

reporting the results

**VISION ZERO
SAFE STREETS
EVALUATION
PROGRAM**

2018 YEAR-END REPORT





A Note from the Mayor

In 2014, San Francisco adopted Vision Zero, a plan committed to eliminating all traffic deaths in our city. At the core of Vision Zero is a simple and powerful philosophy: traffic deaths are unacceptable and preventable.

In San Francisco, we have nearly 13,000 blocks of streets. Streets around our city serve a variety of needs, but all of them share a common goal of safety. To ensure we have streets and street improvements that best support our safety goals, we must understand what is working, what is not, and use this information to continually improve.

The Safe Streets Evaluation Report takes a thorough look at new and innovative designs from the past year to help us understand their effectiveness through the lens of safety. In some examples, outcomes match our expectations. In others, there are lessons to be learned for the future. This approach allows us to be innovative while also establishing the cutting-edge for street safety here in San Francisco and for our peer cities around the world.


As Mayor, I have committed to achieving our Vision Zero goal by 2024. The findings in this document and subsequent reports ensure we are prioritizing the improvements that work best to help achieve this goal.

Sincerely,

A handwritten signature in blue ink that reads "London Breed". The signature is fluid and cursive.

London Breed

Mayor of San Francisco



“The green paint - it feels like drivers notice the bike lane more. I also like that parking and bus pads are now moved to the left to protect the bike lane.”

The San Francisco Municipal Transportation Agency (SFMTA) is committed to understanding and reporting on how our projects affect neighborhoods and meet city and agency goals, including Vision Zero, the city’s commitment to eliminate traffic deaths in San Francisco.

REPORTING THE RESULTS

To meet this ambitious goal, the SFMTA's Safe Streets Evaluation Program tracks progress and measures project performance for key traffic calming, bicycle, and pedestrian safety projects throughout San Francisco. The Safe Streets Evaluation Program serves many purposes, including:



Inform updates and refinements to project designs.

Even after construction, the SFMTA continues making adjustments to ensure that projects function as intended. By collecting location-specific data related to transportation behaviors, street designs are analyzed for effectiveness and targeted for refinement as needed.



Communicate project effectiveness to the public, decision makers and other transportation professionals.

Evaluation results are shared with the public and decision-makers to convey the effects of SFMTA safety investments on the real world experiences of the people using San Francisco's streets.



Advance the state of practice for San Francisco street designs.

Also referred to as "proof-of-concept," project evaluations are often used to analyze innovative design treatments new to San Francisco. The data associated with proof-of-concept project evaluations allow San Francisco to rapidly evolve our state of practice to keep pace with national or international best practices.



Streamline the design of future projects.

Project evaluations use consistent metrics and analysis techniques to track trends over time to demonstrate efficacy of facility improvements.

The SFMTA developed the **Safe Streets Evaluation Handbook** to document our processes and methodologies for starting an evaluation, collecting data, performing analysis, and communicating findings. The Handbook also includes Standard Operating Procedures (i.e., documents and templates for collecting and analyzing data consistently across projects). The findings in this report utilized the methodologies found in the Safe Streets Evaluation Handbook.

FROM PLANS TO PROJECTS

how are we doing?

In the last year, we installed over nine miles of bike lanes, including a record 5.5 miles of new protected bike lanes, as well as pedestrian improvements along many major corridors. The mileage is important, but what is even more important is how these projects affect people's travel experiences. Our evaluations of 15 individual projects in 2018 show that SFMTA's investments create positive impacts across many metrics.

To find out more about the methodologies used and to see full project evaluation reports, please visit: sfmta.com/safestreetsevaluation



People feel safer and more comfortable walking and biking in locations with protected bicycle infrastructure.

FOLSOM STREET

83%

of bicyclists reported an increase in comfort after the implementation of a new parking protected bike lane.

54%

of pedestrians reported feeling more comfortable walking along Folsom Street after project implementation.

48%

of drivers reported feeling more comfortable driving on Folsom Street after project implementation. An additional 40 percent feel no change.

7TH AND 8TH STREETS

85%

of bicyclists reported feeling safer and more comfortable in the new protected bike lanes.

9TH STREET/DIVISION STREET

83%

of bicyclists reported feeling safer and more comfortable after the installation of a protected intersection.

55%

of pedestrians reported their level of comfort and feeling of safety increased.

17TH STREET

80%

of people surveyed felt more comfortable using 17th Street after protected bike lanes were installed between Church and Sanchez streets.

Detailed survey results are available upon request.



Mixing zones help with right hook conflicts, but don't solve the problem.

FOLSOM STREET

80%

of people driving yielded to people biking at mixing zones.

4%

of all observations at mixing zones were "close calls" or near-crash instances.

TURK STREET

35%

increase of vehicles yielding to people biking was reported where mixing zones were installed.

The majority of vehicles are yielding to bicycles at mixing zones, however conflicts still occur. Later in this report we will discuss how separated bike signals may help nearly eliminate right-hook vehicle conflicts with bicycles.



Vehicles travel at safer speeds after installation of traffic lane reductions and other traffic calming features.

TURK STREET

10%

decrease in vehicle speeds was reported after a travel lane was removed and a bike lane was installed.

7TH AND 8TH STREET

16%

decrease in vehicle speeds reported on 7th Street following the road lane reduction and bicycling improvements.

9%

decrease in vehicle speeds reported on 8th Street following the road lane reduction and bicycling improvements.

VICENTE STREET

18%

decrease in vehicle speed was reported on Vicente Street with the introduction of new bike lanes and speed humps.

Even slight reductions in vehicle speeds can dramatically increase the probability of surviving a crash.

85th percentile speeds used for data analysis.



More people are cycling on the streets with new and upgraded bike lanes, especially protected bike lanes.

TURK STREET

287%

increase in bike counts in the peak evening commute occurred on Turk Street after a protected bike lane was installed; morning commute peak hour bicycle counts have also significantly increased.

FOLSOM STREET

21%

increase in bike counts in the first year after installing protected bike lanes.

13TH STREET/DIVISION STREET

24%

increase in bike counts on the east bound protected bike lanes on 13th Street from Bryant to Folsom Streets.

POLK STREET

21%

increase in bike counts during morning peak hour bicycle volumes on southbound Polk Street after the installation of a new bike lane.



valencia street—how evaluation can help us make safe choices

Evaluations help inform design changes and future projects. The SFMTA will be able to understand the Valencia Bikeway Improvements pilot project implemented in early 2019 more quickly with methodologies and standard processes developed through the Safe Streets Evaluation Program. Double-parking and vehicles blocking the bike lane is a significant issue on Valencia Street, especially in the evening hours. We will be evaluating the pilot to measure any improvements. This feedback will directly inform the design for remaining portions of the corridor.



7TH AND 8TH STREET

BEFORE

7th and 8th streets are multimodal corridors, with multiple freeway on-and off-ramps, the 19-Polk bus route, active bicycle network, and high pedestrian volumes.

AFTER

In 2017 and 2018, we installed protected bike lanes, transit boarding islands with new directional indicators for people with vision impairment, and other bicycle and pedestrian safety improvements.

LOCALIZED TOOLS

are spot safety treatments working?

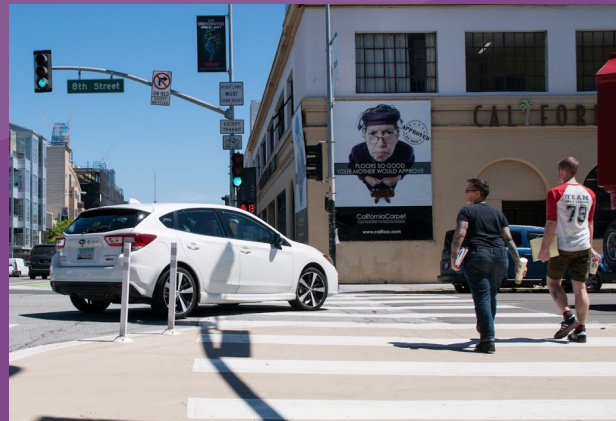
In addition to our corridor-focused bike lane projects, the SFMTA implements targeted safety measures at intersections throughout the city. These include:

- **Painted Safety Zones**
- **Rectangular Rapid Flashing Beacons (RRFBs)**
- **Daylighting**



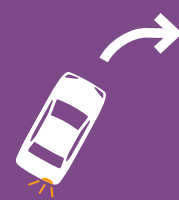
LOCALIZED TOOLS

Painted safety zones



Painted safety zones are the khaki-colored painted areas flanked by flexible white posts which wrap around a growing number of sidewalk corners in San Francisco to slow right-turning vehicles.

When it comes to making pedestrians safer, painted safety zones work.



Motorists turned corners more slowly.

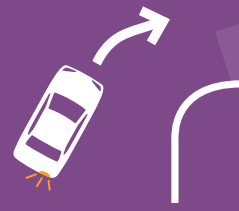
On average, turning speeds decreased by up to 55 percent.

This is based on turning speeds recorded for 100 vehicles at a site where a painted safety zone was installed.



Motorists yielded to pedestrians more often.

The number of drivers who "fully yielded" to pedestrians increased by an average of 25 percent after painted safety zones were installed.



More motorists turned further from the curb, at safer distances from people on sidewalks.

The number of vehicles turning within six feet of the curb decreased by an average of 35 percent after painted safety zones were implemented.

LOCALIZED TOOLS

rectangular rapid flashing beacons



Rectangular Rapid Flashing Beacons increase yielding to pedestrians in San Francisco, but are not being used by the majority of pedestrians using the crosswalks where they have been installed.

6%↑

Six percent increase in vehicle yield rate after installation of RRFB.

13%↓

13 percent decrease in number of "close calls" after installation of RRFB.

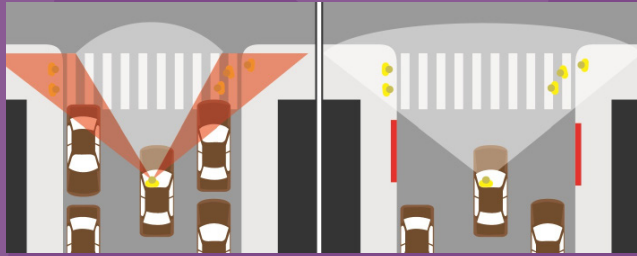
34% 

Average use of RRFB's by pedestrians is **34 percent.** The vehicle yield rate will likely to increase with more use of the beacon.

Rectangular Rapid Flashing Beacons are user-actuated amber LEDs used at unsignalized intersections or mid-block crosswalks. In San Francisco, most RRFB's can be activated manually when pedestrians push a button. This evaluation collected data at two locations before and after the installation of RRFBs. We will be evaluating at least four other locations in 2019 to better understand the efficacy of this tool.

LOCALIZED TOOLS

daylighting



Daylighting removes visual barriers within a minimum of ten feet of a crosswalk or intersection to improve sight-lines, and is a straightforward improvement that makes everyone easier to see at intersections.

Daylighting, or red zones at intersections, improves sight-lines and visibility between drivers and people crossing the streets in the Tenderloin.

14%↓



There were **14 percent fewer reported collisions** at intersections where daylighting treatments were implemented in the Tenderloin neighborhood, which experiences high pedestrian volumes.

The intersection of Geary and Taylor Streets experienced the **greatest reductions in collisions** after daylighting treatments.

Although collisions were generally reduced in the area, the intersections of Jones Street at Ellis and Eddy Streets experienced more collisions, suggesting that **more intervention is needed** at these locations.



17TH STREET BETWEEN CHURCH AND SANCHEZ

BEFORE

People on bikes and people in wheelchairs were getting caught in the MUNI train tracks.

AFTER

In 2018, parking was removed to accommodate a protected bike lane with flexible soft-hit posts, which was later upgraded to concrete island barriers.

LEADING THE WAY

have innovative safety treatments been successful?

The SFMTA continually seeks to install new types of bicycle and pedestrian improvements such as parking protected lanes, protected intersections, and fully separated bike signals. These new treatments offer the chance to solve long-standing issues, but require thorough evaluation to ensure that they are deployed effectively.



what is a protected bike lane?

One-way protected bike lanes are bikeways that are at street level and use a variety of methods for **physical protection from passing traffic.** Types of physical protection can include a parking lane, concrete/landscaped buffers, or flexible soft-hit posts.



what is a protected intersection?

A protected intersection **reduces conflict between bicyclists and vehicles by increasing visibility and delineating by slowing turning vehicles and clarifying right-of-way** through median islands and/or paint, soft-hit posts, and signs for bicyclists as they move through the intersection. Protected intersections rely on these concrete and paint treatments to separate bicycles rather than an exclusive bike signal phase.



what is a mixing zone?

A mixing zone is a **combined bike lane/turn lane with distinctive markings to delineate that bicyclists are merging with vehicles in the vehicle turn lane.** The zone is intended to minimize conflicts with turning vehicles at intersections and is an alternative to an exclusive bike signal phase that minimizes delay for cyclists.



FOLSOM STREET

BEFORE

People walking and biking were vulnerable to vehicles accessing the freeway ramps.

AFTER

Parking protected bike lanes, more yellow commercial loading zones, daylighting, and transit boarding islands were installed.

INNOVATIVE SAFETY TREATMENTS

parking protected bike lanes

Parking protected bike lanes work.

The city installed its first parking protected bike lane in 2012 on JFK Boulevard in Golden Gate Park. Today, San Francisco has over six miles of protected bike lanes across the city. Division Street, Folsom Street, Howard Street, 7th Street, 8th Street, Turk Street, and portions of Valencia Street are some examples of these new types of protected bike facilities. Studies show that parking protected bike lanes virtually eliminate loading violations with fewer vehicles blocking the bike lane and little to no conflicts between pedestrians and bikes at painted buffers and at transit boarding islands. This treatment also reduces dooring conflicts; the most prevalent type of crash for cyclists.



FOLSOM STREET

Recent improvements to Folsom Street include doubling the number of loading zones and installation of parking protected bike lanes. Since implementation, there have been fewer loading violations (i.e., parking, loading or blocking the bike lane). Average loading times were reduced.

7TH AND 8TH STREETS

Fewer than six percent (8 out of 145) of pedestrians experienced a conflict with bicyclists in the new buffered loading areas.

TURK STREET

There were 88 percent fewer loading violations (i.e., parking, loading or blocking the bike lane) on Turk between Jones and Taylor compared to the previous layout of the street which included curbside loading.

Though many pedestrians are present on Turk Street and some enter or cross the bike lanes, findings show no collisions and a very low conflict rate of 1 percent between and pedestrians on Turk Street (25 out of 2248 pedestrians interacted with a cyclist).

REPORTING THE RESULTS

INNOVATIVE SAFETY TREATMENTS

separated bike signals

Separated bike signals, which aim to remove the conflict between turning vehicles and through-moving cyclists, are being incorporated into different streetscape projects in San Francisco. Analysis was conducted using two separated bike signals in San Francisco: Folsom Street at 8th Street and 8th Street at Brannan Street. The data collected shows compliance at the signals with some room for improvement. We also found that the new signals definitively reduce conflicts. To date, our findings show that **separated bike signals are a significant improvement over mixing zones.**



On average, **bikes comply with the traffic signal indications 86 percent** of the time at the two observed locations with separated bike signals. With separated bike signals, there can be delay to cyclists at the intersection, which may cause compliance issues. We will further study this in future evaluations.

After comparing six mixing zones on Folsom Street, 8th Street, and Turk Street to the two new separated bike signal locations, we found a significant reduction in the number of times right turning vehicles encountered a bicycle as they turned. The percentage of right-turning vehicles that interacted with a bike dropped from 41 percent at mixing zones to two percent at bike signals. **Separated bike signals significantly reduce the probability of conflicts between cyclists and vehicles.**

On average, **vehicles comply 96 percent** of the time. Typically, we find that in the instances when vehicles are

non-compliant, bicycles and pedestrians are not present.

The number of close calls (or instances when drivers and bicyclists made sudden, reactive moves to avoid a collision) dropped from 17 close calls at observed mixing zones to 1 close call at observed bike signals. **Separated bike signals result in the near-elimination of any close calls between cyclists and vehicles.**

Given these results and the clear benefits of safer turns for all users, the SFMTA is significantly expanding our investments in protected bike signals, particularly in the South of Market area. New protected bike signals are currently being installed on 2nd Street and Polk Street, and are planned for projects along Folsom, Howard, 5th Street and others. However, given the complexity and cost of signal modifications, mixing zones will continue to exist as the gradual upgrades to fully separated bike signals continue.

INNOVATIVE SAFETY TREATMENTS

protected Intersections

San Francisco's first protected intersection has been well-received by the community and reduces conflicts. To increase safety and comfort for the area, the SFMTA implemented a protected intersection at the 9th Street/ Division Street/San Bruno Avenue intersection, an area that has experienced a high number of collisions in the last 5 years, including two fatalities. The new protected intersection is experiencing high vehicle yielding rates, low vehicle turning speeds, with a majority of pedestrians and cyclists reporting an increase in perceived safety. As a result of these findings, the SFMTA is incorporating protected intersection designs in future streetscape projects.



96% drivers approaching a bicyclist yielded.

100% drivers approaching a pedestrian yielded.

98% of vehicles turned at speeds **at or below the speed limit.**

85% of bicyclists reported their level of **comfort and feeling of safety increased.**

55% of pedestrians reported their level of **comfort and feeling of safety increased.**

Detailed survey results are available upon request.

what determines a “conflict” or “close call”?

The term “close call” refers to instances when people walking, biking or driving make a **sudden, reactive moves to avoid a collision** with one another. Close calls can indicate the degree of safety that bicyclists experience at mixing zones and pedestrians experience when crossing the street.

The term “conflict” refers to instances when people walking, biking or driving encounter another mode of transportation.

safe streets in every neighborhood, for every person

The Safe Streets Evaluation Program has conducted a number of intercept surveys to evaluate key projects and have received valuable data. However, we recognize there are short-comings to the current survey process. The socio-economic status, gender, race, age, and mobility of those surveyed to date has been limited and needs to reach a wider range of stakeholders. We will be making changes to the survey process as the SFMTA strives towards more equity in both our infrastructure and how we measure performance of our facilities.

REPORTING THE RESULTS

LOOKING AHEAD

upcoming evaluations

In 2019, the Safe Streets Evaluation Program will continue to evaluate complete street projects, including improvements on Masonic, Polk, Howard, Townsend, and Valencia Streets. The program will also continue to evaluate city-wide countermeasures such as such as flashing yellow left turn arrows as well as additional evaluations of Rectangular Rapid Flashing Beacons (RRFBs) and fully separated bike signals.

We also strive to work with our agency partners such as Transit, the SFMTA Parking/Curb Management Department and the San Francisco Department of Public Health to further bolster our data sets and findings to understand how our streets are operating from every aspect.

“The separation from the moving traffic has been a huge improvement for me as a cyclist.”



LOOKING AHEAD

successes and lessons learned

We saw positive impacts on streets where major safety projects have been installed:

People are feeling **more safe and comfortable** biking in the new protected bike lanes.

More people are biking after the installation of new bikeways.

Vehicles are traveling at **safer speeds**.

Localized pedestrian improvements such as daylighting, painted safety zones, and rapid flashing beacons are helping to create a **safer walking environment**.

Innovative treatments such as parking-protected bike lanes, protected intersections, and fully separated bike signals have **community support and are reducing conflicts**.



We also saw areas where improvements need to be made:

Mixing zones help with conflicts, but some users find the treatments confusing and the zones do not eliminate conflicts. In contrast, separated bike signals greatly reduce the probability of interactions between cyclists and vehicles and reduce conflicts; **therefore the SFMTA is expanding our investments in separated bike signals, alongside other treatment to reduce conflicts at intersections.**

To date, the socio-economic status, gender, race, age, and mobility of those surveyed in our evaluations has been limited; we need to reach a wider range of street users. **We are improving both our survey tool and collection methods in 2019 to better capture under-represented communities.**

We need more information and data on the performance of our city-wide countermeasures, such as rapid flashing beacons and separated bike signals. **We will be working to better understand the efficacy of city-wide countermeasures by increasing sample sizes and amount of data collected.**



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For more information about the Safe Streets Evaluation Program, please visit:
sfmta.com/safestreetsevaluation



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