Geary Rapid Project
Evaluation Report

SFMTA.com/GearyRapid

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SFMTA

Contents

Executive summary

The Geary Rapid Project is the first phase of the Geary Bus Rapid Transit Project, which is bringing transit and safety improvements to the Geary corridor between Stanyan and Market streets, plus Starr King Way and O'Farrell Street between Gough and Market streets.

Project work began with quick-build improvements implemented in late 2018 and early 2019. Construction of utility upgrades and major transit and safety improvements were completed in 2021.

The project evaluation covers nine objectives centered around transit performance and safety. Key results include:

- The project used best practices to support equity, including calming the Geary Expressway and supporting pedestrian safety in the Tenderloin.
- Transit travel time decreased after project implementation, with up to an 18% decrease in 38R Geary Rapid bus travel time.
- There was up to a 37% improvement in 38R travel time reliability, which means less time spent waiting at a bus stop.
- Coloring bus lanes red led to a 50% reduction in violations by private vehicles as compared to 2019 non-colored transit lanes.
- The collision rate of 38/38R buses decreased by 2/3 and is now about half that of the citywide Muni bus collision rate.
- The number of vehicles going over 40 mph (>5mph over speed limit) has reduced by up to 81%. This is welcome news, as the risk of pedestrian fatality increases dramatically at collision speeds above 30 mph.
- Impacts to people driving have been minor. The project may have contributed to a ~1 minute or 15% decrease in vehicle travel speeds in the eastbound direction, but there were minimal diversions to parallel streets. And despite some parking removal from the project, parking availability on the corridor remains high.
- The project has been well-received by Muni customers. The vast majority of 38 Geary/38 Geary Rapid riders noticed an improvement in their travel time after implementation of the quick-build project and many have provided very positive feedback about how the project has improved their experience riding the bus.

More information about the project is available at SFMTA.com/GearyRapid.

Introduction

The Geary Rapid Project is the first phase of the Geary Bus Rapid Transit Project, which is bringing transit and safety improvements to one of the busiest bus corridors in North America. The Geary Rapid corridor includes Geary Boulevard and Geary Street between Stanyan and Market streets, plus Starr King Way and O'Farrell Street between Gough and Market streets. The Geary Boulevard Improvement Project, currently in design, will extend these improvements west from Stanyan Street to 34th Avenue.

Project work began with quick-build improvements including transit lanes, traffic signal retiming, and pedestrian safety improvements implemented in late 2018 and early 2019. Construction of utility upgrades and major transit and safety improvements took place between 2019 and 2021. Substantial project completion was celebrated with a ribbon-cutting ceremony at the Japantown Peace Plaza on October 20, 2021. More information about the project is available at SFMTA.com/GearyRapid.

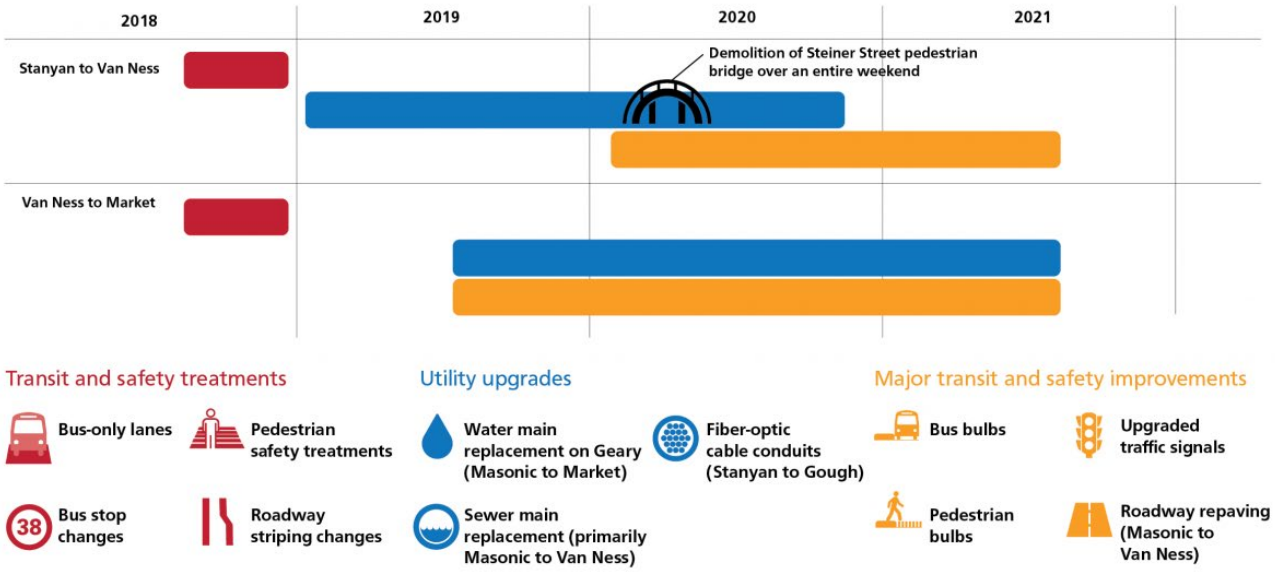


Figure 1: Timeline of Geary Rapid Project construction work

The Geary Rapid Project added transit lanes on Geary Boulevard between Stanyan and Gough streets and filled in gaps on existing lanes on O'Farrell Street and Geary Street between Gough and Market streets, providing nearly continuous transit lanes for routes 38 Geary and 38R Geary Rapid throughout the project limits. Bus bulbs, which are sidewalk extensions at bus stops, were added at busy stops to add waiting area for passengers and to allow buses to pull up directly to the stops without leaving the travel lane. To calm highway-like traffic conditions from the outdated 1950s expressway

design, Geary Boulevard was reduced to two general travel lanes and one transit lane per direction. Traffic signals were retimed to increase the likelihood that buses get a green light at intersections and extend the amount of time for people walking to cross Geary Boulevard.

Pedestrian safety improvements included new crosswalks at three intersections, pedestrian countdown signals to let people walking know how much time they have to safely cross the street, and enhanced medians. Pedestrian bulbs—curb extensions at intersection corners—were added to shorten crossing distances, make people walking more visible to motorists and reduce vehicle turning speeds. Block-by-block designs of all project changes are available online.

The project was coordinated with work sponsored by other city agencies. Roadway repaving sponsored by San Francisco Public Works upgraded 1.5 miles of deteriorated streets, giving drivers a smoother ride. San Francisco Public Utilities Commission-sponsored work replaced or rehabilitated 1.5 miles of aging sewer lines and two miles of water lines as part of the Water System and Sewer System Improvement Programs. And the Department of Technology co-sponsored installation of 1.75 miles of underground conduits for fiber optic cables to provide future internet services and connect traffic signals.

SFMTA staff will continue to monitor key metrics on the corridor, including travel time and collision rates. A similar evaluation will also be conducted for the Geary Boulevard Improvement Project.

Evaluation approach and objectives

The Geary Rapid Project has two primary goals:

1. **Transit performance:** The Geary Rapid Project aims to provide efficient and dependable service for 38 Geary/38R Geary Rapid riders by improving transit performance.
2. **Safety:** The Geary Rapid Project aims to improve safety for all those travelling on Geary Boulevard, especially people walking.

Table 1 below summarizes each objective considered in the Geary Rapid Project evaluation. This framework was developed to quantify relevant metrics that relate to the two main project goals, as well as additional metrics that are of interest to the SFMTA and/or community stakeholders.

Objective
1. Ensure that the project supports the SFMTA's equity goals
2. Reduce Muni travel time
3. Improve Muni travel time reliability
4. Improve transit lane compliance
5. Make street space allocation more consistent with usage
6. Decrease transit-involved collisions in the project area
7. Improve traffic safety
8. Monitor impacts to people driving in the corridor (travel speeds, diversions, parking)
9. Improve the Muni customer experience in the corridor

Table 1: Evaluation objectives for the Geary Rapid Project

The COVID-19 pandemic began during the construction phase of the Geary Rapid Project and is ongoing as of the writing of this report. Changes to travel patterns during the pandemic affect every metric in the evaluation, making it difficult to separate the effects of the project from those of changed travel patterns. As much as possible, attempts have been made to control for the effects of the pandemic, as well as noting analysis limitations in relevant sections of the report.

Before/after photos

A photo is worth a thousand words to show the improvements made on Geary Boulevard. These birds-eye shots provide representative examples of the street design on Geary before (August 2018, left) and after implementation (February 2022, right) of the Geary Rapid Project.

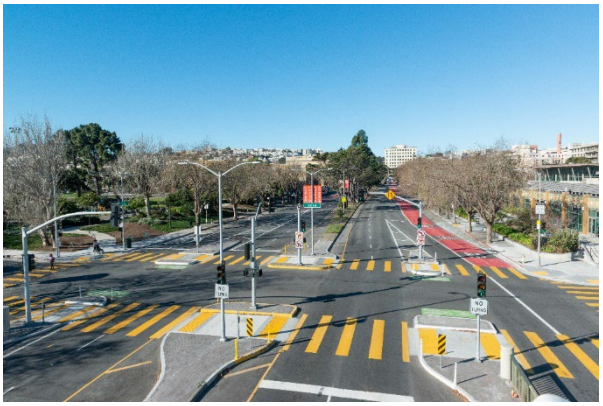
Looking west from Cook Street

Looking east at Cook Street

Looking west at Scott Street

Inbound bus stop at Scott Street

Looking west at Steiner Street



Looking east at Fillmore Street

Looking west at Webster Street

Looking east at Buchanan Street

Looking west at Laguna Street

Looking west at Gough Street

Looking east at Gough Street

Equity

The first goal in the SFMTA Strategic Plan[1] is to "Identify and reduce disproportionate outcomes and resolve past harm towards marginalized communities." While measuring equity outcomes was not part of this evaluation, as it would require a minimum of several years of data, several elements of the project were designed with best practices intended to improve equity in the project area. This section also examines demographics in the project area and of Geary bus riders.

Calming the Geary Expressway

By calming the Geary Expressway, the project helps to reconnect the surrounding communities harmed by 1960s "urban renewal." The Fillmore and Japantown communities, which Geary Boulevard runs between, were devastated by "urban renewal" in the 1960s. Black and Japanese-American homes and businesses were torn down for construction of the eight-lane Geary Expressway, which divided the neighborhoods and encouraged motorists to speed past these vibrant areas.

While we can never undo all the harm caused by this roadway, the Geary Rapid Project brings transit improvements and safety for people walking, developed in partnership with the communities most affected by the Geary Expressway construction. The expressway portion was "calmed" by replacing two of the four travel lanes in each direction with a transit lane. New signalized crosswalks were added at Buchanan, Webster, and Steiner streets, helping to reconnect the surrounding neighborhoods. The new crosswalk at Buchanan includes decorative panels installed in the center median that were inspired and designed by the communities it reconnects.

The project's comprehensive safety improvements in the Tenderloin respond to the disproportionate negative traffic safety outcomes experienced in the neighborhood. Traffic safety disproportionately impacts people who live and work in the Tenderloin. The Tenderloin is home to many of San Francisco's most vulnerable communities, including historically marginalized groups such as people with disabilities, residents of SROs and supportive housing and limited-English proficient communities. Every single street in the Tenderloin is on the city's High Injury Network – the 13 percent of San Francisco streets that account for 75 percent of severe traffic injury collision and fatalities. The Geary Rapid Project added numerous pedestrian safety measures, including thirteen pedestrian bulbs, to Geary and O'Farrell streets in the Tenderloin.

[1] https://www.sfmta.com/reports/sfmta-strategic-plan-fiscal-year-2022-2024

Demographics - methods

One of the Geary Rapid Project objectives is to provide a safe and reliable travel option for those reliant on Muni, particularly Black, Indigenous, People of Color, lower income, and unsheltered individuals. This section provides information about the equity implications of the Geary Rapid Project by sharing data about the demographics of 38/38R Geary riders who are the key beneficiaries of the project. Data considered includes information on Muni rider demographics collected through SFMTA's biennial On Board Survey, compared to census data on neighborhoods surrounding the project plus North Bay demographics as a proxy for potential impacts to people driving along Geary.

Demographics - key findings

- Geary Rapid Project beneficiaries include a greater proportion of low-income individuals than the surrounding population as a whole.
- Geary Rapid Project beneficiaries include at least ~1/3 of riders who are low-income and over half who are people of color[2]. These numbers are pre-COVID and are likely higher during the COVID-19 pandemic.
- The 38/38R lines are also designated as a part of SFMTA's Equity Strategy lines because of their importance for seniors and people with disabilities for citywide accessibility, and because they serve the Tenderloin and Western Addition neighborhoods[3].

Demographics - additional results

Table 2 compares 38 Geary and 38 Geary Rapid customer demographics to Muni system-wide averages, and to Richmond District, Laurel Heights, Lower Pacific Heights, Western Addition, Japantown, Tenderloin, San Francisco citywide, and North Bay demographics. A greater proportion of 38/38R riders are low income than San Francisco as a whole, as well as than the Richmond District and Laurel Heights. A slightly higher proportion of Richmond District, Japantown, and San Francisco residents are people of color than 38/38R riders.

Some vehicle traffic on Geary Boulevard also consists of commuters from Marin and Sonoma counties entering San Francisco over the Golden Gate Bridge. The population of these counties has fewer people with low incomes and substantially fewer people of color than 38 Geary and 38R Geary Rapid riders.

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[2] SFMTA 2017 On Board Survey
[3] SFMTA.com/Equity

	Household income below $35,000[4]	People of Color
38[2]	31%	53%
38R[2]	29%	51%
Systemwide average	26%	57%
Richmond District[5]	24%	62%
Laurel Heights[5]	23%	39%
Lower Pacific Heights[5]	31%	47%
Western Addition[5]	42%	73%
Japantown[5]	34%	57%
Tenderloin[5]	29%	78%
San Francisco City/County	18%	60%
Marin County[5]	18%	29%
Sonoma County[5]	25%	32%

Table 2: Geary and systemwide customer demographics and Richmond District demographics (pre-COVID)

[4] Low income households are defined by the SFMTA as those with total incomes under 200% of the federal poverty level per household size. This data was not readily available for the Richmond District, so household income under $35,000 (approximately 200% of the federal poverty level for a two-person household) is used as a proxy.
[5] American Community Survey 2019 data via city-data.com

Transit travel time

Methods

Transit travel time data for the 38 Geary and 38R Geary Rapid was processed from automated vehicle location (AVL) data collected in Muni's OrbCAD[6] system. Due to limitations in the source data, travel time was calculated between Park Presidio Boulevard and Van Ness Avenue.[7] The western third of that segment (Stanyan Street to Park Presidio Boulevard) was not modified by the Geary Rapid Project, but had transit lanes added in 2020 as part of the Geary Temporary Emergency Transit Lanes Project that was made permanent in 2021. An evaluation report for that project was previously published.[8]

50th percentile (median) travel times were calculated, approximating the typical passenger experience, for both routes. Travel times include dwell times (the time that buses have their doors open at stops). Each direction was analyzed separately: inbound (IB; eastbound) and outbound (OB; westbound). The following time periods were analyzed: AM peak (6-9am) and PM peak (4-7pm), with all-day (6am-7pm) also analyzed. Travel times from April 2018, April 2019, and April 2022 were used to control for seasonal changes in ridership and traffic.

Key findings

Transit travel time improved after the quick-build phase of the project, and again after the full project with savings as great as 18%. Travel times for local buses between Park Presidio and Van Ness decreased up to 5%, and for Rapid buses up to 12%, from 2018 to 2019. Analysis performed in 2019 indicated decreases of between 7% and 20% between Arguello and Van Ness, which more closely corresponds to the project boundaries. From 2019 to 2022, travel times for local buses between Park Presidio and Van Ness decreased up to 7%, and for Rapid buses up to 8%.

Combined, travel times decreased significantly from 2018 to 2022: up to 11% for local buses, and 18% for Rapid buses. Westbound travel times generally decreased more than eastbound travel times. The total westbound PM peak time savings was 2.6 minutes for

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[6] OrbCAD is a computer-aided dispatch (CAD) and automatic vehicle location system used by the Muni Operations Control Center.

[7] The most reliable data available for the project timeframe was only available for timepoints – major stops used for scheduling purposes – which did not include Arguello. Because the section east of Van Ness had limited transit scope, it was not included in the travel time analysis.

[8] https://www.sfmta.com/sites/default/files/reports-and-documents/2021/06/geary_tetl_evaluation_final.pdf

local buses and 3.6 minutes for Rapid buses. These results are shown in Figure 2 and Figure 3.

Note that the decrease in traffic due to the COVID-19 pandemic may also have contributed to some of the travel time savings experienced between 2019 and 2022. (See the *Street space allocations and volumes* section later in this report.) However, systemwide analysis conducted as a part of the SFMTA's Temporary Emergency Transit Lanes Program found that the Muni corridors with the most significant transit travel time savings were busy arterials that did not already have transit lanes in place, which indicates that corridors like the Geary Rapid Project area did not have as much travel time change due to reduced traffic[9].

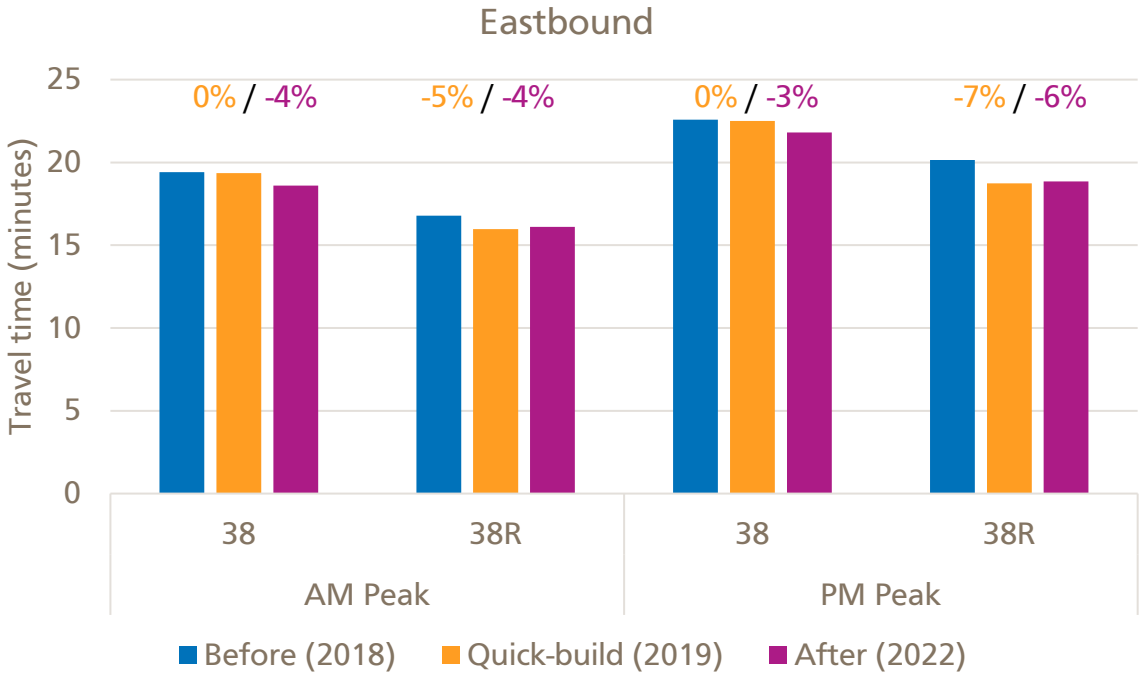

Figure 2: Changes in eastbound transit travel time (Park Presidio to Van Ness) from April 2018 to April 2019 and April 2022. Percent change since 2018 is noted above.

[9] https://www.sfmta.com/blog/shelter-place-allows-muni-analyze-sources-delay

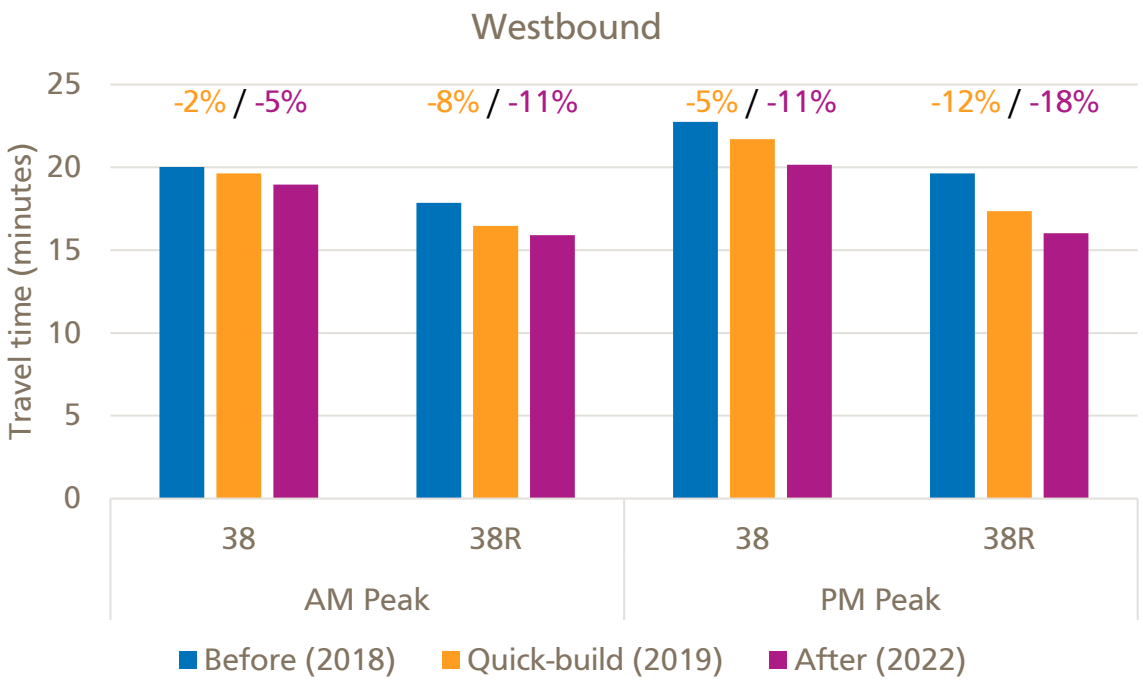

Figure 3: Changes in westbound transit travel time (Van Ness to Park Presidio) from April 2018 to April 2019 and April 2022. Percent change since 2018 is noted above.

Reliability

Reliability is key to high-quality transit service. Consistent travel times reduce the amount of time that riders have to schedule to complete their trip – they do not have to allow as much extra time in case of slower trips. By reducing variability in travel times, transit lanes can also reduce headway variability.[10] Headway reliability is important to passenger experience, as it affects both travel time (passengers must wait longer for a late bus) and crowding (more passengers will arrive at stops before the late bus arrives). Unreliable service is subject to bus bunching, wherein less-full early buses tend to catch up to more-full late buses, causing longer gaps between trips.

Methods

Headway reliability was measured using an internal SFMTA dashboard based on OrbCAD data. SFMTA service standards consider a bus to be bunched if it arrives at a timepoint within two minutes of the previous bus. A bus is considered gapped if it arrives five or more minutes after the scheduled headway. Gaps in service translate to additional wait times and more crowded buses.

In mid-2020, the SFMTA switched from schedule-based dispatching (where buses are dispatched from terminals on a fixed schedule regardless of the actual previous departure, and may hold at timepoints to match the schedule) to headway-based dispatching (where buses are dispatched from terminals at consistent intervals, and do not hold mid-route for schedule adjustments). This makes direct comparison of headway reliability before and after this change less meaningful. For this reason, only the most recent headway reliability data (September and October 2022) was analyzed.

Travel time reliability was also measured using the same methodology as the analysis in the travel time section. The difference between 10th percentile trips (slower than 90% of trips on the route) and 90th percentile trips (faster than 90% of trips on the route) was measured to provide a measurement of typical variability in travel times. This analysis used the same time periods as travel time.

[10] Headway refers to the amount of time between when two buses arrive; for example, buses may be scheduled to arrive every 5 minutes during peak hours. Headway reliability refers to how close to that planned headway the buses actually arrive. So, for example, good headway reliability might mean buses at 5 minute headways are never more closely spaced than 4 minutes or further spaced than 6 minutes, while bad headway reliability might mean you sometimes wait more than 10 minutes for the bus.

Key findings

Headway reliability improves or remains consistent along the Geary Rapid Project area, indicating that the project changes are helping to keep service reliable. For outbound buses, headway reliability actually increases as buses traverse the project area: in the PM peak, 25% of local buses are gapped at Van Ness Avenue, but only 15% when arriving at Park Presidio Boulevard; the drop is from 18% to 16% for Rapid buses. Inbound buses showed only a slight increase in gaps across the project area: in the AM peak, 12% of local buses are gapped at Park Presidio Boulevard and 17% at Van Ness; 7% of Rapid buses are gapped at both points. For most routes, the number of gaps increases and reliability decreases along the length of the route; these results indicate that the project is improving reliability. These results are shown in Figure 4.

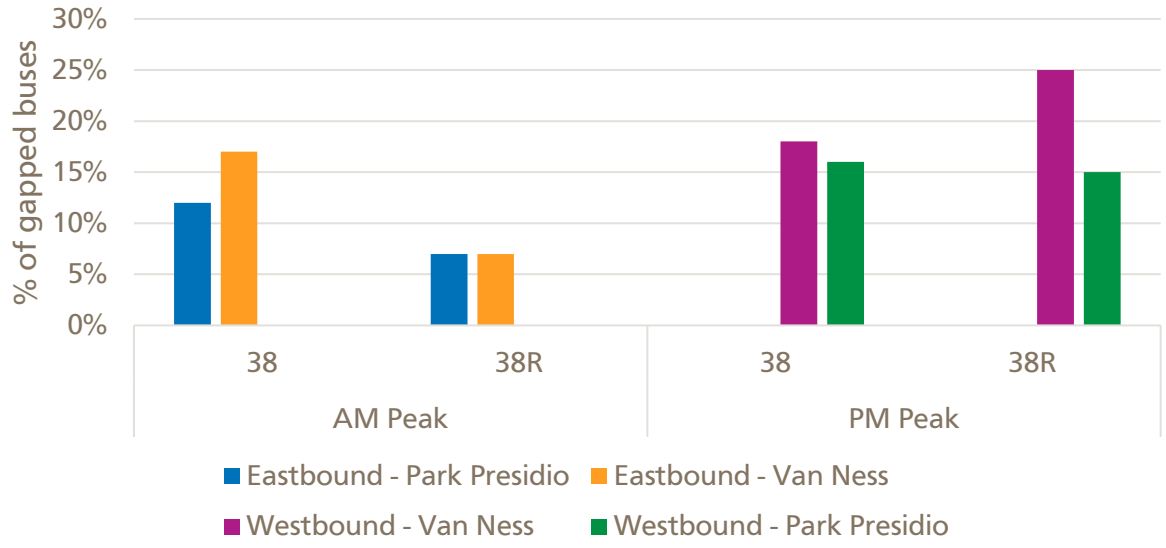

Figure 4: Gapped buses across the Geary Rapid Project area at peak hours (Fall 2022)

Travel time reliability in the Geary Rapid Project corridor improved significantly during the quick-build portion of the project. Variability decreased 24% for local buses and 37% for Rapid buses eastbound in the AM peak, and 11% and 7% in the PM peak. Variability has increased for some service since 2019 – though almost all service is still more reliable than before the project – and stayed constant or decreased for other service. These results are shown in Figure 5 and Figure 6.

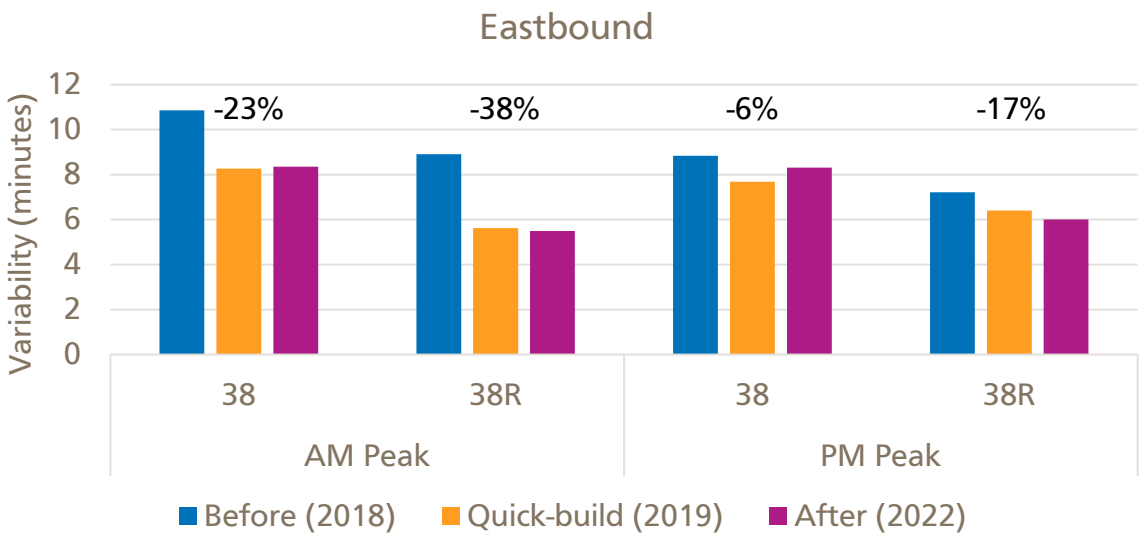

Figure 5: Eastbound travel time variability from Park Presidio to Van Ness. Lower variability indicates higher reliability.

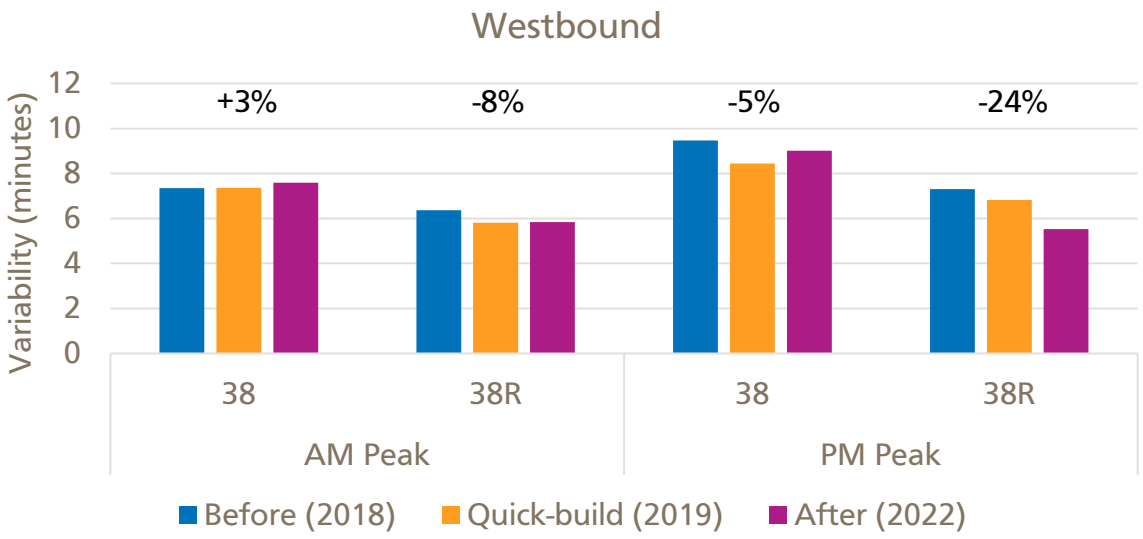

Figure 6: Westbound travel time variability from Van Ness to Park Presidio

Street space allocation and volumes

In its previous configuration, the allocation of street space on Geary Boulevard did not reflect actual usage of the street. The vast majority of street space was dedicated to private automobiles, even though non-auto modes account for about half of people traveling along Geary Boulevard. The Geary Rapid Project reallocated some street space from general traffic to transit and pedestrians to better align street space with how it is used, and thus make the street more efficient. Figure 7 shows how the project changed street space allocation to better reflect transit and auto usage; further details are available in the *Street space allocation* section.

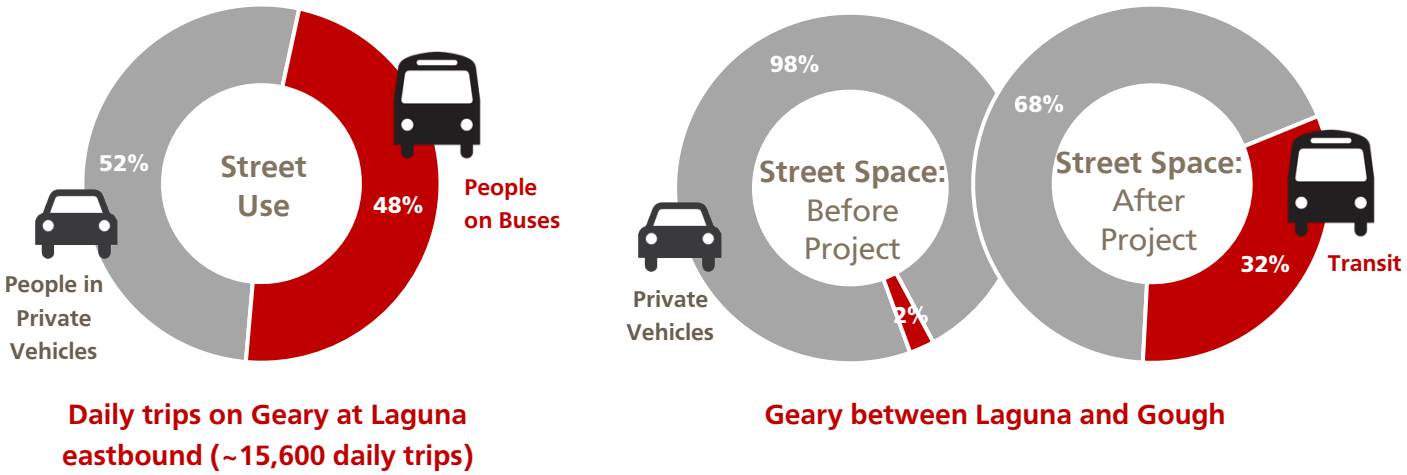

Figure 7: Private vehicle volumes and transit ridership on Geary Boulevard at Laguna in May 2022, and street space allocation (not including sidewalks and medians) between Laguna and Gough before and after the project.

Transit ridership

As of September 2022, weekday ridership on the 38 and 38R averages 36,300 boardings – two thirds of typical pre-COVID ridership. This is slightly above overall ridership trends; system ridership is at 60% of pre-COVID ridership. A 2019 passenger survey after the quick-build project indicated that one-third of riders were riding Geary buses more frequently after the project. Table 3 shows a comparison of pre-COVID and September 2022 ridership.

	38	38R	38+38R	All Muni routes	All Muni bus routes
Pre-COVID (2019)	21,800	32,600	54,400	697,900	524,500
September 2022	18,400	17,900	36,300	421,500	353,500
%	84%	55%	67%	60%	67%

Table 3: Comparison of pre-COVID and September 2022 ridership

Vehicle volumes

Automated 24-hour vehicle volume counts were taken at several locations in the Geary Rapid Project area in May 2018 and May 2022. Similar to transit ridership, 2022 vehicle volumes were about 60% of pre-COVID counts. Table 4 shows a comparison of pre-COVID and 2022 vehicle volumes.

	Collins Street	Baker Street	Laguna Street
2018 daily volume	40,488	38,177	34,069
2022 daily volume	23,576	24,203	18,650
% of pre-COVID	58%	63%	55%

Table 4: Comparison of 2018 and 2022 vehicle volumes

Pedestrian volumes

24-hour pedestrian counts at four representative intersections in the Geary Rapid Project area, plus 3rd Avenue as a control, were taken in October 2018 and May 2022. The 2022 counts were about 65% to 75% of the 2018 counts, indicating that pedestrian activity has recovered faster that transit ridership or auto usage. Table 5 shows a comparison of 2018 and 2022 pedestrian volumes.

		3rd Ave	Collins	Divisadero	Fillmore	Laguna
2018	**East-west**	3,177	1,572	4,050	4,009	2,778
	North-south	1,483	629	7,136	8,240	3,075
	Total	4,600	2,201	11,186	12,249	5,853
2022	**East-west**	2,224	1,185	2,619	2,332	1,832
	North-south	1,083	465	4,599	6,136	2,180
	Total	3,288	1,650	7,218	8,468	4,012
%	**East-west**	70%	75%	65%	58%[11]	66%
	North-south	72%	74%	64%	74%	71%
	Total	71%	75%	65%	69%	69%

Table 5: Comparison of 2018 and 2022 pedestrian volumes

[11] The 2022 count on the north crosswalk (east-west pedestrian traffic) at Fillmore Street was only 10% of the 2018 count, indicating there may have been a data error or a temporary condition that directed pedestrians away from that crosswalk. The 2022 count on the south crosswalk was 85% of the 2017 count.

Street space allocation

On the western portion of the corridor (Stanyan to Scott), the primary reallocation of street space was from general traffic to transit. Prior to the project, only about 2% of street space was dedicated to transit (as bus zones), while 54% was general traffic lanes. About one-fifth of street space was reallocated to create bus lanes and larger bus zones. Figure 8 shows how street space allocation changed on typical blocks (building face to building face, crosswalk to crosswalk) in this section. This was calculated using digital drawings of the blocks.

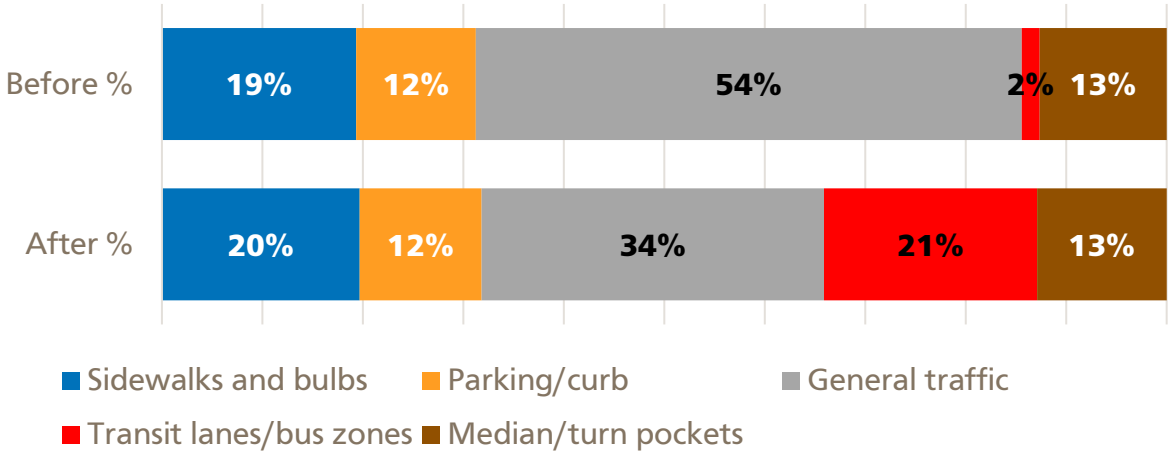

Figure 8: Change in street space allocation between Stanyan and Scott

There was more variation in the change in street space allocation in the eastern portion of the corridor, where some blocks have unique characteristics, but the amount of space reallocated to transit lanes was also about one-fifth. The addition of bus bulbs and pedestrian bulbs meant that about 5% of street space was also relocated from general traffic to pedestrians. Figure 9 shows how allocation changed between Laguna Street and Gough Street, a typical block on this portion:

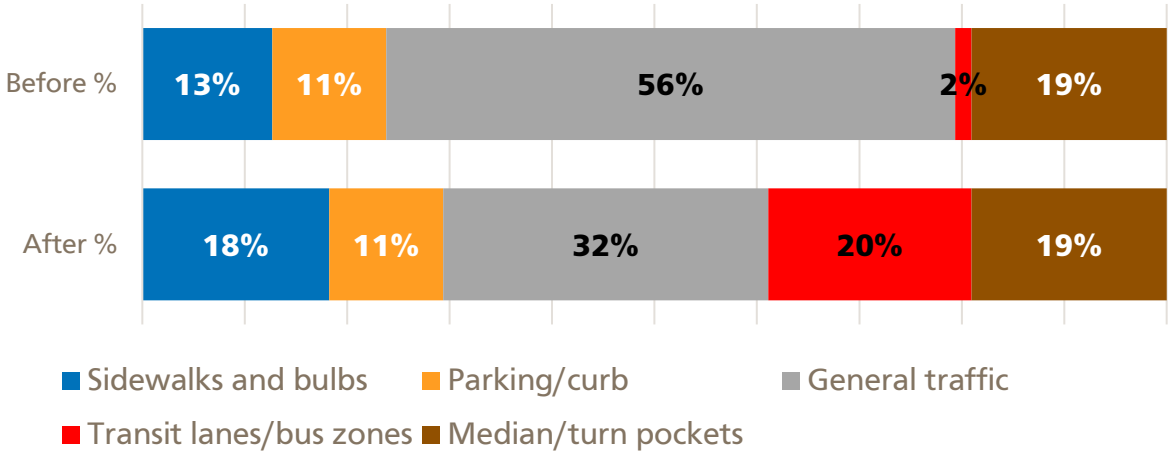

Figure 9: Change in street space allocation between Laguna and Gough

Transit lane compliance

Methods

The Geary Rapid Project introduced red transit lanes between Stanyan Street and Gough Street, and filled in several gaps in existing lanes to the east. The red treatment on these lanes is intended to provide a highly visible reminder that transit lanes are for use only by transit and emergency vehicles. (Private vehicles may still enter the lanes to make right turns, which is typically indicated by dashing of the red paint near intersections, and to access curbside parking and driveways.)

A 2017 study[12] - part of the SFMTA's pioneering work to introduce some of the first red transit lanes in the United States - found that the red treatment reduced illegal use of the lanes by private automobiles by about 50 percent. The Geary Rapid Project afforded the opportunity to conduct additional research on the benefits of coloring transit lanes red because the quick-build project implemented non-colored transit lanes in fall of 2018 that were then colorized red after all project construction was complete. Video counts were taken during both conditions in order to understand how the red color affected compliance. The number of private vehicles illegally entering transit lanes at three locations was recorded at three representative locations. Counts were taken from 7am to 9am and 4pm to 6pm in January 2019 (after non-colored transit lanes were added in the quick-build phase project) and May 2022 (after the full project, including painting the lanes red, was complete). Any instances of private vehicles illegally parking in the transit lanes were also recorded.

Key findings

Overall compliance improved greatly after lanes were colored red as compared to the non-colored transit lanes implemented during the quick-build phase. The number of vehicles illegally entering the lanes dropped by 47% from 2019 to 2022, even as traffic congestion returned, which was consistent with the past studies. The location with the highest violation rate – at Parker Street in the peak direction – saw violations drop by two-thirds eastbound and over one-half westbound. This represents more than 100 motorists per hour that no longer impede buses. These results are shown in Table 6 and Figure 10.

The number of vehicles illegally parking in the transit lanes was also substantially reduced: 12 incidents were recorded during the 2019 counts, but only 2 incidents in the 2022 counts.

[12] https://www.sfmta.com/blog/red-transit-only-lanes-work-two-new-studies-show-their-benefits

	AM	PM	Total
Gough EB	-88%	-65%	-79%
Gough WB	-1%	-21%	-14%
Divisadero EB	-60%	+53%	-28%
Divisadero WB	+9%	-39%	-23%
Parker EB	-66%	-47%	-61%
Parker WB	-16%	-46%	-39%
Peak direction	-69%	-35%	-56%
Total	-55%	-37%	-47%

Table 6: Change in the number of transit lane violations from 2019 to 2022

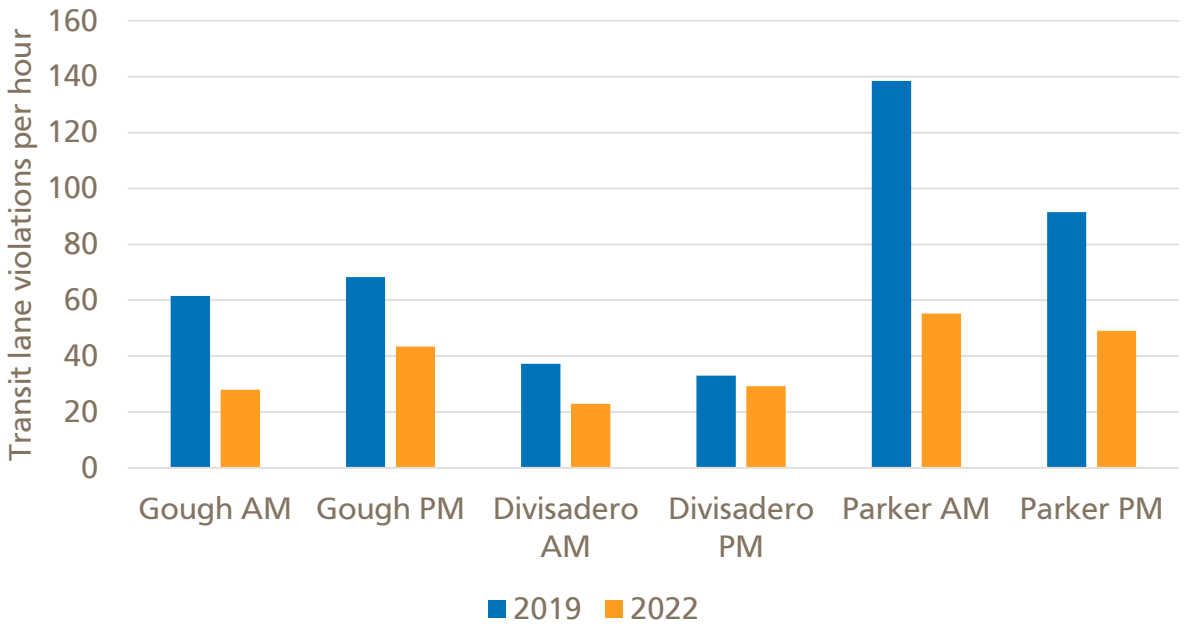

Figure 10: Transit lane violations per hour in 2019 and 2022

Transit collisions

Methods

A secondary goal of the project to reduce transit collisions, largely by providing dedicated transit lanes and eliminating the need for buses to merge into the traffic lane after stops. Transit collisions were monitored on three road segments within the project limits (Geary between Stanyan and Van Ness, Geary east of Van Ness, and O'Farrell east of Van Ness), with monthly rates calculated. Time periods used were pre-project (June 2017 – September 2018), quick-build (October 2018 – January 2019), construction (February 2019 – September 2021) and post-project (October 2021 – June 2022). The data was taken from the SFMTA's internal System Safety database. This includes all collisions involving motor coaches and trolley coaches, the majority of which do not cause injuries.

Key findings

The Geary Rapid Project has approximately halved transit collisions in the project corridor compared to the citywide rate. Compared to pre-project rates, transit collisions decreased slightly during the quick-build period, and more significantly during the construction period (which partially overlapped with the beginning of the COVID-19 pandemic.) The citywide transit collision rate generally paralleled these changes. However, after the completion of the project, the transit collision rate on Geary dropped to about 30% of the pre-project rate, while the citywide rate was about 60% of pre-project. This indicates that the project has reduced the transit collision rate within the project area by about 50%. This data is shown in Figure 11.

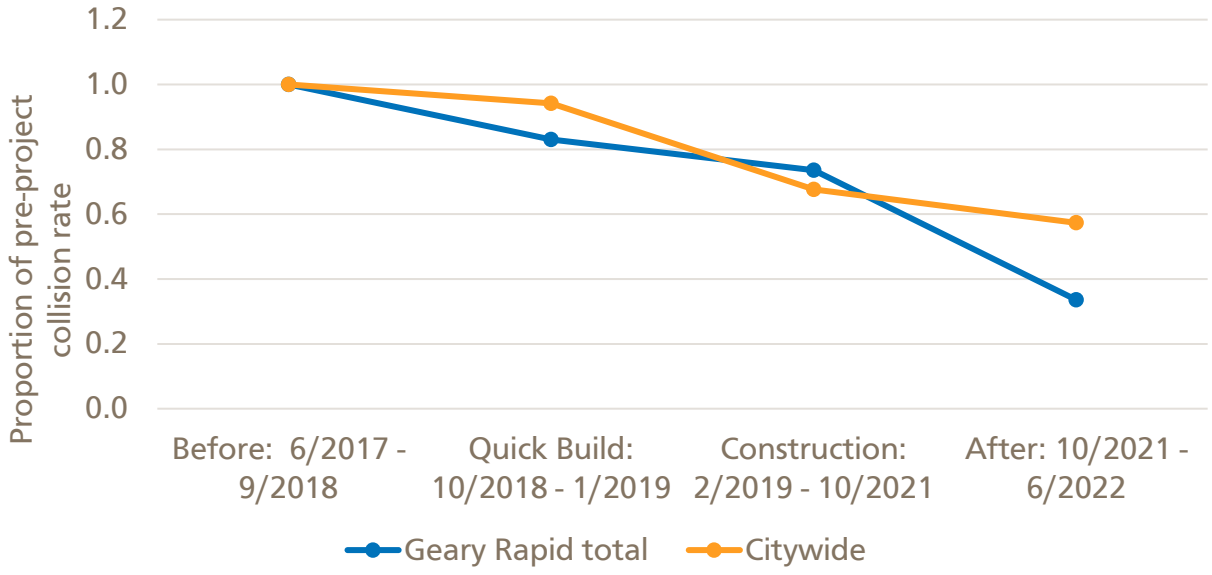

Figure 11: Transit collision rates in the Geary Rapid Project area and citywide before and after the project

Traffic safety

Geary Boulevard east of 31st Avenue is part of the "High-Injury Network" – the 13% of San Francisco streets on which 75% of injury-causing traffic collisions occur – as are most of Geary and O'Farrell streets. The Geary Rapid Project aimed to improve safety for all users by implementing safety improvements that work together to reduce vehicle speeds and decrease the frequency of injury-causing collisions. Several treatments were specifically designed to improve safety for people walking, as they are more vulnerable to serious injury or death in a collision.

Speeds - methods

The Geary Rapid Project reduced the number of through travel lanes (from four to two per direction in the "expressway" section, and from three to two per direction elsewhere) and reduced the width of some traffic lanes. The reduction in overall general travel lane capacity was not expected to significantly increase typical vehicle travel time, as congestion and vehicle throughput on the corridor are primarily determined by factors like downstream capacity rather than road width. However, the narrower lanes and other safety components of the project were designed to discourage speeding in support of Vision Zero goals. Because collisions at higher speeds are more likely to cause death or serious injury – with the risk of death for pedestrians increasing dramatically at collision speeds over 30 mph – reducing the speeds of the fastest vehicles is expected to have the largest effect on collision severity.

Speeds - key findings

85thpercentile speeds[13] – a standard measure of faster traffic used to set speed limits – dropped slightly, while the proportion of vehicles traveling faster than 40 mph dropped significantly (by 81%), indicating that the safety components of the project have been effective at discouraging speeding. This is particularly notable with the reduced vehicle volumes on Geary, which usually lead to increased speeding. These results are summarized in Table 7 and Figure 12.

[13] The 85th percentile speed for a given segment of road is the speed that 85% of vehicles are traveling slower than.

		% over 30 mph	% over 40 mph	Median	85th percentile
Laguna	**2016-17**	91%	16%	35	40
	2022	76%	3%	33	38
Baker	**2016-17**	85%	10%	34	38
	2022	76%	3%	34	36

Table 7: Summary of 2016-17 and 2022 speed surveys (Geary Boulevard speed limit in these locations is currently 35 mph)

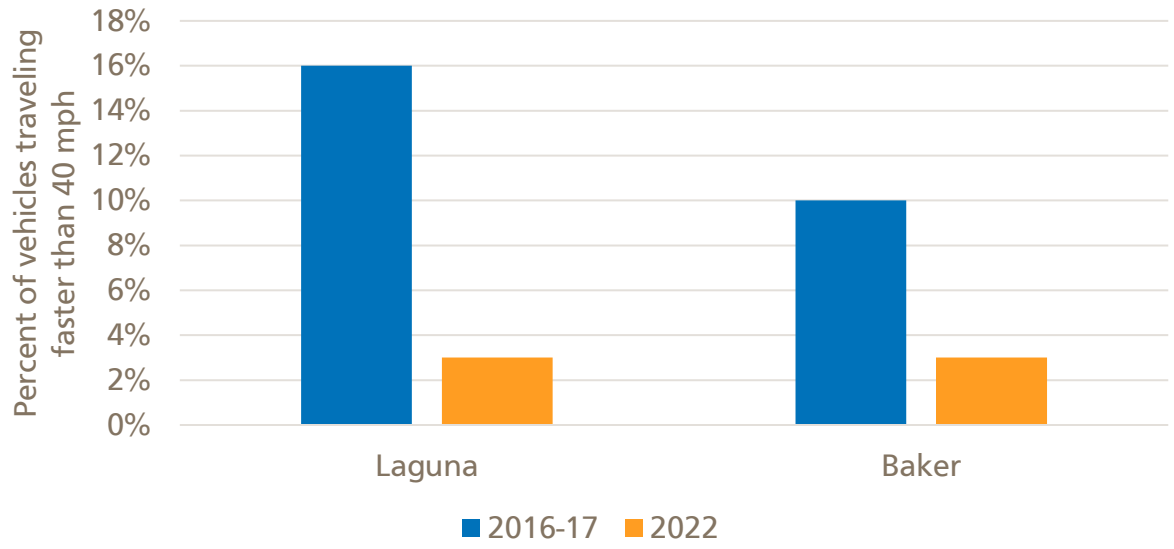

Figure 12: Changes in percentage of vehicles traveling faster than 40 mph in 2016-17 and 2022

While it does not appear that the project resulted in a significant decrease in median speeds, speeds observed in the 2022 survey will allow for the SFMTA to pursue a speed limit reduction to 30 mph on segments of the project area that are currently 35mph. This change, anticipated to be implemented in 2023, is expected to complement Geary Rapid safety improvements in reducing the frequency and severity of traffic collisions in the corridor.

Collisions - methods

The TransBASE Dashboard (https://transbase.sfgov.org/dashboard/dashboard.php) displays the location and basic data for all traffic collisions in San Francisco involving injury or death. The data is provided by the SFMTA, San Francisco Police Department (SFPD), and San Francisco Department of Public Health (SFDPH). Collision data is updated quarterly, typically near the end of the following quarter.

Collisions were monitored on the same road segments as for transit collisions, with monthly rates calculated. Time periods used were pre-project (June 2017 – September 2018), quick-build (October 2018 – January 2019), construction (February 2019 – September 2021) and post-project (October 2021 – June 2022).

This metric has a small sample size compared to others in the evaluation – tens (or fewer) of collisions in the project area during each sample period, versus tens of thousands of bus or auto trips. It also has longer time periods with more outside factors, including variation in vehicle volumes, weather events, various construction projects, driver behavior, and road conditions. These factors mean there is inherently a higher degree of randomness in these results than in others in this evaluation, with less data to analyze.

While the aggregated monthly averages provide some indication of overall trends, several years of data following project completion will be necessary to better understand whether the project contributed to a reduction in traffic collisions in the corridor. (Five years of collision data is the standard when engineers determine whether to add traffic control devices.) For segments or locations that show a significant increase in collisions compared to others, staff have reviewed SFPD collision reports to ensure that collisions are not being increased by traffic changes associated with the Geary Rapid Project.

Collisions - key findings

Overall traffic collision rates remained about the same after Geary Rapid Project implementation. The Geary Rapid Project area averaged 6.2 injury collisions per month for all users before implementation, and 6.0 per month after. The limited data indicates that collisions causing injuries to pedestrians and bicyclists increased slightly from 3.1 per month to 3.3, similar to the Citywide changes. Monthly collision rates by segment are shown in Table 8 and Table 9.

Normal variation in collision rates occurred: some segments had a small increase in collisions, while others had a small decrease. No segments or intersections showed a significant increase in collisions that would indicate a potential deterioration in safety. Collision reports were checked by SFMTA, with no collisions attributed to conditions that changed as part of the Geary Rapid Project.

		Before	Quick-build	Construction	After
		6/2017 - 9/2018	10/2018 - 1/2019	2/2019 - 10/2021	10/2021 - 6/2022
Within Project Area	Geary: Stanyan - Van Ness	2.8	3.3	2.7	2.4
	Geary: Van Ness - Market	2.2	2.8	2.5	1.2
	O'Farrell: Van Ness - Market	1.3	1.5	1.4	2.3
	Geary Rapid total	6.2	7.5	6.6	6.0
Control	Geary: Park Presidio - Stanyan	1.6	1.3	1.5	1.6
	Citywide	278	272	240	229

Table 8: Average monthly rates of injury-causing collisions for all users. Geary between Park Presidio and Stanyan (not part of the Geary Rapid corridor) and citywide rates are included for comparison.

		Before	Quick-build	Construction	After
		6/2017 - 9/2018	10/2018 - 1/2019	2/2019 - 10/2021	10/2021 - 3/2022
Within Project Area	Geary: Stanyan - Van Ness	1.2	0.5	0.8	1.3
	Geary: Van Ness - Market	1.4	2.3	1.1	0.8
	O'Farrell: Van Ness - Market	0.6	1.0	0.5	1.2
	Geary Rapid total	3.1	3.8	2.5	3.3
Control	Geary: Park Presidio - Stanyan	0.5	0.8	0.5	0.8
	Citywide	118	116	93	116

Table 9: Average monthly rates of collisions involving injuries to pedestrians and bicyclists. Geary between Park Presidio and Stanyan (not part of the Geary Rapid corridor) and citywide rates are included for comparison.

Impacts to people driving

During public outreach for the Geary Rapid Project, some stakeholders raised concerns about potential impacts to people driving in the corridor, such as increases in travel time, diversions to parallel streets, or ability to find parking in the corridor. These types of potential impacts were monitored as a part of the project evaluation and are summarized here.

Automobile travel time

The project may have contributed to a ~1 minute or 15% decrease in vehicle travel speeds in the eastbound direction, but there were minimal diversions to parallel streets. Automobile travel time between Arguello and Gough streets was measured before (September 2018) and after (January 2019) the quick-build portion of the project. This data was taken from Inrix Roadway Analytics, which collects and aggregates anonymous location data from smartphones, GPS, and other sensors.

The quick-build analysis found that eastbound auto travel times showed an increase, up to 1 minute (15%), while westbound auto travel times decreased. Speeds on parallel streets did not show any significant change and remained similar to streets outside the project area, indicating that few motorists diverted to these parallel streets[14].

Because of the substantially lower vehicle volumes since 2020 due to COVID-19, as well as technical limitations on available data, it was not possible to directly compare auto travel times before and after the full project. However, the quick-build phase in 2018-2019 included the only significant change to traffic operations (repurposing one general travel lane for a transit-only lane).

Parking availability - methods

A variety of uses compete for limited curb space on busy corridors like Geary Boulevard: commercial loading, passenger loading, short-term parking, long-term parking, Shared Spaces dining areas, daylighting (red curb at intersection corners) and bulb-outs to improve pedestrian visibility, and bus stops. Most of the improvements made in the Geary Rapid Project did not affect existing curb use, as transit lanes replaced existing travel lanes.

However, some locations did require changes in curb use. The most significant reductions in the number of parking spaces were near Masonic Avenue where pedestrian safety and transit improvements were made, and near Fillmore Street where

[14] SFMTA analysis using INRIX, July 2019.

the position of the underpass meant that a parking lane, rather than a general travel lane, was converted to a transit lane. At other locations, a small number of parking spaces were removed to accommodate safety improvements, bus bulbs, and lengthening of bus stops to meet SFMTA standards.

Other factors, including expansion of the Shared Spaces program during the COVID-19 pandemic, have affected parking availability citywide. SFMTA staff checked availability for metered parking on Geary in the project area in 2022, with a focus on the blocks around Masonic Avenue and Fillmore Street where parking supply was changed most, to monitor how the project affected parking availability. Availability was also checked for the Japantown Center Garage and Annex, the only SFMTA off-street parking facilities in the project area.

Under the SFMTA's Demand Responsive Parking Pricing program, citywide meter prices are adjusted quarterly to maintain average occupancy between 60% and 80%. This aims to strike a balance where available metered parking is well-utilized, but at least one spot is available on each blockface at any given time.

Parking availability - results

Despite some parking removal with the Geary Rapid Project, parking availability on the corridor remains high. In the most recently available data (April-June 2022), average occupancy for general parking meters was 52% on Geary Boulevard in the Laurel Heights area, and 59% on Geary Boulevard and adjacent blocks in Japantown. These figures are shown in Table 10, Table 11, and Figure 13.

	Weekday	Weekend	Total
Open-Noon	58%	45%	**51%**
3pm-6pm	54%	45%	**50%**
Noon-3pm	57%	50%	**54%**
Total	**57%**	**47%**	**52%**

Table 10: Average metered blockface occupancy on Geary Boulevard in Laurel Heights, April to June 2022

	Weekday	Weekend	Total
Open-Noon	62%	57%	**59%**
3pm-6pm	63%	58%	**60%**
Noon-3pm	61%	55%	**58%**
Total	**62%**	**57%**	**59%**

Table 11: Average metered blockface occupancy within one block of Geary Boulevard in Japantown, April to June 2022

In Laurel Heights, no blockface averaged greater than 80% occupancy for any time band (9am-noon, noon-3pm, 3pm-6pm) on either weekdays or weekends. In Japantown, no blockface averaged greater than 90% occupancy for any time band on either weekdays or weekends, and only 7% averaged greater than 80% occupancy. (Occupancy rates on Geary Boulevard itself in the Japantown area were several percent lower than these numbers.) These results indicate that metered parking is typically available in the Geary Rapid Project area.

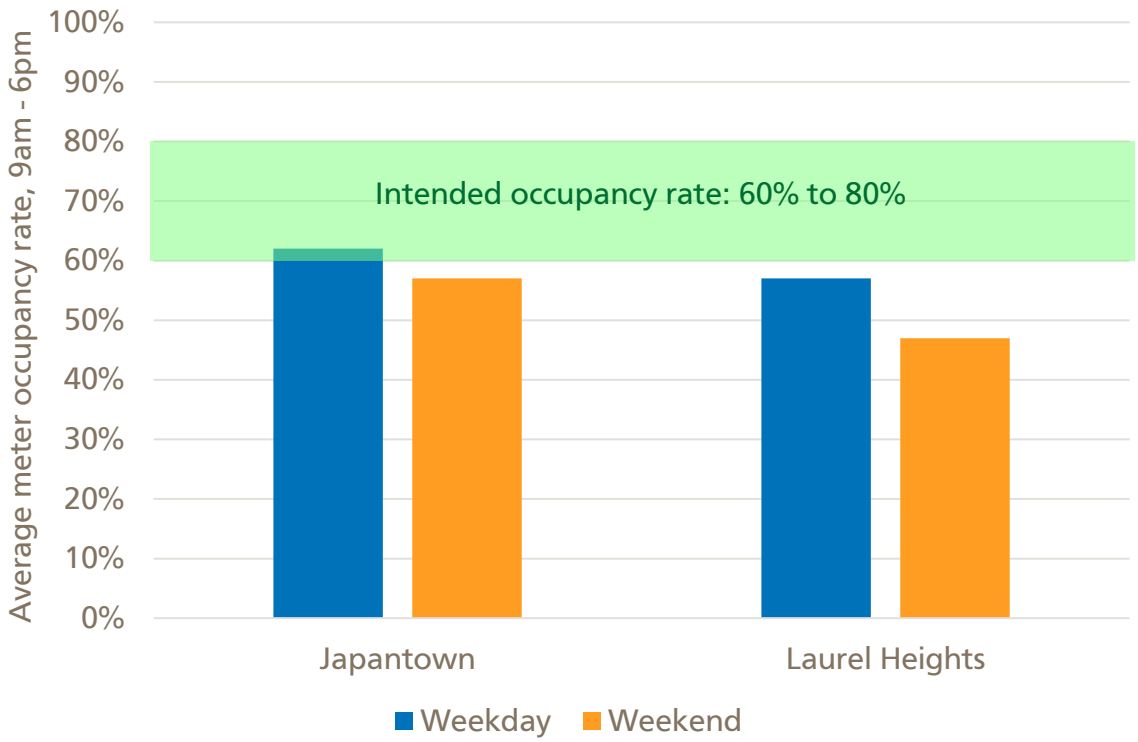

Figure 13: Average meter occupancy along Geary Boulevard in Japantown and Laurel Heights in April to June 2022

During the most recent week with available data – August 22 to 28, 2022 – neither the Japantown Center Garage (745 spaces) nor the Annex (175 spaces) reached capacity at any time. The main garage remained at 41% or lower occupancy (440 spaces available) on weekdays. Maximum occupancy was 69% (231 spaces available) on Saturday and 88% (89 spaces available) on Sunday. The Annex saw higher utilization rates, with a maximum occupancy of 94% (10 spaces available), though only four hours of the week had availability below 20% (35 spaces). Combined, the garages had occupancy below 49% (at least 466 spaces available) at all hours on weekdays, 71% (267 spaces available) on Saturday, and 82% (162 spaces available) on Sunday. Utilization rates for the previous three months were similar; at no point did either garage reach capacity.

Muni customer experience

Methods

An overarching aim of the Geary Rapid Project was to improve the experience for Muni customers in the corridor. This section reports qualitative findings from the following sources:

1. Feedback from an on-board survey of bus riders that was completed after the quick-build implementation. SFMTA retained a professional surveying firm, Ewald & Wasserman to conduct the survey. The survey was conducted on weekdays between April 24 and May 3, 2019, in five languages (English, Spanish, Vietnamese, Russian, and Chinese). About 600 surveys were completed (89% response rate). Passengers on the 38 Geary and 38 Geary Rapid lines were surveyed on their overall experience riding the bus since the quick-build portion of the project was implemented. A similar survey was not conducted after full project completion.

2. Feedback provided as a part of public outreach activities. A project email and hotline were set up to capture public feedback throughout the project design and implementation. Additionally, many people expressed comments about the Geary Rapid Project during public outreach activities for the Geary Boulevard Improvement Project.

Results

The vast majority of 38 Geary/38 Geary Rapid riders noticed an improvement in their travel time after implementation of the quick-build project. Of those surveyed during the 2019 on-board survey, over 80% perceived an improvement in travel time as shown in Figure 14. Of those who reported an improvement in travel time, the average (mean) time perceived to be saved was 11 minutes. While actual travel time savings was a fraction of that as discussed earlier in this report, the substantial perceived amount of travel time savings is likely an indicator of other benefits beyond travel time that the transit lane provides in improving the Muni customer experience, including more reliable trip planning.

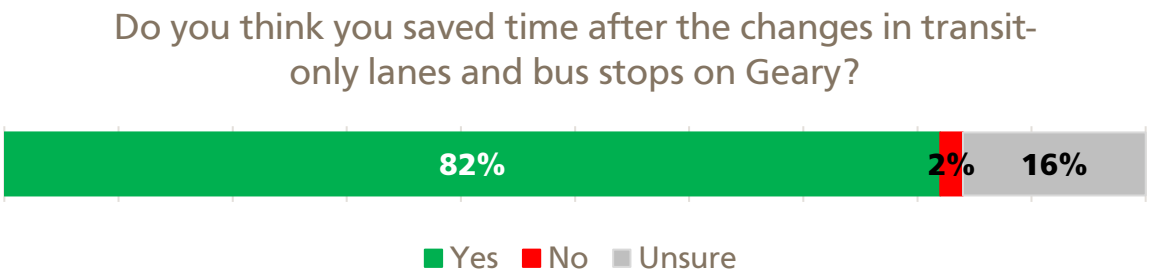

Figure 14: Response to on-board survey question regarding perception of travel time savings (N=594)

A majority of riders supported the quick-build changes, with only 6% indicating they did not support. Of those surveyed during the 2019 on-board survey, almost 2/3 supported or strongly supported the changes, with only 6% indicating they did not support as shown in Figure 15 below.

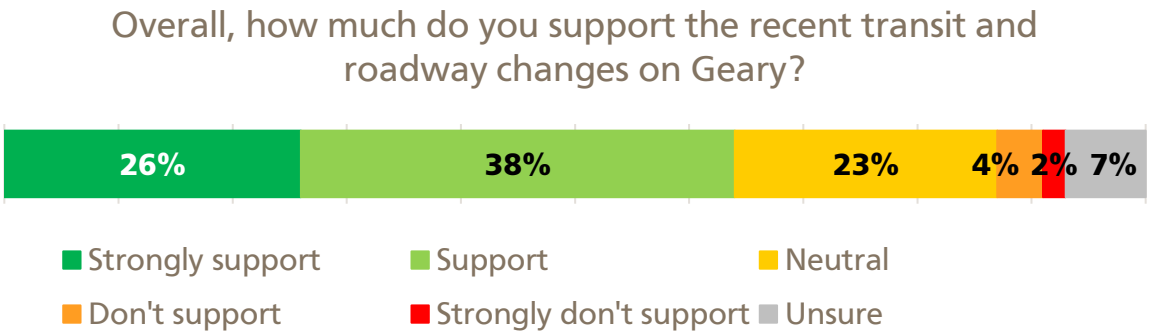

Figure 15: Response to on-board survey question regarding support of quick-build implementation (n=467)

About 1/3 of riders report riding the bus more often after quick-build implementation, compared to six months prior. As shown in Figure 16, of those surveyed during the 2019 on-board survey, about 1/3 indicate riding the bus more often after implementation.

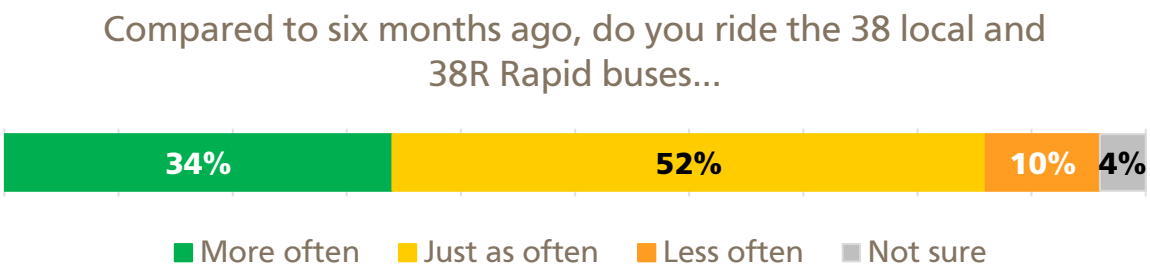

Figure 16: Response to on-board survey question regarding frequency of riding the bus since quick-build implementation (n=596)

Qualitative feedback received

The following are quotations from feedback we received as a part of surveys conducted during Geary Boulevard Improvement Project outreach that related to Geary Rapid Project improvements. Most feedback was positive, although some riders were unhappy that the 38 Rapid stops at Spruce Street were discontinued, leaving only 38 local service at these stops. Altogether, these indicate the impact these changes have had for Geary riders in the corridor.

"The transit lane as you approach downtown has made riding the 38 so much more reliable, expedient, and has really changed the experience of living in an outer district. It makes the outer Richmond feel much more connected... Even with the partial transit lane in Geary, riding the bus to nearly everything has become some much more viable because the travel time difference between car and bus is much less dramatic than it used to be."

"Thanks for the improvements so far, it's made the 38 faster and I've had no trouble driving on Geary either."

"Better public transit makes a positive impact on my life. Our household does not own a car and it is frustrating to see parked cars on Geary prioritized over buses actively transporting thousands of residents everyday. Any improvements to the 38's speed and reliability are appreciated!"

"Great improvement, the side-running lane works perfectly, it just needs to be continuous from 34th Ave to downtown."

"On the bus, the travel time feels reduced and the boarding bulbs make boarding and waiting better because there is more space and buses can just stop and go instead of waiting to pull back into traffic. Driving times also feel faster due to the traffic signal timing and reduced conflicts with buses, not to mention the new paving, which is great."

"If the 38R were still stopping at Spruce, all passengers at that stop would have more options instead of having to walk a minimum of five blocks (as I did today in the rain) to catch the 38R. Please reconsider allowing the 38R to stop at Spruce Street as it ALWAYS has."