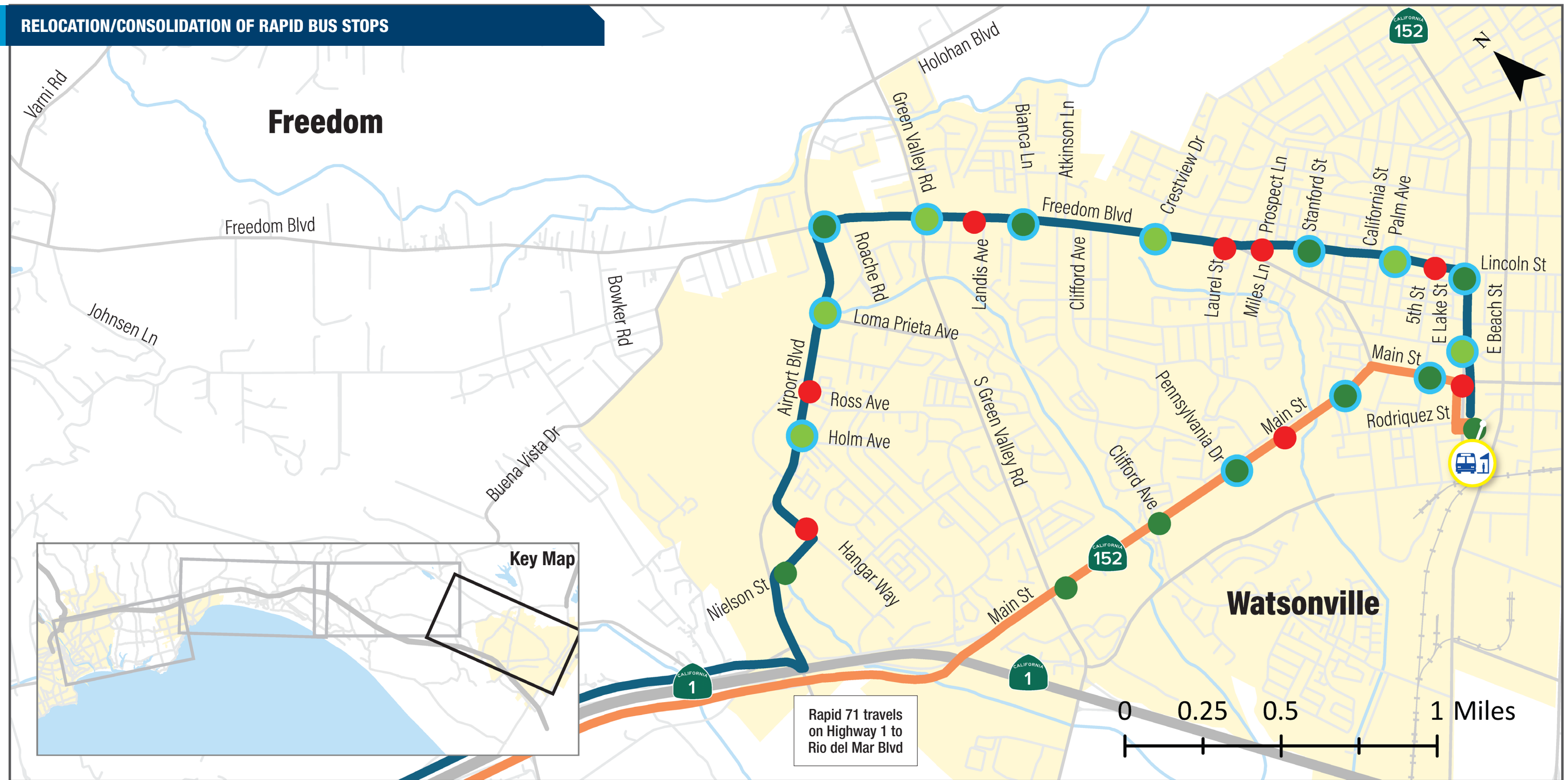
New/Relocated Stop (Proposed Location Shown)

Stop Identified for Removal

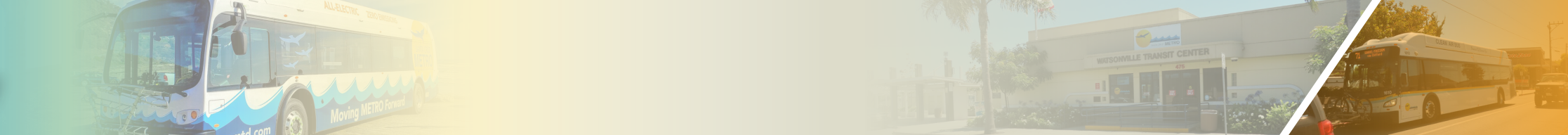
Stop Requiring Amenity Upgrades



RELOCATION/CONSOLIDATION OF RAPID BUS STOPS



Southbound



BUS BULBS



Description

- Extends the curb into the roadway, closer to the traffic lane. This allows buses to stop in lane instead of pulling out of traffic to the curb. As a result, it avoids the need to wait for a gap in traffic flow to depart the bus stop.
- Provides for a transit waiting area separate from the sidewalk.
- Provides additional space for transit amenities.

TRANSIT ISLANDS



Description

- Similar to a bus bulb, but in a location with bike lanes. Most commonly, the bike lane is placed behind the bus loading area, either raised to sidewalk level or at roadway level. Pedestrian crossings of the bike lane are marked. In locations with extremely narrow right-of-way, the bike lane may pass through the bus loading area with distinctive markings.
- Eliminates conflict between bikes and buses at stops, improving the quality of the bike facility.

EFFECTS OF IMPROVEMENTS ON:

On Time Performance	Trip Time		Wait Time	User Delay	Coverage
Reliability is improved as buses do not need to wait for a gap in traffic to exit a bus stop.	Travel time is improved as buses do not need to wait for a gap in traffic to exit a bus stop. Reduces peak period northbound and southbound travel time on either route by 1-2 minutes per trip.		Reduced variability and faster travel time allows for more frequent service for the same cost.	Buses stopping in lane may cause delay for cars behind them. Delay for bus riders is reduced.	-
Accessibility	Ridership	Ped/Bike Safety	User Experience at Stops	Operation and Maintenance Costs	Estimated Capital Cost
Allows for wider bus boarding areas, improving accessibility for mobility-impaired riders.	Quicker, more reliable and frequent service is expected to attract additional riders.	Transit Islands only: Eliminates conflict between buses and bikes, improving comfort and safety of bike facility.	Provides additional space for amenities and waiting areas.	Low maintenance cost for additional infrastructure, but may reduce operating cost.	Bus Bulbs: \$120,000 Transit Islands: \$1,295,000

Category

Quantity



Bus Speed and Reliability



Bus Stop Access

Bus Bulbs: 7

Transit Islands: 16

Key Implementation Considerations

- Platforms can be configured for near level boarding to make it easier to board the bus and reduce delays.
- Transit island configuration will require further design. Limited right-of-way may result in shared bike and bus loading areas.
- May impact existing trees, utilities and other street furniture, requiring further investigation.
- Further investigation required to assess drainage impacts and solutions.

LEGEND

Benefits with little to no trade-offs for all users

Benefits, but with minor trade-offs for some users

Benefits, but with greater trade-offs for some users

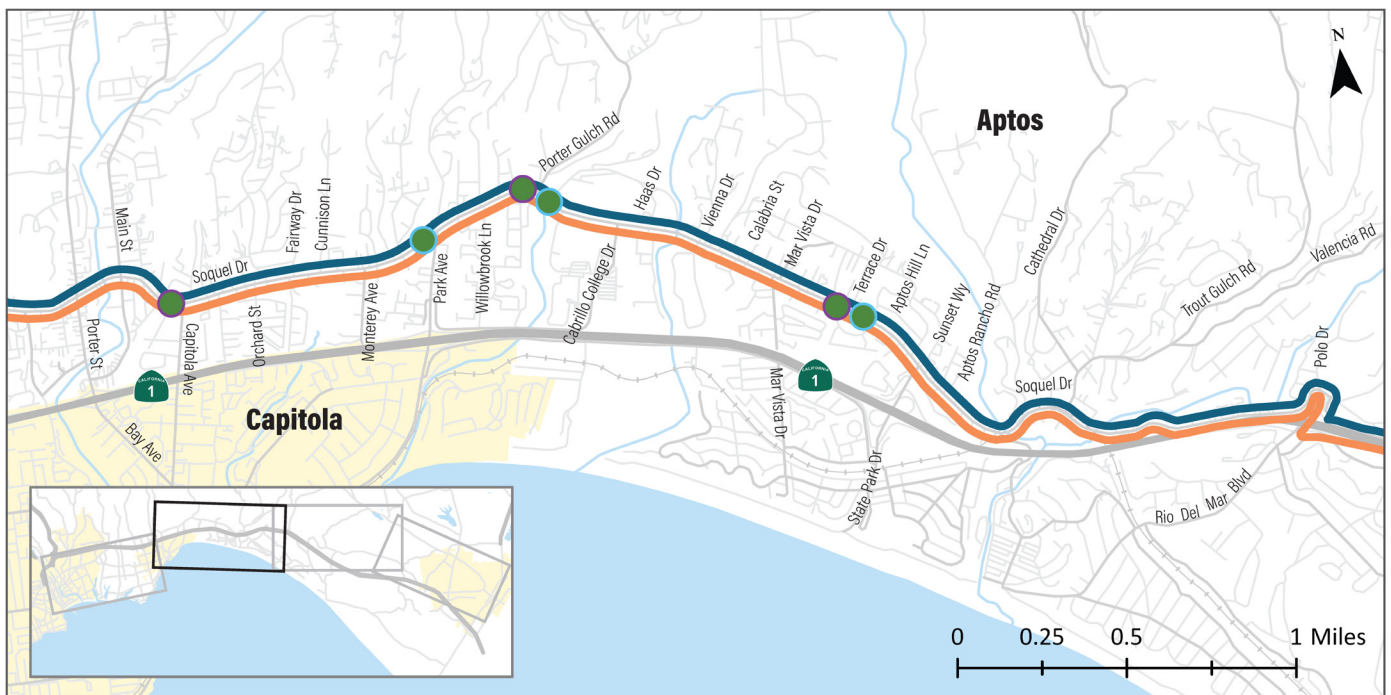
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Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study

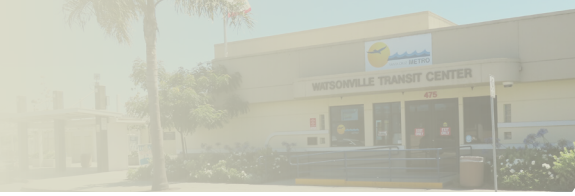


Bus Bulb & Transit Island Locations - Santa Cruz to Capitola

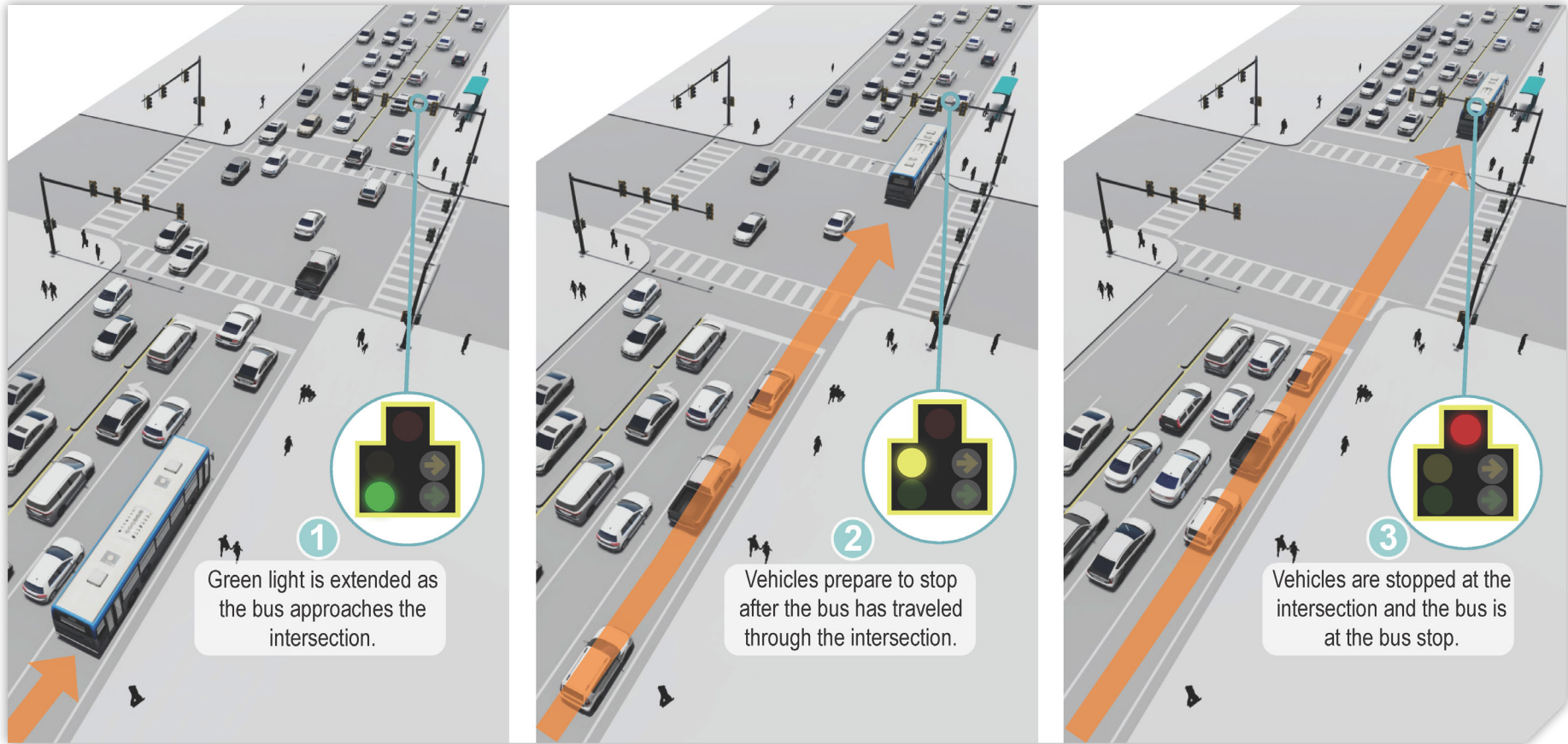


Legend	City Limits	Transit Center	Transit Island	
			Northbound	Northbound
			Southbound	Southbound
				Proposed Rapid Route Alignment 1
				Proposed Rapid Route Alignment 2





TRANSIT SIGNAL PRIORITY (TSP)



EFFECTS OF IMPROVEMENTS ON:

On Time Performance	Trip Time		Wait Time	User Delay	Coverage
Fewer red lights for buses results in more consistent travel time and improved reliability.	Reduced delay at signals means shorter travel times. Reduces peak period northbound travel time on either route by 5-9 minutes per trip. Reduces peak period southbound travel time on either route by 6-9 minutes per trip.		Reduced variability and faster travel time allows for more frequent service for the same cost.	Anticipated to have a minor effect on auto delay. Reduction in delay for transit riders.	-
Accessibility	Ridership	Ped/Bike Safety	User Experience at Stops	Operation and Maintenance Costs	Estimated Capital Cost
-	Quicker, more reliable and frequent service is expected to attract additional riders.	-	-	Medium maintenance cost to maintain technology and communications, but may reduce operating cost.	On-board equipment: \$954,000 In-cabinet equipment: \$1,830,000

Description

- Technologies used to reduce transit vehicle delays at signalized intersections.
- Examples include holding lights green for a few seconds until the bus can pass through and providing an earlier green to the bus to reduce its wait time.
- Requires devices at the signals and on-board the buses.

Category

Quantity



Bus Speed and Reliability

Signals to be outfitted with
Transit Signal Priority: 61

Key Implementation Considerations

- May require signal controller upgrades and new communications.
- Requires a coordinated implementation across the entire system.
- Requires further coordination to determine the type of TSP and specific TSP parameters.
- May also benefit emergency vehicles in locations without existing emergency vehicle pre-emption.

LEGEND

Benefits with little to no trade-offs for all users

Benefits, but with minor trade-offs for some users

Benefits, but with greater trade-offs for some users

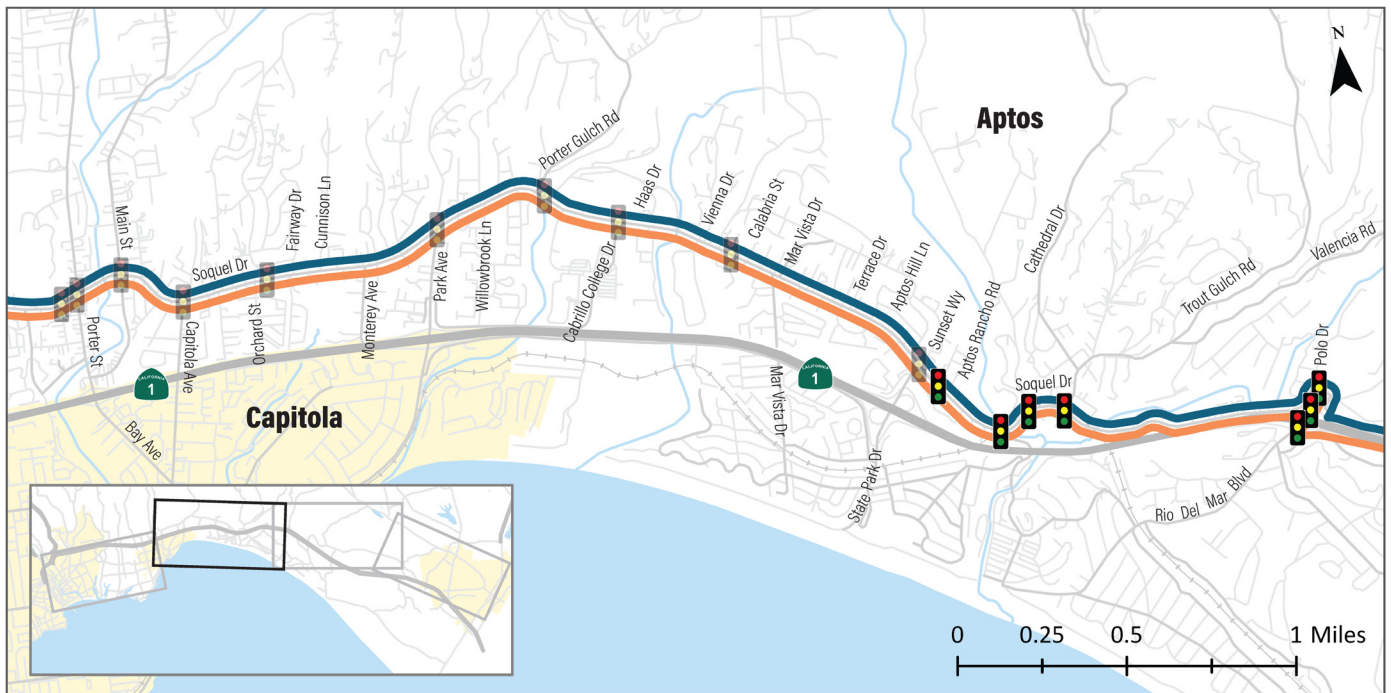
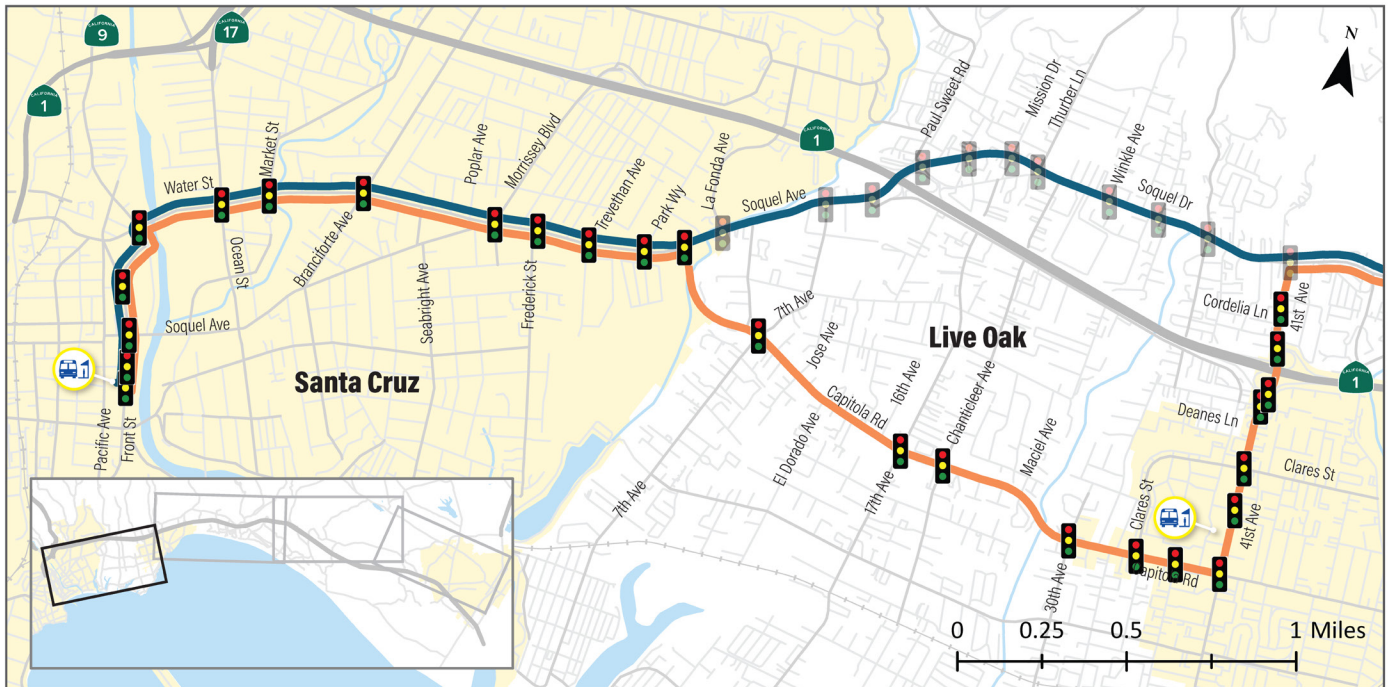
Does not have significant effect



Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study



Transit Signal Priority - Santa Cruz to Capitola



Legend

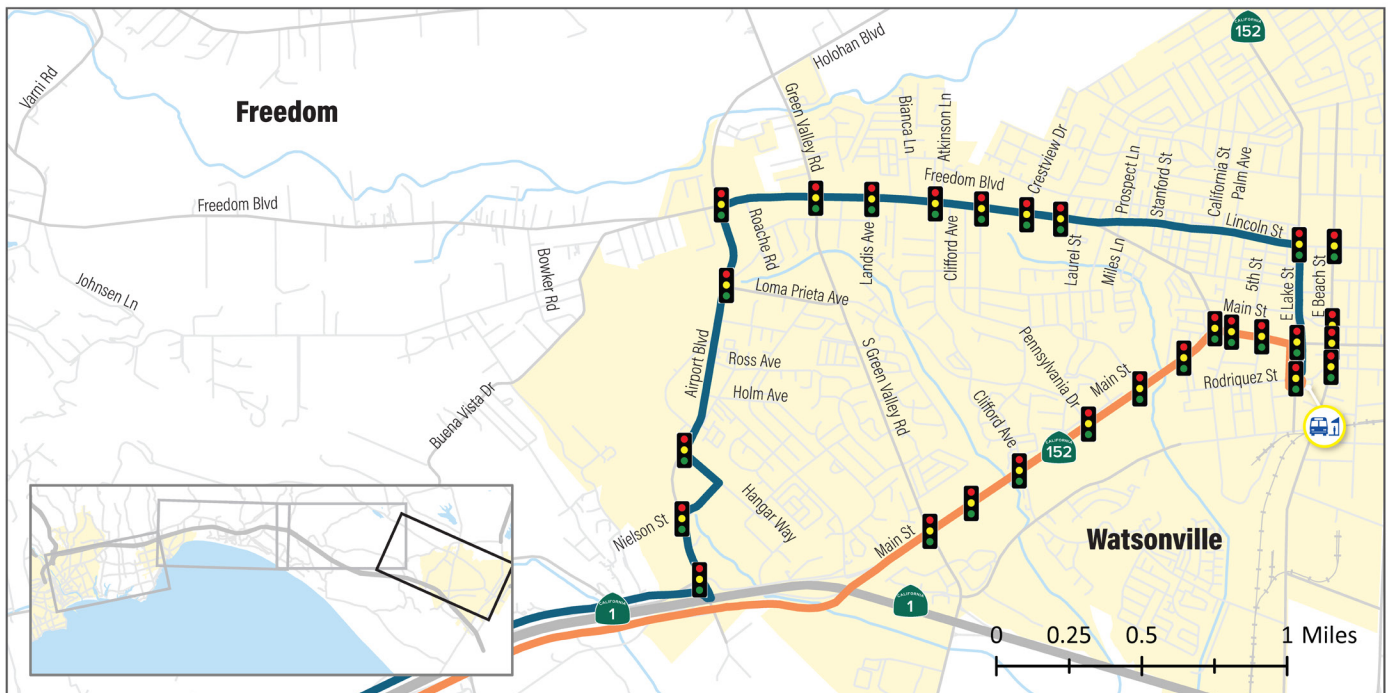
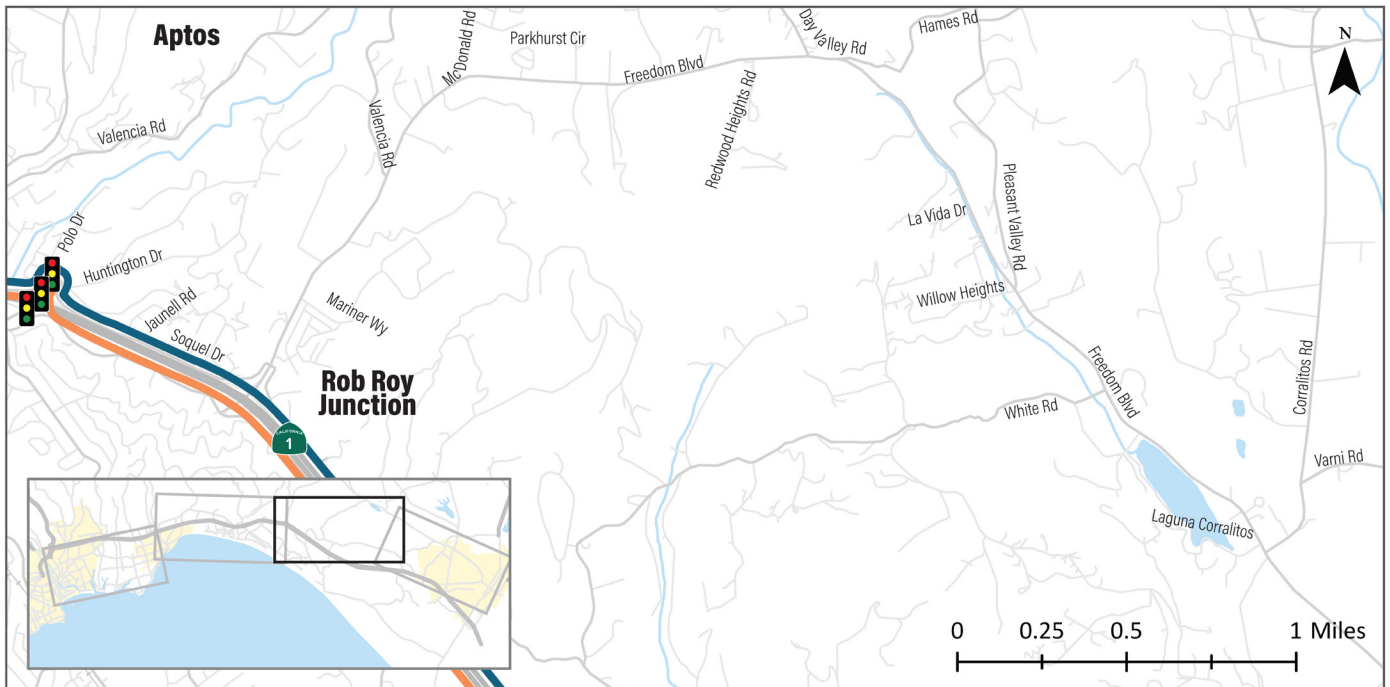
- City Limits
- Transit Center
- Proposed Rapid Route Alignment 1
- Proposed Rapid Route Alignment 2
- Transit Signal Priority (TSP) Recommended
- TSP Treatments Included in County Project



Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study



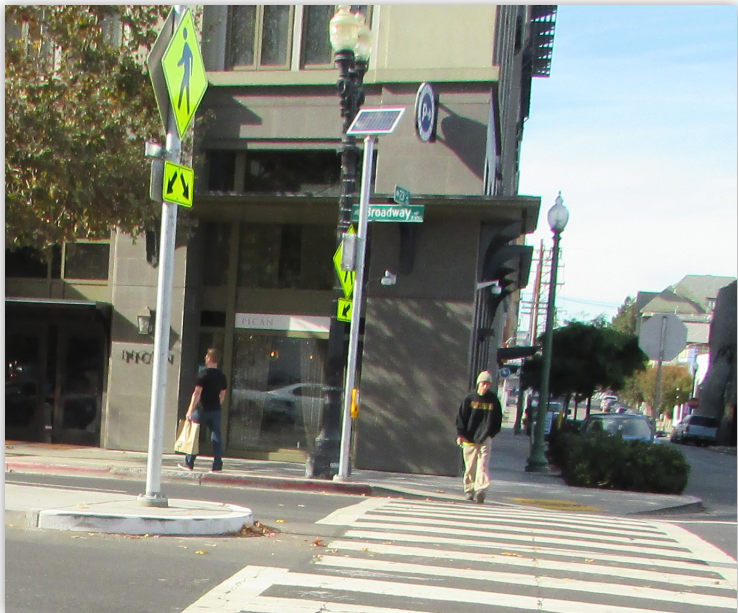
Transit Signal Priority - Aptos to Watsonville



- Legend**
- City Limits
 - Transit Center
 - Proposed Rapid Route Alignment 1
 - Proposed Rapid Route Alignment 2
 - Transit Signal Priority (TSP) Recommended
 - TSP Treatments Included in County Project



RECTANGULAR RAPID
FLASHING BEACONS (RRFB)



Description

- Flashing lights at crosswalks that are activated by pedestrians that warn drivers to stop. Proven to increase driver awareness of pedestrians crossing roadways and yielding of vehicles to pedestrians.

PEDESTRIAN HYBRID
BEACONS (PHB)



Description

- A type of traffic signal that stops cars to allow pedestrians to cross at a crosswalk. Vehicles can proceed once pedestrians have cleared the crosswalk.

HIGH-VISIBILITY
CROSSWALKS



Description

- Enhances striping of crosswalks to make them more visible to drivers, increasing yielding of vehicles to pedestrians.

Category

Quantity



Bus Stop
Access

RRFB: 6
PHB: 1
High Visibility
Crosswalks: 12

Key Implementation Considerations

- Follow state and local standards for striping.
- Run warrants for PHB installation.
- PHBs may require communications and signal coordination.

LEGEND

Benefits with
little to no
trade-offs
for all users

Benefits, but
with minor
trade-offs for
some users

Benefits, but
with greater
trade-offs for
some users

Does not
have
significant
effect

EFFECTS OF IMPROVEMENTS ON:

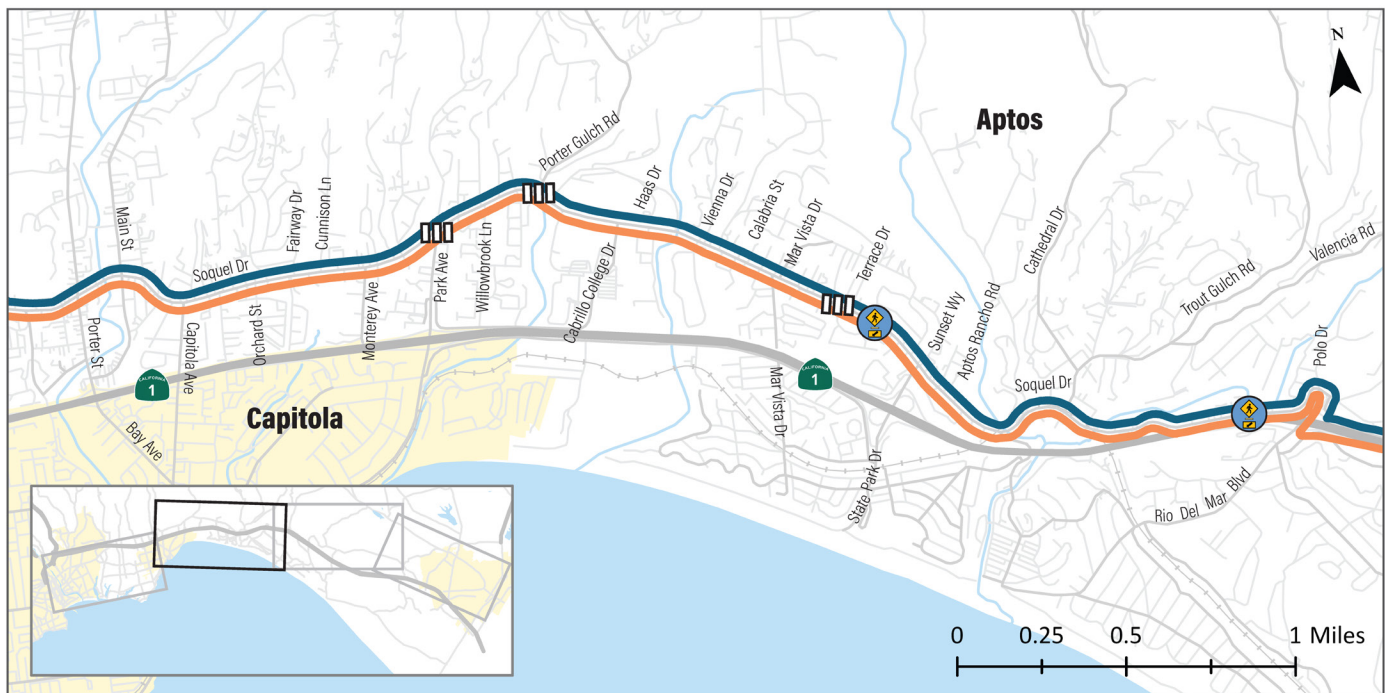
On Time Performance	Trip Time		Wait Time	User Delay	Coverage
-	-		-	No change for RRFBs and high visibility crosswalks - autos and cyclists are already required to stop for pedestrians. PHBs may reduce auto delay by optimizing when pedestrians can cross the street.	-
Accessibility	Ridership	Ped/Bike Safety	User Experience at Stops	Operation and Maintenance Costs	Estimated Capital Cost
Improves access to stops by providing safer and more comfortable places to cross the street.	-	Increases visibility of pedestrians and increases autos yielding to pedestrians.	-	Medium maintenance cost for striping and new equipment.	RRFB: \$1,503,000 PHB: \$454,000 High-Visibility Crosswalks: \$516,000



Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study



Pedestrian Crossings - Santa Cruz to Capitola



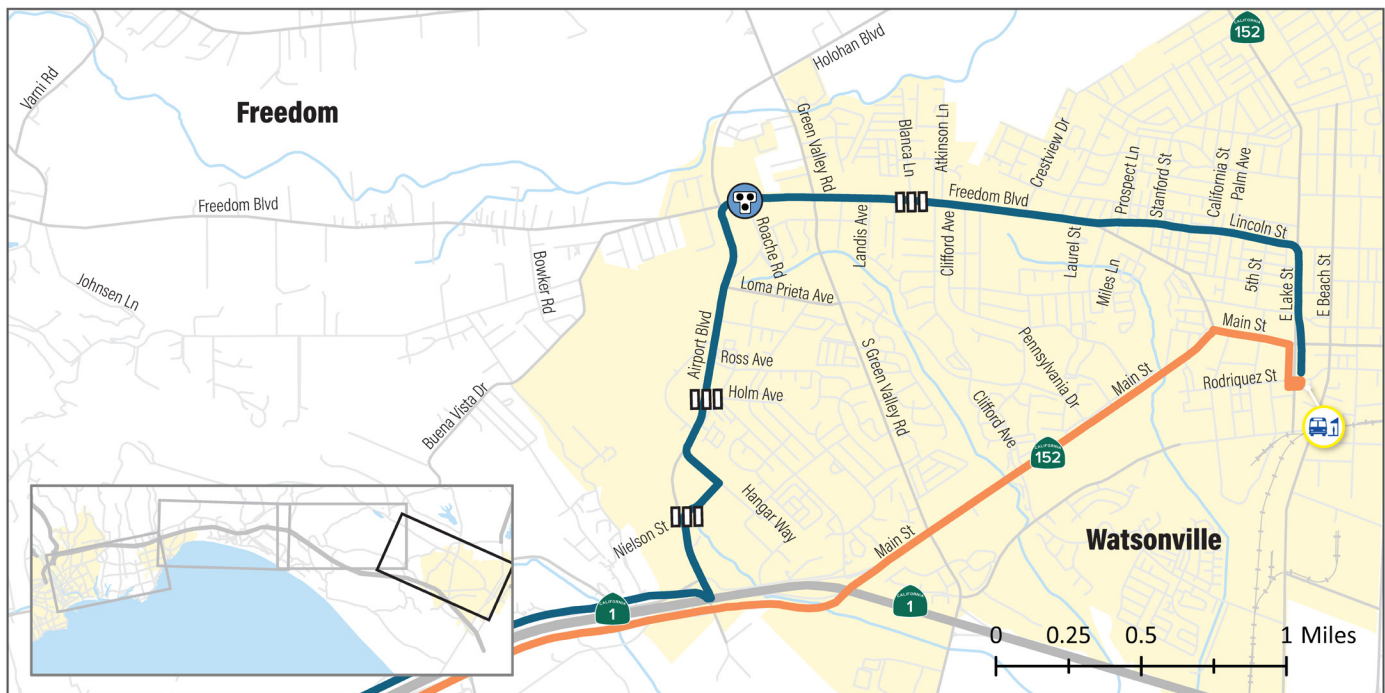
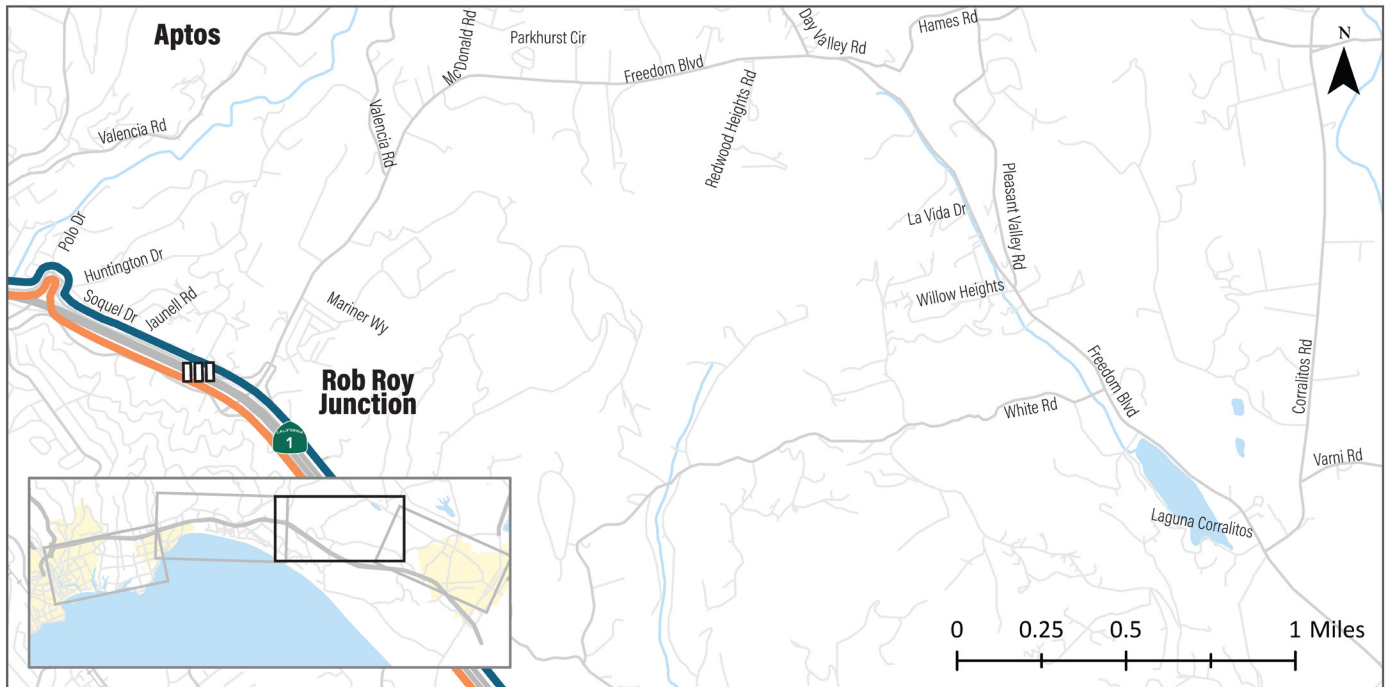
Legend	City Limits	Pedestrian Crossings	
	Transit Center	High-Visibility Crosswalks	Rectangular Rapid Flashing Beacons (RRFB)
	Proposed Rapid Route Alignment 1	Pedestrian Hybrid Beacons (PHB)	
	Proposed Rapid Route Alignment 2		



Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study



Pedestrian Crossings - Aptos to Watsonville

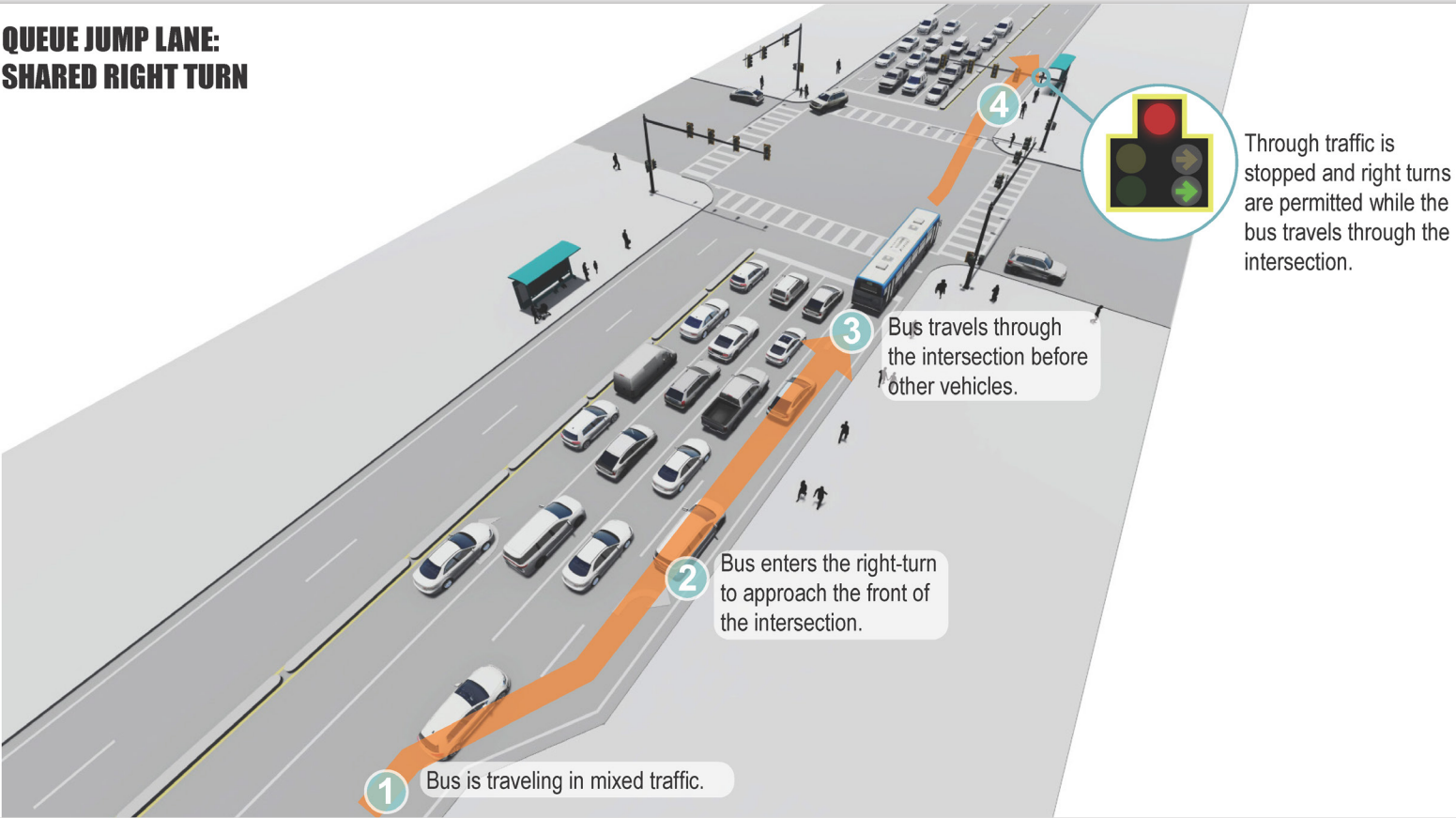



Legend	City Limits	Pedestrian Crossings
	Transit Center	High-Visibility Crosswalks
Proposed Rapid Route Alignment 1	Rectangular Rapid Flashing Beacons (RRFB)	Pedestrian Hybrid Beacons (PHB)
Proposed Rapid Route Alignment 2		



QUEUE JUMPS

QUEUE JUMP LANE:
SHARED RIGHT TURN



Description	
<ul style="list-style-type: none">A queue jump lane is a travel lane specially marked or signed for transit vehicles at traffic signals that allows buses to get ahead of the traffic queue at the signal.May include a special indicator and phase at the signal specifically for transit vehicles.	
Category	Quantity
 Bus Speed and Reliability	5
Key Implementation Considerations	
<ul style="list-style-type: none">Requires Transit Signal Priority, which may require signal controller upgrades and new communications.Traffic analysis may be required to assess the traffic affects of dedicated transit phases or changes to turn lane configuration.	

LEGEND

Benefits with little to no trade-offs for all users	Benefits, but with minor trade-offs for some users	Benefits, but with greater trade-offs for some users	Does not have significant effect
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EFFECTS OF IMPROVEMENTS ON:

On Time Performance	Trip Time		Wait Time	User Delay	Coverage
Reduces variability caused by traffic congestion at traffic signals.	Reduced delay caused by traffic congestion. Reduces peak period northbound and southbound travel time on Route A by 10 seconds per trip. Greater travel time reductions realized when paired with TSP.		Reduced variability and faster travel time allows for more frequent service for the same cost.	May cause a minor increase in auto delay if a transit-only phase is required. Reduction in delay for transit riders.	-
Accessibility	Ridership	Ped/Bike Safety	User Experience at Stops	Operation and Maintenance Costs	Estimated Capital Cost
-	Quicker, more reliable and frequent service is expected to attract additional riders.	-	-	Low maintenance cost for modified striping and signal equipment, but may reduce operating cost.	\$422,000



Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study



Queue Jump Locations - Santa Cruz to Capitola



Legend

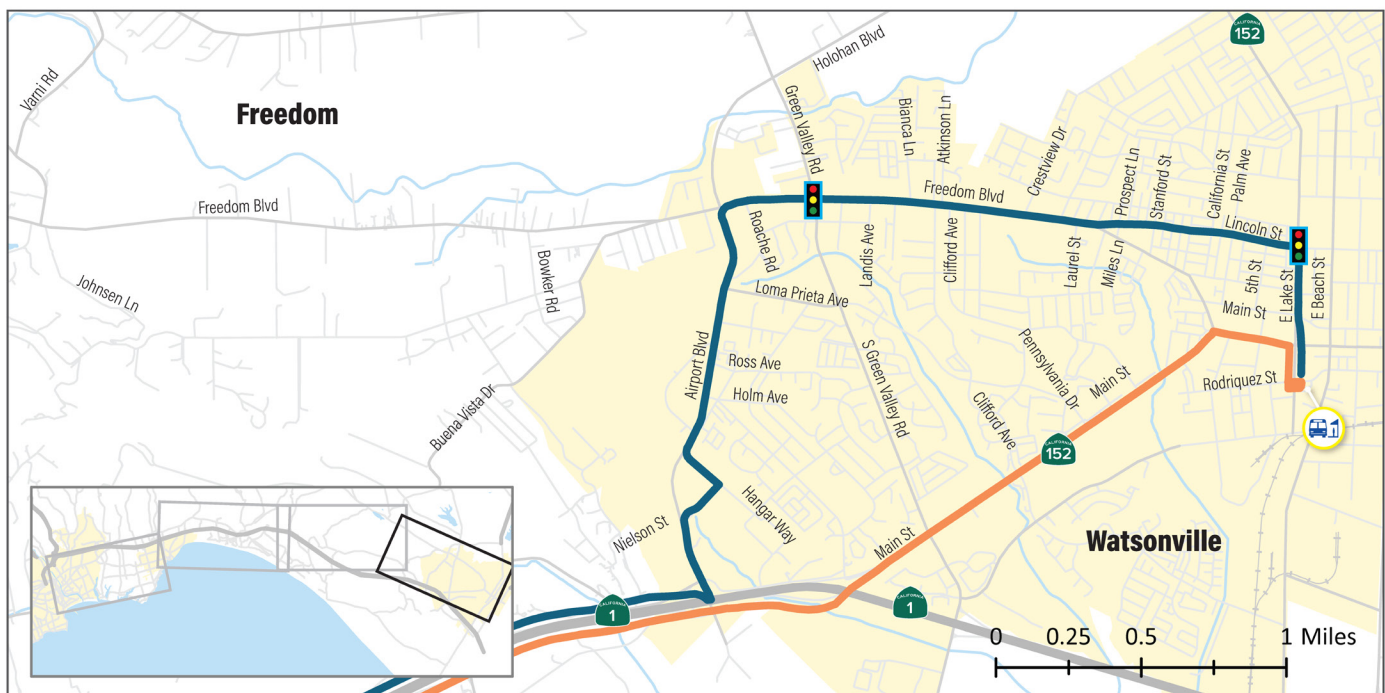
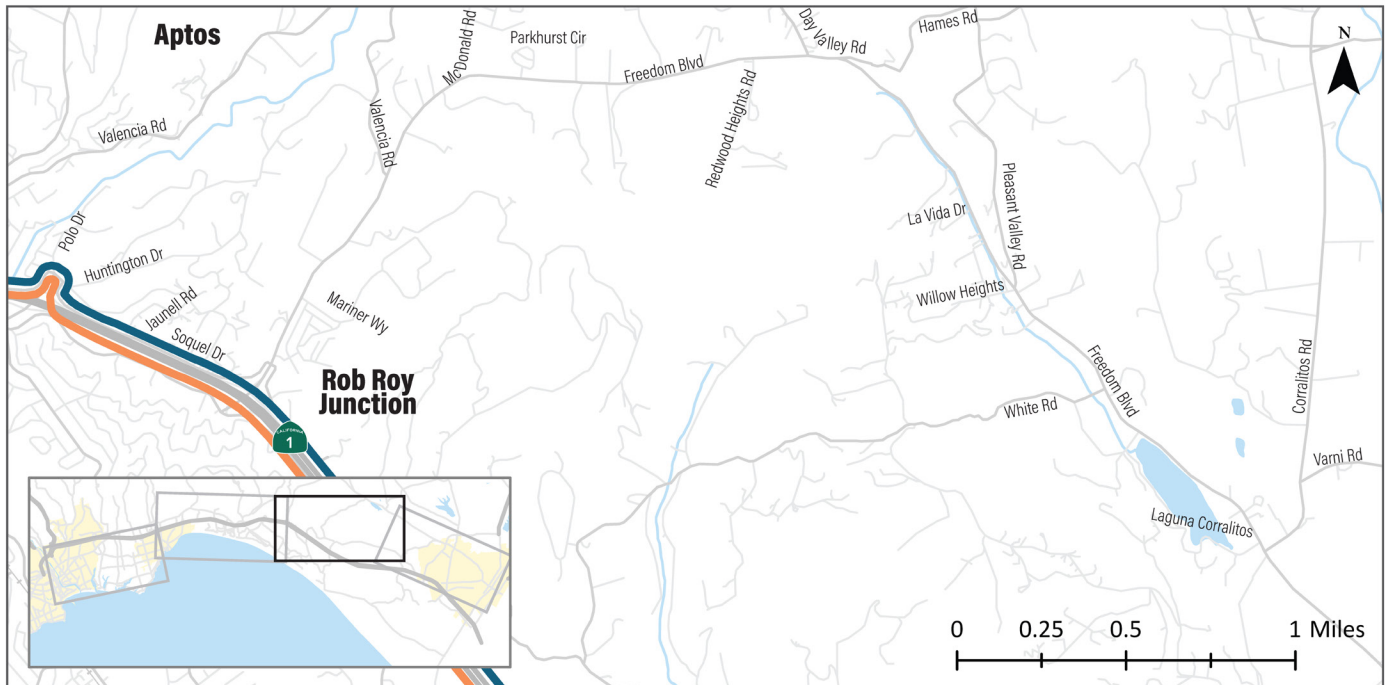
- City Limits
- Transit Center
- Proposed Rapid Route Alignment 1
- Proposed Rapid Route Alignment 2
- Northbound Queue Jump Location
- Southbound Queue Jump Location



Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study

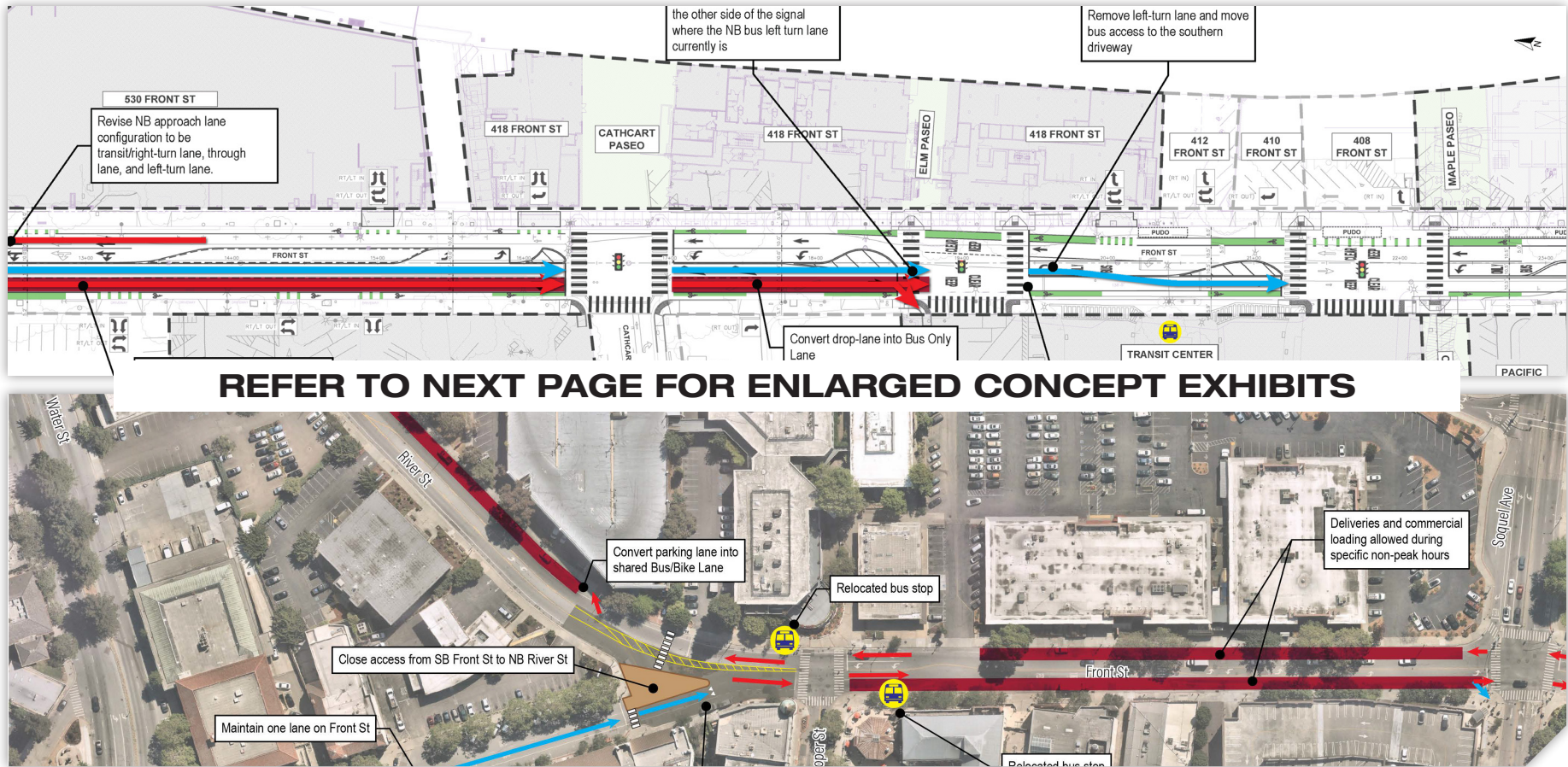


Queue Jump Locations - Aptos to Watsonville





DOWNTOWN SANTA CRUZ FRONT STREET & RIVER STREET TRANSIT LANE



EFFECTS OF IMPROVEMENTS ON:

On Time Performance	Trip Time		Wait Time	User Delay	Coverage
Front and River Streets have high variability in travel time. Dedicated lanes reduce that variability by eliminating the effect of traffic congestion.	Front and River Streets have very slow bus speeds. Removing the effect of traffic congestion will increase bus speeds. Reduces peak period northbound travel time on either route by 40 seconds per trip. Reduces peak period southbound travel time on either route by 20 seconds per trip.		Reduced variability and faster travel time allows for more frequent service for the same cost.	May result in an increase in auto delay for some movements, may require further study. Reduction in delay for transit riders.	-
Accessibility	Ridership	Ped/Bike Safety	User Experience at Stops	Operation and Maintenance Costs	Estimated Capital Cost
Relocates bus stops closer to key destinations.	Quicker, more reliable and frequent service is expected to attract additional riders.	Improved pedestrian crossings and reduced vehicle speeds improve pedestrian safety. Bikes will be provided wider and more continuous lanes but will need to share with buses.	-	Low maintenance cost for bus lane striping, but may reduce operating cost.	\$1,474,000

Description

- Install bus and bike lane on Front St and River St, replacing existing auto or parking lanes.
- Relocation of some existing bus stops.

Category



Bus Speed and Reliability



Bus Stop Access Projects

Key Implementation Considerations

- Requires design development to configure signing, striping, and any other associated improvements.
- Consider option to provide loading access during certain hours of the day.
- May require traffic analysis to assess corridor operations.
- Would require towing and/or ticketing enforcement to maintain effectiveness.

LEGEND

Benefits with little to no trade-offs for all users

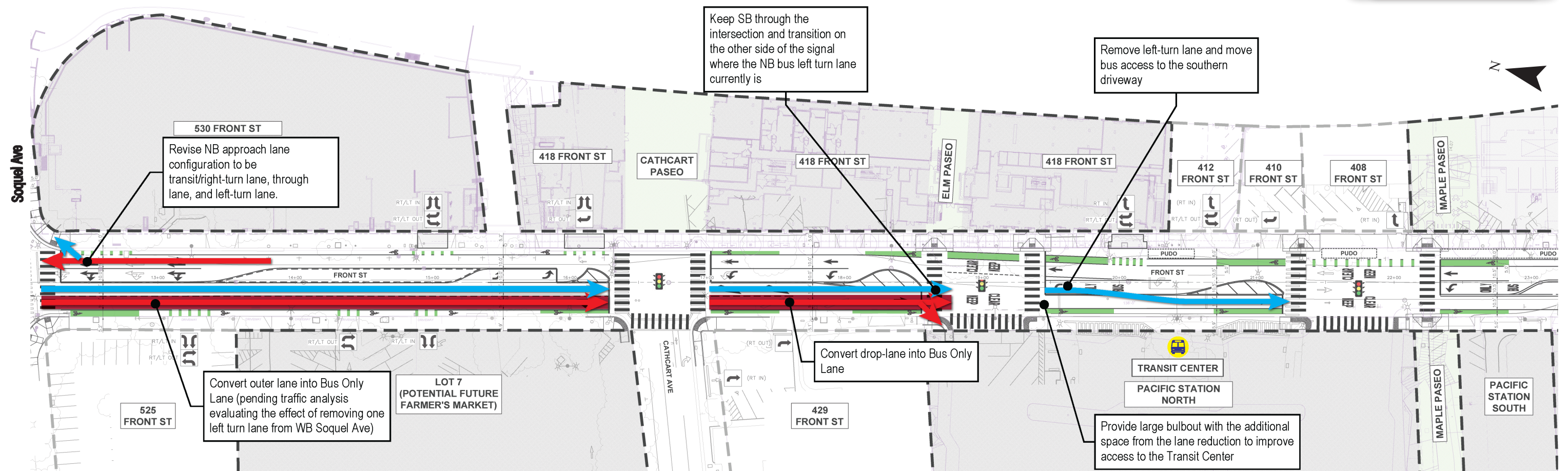
Benefits, but with minor trade-offs for some users

Benefits, but with greater trade-offs for some users

Does not have significant effect



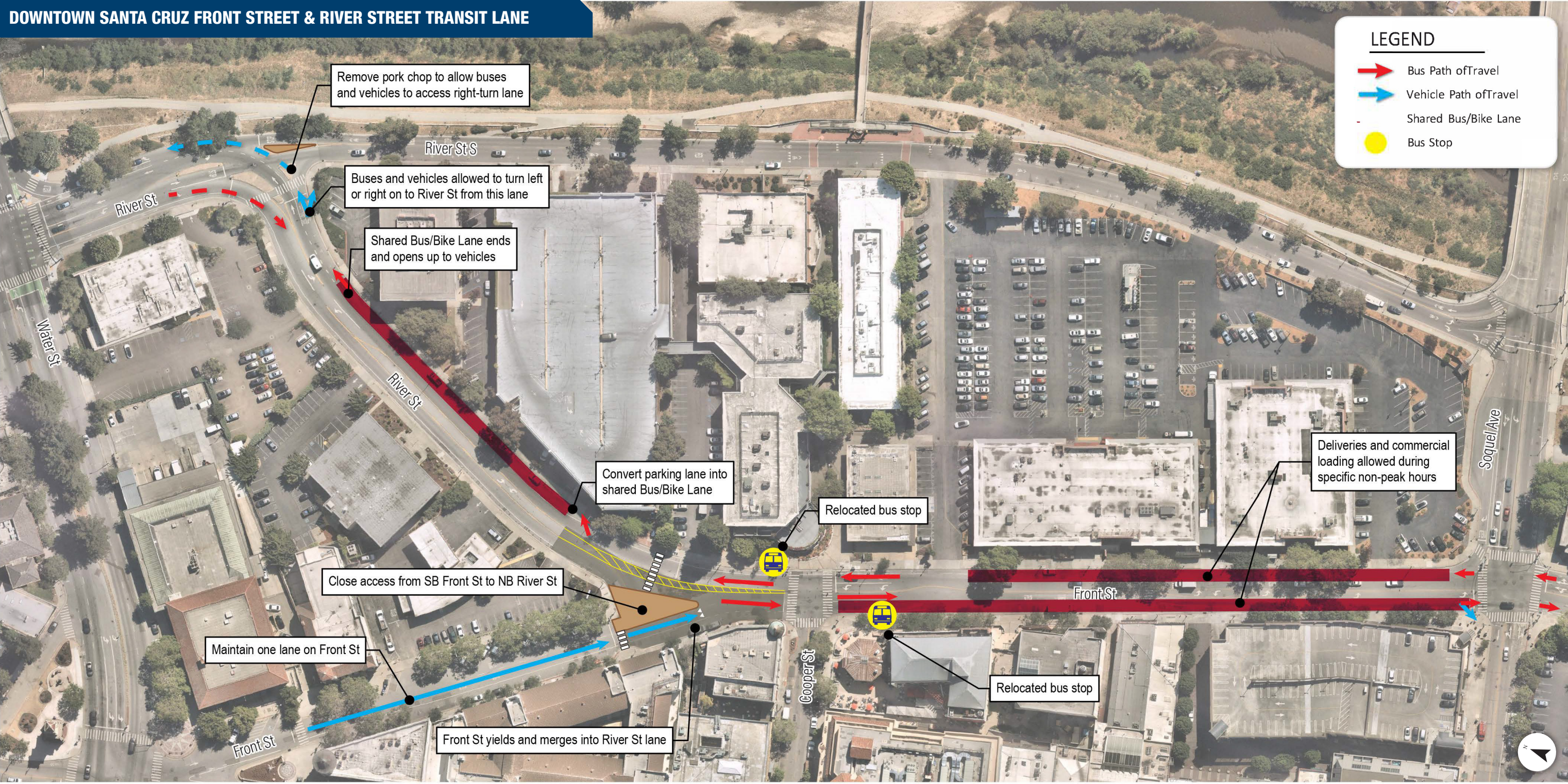
DOWNTOWN SANTA CRUZ FRONT STREET & RIVER STREET TRANSIT LANE



Note: Bus lanes concept illustrated on top of initial Front Street concept with Pacific Station project

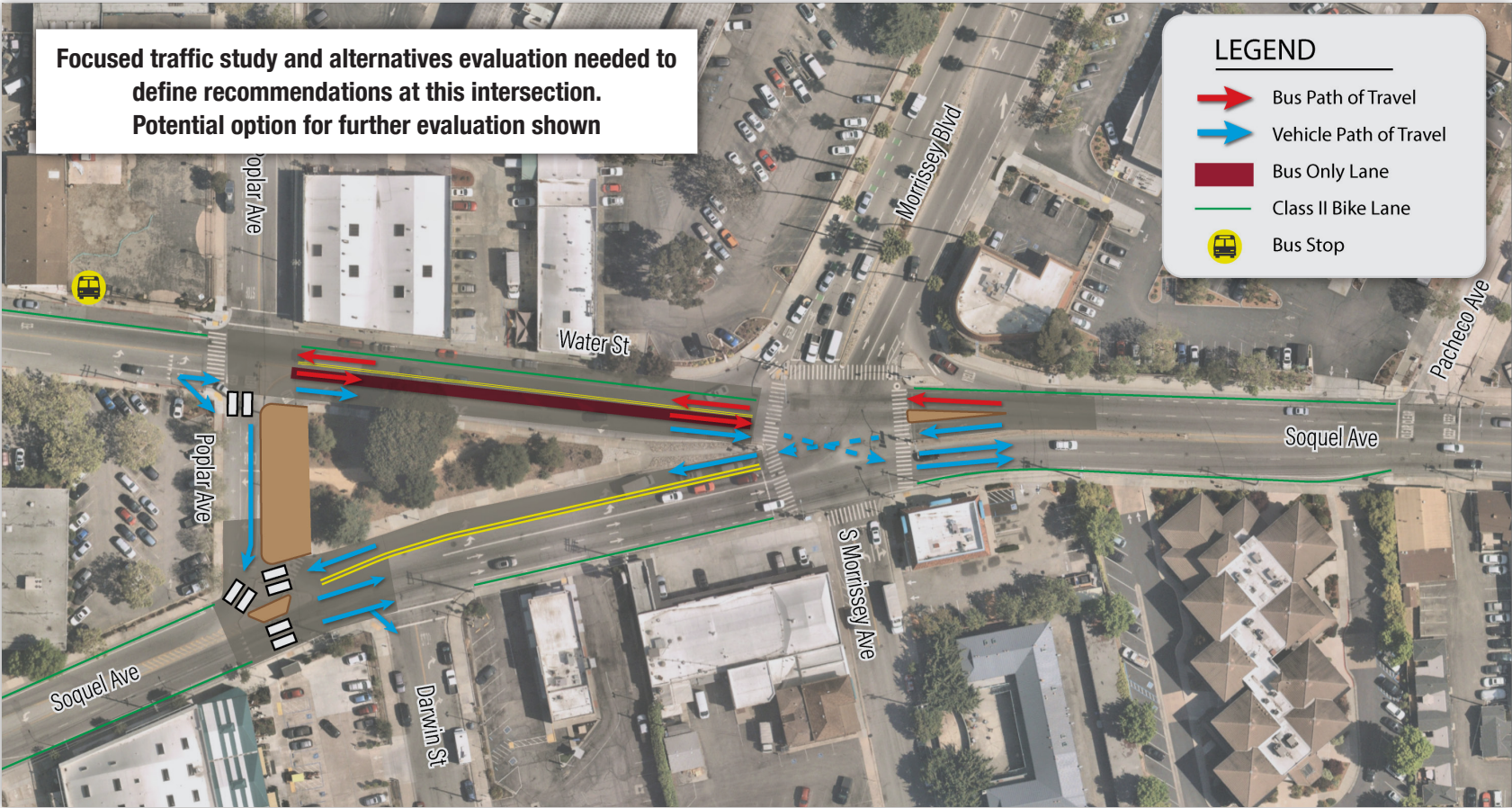


DOWNTOWN SANTA CRUZ FRONT STREET & RIVER STREET TRANSIT LANE





WATER/SOQUEL/MORRISSEY INTERSECTION IMPROVEMENTS



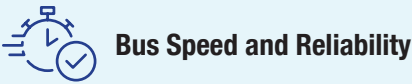
EFFECTS OF IMPROVEMENTS ON:

On Time Performance	Trip Time		Wait Time	User Delay	Coverage
Complex intersection causes high variability in travel time. Providing bus priority treatments will reduce effect of congestion on bus travel time.	Complex intersection causes large delays for buses. Providing bus priority treatments will reduce bus travel time. Reduces peak period southbound travel time on either route by 30 seconds per trip.		Reduced variability and faster travel time allows for more frequent service for the same cost.	May result in an increase in auto delay or changes in routing for some movements, may require further study. Reduction Benefits, but with greater trade-offs for some users in delay for transit riders.	-
Accessibility	Ridership	Ped/Bike Safety	User Experience at Stops	Operation and Maintenance Costs	Estimated Capital Cost
-	Quicker, more reliable and frequent service is expected to attract additional riders.	Intersection improvements anticipated to include shortened pedestrian crossings, reduced auto speeds, and improved wayfinding to benefit cyclists and pedestrians.	-	Low maintenance cost for bus lane striping, but may reduce operating cost.	\$1,872,000

Description

- Reconfigure Water Street/Soquel Avenue/Morrissey Boulevard intersection to optimize transit movements.
- This may include providing more direct access between eastbound Water Street and eastbound Soquel Avenue, including a transit queue jump lane.
- May require some turn restrictions to optimize traffic operations.

Category



Key Implementation Considerations

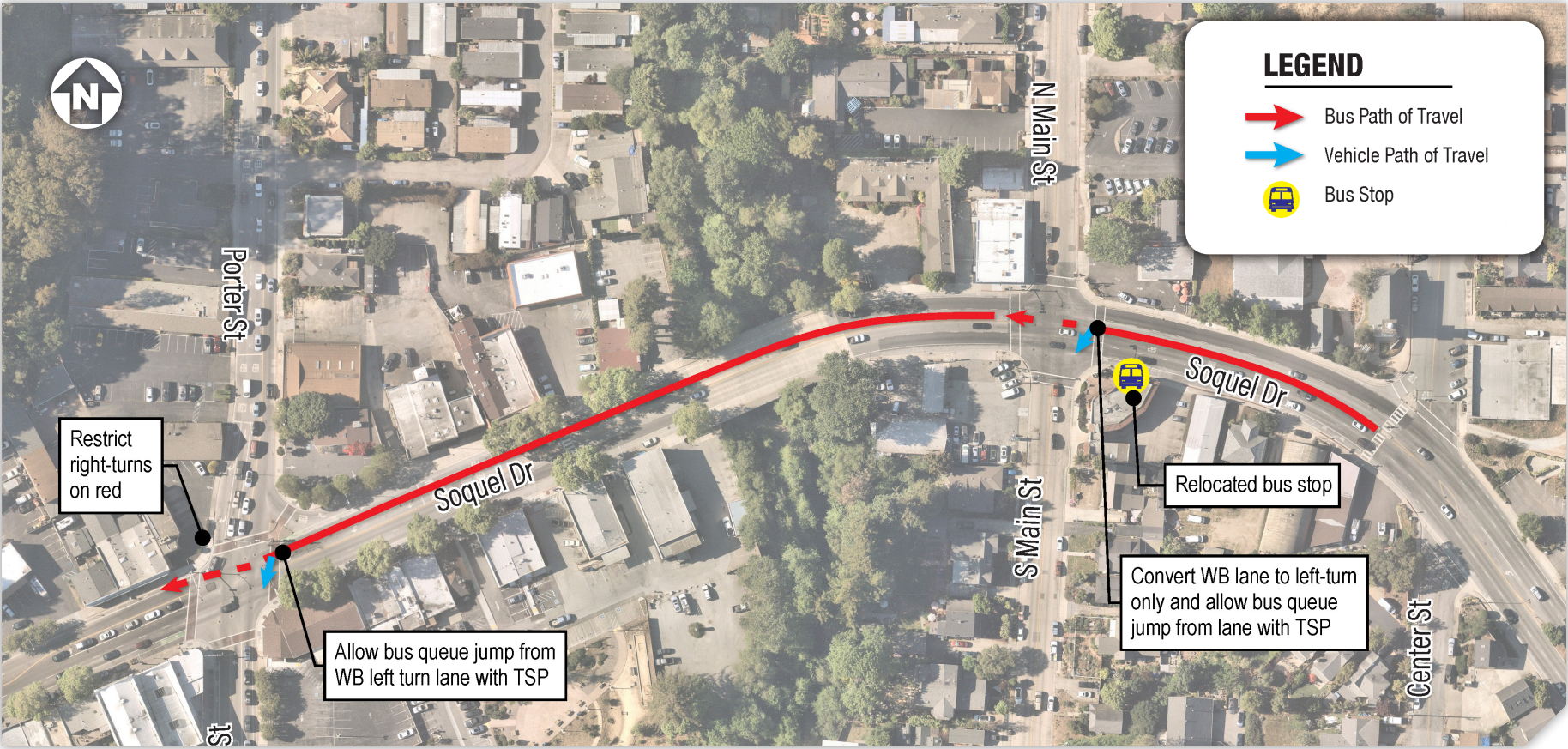
- Requires focused traffic study, design concept development, and alternatives evaluation to define recommendations at this intersection.

LEGEND

Benefits with little to no trade-offs for all users	Benefits, but with minor trade-offs for some users	Benefits, but with greater trade-offs for some users	Does not have significant effect
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SOQUEL QUEUE JUMPS




EFFECTS OF IMPROVEMENTS ON:

On Time Performance	Trip Time		Wait Time	User Delay	Coverage
Heavily congested segment causes variation in bus travel times. Bus priority treatments will provide a more consistent travel time.	Heavily congested segment causes delays to buses. Bus priority treatments will reduce travel time for buses. Reduces northbound peak period travel time on either route by 40 seconds per trip.		Reduced variability and faster travel time allows for more frequent service for the same cost.	May result in an increase in auto delay or changes in routing for some movements, may require further study. Reduction in delay for transit riders.	-
Accessibility	Ridership	Ped/Bike Safety	User Experience at Stops	Operation and Maintenance Costs	Estimated Capital Cost
-	Quicker, more reliable and frequent service is expected to attract additional riders.	-	-	Low maintenance cost for modified striping and signal equipment, but may reduce operating cost.	\$958,000

Description

- Modify lane geometry and signal operations to provide transit priority treatments on westbound Soquel Drive approaching Porter St and Main St.

Category

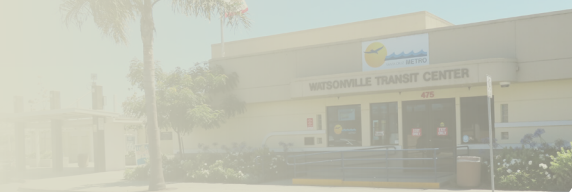
Bus Speed and Reliability

Key Implementation Considerations

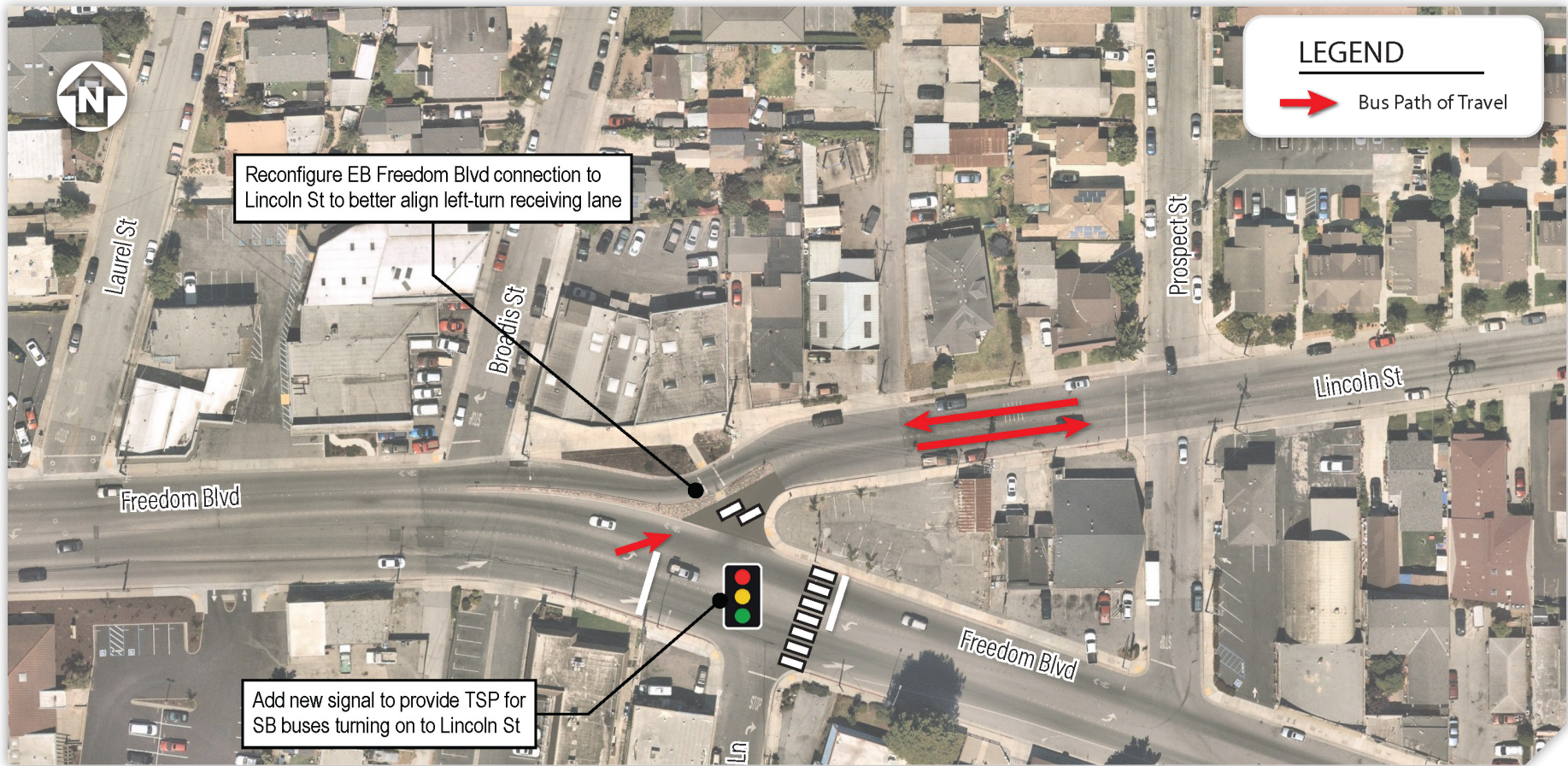
- Requires sophisticated Transit Signal Priority, which may require signal controller upgrades and new communications.
- Traffic analysis may be required to assess the traffic affects of dedicated transit phases or changes to turn lane configuration.

LEGEND

Benefits with little to no trade-offs for all users	Benefits, but with minor trade-offs for some users	Benefits, but with greater trade-offs for some users	Does not have significant effect
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FREEDOM BLVD & LINCOLN STREET TRAFFIC SIGNAL



EFFECTS OF IMPROVEMENTS ON:

On Time Performance		Trip Time		Wait Time	User Delay	Coverage
Unsignalized left-turn movement for buses results in travel time variability. Traffic signal with TSP reduces variability.		Unsignalized left-turn movement for buses causes delays for buses. Traffic signal with TSP will reduce delay. Reduces peak period southbound travel time on Route A by 30 seconds per trip.		Reduced variability and faster travel time allows for more frequent service for the same cost.	May result in moderate increases in auto delay for some users. Reduction in delay for transit riders.	-
Accessibility	Ridership	Ped/Bike Safety	User Experience at Stops		Operation and Maintenance Costs	Estimated Capital Cost
New signalized crosswalk provides opportunity to safely cross Freedom Blvd, improving bus stop access.	Quicker, more reliable and frequent service is expected to attract additional riders.	Provides a new, protected crossing of Freedom Boulevard, improving pedestrian circulation and safety.	-		Medium maintenance cost for traffic signal.	\$1,525,000

Description

- Install traffic signal and provide transit signal priority at intersection of Lincoln St & Freedom Blvd in Watsonville to accommodate bus turns.
- Provide protected pedestrian phase to cross Freedom Blvd.

Category

Bus Speed and Reliability

Key Implementation Considerations

- Requires signal warrant analysis to confirm signal viability.
- Recommended to incorporate transit signal priority into new signal.
- May also benefit emergency vehicle circulation.

LEGEND			
Benefits with little to no trade-offs for all users	Benefits, but with minor trade-offs for some users	Benefits, but with greater trade-offs for some users	Does not have significant effect



Watsonville-Santa Cruz Intercity Transit Speed and Reliability Study



IMPLEMENTATION PLAN

The Project developed planning-level cost estimates for the recommended strategies. The total cost to implement the full suite of strategies is \$24.1 million*. METRO has already secured \$7.5 million from grants for implementing the identified strategies. Opportunities to implement strategies as part of upcoming projects, such as the Pacific Station Redevelopment, are also being explored. Potential federal, state, and local funding sources have been identified to address the funding gap:

Required

\$24.1 MILLION

Secured

\$7.5 MILLION

* 2023 dollars

Federal Funding Sources

- Federal Transit Administration (FTA) Urbanized Area Formula Grants: Section 5307
- FTA Capital Investment Grants: Section 5309
- FTA Grants for Buses and Bus Facilities Formula Program: Section 5339 (a)
- FTA Grants for Buses and Bus Facilities Program
- RAISE
- Safe Streets and Roads for All
- Strengthening Mobility and Revolutionizing Transportation (SMART)
- Surface Transportation Block Grants

State Funding Sources

- Local Partnership Program (LPP)
- Solutions for Congested Corridors (SCCP)
- State Transportation Improvement Program (STIP)
- Transit and Intercity Rail Capital Program (TIRCP)
- Affordable Housing and Sustainable Communities (AHSC) Program

Local Funding Sources

- City/County Local Gas Taxes
- Developer Impact Fees
- General Fund Reserves

The following immediate next steps have been identified:

1. Use secured funding to advance design and environmental review for enhanced bus stop amenities along Soquel Drive, from La Fonda Avenue to State Park Drive
2. Implement elements of Downtown Santa Cruz Front Street and River Street Transit Lane as part of Pacific Station Relocation Project
3. Use METRO funds to advance design and environmental review for relocation/consolidation of rapid bus stops
4. Secure funding to advance TSP implementation
5. Secure funding to advance engineering design, environmental analysis, approvals, permitting, and construction of remaining recommended improvements



Kimley»Horn