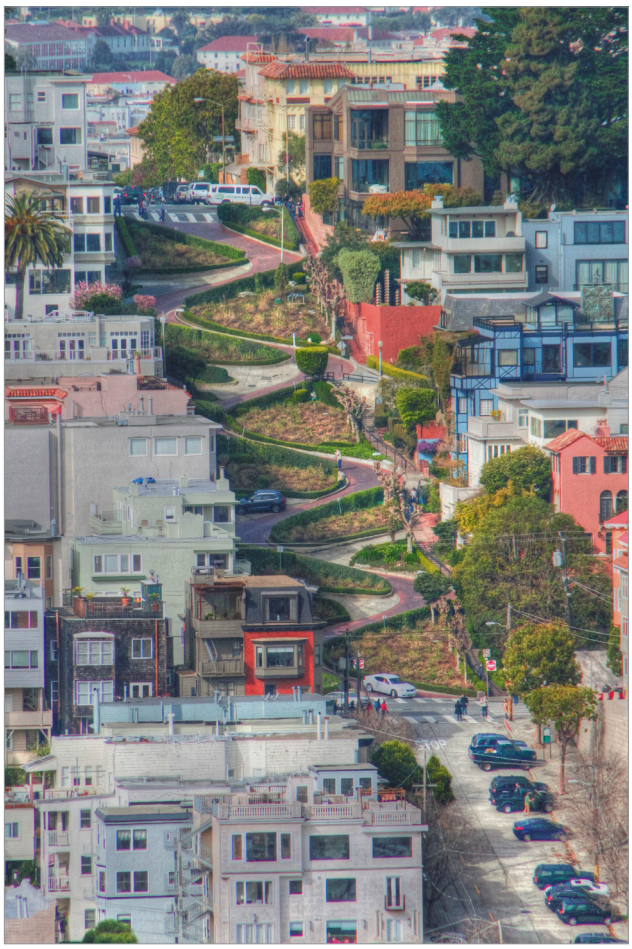

# Lombard Study: Managing Access to the "Crooked Street"

## FINAL REPORT

MARCH 2017



**REPORT DESIGN**
Bridget Smith

**PHOTO CREDITS**
Uncredited photos are from the Transportation Authority photo library or project sponsors. The photographers cited below, identified by their screen names, have made their work available for use on flickr Commons. Links lead to the photograph's page where licensing information is available.

Front cover and p. 10, bottom: Daniel, https://flic.kr/p/7pQJF8

Contents page: MG Stanton, https://flic.kr/p/e3CDX3

p. 1: Nan Palermo, https://flic.kr/p/s3srjf

p. 6: Ryan Park, https://flic.kr/p/svnEK

p. 8: Dustin Gaffke, https://flic.kr/p/bzKvjX

# Contents

**Executive Summary** 1

**Introduction** 2

Goals and Methods 2

**Existing Conditions** 3

Outreach 4

**Recommended Strategy and Solutions** 5

Short-Term 5

Mid-Term 7

**Appendices** 10

A. Existing Conditions Report

B. Alternatives Evaluation Memo

C. Pricing & Reservation System Feasibility Memo

D. Conceptual Drawings

E. Summary Feedback Results

NTIP
NEIGHBORHOOD TRANSPORTATION IMPROVEMENT PROGRAM

SAN FRANCISCO COUNTY TRANSPORTATION AUTHORITY

1455 Market Street, 22nd Floor, San Francisco, CA 94103
TEL 415.522.4800 FAX 415.522.4829
EMAIL info@sfcta.org WEB www.sfcta.org

## ACKNOWLEDGEMENTS

This project is funded in part through the San Francisco County Transportation Authority's Neighborhood Transportation Improvement Program (NTIP). The NTIP was established to fund community-based efforts in San Francisco neighborhoods, especially in underserved neighborhoods and areas with vulnerable populations (e.g. seniors, children, and/or people with disabilities). The NTIP is made possible with Proposition K local transportation sales tax funds.

The San Francisco County Transportation Authority (SFCTA) would like to thank Commissioner Mark Farrell for recommending the Managing Access to Lombard Crooked Street project for NTIP funding. The SFCTA would also like to acknowledge our project partners, including the San Francisco Municipal Transportation Agency (SFMTA), the San Francisco Police Department (SFPD), and the Mayor's Office of Economic and Workforce Development (OEWD).

Adopted by the Transportation Authority Board on March 21, 2017.

## PROJECT TEAM

**ANDREW HEIDEL** (Project Manager), **DAVID WEINZIMMER, RACHEL HIATT, SARA BARZ, ERIC YOUNG, YEYING HUANG, APRIL MO, COLIN PIETHE, BRIDGET SMITH,** San Francisco County Transportation Authority

**DANA WEISSMAN, INGRID BALLUS-ARMET,** Fehr & Peers

**FRANK FURGER, CORDELIA CROCKETT, RAY AKKAWI, KASRA BEHBAHANI, AZZI OLFATI,** Stantec Consulting

## PUBLIC AGENCIES

**SARAH JONES, NEAL PATEL, PAUL BIGNARDI, ED COBEAN, RICARDO OLEA, CAMRON SAMII, ALEXANDRA HALLOWELL,** San Francisco Municipal Transportation Agency

**CAPTAIN DAVID LAZAR,** San Francisco Police Department

**LISA PAGAN,** Mayor's Office of Economic and Workforce Development

## NEIGHBORHOOD AND CIVIC ORGANIZATIONS

Lombard Hill Improvement Association

Russian Hill Improvement Association

SF Travel

**TROY CAMPBELL,** Fisherman's Wharf Business Improvement District

# EXECUTIVE SUMMARY

The Managing Access to the Crooked Street Study was recommended by Commissioner Mark Farrell for Proposition K local transportation sales tax funds from the San Francisco County Transportation Authority's Neighborhood Transportation Improvement Program (NTIP). The NTIP is intended to strengthen project pipelines and advance the delivery of community-supported neighborhood-scale projects, especially in Communities of Concern and other underserved neighborhoods and areas with at-risk populations (e.g. seniors, children, and/or people with disabilities).

This study focuses on the neighborhood at and around the 1000 Block of Lombard Street between Hyde and Leavenworth streets, the "Crooked Street," one of San Francisco's most prominent landmarks and one which attracts millions of visitors each year. The purpose of the study was to identify and evaluate a range of options for managing visitor access and circulation on and around the Crooked Street while maintaining the character and livability of the residential neighborhood and avoiding spillover effects into adjacent streets.

This study began with onsite observations of traffic circulation, traffic volume counts, intercept surveys, and interviews with local residents as well as community groups and businesses. A preceding pilot closure of the Crooked Street to vehicles, during the summer of 2014, also resulted in valuable observations and data.

These efforts informed seven project goals, listed below. Though different groups (neighborhood residents, visitors, tour industry professionals) prioritized each of these goals differently, this study considers each to be on equal footing and analyzes each potential improvement against all seven.

The project goals are:

- Manage pedestrian congestion
- Manage automobile congestion
- Ensure traffic safety
- Maintain access to the Crooked Street
- Maintain the livability of the surrounding neighborhood
- Preserve tourism
- Implement a financially viable solution

The team then compiled a wide range of potential interventions and improvements and evaluated how well each would meet one or more project goals. The team presented a short list of options for further study at two

public meetings in the fall of 2016, accompanied by a feedback form that community members could respond to online and/or in person.

From these efforts, the study identifies the following recommended strategies for further planning, analysis, and development:

### RECOMMENDED STRATEGIES

- **Improved enforcement of existing regulations**
- **Engagement of tourism industry as partners in visitor management**
- **Engineering and signage enhancements**
- **Reservations and Pricing Vehicle Access to the Crooked Street, including the creation or designation of a dedicated management agency for the Crooked Street and surrounding neighborhood**

Some of these proposals can be implemented in the very near term, provided resources are made available. Others will require further study, outreach, design, and legislation to advance toward implementation. This report sets out recommendations as well as a timeline and framework for implementation of each, so that improvements to the issues surrounding the Lombard Crooked Street can be made in the near future while progress is made towards a more comprehensive solution. As with all recommendations in this study, the efficacy of the near-term solutions must be monitored and reviewed, to understand if and to what extent each should be incorporated into the final suite of solutions implemented on and around the Cooked Street.

# INTRODUCTION

The Managing Access to the Crooked Street Study was recommended by Commissioner Mark Farrell for Proposition K local transportation sales tax funds from the San Francisco County Transportation Authority's Neighborhood Transportation Improvement Program (NTIP). The NTIP is intended to strengthen project pipelines and advance the delivery of community-supported neighborhood-scale projects, especially in Communities of Concern and other underserved neighborhoods and areas with at-risk populations (e.g. seniors, children, and/or people with disabilities).

This study focuses on the neighborhood at and around the 1000 Block of Lombard Street between Hyde and Leavenworth streets, the "Crooked Street," one of San Francisco's most prominent landmarks and one which attracts millions of visitors each year. Though the area surrounding the Crooked Street is consistently residential in character, the increasing volume of visitors has resulted in a significant strain on the neighborhood's transportation infrastructure, resulting in significant automobile and pedestrian congestion that negatively impacts the quality of life of neighborhood residents. The purpose of the study was to identify and evaluate a range of options for managing visitor access and circulation on and around the Crooked Street while maintaining the character and livability of the residential neighborhood and avoiding spillover effects into adjacent streets.

## GOALS AND METHODS

The Study approach included goal-setting, existing conditions analysis, alternatives development, public outreach, and evaluation. The Study team consisted of Transportation Authority staff with support from the San Francisco Municipal Transportation Agency (SFMTA), and consulted Russian Hill residents, neighborhood groups, the San Francisco Police Department (SFPD), Fisherman's Wharf Business Improvement District, and SF Travel. Our existing conditions analysis began with onsite observations of traffic circulation, traffic volume counts, intercept surveys, and interviews with local residents as well as community groups and businesses. A preceding pilot closure of the Crooked Street to vehicles, during the summer of 2014, also resulted in valuable observations and data. These efforts, which are detailed in the Existing Conditions Report (Appendix A), informed the development of seven project goals, listed below. Though different groups (neighborhood residents, visitors, tour industry professionals) prioritized each of these goals differently (see Appendix E), this study considers each to be on equal footing and analyzes each potential improvement against all seven.


These project goals are:

- Manage pedestrian congestion
- Manage automobile congestion
- Ensure traffic safety
- Maintain access to the Crooked Street
- Maintain the livability of the surrounding neighborhood
- Preserve tourism
- Implement a financially viable solution

Based on research on relevant programs and practices in and around San Francisco and beyond, the study team developed a wide range of potential interventions and improvements and evaluated how well each would meet one or more project goals. The team presented a subset of options that performed successfully in this evaluation for further study at two public meetings in the fall of 2016, accompanied by a feedback form that community members could respond to online and/or in person.

Based on the results of the goals-based evaluation and public feedback, the study identifies several recommended strategies for further study and development.

This report summarizes key existing conditions on the Crooked Street and discusses how each of the above solutions is expected to address the congestion, circulation, and livability challenges on and around the block. The discussion of each solution includes any anticipated opportunities and barriers for implementation.

## EXISTING CONDITIONS

The Crooked Street, consisting of the 1000 block of Lombard St, is located in the Russian Hill neighborhood between Hyde and Leavenworth streets, as shown in Figure 1.

The Crooked Street is a residential street. Its distinctive switchbacks, landscaping, and vistas are famous around the world, and as a result the street draws many visitors from both near and far. As overall tourism levels in San Francisco and the entire Bay Area have increased in recent years, so have the number of tourists on the Crooked Street, and as a result crowd and traffic control issues have become more challenging.

There have been several past attempts to better understand the transportation and livability concerns on and around the Crooked Street. A study completed in August 2000 of vehicle and pedestrian congestion on the Crooked Street provided key information on traffic and pedestrian volumes, vehicle origins, effectiveness of enforcement, and other key indicators. In June 2014, the SFMTA conducted a temporary closure of the street to vehicles (the Crooked Street was closed from the hours of Noon to 7:00 PM each day). Traffic counts conducted before and after the closure demonstrate that while there was a reduction in the vehicle queue during the actual hours of the closure, much vehicle demand was pushed to the hours just before and after the closure was in effect; other visitors chose to visit by foot, increasing pedestrian crowding and pick-up/drop-off congestion on and around the Crooked Street.

This NTIP study continued the effort in the summer of 2015. The study began with conversations with neighborhood residents and stakeholders and collecting data through field observation, intercept interviews with visitors, and a review of video records of automobile and pedestrian behavior to develop a more complete picture of what types of issues stem from the increased visitation of the Crooked Street. The full Existing Conditions Technical Memorandum is found in Appendix A; key findings are summarized below:

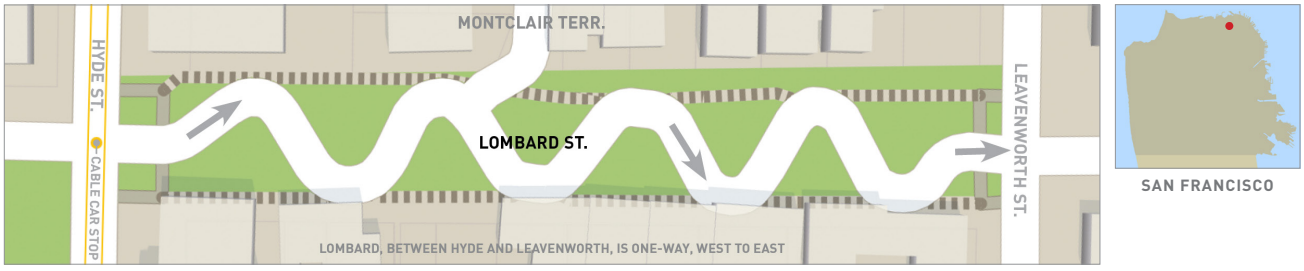

### PEDESTRIAN CONGESTION

Pedestrian congestion resembles that seen in a downtown area, not a residential neighborhood, with approximately 2 million visitors a year and as many as 17,000 visitors per day during peak summer weekends. During peak periods (10:00 AM–6:00 PM), pedestrian congestion is present not only on the Crooked Street block itself, but at all corners and crosswalks of the Lombard/Hyde and Lombard/Leavenworth intersections as well. This congestion leads to pedestrian spillover into adjacent roadway and crosswalks, particularly at the Lombard and Leavenworth intersection.

### AUTOMOBILE CONGESTION

Automobile Congestion affects vehicle circulation and resident access not just on Lombard, but also on Larkin, Polk, Van Ness, Chestnut, and other neighborhood streets. During peak periods, a significant queue forms along Lombard Street west of Hyde, as cars wait to access the Crooked Street. At the busiest times, this queue can stretch past the intersection of Lombard and Van Ness and can take over 20 minutes to traverse by car. Additionally, vehicle loading and parking activity creates congestion and blocks sidewalks and driveways. Outreach with the community also identified double-parking and parking on sidewalks as issues related to vehicle congestion.

**FIGURE 1. MAP OF THE CROOKED STREET**



### TRAFFIC SAFETY

Traffic safety data demonstrates that there is not an abnormally high incident of collisions on the Crooked Street or at the intersections at both ends; however, both pedestrians and drivers report that the area is stressful to navigate and does not feel safe during congested conditions. In addition, there is concern among community members about traffic safety around Yick Wo Elementary School, located at Lombard and Jones two blocks away from the Crooked Street, particularly when peak visitation times coincide with the end of the school day.

### LIVABILITY AND TOURISM

Livability and tourism are two continually juxtaposed characteristics of a place that is both a residential block and an attraction for visitors. Residents have expressed greater concern over pedestrian visitor behavior than many other transportation issues. The most oft-cited complaints about visitor behavior relate to noise, pedestrian spillover into the roadway, robberies, trespassing, and littering.

### STREET MANAGEMENT

Management of the Crooked Street is currently shared amongst neighborhood residents, the SFMTA, the Mayor's Office of Economic and Workforce Development, and SFPD. Other attractions with similar visitor levels in the Bay Area typically have a single management authority in charge of access management and the programs and strategies to mitigate the impacts of visitors.

The results of the existing conditions analysis were used to develop and evaluate a wide-ranging list of potential interventions and improvements that could help address some of the key issues and concerns on the Crooked Street and surrounding blocks. Appendix B lists these alternatives and their expected impact on key indicators related to the goals of this study.


**Staff from Commissioner Farrell's office, the SFCTA, and SFMTA discuss the issues surrounding Lombard Street with neighborhood residents.**

## OUTREACH

In the fall of 2016, Transportation Authority held two public open house meetings, each supplemented by a feedback form that could be completed online or in person. The purpose of these meetings was to help share the analysis described in the Existing Conditions Technical Memorandum (Appendix A) and solicit input on whether or not the report accurately described the issues surrounding the Crooked Street. Additionally, a second purpose to these meetings was to have a discussion with neighborhood residents on what solutions may best address the identified issues. The feedback received at and after these meetings resulted in the removal of some proposals from consideration and changes or refinements to others. This resulted in a refined set of strategies which the study team presented to neighborhood groups in late 2016. Technical assessments and public feedback informed the final recommendations described in the following section.

# RECOMMENDED STRATEGY AND SOLUTIONS

The challenges surrounding the Lombard Crooked Street are complex and no single solution will address the issues in their entirety. Some of the most effective solutions may also take more time to develop and implement than those that may have a comparatively smaller impact yet still begin to address some key areas of difficulty. The recommendations of this study include improvements that can be made both in the near future and in medium-term to begin addressing the problems on the ground now while still moving towards a comprehensive solution.

## SHORT-TERM

"Give out tickets to offenders, raise/establish minimum fines, and penalize the [tour] companies that allow their drivers to break the rules."

"[Parking Control Officers] are effective but they are not there consistently and we need more of them at more intersections throughout the neighborhood."

"[Parking Control Officers] improve safety, so increased hours would be a benefit. But that would not address congestion, noise pollution, or behavior issues."

—SURVEY RESPONDENTS

### IMPROVED ENFORCEMENT OF EXISTING REGULATIONS

There is widespread consensus among community members that more robust enforcement of existing regulations could help address perceived traffic circulation and safety issues on the Crooked Street. Additional enforcement was also one of the most common requests throughout the outreach process. Existing regulations include parking and loading restrictions, a prohibition on turning left onto the Crooked Street from southbound Hyde Street, and the exclusion of tour buses from the area. Signs restricting certain behaviors include those directing pedestrians not to stand in the intersections or roadway, reminding parked drivers to remove valuables from and lock their cars, and notices on each block restricting their use by vehicles with 8 or more passenger capacity.

#### ENFORCEMENT RECOMMENDATIONS

- Expand the use of Parking Control Officers (PCOs) to more locations, and confirm that these locations are adequately staffed for the demand and crowds.
- Conduct targeted and continuous enforcement of violations of tour bus restrictions, improper use of loading zones and Muni stops, and other applicable regulations.
- Fund and implement a dedicated SFPD officer presence on a pilot basis during peak days and times to aid in visitor, vehicle, and property safety as well as crowd and traffic control.
- Continue and enhance the Ambassador program with specific training for Ambassadors to help them address the issues on and around the Crooked Street.

One strategy, which received considerable support in public feedback, would be to increase the number of SFMTA Parking Control Officers (PCOs), expanding their hours of deployment and the locations they patrol. To increase the issuance of citations for violations for unlawful behavior or moving violations, including those by tour companies and operators, however, a sworn police officer must be present. One way to have an SFPD police officer dedicated to the Crooked Street would be through the "10B" program, where off-duty officers are hired on an overtime basis by merchant or community groups to perform enforcement.

The "eyes on the street" function played by neighborhood residents is currently supplemented by the Lombard Ambassadors, individuals hired under a contractor managed by the Mayor's Office of Economic and

**Example of existing signed restriction of large vehicles around the Crooked Street.**


**SFMTA Parking Control Officers at work near the Crooked Street.**

Workforce Development (OEWD), to focus on cleaning, safety, and hospitality. The Ambassadors program was launched on the Crooked Street in August 2015, but has no permanent source of revenue. Finding a permanent source of funding would allow Ambassadors, and more of them, to continue to serve the Crooked Street.

Each implementing agency, including SFMTA, SFPD, and OEWD will need to consider expanded staffing of the Crooked Street in the context of overall security and enforcement priorities across the entire city. Excess revenues from the pricing and reservation system described in more detail in the Mid-Term section could be used to pay for PCO, Ambassador, and police officer programs, but until such a system is implemented, other sources of funding would need to be identified to support an expansion of enforcement through existing agencies in the Short-Term. For additional discussion of the Mid-Term Reservations and Pricing Strategy, including the potential to deliver these enhanced enforcement resources in a self-funding and coordinated manner through a neighborhood management organization, see the Reservations and Pricing Section on page 8.

## SHORT-TERM

"Don't make this residential area more comfortable for tourism—it will just attract more."

"It might help… if signage and messages are also in languages other than English."

—SURVEY RESPONDENTS

### ENGAGEMENT OF TOURISM INDUSTRY AS PARTNERS IN VISITOR MANAGEMENT

Among the solutions identified is the creation of an education and marketing campaign/partnership with the San Francisco Travel Association (SF Travel), tour operators, rental car companies, and hotels. Since many tour operators bring groups to experience the Crooked Street, this effort is an opportunity to remind operators directly about how to be a good neighbor, in terms of tour group size, timing, and loading/unloading.

Additionally, as the front-line source of information, all tourism industry players should be equipped to disseminate accurate and timely information about tourist attractions. By helping visitors make better informed decisions about when and how to access the Crooked Street, the education campaign could have a positive impact on automobile and pedestrian congestion, as well as resident and visitor access to the Crooked Street. In turn, traffic and personal safety could also improve.

#### ENGAGEMENT OF TOURISM INDUSTRY RECOMMENDATIONS

- Convene a community and tourism industry working group to discuss issues related to the impacts of tourism on neighborhood residents.
- Partner with SF Travel and other tour operator groups to develop and disseminate information about how to visit the Crooked Street with the least amount of impact to neighborhood residents.
- Provide support to SF Travel and other groups to continuously update the information disseminated and educate tour operators and visitors.

Sample message points that this education campaign could feature include:

- **Tour operators:** Renewed awareness that this is a residential neighborhood, and what appropriate visiting hours and group sizes are.
- **Visitors:** Visit the Crooked Street via public transit or on foot to avoid the hassles of limited parking and congested streets. (Where space allows, the message will include information on which public transit lines stop at or near the Crooked Street.)
- **Visitors:** Advise about waiting times for vehicles and crowding for pedestrians during peak periods (approximately 10:00 AM–6:00 PM on weekends).
- **Visitors and Tour Operators**: Ensure a safe and enjoyable experience for all by remaining on sidewalks and marked pedestrian areas and observing posted signs as well as safety officer/ambassador instructions.

A preliminary education campaign strategy is under development. Messaging would need to be adjusted and revisited continuously as the situation on the ground changes. Finalization and implementation of this education strategy would require SF Travel's input and coordination to ensure success.

## MID-TERM

"Any concept must be careful of effect on neighbor's ability to get through the intersection."

"Pedestrians walking in the street is a real safety problem. I frequently see them standing right in front of "Do Not Walk in Street" signs."

—SURVEY RESPONDENTS

### ENGINEERING AND SIGNAGE RECOMMENDATIONS

- Make the "No Right Turn" restriction from Northbound Hyde to Eastbound Lombard permanent (local traffic exempt), and add signage advising no access to the Crooked Street via Hyde, Larkin, or Polk beginning at Union St. on the south and Bay St. on the North.
- Add wayfinding signage for vehicles along Union, Bay, and Van Ness to direct vehicles to the Lombard Street approach to the street and/or remote parking near Ghirardelli Square or Fisherman's Wharf (existing garages). On Lombard Street, add signage indicating estimated wait time in traffic, to discourage vehicles from joining long queues, particularly on the steep 1200 block of Lombard.
- Re-stripe centerline on 1100 and 1200 block of Lombard Street to improve driver awareness of two-way traffic.
- Pilot increases in pedestrian space at the Lombard and Hyde and Lombard and Leavenworth intersections via painted pedestrian refuge areas. Monitor these areas for the duration of the pilot period and evaluate their ability to reduce congestion and conflicts. Consider whether to remove or make permanent installations of these expanded pedestrian zones based on the results of this evaluation.

### ENGINEERING AND SIGNAGE ENHANCEMENTS

The alternatives screening also considered a series of traffic engineering interventions—such as painted or raised sidewalk extensions, barriers, or wayfinding signage—for their potential to address conflicts and near-misses between pedestrians, drivers, and transit. Conceptual designs for each type of enhancement, used for discussion in outreach and public meetings, can be found in Appendix D. Through the outreach process, additional opportunities for signage enhancements, including estimated wait time for vehicles in the queue and encouragements to lock vehicles and leave nothing in sight were identified.

Though initial technical work and community engagement has shaped the following recommendations, SFMTA would also need to evaluate its capacity to put any engineering improvements into place in the context of overall traffic circulation and safety priorities. Revenues from the vehicle access fee could be used to fund for these improvements, but otherwise other funding sources will need to be identified. Just as importantly, as part of the implementation process, more detailed planning, analysis, and evaluation of the measures will be required. In particular, the downstream impacts on both automobile and pedestrian traffic circulation would need to be evaluated, as they could diminish the positive effects originally intended by the improvements by displacing the issue to another location. For example, reducing or eliminating eastbound through-vehicle access on Lombard at Leavenworth by expanding the pedestrian curb space could worsen congestion both on the Crooked Street itself as well as blocks of Lombard, Chestnut, Leavenworth, and other cross streets. Plans to redirect traffic would also need to account for traffic volume and speed effects around nearby Yick Wo Elementary School.


**Increases in pedestrian space can help reduce the conflicts between automobile drivers and pedestrians. The estimated cost for increased pedestrian space around the Crooked Street is $20,000 for a temporary, pilot installation and up to $250,000 for a permanent installation.**



**Wayfinding signage can help keep traffic away from neighborhood streets and schools. The estimated cost for wayfinding around the Crooked Street is $25,000.**

**The worn centerline on Lombard Street sometimes results in wrong-way vehicles attempting to avoid the queue.**

## MID-TERM

"Not sure how I feel about [pricing] a public street but I do think charging a fee would reduce traffic."

"This may work but it will take time to educate tourists."

—SURVEY RESPONDENTS

### RESERVATIONS AND PRICING SYSTEM FOR VEHICLES: ADMISSION FEE WITH A DISCOUNT FOR ADVANCED RESERVATIONS

One of the most direct ways to manage automobile congestion, including the vehicle queues that form at peak periods, would be to use an electronic system to manage reservations for and price access to the Crooked Street. Much like museums limit the amount of tickets available at any given time for popular exhibits, and allow those who plan ahead to reserve a time in advance, this strategy would allow for the flow and demand of automobiles entering the Crooked Street to be regulated, reducing queue lengths.

An all-electronic system, supported by a website, mobile app, and on-street kiosks would enable reservations, payments, and user support without the need for a staffed, physical booth or toll gate onsite, thereby minimizing visual impact and operational cost. The primary goal of the system would be to manage demand while being self-sustaining, and prices and number of available reservation slots would be set per this goal. The assumptions, feasibility considerations, potential visitor experience, and additional studies needed to advance this solution are detailed below.

#### Background assumptions

In order to verify or process reservations and an admission fee on the Crooked Street, vehicle traffic would be consolidated to a single approach via the 1100 block of Lombard Street, just west of Hyde. There would also need to be permanent prohibitions on right or left turns from Hyde onto the Crooked Street, except for residents of the block, as recommended in the mid-term engineering solutions. Additionally, because many visitors who would previously have driven down the Crooked Street will now take transit or walk, improvements to pedestrian space and continued PCO and/or Ambassador presence would be necessary to manage the increased number of visitors on foot, also as recommended in the short-term and mid-term solutions.

A robust and sustainable outreach and marketing plan would be needed to ensure that there is ample and clear advanced messaging, to both regional residents and tourist audiences, about the system's rollout and intended price levels. This effort would need to be considered part of the ongoing operational expenses for the system.


**Engineering improvements, such the permanent restriction of non-residents from making turns from Hyde, are a prerequisite for the Reservations and Pricing system's functionality.**

We must also assume that the first priority for the revenue generated by the admission fee would be the administration and maintenance of the system. However, revenue in excess of that required to operate and maintain the reservation and pricing system could also support the other recommended strategies contained in this report, and the managing organization of the reservations and pricing system could act as the designated management agency for the Crooked Street and surrounding neighborhood, coordinating service procurement and delivery.

#### How it would work: Visitor experience and technical feasibility

Before accessing the Crooked Street via automobile, visitors would go to a website, app, or kiosk to select a day and time (offered in 30–60 minute increments) to visit

#### RESERVATION AND PRICING SYSTEM RECOMMENDATIONS AND NEXT STEPS

- Create or designate an agency with authority and responsibility to manage all aspects of the Crooked Street as a residential neighborhood and tourist attraction, including implementation of a Reservations & Pricing system.
- Pursue a Reservations and Admission Fee Pricing system as the preferred way to manage vehicle congestion on the Crooked Street.
- Initiate a follow-on study, led by SFCTA in close partnership with the SFMTA and BATA, to advance work on the outstanding system design and operations questions detailed in this section.
- Identify potential legislative champions to advance the required state-level legislation to authorize collecting an access fee for the street.

the street, registering with their license plate number. Visitors planning to use a rental car could reserve their spot and return to the reservation to update the license plate information once they have arrived and rented a vehicle. Signage along the approaches to the Crooked Street would advise that reservations are required and provide the web address at which to make one, along with an indication of what the price will be for those who choose to continue without a reservation. The price for continuing without a reservation would likely be significantly higher than that of visiting with a reservation, to discourage this practice.

Since average capacity on the Crooked Street is about 220 vehicles per hour, this many or fewer slots could be reserved. Pre-reserving fewer slots would allow for those that arrive without a reservation while still maintaining a limited length queue to access the Crooked Street.

When a pre-registered vehicle enters the Crooked Street, automated cameras would read its license plate information and check it against the system database. If there is a match, the system would verify payment and the transaction is complete. If a non-preregistered vehicle enters the street, the system would recognize the need to charge and collect the higher non-reservation price. If the vehicle has a FasTrak or FasTrak account associated with its license plate, the system would charge the fee to the FasTrak account. Otherwise, the system would generate an invoice that would be mailed to the registered owner, much like the system in place at the Golden Gate Bridge. Unpaid invoices would be subject to fees and eventually license renewal holds by the DMV, much like unpaid tolls.

The operator of a pricing system for the Crooked Street would need to develop or contract for a back-end processing system. Given the volume of vehicles that visit the Crooked Street, contracting with an existing provider, such as the FasTrak regional service center, is likely the most feasible path forward. See Appendix C for more technical details.

### Required technical and policy follow ups

There are many questions that would need to be answered before a pricing system on the Crooked Street could begin operating. The recommendation of this study is to undertake additional preliminary design, review, and econometric analysis to address these questions.

On the policy side, additional work must determine what entity, either existing or new, would govern and oversee the program, as state legislation would be needed to authorize pricing access to the street. The designated governing entity would likely also be considered to serve as the overall management agency for the Crooked Street. This designation would allow for the consolidation of other functions related to management of the street as a tourist attraction, such as contracting with Ambassadors and other public safety professionals as well as leading street maintenance and improvement efforts in the surrounding neighborhood.

A myriad of technical and operational questions would also need to be answered and informed by further analysis, including demand and financial modeling. These questions include, but are not limited to the following:

- What entity, either existing or new, should lead project planning, design, environmental review, and construction of the reservation/toll system?
- What entity, either existing or new, would lead management, operation and maintenance of the system, including monitoring and adjusting pricing policy, once built?
- What should the reservation and pricing policy be, including who is required to pay, at what times, and at what rate?
- How would pedestrian congestion be impacted? Would people crowd the sidewalks if they are discouraged from using their cars, or would they just shift their automobile visit to a different time?
- How much would the system cost, including both initial capital investment and ongoing operation and maintenance costs?
- What would the policy be for visitors who don't have access to credit/debit card or electronic funds transfer accounts?
- How would revenue in excess of operational and management costs be used?

Further planning and design studies, including multi-agency involvement, will be required to answer these and other questions. Moreover, designing and implementing a system would require wide-ranging engagement with various stakeholders, including residents, visitors, local and statewide elected officials, the local tourism industry, and others. The additional studies, authorization, and implementation of a Reservations and Pricing System is expected to cost approximately $2 million in total.


# Lombard Study: Managing Access to the "Crooked Street"

## FINAL REPORT APPENDICES

MARCH 2017

# Appendix A: Draft Existing Conditions Technical Memorandum


# Lombard Study: Managing Access to the "Crooked Street"

## DRAFT EXISTING CONDITIONS TECHNICAL MEMORANDUM

SEPTEMBER, 2016

# Contents


**Introduction** 1

**I. Review of Past Studies/Data Collection and Other Management Efforts** 1

- Final Study, Crooked Street Task Force, August 2000 3
- Lombard Street Temporary Closure, August 2014 4
- SFMTA Traffic Counts 4
- Ambassadors Program 4

**II. Orientation to the Crooked Street** 5

**III. Stakeholder and Community Interviews** 6

**IV. Data and Interpretation** 10

- Counts and Spatial Analysis of Visitors 10
- Vehicle Profile 16

**V. Findings** 22

**VI. Next Steps** 23



**REPORT DESIGN**

Bridget Smith

**PHOTO CREDITS**

Uncredited photos are from the Transportation Authority photo library or project sponsors. The photographers cited below, identified by their screen names, have made their work available for use on flickr Commons. Links lead to the photograph's page where licensing information is available.

Cover, bottom: Phil Whitehouse, https://flic.kr/p/4VW6c7

Contents page: David Yu, https://flic.kr/p/idvfXo

p. 1: Nan Palermo, https://flic.kr/p/s3srjf

p. 3: Ryan Park, https://flic.kr/p/svnEK

p. 9: Dustin Gaffke, https://flic.kr/p/bzKvjX

p. 10: Daniel, https://flic.kr/p/7pQJF8

p. 22: Dinur, https://flic.kr/p/55HCyV

p. 23: Adam Chandler, https://flic.kr/p/7xYo77



SAN FRANCISCO COUNTY TRANSPORTATION AUTHORITY

1455 Market Street, 22nd Floor, San Francisco, CA 94103

TEL 415.522.4800 FAX 415.522.4829

EMAIL info@sfcta.org WEB www.sfcta.org


# INTRODUCTION

The San Francisco County Transportation Authority is leading a Neighborhood Transportation Improvement Program (NTIP) study on Managing Access to the Crooked Street at the request of Supervisor Mark Farrell, District 2. The purpose of the study is to identify and evaluate a range of options to manage visitor access and circulation on the "Crooked Street" (Lombard Street between Hyde and Leavenworth) while maintaining the character of the street, managing vehicle and pedestrian congestion, avoiding spillover effects into adjacent streets, and other goals. These full project goals include:

- Manage Pedestrian Congestion
- Manage Auto Congestion
- Ensure Traffic Safety
- Maintain Access to the Crooked Block
- Maintain Livability of the Surrounding Neighborhood
- Preserve Tourism
- Implement a Financially Viable Solution

# I. REVIEW OF PAST STUDIES/ DATA COLLECTION AND OTHER MANAGEMENT EFFORTS

There have been several past efforts to collect data and examine the challenges on the Crooked Street.

## FINAL STUDY, CROOKED STREET TASK FORCE, AUGUST 2000

The most recent full study of challenges around vehicle and pedestrian congestion on the Crooked Street was completed in 2000.[1] The study methodologies included:

- Traffic volume counts
- Motorist and pedestrian behavior observations
- Speed, license plate, and collision data collection
- Monitoring of driveway access delay and blockages on street segments around the Crooked Street and specifically at the two homes at the eastern end of the Crooked Street
- Frequency of violation of tour bus restrictions on Chestnut and Larkin Streets
- Analysis of bottlenecks and traffic backups caused by pedestrians and vehicles
- Analysis of air pollution and noise pollution

1 The Crooked Street Traffic Study Report, by Tom Folks and Amanuel Halle, August 22, 2000. Reviewed by Crooked Street Task Force as Final Report on September 20, 2000.

The key findings from the 2000 study's data collection efforts were:

- **AVERAGE DAILY TRAFFIC (ADT):** 24-hour vehicle volumes were collected for the segments shown in Table 1.

**TABLE 1. AVERAGE DAILY TRAFFIC**

| STREET SEGMENT | ADT |
|---|---|
| Lombard Street eastbound, between Van Nessand Polk | 4,078 |
| Lombard Street eastbound, between Polk and Larkin | 3,709 |
| Lombard Street eastbound, between Larkin and Hyde | 3,488 |
| Lombard Street eastbound, between Hyde and Leavenworth | 1,560 |
| Chestnut Street westbound, between Polk and Hyde | 901 |

- **VEHICLE TRENDS:** Demand to access the Crooked Street by vehicle was highest on weekends from 1:00 PM to 5:00 PM, and there would consistently be blockages of Muni service from vehicles turning right off of Van Ness at the intersection with Lombard. The highest demand weekend in May 1999 was Labor Day, when vehicular traffic capacity of the Crooked Street was 350 vehicles per hour. Queues formed since the traffic volumes west were higher than the capacity of the Crooked Street, and the traffic delay was approximately 35–40 minutes (to drive the three blocks from Van Ness to Hyde, 1,230 feet long).
- **VEHICLE ORIGINS:** A license plate study from Memorial Day weekend of 1999 found that 13% of vehicles on the Crooked Street were from San Francisco, 41% from the rest of the Bay Area, and 40% from outside the Bay Area; an additional 6% were rented vehicles.
- **PEDESTRIAN VOLUMES:** 10-minute counts were conducted between 1:00 PM–4:30 PM on high tourist season weekends in May 1999, with the results shown in Table 2.

**TABLE 2. PEDESTRIAN VOLUMES**

| STREET SEGMENT | PEDESTRIAN ACTIVITY | NUMBER OF PEDESTRIANS CROSSING LOMBARD ST (10 MIN COUNT) | NUMBER OF PEDESTRIANS CROSSING SIDE STREET (10 MIN COUNT) |
|---|---|---|---|
| Leavenworth | High | 62 | 46 |
| Hyde | High | 54 | 40 |
| Larkin | Low | 6 | 10 |
| Polk | Low | 3 | 7 |
| Van Ness | Moderate | 15 | 21 |

- **PEDESTRIAN COLLISIONS:** There were 14 pedestrian-vehicle collisions in the blocks surrounding the Crooked Street from 1994–1998. The cause for most accidents was driver's inattention. Half of the collisions were at Lombard and Van Ness. Notably, despite their very high pedestrian activity, there were no collisions at either Lombard and Hyde or Lombard and Leavenworth.
- **DRIVEWAY ACCESS:** Access to driveways was not a major concern, aside from the ongoing nuisance of driveways at the base of the Crooked Street being blocked for short periods by people who park their cars to take photographs.
- **TOUR BUSES:** Tour bus restrictions on Chestnut and Larkin were found to be violated occasionally; one challenge in addressing this was that only SFPD could cite tour bus violations (i.e., not officers of DPT, which is now part of SFMTA).
- **MUNI CABLE CAR:** The northbound cable car stop at Hyde and Lombard sometimes blocked vehicles from entering the Crooked Street, exacerbating the queue. It was deemed unfeasible to move the stop further south, however, since the cable car operator must be able to see the following block before proceeding, and only one cable car can be on the steep grade north of Lombard at a time for safety reasons.
- **ENFORCEMENT OFFICERS:** SFPD's Central Station had limited budget and staffing and needed to direct most of its resources elsewhere, including Fisherman's Wharf, Telegraph Hill, and Coit Tower. There was also the perception that enforcement will not have a lasting effect on tourists, who are not typically repeat violators/visitors. The DPT (now SFMTA) Enforcement Division had a budget of $17,000 in 1999 for a PCOs overtime budget to fund enforcement on the weekend, when queues were worst. The budget was only able to cover about nine weekends, and being overtime this required PCOs to volunteer for shifts, which was challenging given the generally stressful nature of the assignment.
- **AIR POLLUTION:** Air pollution (carbon monoxide) was monitored at one site along the vehicle queue to enter the Crooked Street and also mid-block on the Crooked Street during particularly busy times. Carbon monoxide levels posed no public health hazard, averaging less than one part per million (ppm) in both locations, compared to California ambient air quality standards of 9 ppm over an eight-hour period or occupational health safety standards of 25 ppm. A previous study from August 1997 found carbon monoxide levels averaging 2–3 ppm.
- **NOISE:** The Task Force agreed that noise pollution on and around the Crooked Street was difficult to quantify and was "primarily a matter of enforcing existing laws."

The Task Force examined a number of potential solutions:

- **EXTEND MUNI ROUTE 39:** The possibility was discussed of extending Muni Route 39 to the Crooked Street to provide another non-vehicular way to access the street. Route 39 runs between Fisherman's Wharf and Coit Tower. It was determined that an extension to the Crooked Street would overextend the running distance of the line. Muni staff suggested a "wait-and-see" approach to see if the then-new F-line historic streetcar service on the Embarcadero along with the cable car connection could provide sufficient transit access.
- **NEW SHUTTLE SERVICE:** As a second suggestion by Muni staff, in addition to a wait-and-see approach on transit access with the F-line and cable car, the city could encourage development of a shuttle service by a private operator. The shuttle would need an exemption from the prohibition on and around the Crooked Street of buses and vans with capacity over eight passengers. No further details were studied.
- **PART-TIME PARKING PROHIBITION ON VAN NESS:** The task force recommended a part-time parking prohibition on the east side of Van Ness, south of Lombard Street, to alleviate the queuing of traffic turning right onto Lombard Street. The prohibition would be in effect from 9:00 AM–9:00 PM Friday–Sunday from May to September.
- **INCREASED ENFORCEMENT:** The task force recommended increasing the Parking Control Officer (PCO) budget ($17,000 in FY1999) by at least 50% and also allocating more nighttime SFPD presence, particularly to enforce noise-related infractions.
- **STREET CLOSURE:** The task force members were split on support of a street closure. At the Russian Hill Neighborhood Director's meeting in January 2000, the board voted in favor of a closure. A 1998 DPT postcard survey found that among residents who responded they supported some form of road restrictions three to one, though only 26% of residents of the single block of the Crooked Street supported such a proposal. The report notes that California Vehicle Code Section 21101.6 prohibits the closure of a public street to allow local access only; it is illegal to gate a public street and selectively allow access to residents. State Senator Quentin Kopp introduced a bill in March 1987 to amend the Vehicle Code to allow a gate on the Crooked Street, but the bill was never acted upon. Any street closure would also require consensus among a majority of neighbors, and would need to consider gate placement, delivery access, guest access, turnaround space, and financial issues. Specific closure alternatives considered were:
  - » **MID-BLOCK CLOSURE:** Make the street two-ways by widening it by five feet, and place barriers mid-block. Turn-arounds would use private driveways. Construction was projected to cost $1.8 million.
  - » **AUTOMATIC GATE:** A gate would be placed at the top of the street; residents would use a remote control key, and visitors would use a telephone entry system. This type of gate was projected to cost $50,000.
  - » **GATE WITH SECURITY PERSONNEL:** An alternative gating arrangement would be staffed by security personnel part-time or full-time. A gate could be installed for $19,000, and the cost of security personnel would also need to be covered.
  - » **SIGNAL SYSTEM:** A signaling system could be installed to alternate the one-way direction of the Crooked Street. This would greatly reduce the capacity of the street.
  - » **VACATING THE CROOKED STREET:** The adjacent property owners could purchase the street, converting it to a private street. This would require a permit from the Department of Public Works and approval of the Board of Supervisors. Residents would then assume all responsibility including maintenance and repairs of the street.

Lastly, the report notes that California Vehicle Code, Section 21101.2 "Local Authority to Divert Traffic" provides that if the peace officer finds that a significant number of vehicles are not promptly moving when the opportunity arises to do so, then the peace officer may divert vehicles subject to traffic congestion until reasonably flowing traffic is restored. Captain Alex Fagan, in his memo dated August 9, 2000, gave DPT's Enforcement Division full authority to close as deemed necessary the 1300 block of Lombard Street, from Van Ness to Polk Street, to alleviate congestion from vehicles turning to access the Crooked Street.

## LOMBARD STREET TEMPORARY CLOSURE, SUMMER 2014

With the support of the Lombard Hill Improvement Association and Russian Hill Neighbors, SFMTA conducted a pilot closure of the Crooked Street in Summer 2014. The closure was intended to prevent queuing and conflicts with pedestrians, and reduce impacts on regional transit that occur when the queue reaches Van Ness. The pilot closure occurred for four weekends, including the July 4th holiday weekend, and consisted of a closure of eastbound Lombard for the block west of the Crooked Street and closure of the Crooked Street. The street segments were closed during summer PCO deployment hours, roughly noon to 7:00 PM, with residents exempt from the restrictions.

The evaluation examined the performance of the Hyde and Leavenworth intersections with Lombard during the closure, whether the closure eliminated or displaced the vehicle queue, residents' access to Lombard Street, and whether pedestrian conflicts with traffic increased. The closure successfully eliminated the vehicle queue during the closure hours. Sidewalks were also less crowded on the Crooked Street, and there were fewer vehicular-pedestrian conflicts during the closure due to reduced vehicle volumes. However, there were also concerns about having to navigate through pedestrians for the residents who drove down the Crooked Street. The closure also caused more tourists to look for parking in the neighborhood, and traffic also dispersed to before and after the closure.

The evaluation report also enumerated a number of alternatives to consider for future action, including:

- Gate the street so only residential vehicles can use Lombard, requiring action from the State legislature.
- Pedestrianize the street, which would entail removing all vehicular access including for current residents, deemed infeasible.
- Limit access to the street based on license plate numbers, which would be difficult to enforce and would require state legislation.
- Privatize the street, vacating it so it would become the responsibility and property of residents.
- Prohibit right turns from Hyde northbound onto Lombard, which PCOs already implement at times, which reduces backups on Hyde Street but does not address queues on Lombard.
- Close Lombard Street between Van Ness and Polk during peak periods, as discussed during the 2000 Final Study of the Crooked Street Task Force, to discourage queuing on Lombard. However, this could simply shift congestion to neighboring streets.
- Implement congestion pricing, charging a variable toll to drive down the Crooked Street, with revenues to pay for area patrols and maintenance. This would require legislative approval and toll-related infrastructure improvements.

## SFMTA TRAFFIC COUNTS

Traffic counts were collected for the Crooked Street in June 2013 and again in June 2014 during the first weekend of the closure. In June 2013, the highest hourly volume of vehicles observed was 316 vehicles per hour, on Saturday from 1:00 PM–2:00 PM.

During most of the closure hours in June 2014, there were less than 10 vehicles per hour on the street, providing local access for residents. Vehicle volumes were very high however before and after the 12:00 PM–6:00 PM closure hours, with over 300 vehicles per hour in the hour before the closure on Friday, Saturday, and Sunday, and a peak observed vehicle flow of 383 vehicles per hour from 8:00 PM–9:00 PM on Saturday, the highest count observed for the Crooked Street from all available count data. The count data demonstrated that the pilot closure did appear to displace some vehicle traffic to the hours directly before and after the daily closure.

## AMBASSADORS PROGRAM

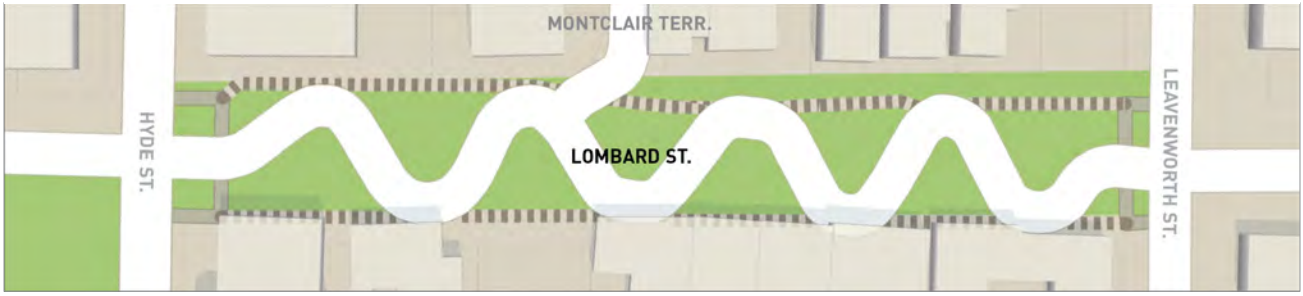
Modeled on the ambassadors at Fisherman's Wharf, Union Square, and elsewhere, an Ambassadors Program for Lombard's Crooked Street was initiated at the request of District 2 Supervisor Mark Farrell and SFPD Central Station's Captain David Lazar. At Fisherman's Wharf, the most well established ambassadors program in the city, the ambassadors are focused on cleaning, safety, and hospitality. The ambassadors were called for on the Crooked Street particularly to manage pedestrian and vehicle safety and proactively address crime and vehicle break-ins. The ambassadors also provide tourist information and instructions and encourage good behavior. They cannot issue citations, but they report to SFPD to coordinate on crime and security. Ambassadors provide very detailed, quantified reporting on their services performed.

The Crooked Street Ambassadors Program launched on August 29, 2015, after most of the data collection for this report. It is funded by a grant managed by the Office of Economic and Workforce Development, with the Fisherman's Wharf Community Benefit District acting as the fiscal agent for the grant.

# II. ORIENTATION TO THE CROOKED STREET

The Crooked Street is located between Hyde and Leavenworth streets on Lombard Street,as shown in the map in Figure 1.

**FIGURE 1. MAP OF THE CROOKED STREET**




The Crooked Street is a residential street. Its distinctive switchbacks, flowers, and vistas are famous around the world, and as a result the street draws many visitors from both far and near. As overall tourism levels have increased in recent years, so have the number of tourists on the Crooked Street, and crowd control issues around the Crooked Street have become more challenging.

**FIGURES 2 AND 3. VISITORS AT THE INTERSECTION OF LOMBARD AND LEAVENWORTH**

Large numbers of people congregate, particularly at the top of the Crooked Street (the east side of Hyde Street), across from the bottom of the Crooked Street (the east side of Leavenworth Street, shown in Figures 2 and 3), and throughout the interior of the block, on the stairways but also often on driveways, doorways, and in the roadway (see Figure 4).

Vehicle traffic on the Crooked Street operates one-way eastbound, though the surrounding blocks of Lombard have two-way traffic. Many people drive down the street each day and SFMTA PCOs staff the intersections at either end of the Crooked Street during summer weekend peak visitor hours (roughly 10:00 AM–6:00 PM) to keep vehicles moving through, avoid conflicts with the cable car on Hyde Street, and enforce parking regulations to keep travel lanes clear. PCOs also cover other intersections as needed, such as the intersection of Lombard and Van Ness.

Due to high demand and the street's limited capacity, a queue often forms on the blocks to the west of the street. During particularly high demand times, the queue extends all the way to and across Van Ness Avenue and sometimes

**FIGURE 4. VISITORS IN THE ROADWAY ON THE INTERIOR OF THE CROOKED STREET**

also north and south on the side streets of Larkin, Chestnut, and Polk.

To manage high volumes of visitor vehicles, PCOs usually institute a no right turn restriction from northbound Hyde Street for all but local access vehicles (see Figure 10, next page). This reduces queue impacts on the cable car on Hyde Street and gives residents a reliable way to get to their homes without waiting in the queue of visitors. Left turns from southbound Hyde Street at this intersection are never permitted.

## III. STAKEHOLDER AND COMMUNITY INTERVIEWS

More than a dozen interviews were conducted with city staff, community groups, local residents, and business and tourism groups to understand the challenges around transportation and visitor impacts around the Crooked Street. Stakeholders and community members described their experiences with the Crooked Street, their opinions of past efforts to manage access to the Crooked Street, and their insights and opinions on potential improvements. The following key messages came across in the various interviews.

### TOURISM HAS INCREASED SUBSTANTIALLY IN RECENT YEARS, THOUGH RESIDENTS HAVE CONFLICTING OPINIONS ON THE IMPACTS OF TOURISM AND WHETHER IT SHOULD BE RESTRICTED.

Residents perceive that levels of tourism have increased dramatically over the past five years of global economic recovery, and visitor levels at the Crooked Street are substantially higher than they have ever been. SFMTA staff and PCOs also perceive the street to be more crowded than in the past. City staff pointed out that the Crooked Street has not been able to address the increase in tourism in the same way as most tourist attractions because, unlike a private business, public park, or other typical attraction, there is no single entity to act as a property manager for the site in the case of the Crooked Street because the attraction itself is a public street in a residential neighborhood.

During busy periods, a vehicle queue forms on the blocks to the west of the Crooked Street, sometimes extending past Van Ness Avenue. Resident interviews and a 311 complaint also noted that the vehicle queue also backs up Larkin, Chestnut, and Polk at times. Vehicles also often try to illegally unload passengers in front of driveways on Hyde and Leavenworth. On Leavenworth in particular, a long stretch of driveways on the west side of the street directly south of the Crooked Street is routinely blocked by passenger vehicles, taxis, and limousines.

**FIGURE 5. PCO DIRECTS VEHICLE TRAFFIC AT HYDE AND LOMBARD**

**FIGURE 6. PCO ENFORCES PARKING RESTRICTIONS ON LEAVENWORTH SOUTH OF LOMBARD STREET**

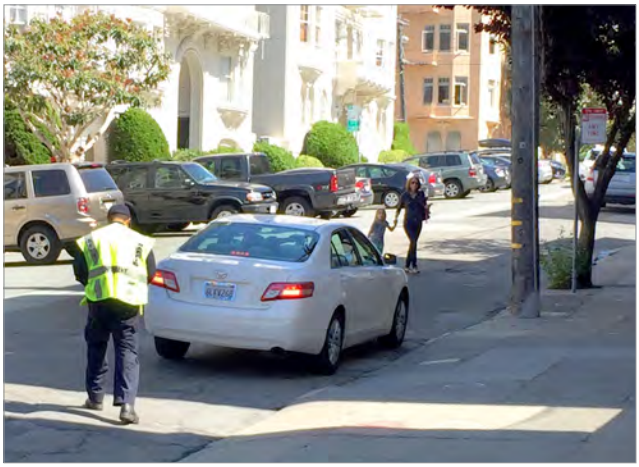


**FIGURE 7. VEHICLE QUEUE EXTENDING WEST ON LOMBARD PAST VAN NESS**

**FIGURE 8. PCO MANAGING VEHICLE QUEUE TRAFFIC AT LOMBARD AND VAN NESS**

**FIGURE 9. VEHICLE TRAFFIC EXTENDING ONTO LARKIN STREET**

**FIGURE 10. RIGHT TURN RESTRICTIONS ON NORTHBOUND HYDE STREET**


Aside from the vehicle queue, residents also complain that tour buses and vans frequently violate the restrictions on tour buses on the blocks around the Crooked Street. Many tour buses also off-load visitors on Columbus Avenue nearby, which is permitted, but the result is that a large number of tourists arrive at the street all at once.

Visitors on foot congregate in certain areas on and around the Crooked Street. Sometimes pedestrians will stop in the middle of the street, blocking the roadway taking pictures, while at other times the entire crowd of pedestrians on the sidewalk extends into the street. The latter is especially the case at the intersection of Lombard and Leavenworth, where large crowds gather at the bottom of the Crooked Street for a particularly scenic view of the street's flowers and switchbacks.

Aside from general crowding and lingering in the roadway, some residents complain about impolite behavior from tourists. There are reports of tourists walking through flowerbeds, climbing onto carports and roofs for photos, and otherwise wandering onto private property on and around the Crooked Street. Some residents also complained about noise from tourists.

However, all residents interviewed recognized that at least a moderate level of tourism was acceptable, and multiple residents noted that they enjoyed the presence of tourism. Multiple residents said they would be sad to see any restrictions placed on tourism in the area, and one resident said "I think that the atmosphere of tourists is why people were drawn to the neighborhood. I certainly was."

The board of the Lombard Hill Improvement Association, a group representing residents of the Crooked Street, voiced support for the idea of tolling the street, not for revenue so much as to moderate visitor demand to the street. Some residents supported the idea of exploring a toll, while others expressed doubts about the feasibility of tolling a public street or general opposition to restricting tourism.

### WHILE THERE ARE IMPACTS OF BOTH PEDESTRIAN AND VEHICLE VISITATION, MOST COMPLAINTS FROM RESIDENTS ARE CENTERED ON PEDESTRIANS.

In previous years, residents of the Crooked Street had difficulty driving to their homes. However, since PCOs started instituting right turn restrictions from northbound Hyde Street for all vehicles except residents, this has essentially given residents a way to bypass the vehicle queue. Residents of the blocks of Lombard west of the Crooked Street also expressed that the ability to make right turns off southbound Hyde Street was critical to them being able to avoid the queue (though there are no restrictions for any vehicles on this turning movement).

As such, most residents are able to access their homes by vehicle, and since most residents have off-street parking there are few complaints from residents about parking impacts of tourism in the neighborhood. Most complaints focused on the impacts of pedestrian visitation.

The three primary needs articulated by the Lombard Hill Improvement Association were for:

1. A more orderly environment and curtailing impolite behavior,
2. Improved security, and
3. Reducing pedestrian and vehicle volumes to acceptable levels.

### THE CONCERNS AND PERCEIVED NEEDS OF RESIDENTS ARE NOT LIMITED TO CONGESTION AND CROWDING. RESIDENTS ARE CONCERNED ABOUT THE LEVEL OF PUBLIC SERVICES THEIR STREET RECEIVES, AND ABOUT SAFETY IN THE AREA.

Some residents expressed that tour operators and the city economy benefit from Lombard Street without helping to maintain it. Garbage collection is insufficient, and the city does not clean the Crooked Street despite having hand-powered street cleaning machines. The residents fund the cleaning, maintenance, and gardening of the street themselves, while tourism and entertainment industries use and benefit from images of the Crooked Street.

Residents also voiced safety concerns. Late night pranksters occasionally drive recklessly down the street, or drive up it the wrong way. Theft from vehicles has been increasing dramatically in San Francisco, and there is a particular problem around Lombard Street and other tourist destinations with "smash and grab" thieves who target tourist vehicles. In a particularly worrisome incident, one tourist was mugged of their camera on the block east of the Crooked Street in August 2015, and was non-fatally shot when he chased after the suspects.

### THE HISTORIC CABLE CARS ON HYDE STREET PRESENT UNIQUE SAFETY AND OPERATIONAL CHALLENGES.

The cable cars are unable to stop midblock on the steep grades of Hyde Street, and as such, one of the critical roles of the PCOs is to keep traffic moving on Hyde Street so the cable cars are able to reach the (flat) intersections where they are able to stop.

At the Crooked Street, the northbound cable car is required to stop for safety reasons at a particular line on the pavement that corresponds to safety infrastructure in the trackway below. At this spot, the cable car blocks the southern crosswalk, making it difficult for PCOs to manage pedestrians crossing the street.

In general, PCOs and others remarked that many pedestrians and drivers are resistant to following the directions of PCOs. This dynamic is difficult and stressful for PCOs, particularly when the southbound cable car is ascending the hill and PCOs encounter resistance to clearing the intersection of Lombard and Hyde. This prompted at least one PCO to suggest that Hyde Street in this area be transit and local access only for safety reasons.

### THERE IS NOT A CONSENSUS ABOUT THE SUCCESS OF THE 2014 PILOT CLOSURE OF LOMBARD STREET.

Both residents and city staff had a variety of views on the pilot closure. Some noted that the street was quieter without vehicle traffic and that there was less tension on the block. This prompted some to deem the pilot a success.

Others disagreed, arguing that the closure turned the street into a "zoo," with tourists treating the Crooked Street more like a park than a street and wandering freely in the roadway and onto private property. Some residents complained that it was difficult to access their driveways, or that they were treated disrespectfully while driving to their homes by the tourists on foot. In addition, some

claimed that there was increased double parking around the Crooked Street as a result of the closure.

Still others disliked the closure, not because of negative impacts on residents, but because they disagreed with the premise of limiting or restricting tourist visitation to the Crooked Street. One resident said that this is a public street and there is "no precedent" for such a closure.

It was also noted that the closure may have been more successful in addressing residents' concerns if it had been paired with a program like the new Ambassadors program being introduced to the street in August 2015. The Ambassadors are specifically trained in crowd management and safety for pedestrians, and are able to help with encouraging visitors to be respectful of neighbors.

### RESIDENTS AND STAKEHOLDERS NOTE A LACK OF ENFORCEMENT AROUND THE CROOKED STREET.

Residents, PCOs, and others are quick to note that PCOs are unable to issue pedestrian or moving violations, and can only cite vehicles for parking violations. In addition, there is not a frequent San Francisco Police Department presence on the Crooked Street.

One result of this is that there is effectively little to no enforcement of the restriction on tour buses and vans with more than eight seats, which are not allowed on the blocks around the Crooked Street. In addition, vehicle "smash and grab" break-ins continue to happen frequently around the Crooked Street.

Many residents and stakeholders expressed that it would be helpful to have a greater police presence to enforce tour bus restrictions, curb crime, and cite dangerous vehicle behavior. Residents and stakeholders had varying and conflicting opinions on whether it would be productive or fair to increase citations to pedestrian visitors.

### OTHER PARTS OF THE CITY HAVE ALREADY EMPLOYED STRATEGIES THAT ADDRESS POTENTIAL NEEDS OF THE CROOKED STREET, INCLUDING CROWD MANAGEMENT, PUBLIC SAFETY, AND REVENUE GENERATION.

Fisherman's Wharf in particular has been creative in how it pursues safety and crowd management. Fisherman's Wharf has a community benefit district (CBD) that brings together property owners and merchants to fund programs and improvements that benefit all the businesses in the area.

The "10-B" program from the San Francisco Police Department allows for organizations to pay for overtime police officers. The program essentially provides organizations with private security, except that the security officers are actual San Francisco police officers who have the ability to provide enforcement. The Fisherman's Wharf CBD uses 10-B officers to strategically supplement the schedule of regular beat officers they receive from SFPD.

In addition to 10-B officers, the Fisherman's Wharf CBD contracts with Block by Block, a national company, to provide Ambassadors at the Wharf. The Ambassadors are focused on cleaning, safety, and hospitality. As noted earlier in this report, an Ambassadors Program was launched on the Crooked Street on August 29, 2015. During interviews in summer 2015, many residents and stakeholders on Lombard's Crooked Street expressed enthusiasm about the introduction of Ambassadors to the Crooked Street.

The 10-B officers and Ambassadors are complementary to each other, and serve different roles. It is helpful to have enforcement to back up the Ambassadors. Also, due to their price differential ($100 per hour for 10-B officers versus $15 per hour for Ambassadors), it is possible to contract more Ambassadors on a fixed budget, and they are able to serve as the eyes and ears for enforcement, while also performing other tasks such as cleaning that would not be performed by police officers. Both Ambassadors and 10-B officers provide the CBD with detailed reporting on their activities and services performed.

Green Benefits Districts provide another interesting opportunity to consider for the Crooked Street. Green Benefits Districts are a neighborhood-based special assessment district. Gardening and security (including Ambassadors) are eligible expenses, and as such they would provide one possible revenue source to fund improvements on the Crooked Street. The Board of Supervisors voted in August 2015 to establish the nation's first Green Benefit District, the Dogpatch and Northwest Potrero Hill Green Benefit District.

# IV. DATA AND INTERPRETATION

Data collection was conducted in summer 2015 to supplement previous efforts and gather more current data that reflects recent growth in tourism. Data collection activities included:

- Camera-based data collection to gather visitor volumes as well as counts of specific vehicle and pedestrian behaviors
- A vehicle profile of the occupancy and origins of vehicles driving down the Crooked Street
- An intercept survey of visitors on foot and in vehicles
- Information on parking conditions and safety

## COUNTS AND SPATIAL ANALYSIS OF VISITORS

Visitor volumes were measured using camera-based data collection during peak tourism weekends (Friday-Sunday, 9:00 AM–8:00 PM) in July 2015. Data collected included:

- Pedestrian volumes entering/exiting the Crooked Street
- Vehicle volumes entering/exiting the Crooked Street,
- Instances of vehicles being unable to enter/exit the Crooked Street due to pedestrians blocking the roadway
- Instances of illegal left turns onto the Crooked Street from southbound Hyde Street
- Instances of pedestrian crowding on the sidewalk extending into the roadway

**TABLE 3. PEDESTRIAN AND VEHICLE VISITOR VOLUMES (9:00 AM–8:00 PM)**

| DAY | PEDESTRIANS* | VEHICLES | VEHICLE PASSENGERS* | PEDESTRIANS PLUS VEHICLE PASSENGERS |
|---|---|---|---|---|
| Friday | 7,640 | 2,700 | 9,230 | 16,870 |
| Saturday | 9,610 | 2,362 | 8,080 | 17,690 |
| Sunday | 8,930 | 2,683 | 9,180 | 18,110 |

* Estimated. See footnotes 2 and 3.

### PEDESTRIAN VOLUMES

Pedestrians were counted as entering the Crooked Street when they crossed the threshold of the beginning of the stairs at either end of the block. Pedestrians entering or exiting were counted separately at each end of the street over five-minute intervals. These cordon counts from each end of the block are used to estimate the number of unique visitors on the Crooked Street.[2]

Since vehicles only travel in one direction on the block, their numbers are certain. Average vehicle occupancy is used to estimate total vehicle passengers.[3]

There are very high levels of visitation on Lombard Street on the weekend, with nearly 10,000 daily pedestrian visi-

2 The technology used (counting the number of people entering or exiting at each end of the block using camera footage) does not allow for tracking individuals, and it is not possible to know with certainty how many times each person would be counted. A person who enters on one side of the block and exits on the other would be counted twice (one entrance plus one exit). A person who enters on one side, exits on the other, lingers taking photos, and then re-enters the block and exits on the original side would be counted four times (two entrances, two exits). Because some tourists walk straight through while others return to the end of the block at which they started, in this analysis the number of pedestrians seen entering or exiting is divided by 3 (the average of 2 and 4) to estimate the total daily pedestrian volume.

3 The number of vehicles is multiplied by an average vehicle occupancy of 3.42 (from the vehicle profile later in this report) to estimate the total number of vehicle passengers on the Crooked Street. The average occupancy is based on 416 vehicle observations.

**FIGURE 11. PEDESTRIAN ENTRANCES AND EXISTS ON THE CROOKED STREET**

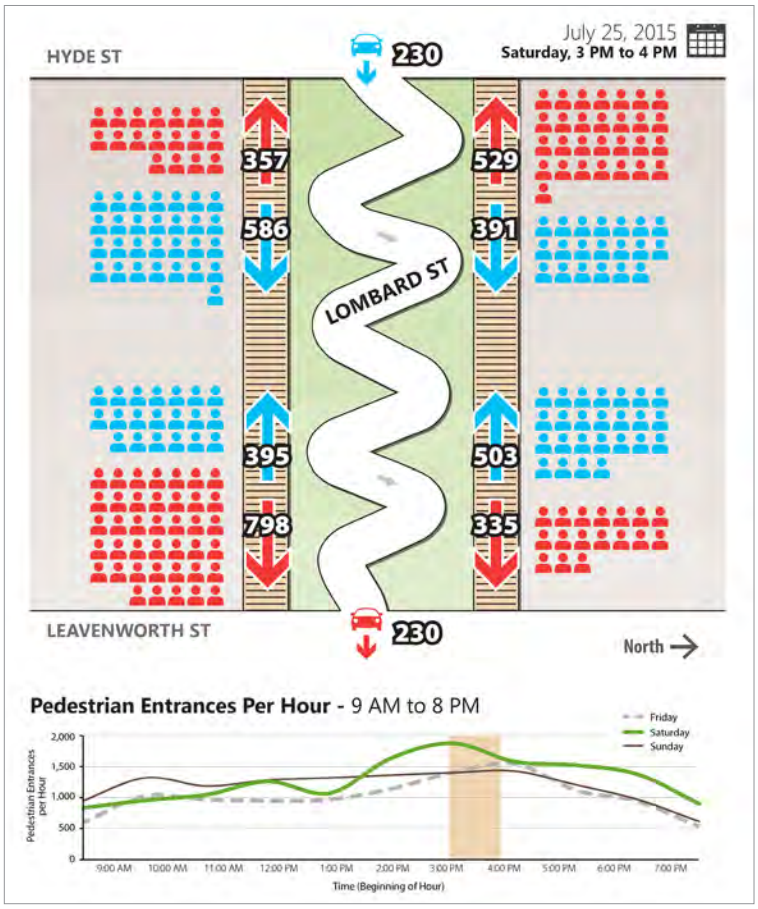



Figure 11 shows the observed number of pedestrians entering and exiting the Crooked Street during the peak time period on Saturday from 3:00 PM to 4:00 PM. The most popular pedestrian path of travel into and out of the Crooked Street was eastbound (downhill) along the southern stairway, with entrances from Hyde Street totaling 586 pedestrians and exits onto Leavenworth Street totaling 798 pedestrians. Pedestrian volumes in the westbound (uphill) direction along the northern stairway were also fairly high, with 503 pedestrians entering from Leavenworth Street and 529 pedestrians exiting onto Hyde Street. Total pedestrian volumes during the peak Saturday time period were observed to be higher than total vehicle volumes, with 1,875 people entering the Crooked Street on foot versus 230 vehicles entering the Crooked Street.

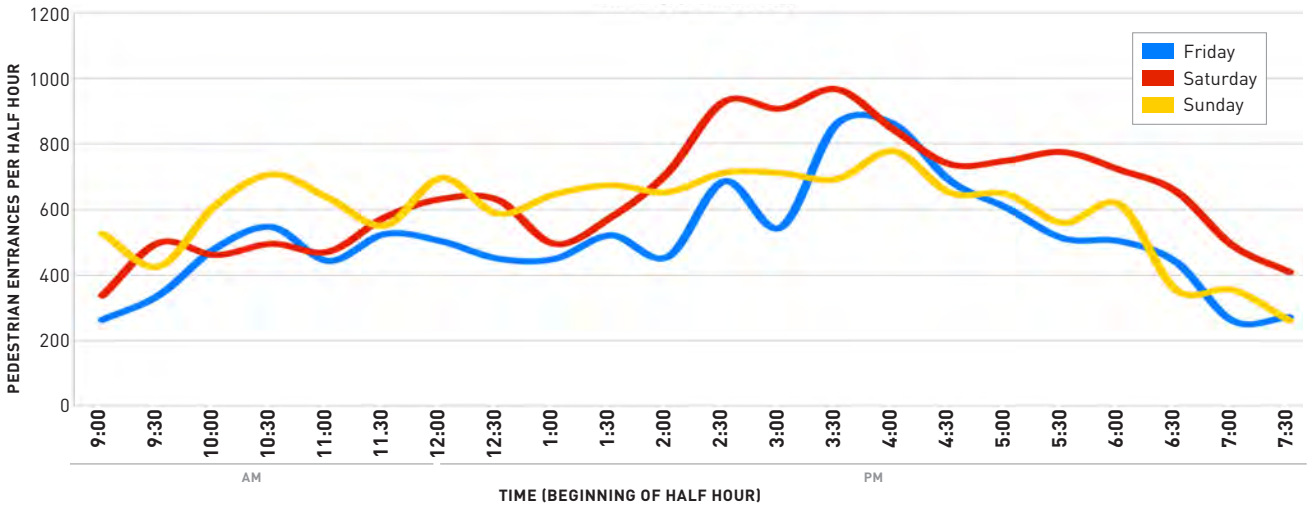
Figure 11 also shows the trends in the number of pedestrian entering the Crooked Street over the course of the day on the observed Friday, Saturday, and Sunday in July 2015. Morning pedestrian visits were most popular on Sunday, but Saturdays saw the highest number of pedestrian visits in the afternoon and evening.

As shown in Figure 12, pedestrian activity[4] has different temporal patterns by day of week. Volumes are highest on the weekend (Friday to Sunday), and tend to peak in the afternoon between 2:30 PM and 4:00 PM. The most sustained periods of particu-

tors (28,843 entrances and exits counted) on Saturday. While there are many more pedestrians counted than vehicles, the two modes actually are responsible for a similar number of visitors per day, since there are multiple passengers per vehicle.

4 Pedestrian activity here is portrayed as the number of pedestrian entrances onto the Crooked Street. This metric is higher than the number of unique visitors to the Crooked Street, since many visitors enter the block more than once during their visit, and as such are counted more than once.

**FIGURE 12. PEDESTRIAN ENTRANCES PER HALF HOUR (9AM-8PM)**



larly high visitor levels occurred on Saturday, when there were more than 700 pedestrian entrances per half hour for 4.5 hours (from 2:00P M to 6:30 PM). On all days, visitor levels tapered off substantially by 7:00 PM.

The pedestrian entrances in Figure 11 are counted by half hour to clearly show the overall trends throughout the day. Even at the half hour level, there is a fair amount of volatility in these counts. However, the source data used to produce this figure was recorded at the five-minute level, and by considering this more granular data, it is clear that visitor volumes can be quite volatile. Figure 13 shows this more granular, five-minute level data for two subsets of the pedestrian volume data collection.

Friday morning is a relatively lower demand part of the weekend on Lombard Street, yet pedestrian entrances still varied substantially from one five-minute interval to the next. Random variation is expected, but there are some particularly large spikes. For instance, from 9:30 AM–9:34 AM, there were three times as many visitors entering at Hyde Street as in the previous time period (98 versus 32 visitors). From video footage, this appears to be partially due to a tour group of about 40 to 50 people on foot seen heading up Hyde Street and walking onto the Crooked Street.

Meanwhile, on Friday from 10:45 AM–10:49 AM, 59 people entered the block, while over the next five-minute interval 152 people entered the block. From video footage however, this particular spike in visitors appears to be a combination of random variation and the arrival of one southbound and one northbound cable car during this time period. There do not appear to have been any large tour groups entering the Crooked Street at this time.

Meanwhile, Saturday afternoon was the time period with the highest overall level of pedestrian demand. While entrances during most of Saturday afternoon hovered around 150 people every five minutes, there were three substantial spikes that saw entrances at a level about a third higher. For instance, from 3:45 PM–3:49 PM, 112 people entered the Crooked Street. Just ten minutes later, 219 people entered, almost twice as many. From video footage, this appears to be partially due to a tour group of about 30 to 40 people seen entering the Crooked Street. Of the previous two spikes that afternoon, there was at least one school-aged tour group during one spike, but the other did not appear to have any large tour groups.

Spikes in the number of visitors were not always caused by tour groups, and none of the incidents examined with video footage showed tour buses offloading visitors directly adjacent to the Crooked Street. Rather, tour groups for the most part appeared to arrive on foot. In addition, even when tour groups were seen in video footage, they could not explain the full magnitude of spikes in pedestrian volumes, suggesting that while tour groups may exacerbate crowding on the Crooked Street, they are just one subset of visitor demand.

## PEDESTRIAN SPATIAL PATTERNS

The occupancy of the Crooked Street was measured directly by counting the number of pedestrians along the Crooked Street every 15 minutes from 12:00 PM to 3:00 PM on a Friday and Saturday. This direct measure of the occupancy of the Crooked Street and adjacent areas allows for crowding to be quantified.

Pedestrians gather in certain areas of the Crooked Street more than others. Figure 14 (next page) shows the occupancy of the Crooked Street by the zones in Figure 15 (next page).

The zones with the most pedestrians, as shown in Figure 14, are the interior of the block as well as the two other zones with the best vistas and photo opportunities: the

**FIGURE 13. PEDESTRIAN ENTRANCES PER FIVE MINUTE INTERVAL FOR SUBSETS OF DATA COLLECTION**

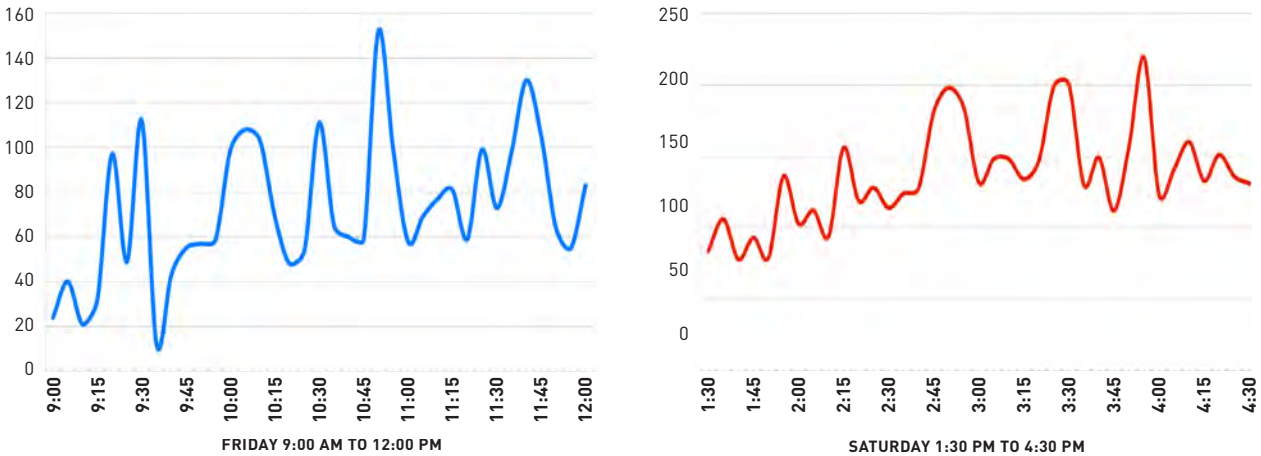
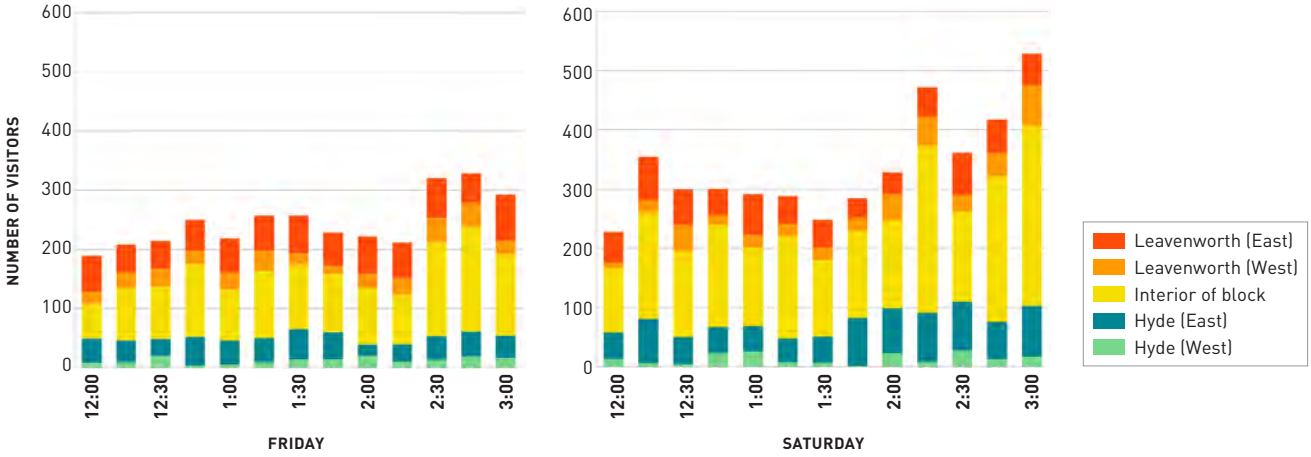


**FIGURE 14. OCCUPANCY OF CROOKED STREET, FRIDAY AND SATURDAY (12PM-3PM)**




east side of Hyde Street at the top of the Crooked Street (Hyde East) and the east side of Leavenworth Street at the bottom of the Crooked Street (Leavenworth East). On average across the six hours of occupancy observations, 85% of pedestrians were in these three zones (with half of all pedestrians on the interior of the block, and close to 20% in Hyde East and Leavenworth East).

In terms of the actual number of people on the street, the maximum observed number of people was at 3:00 PM on Saturday, with 529 people present across all five zones. Based on the video-based pedestrian volume data collected on the same day, the 15 minutes preceding the 3:00 PM occupancy observation was the time period with the greatest number of pedestrian entrances observed all weekend, and the pedestrian activity generally trended downward for the rest of the day, so it is reasonable to assume that the peak observation on Saturday was representative of the most crowded conditions that occur on the Crooked Street. Table 4 shows the occupancy of the different zones of the Crooked Street at 3:00 PM on Saturday, the peak of the block's occupancy, as well as the highest occupancy observed in each zone across all time periods.

**TABLE 4. PEAK OCCUPANCY OF CROOKED STREET**

| ZONE | SATURDAY 3:00PM | ZONE HIGHEST OBSERVED |
|---|---|---|
| Hyde (West) | 17 | 27 |
| Hyde (East) | 86 | 86 |
| Interior of Block | 304 | 304 |
| Leavenworth (West) | 69 | 69 |
| Leavenworth (East) | 53 | 78 |
| **Total** | **529** | **564** |

These high visitor levels result in significant crowding at points along the interior of the block, at either end of the block, and on the east side of Leavenworth.

Pedestrian crowding on the Crooked Street was measured using Level of Service (LOS), which grades pedestrian crowding conditions on a scale of A to F.[5] LOS A conditions are defined as those where each pedestrian has more than 60 square feet of space. Under LOS A conditions, pedestrians move in desired paths without altering their movements in response to other pedestrians, walking speeds are freely selected, and conflicts between pedestrians are

5 Caltrans Highway Design Manual, Chapter 18 Pedestrian Facility Design, Exhibit 18-3 Pedestrian Level-of-Service, 2013.

**FIGURE 15. AREAS ON AND ADJACENT TO THE CROOKED STREET**

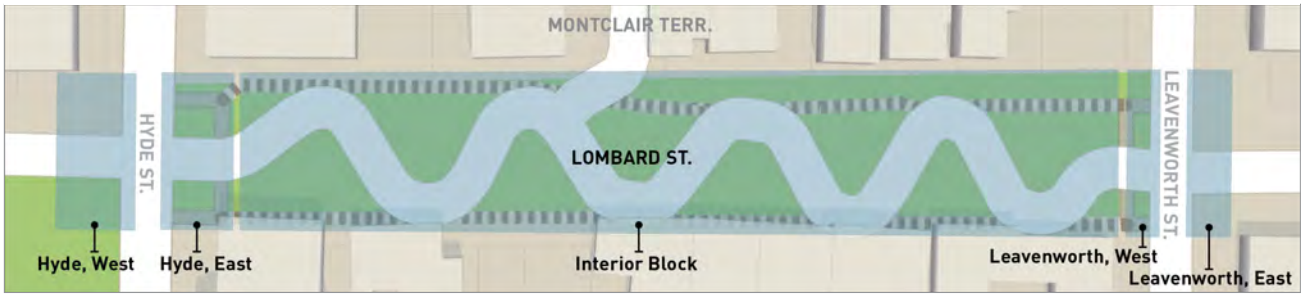
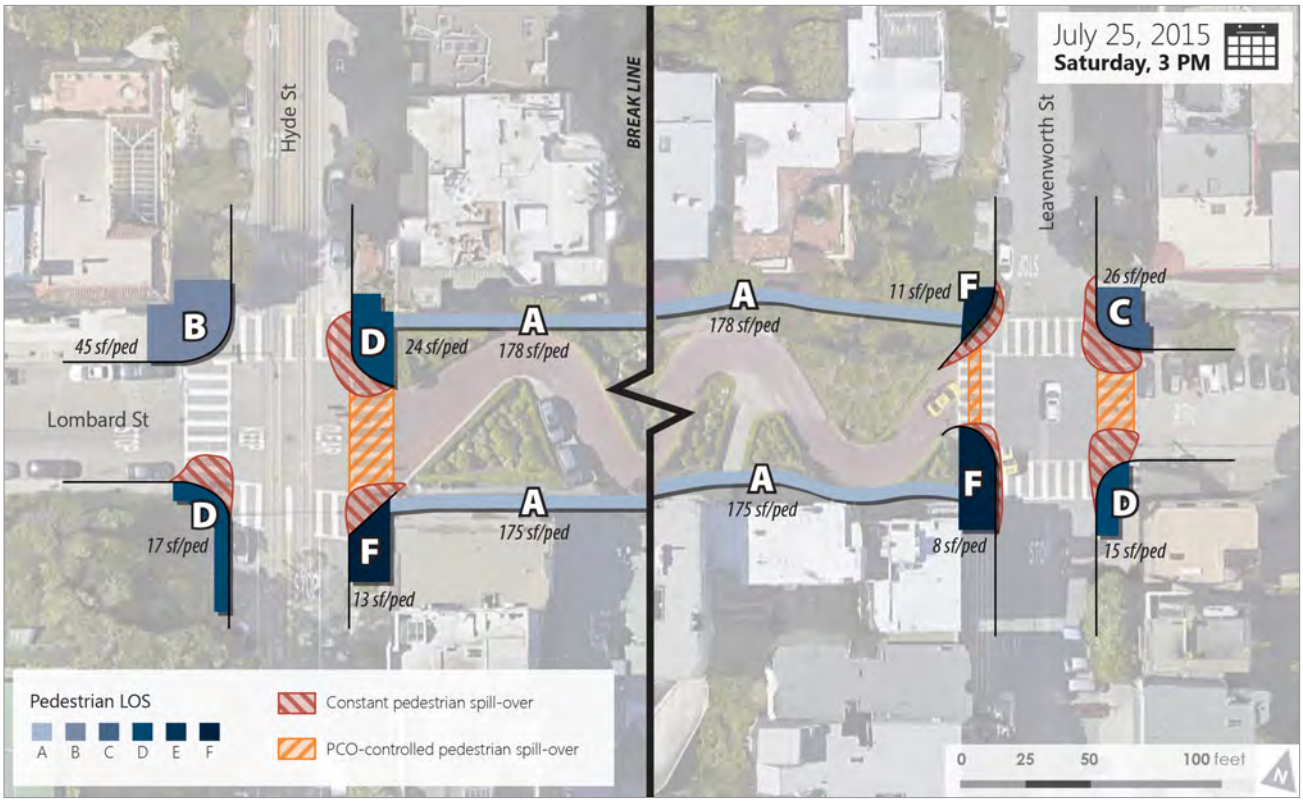


**FIGURE 16. CROOKED STREET PEDESTRIAN CROWDING CONDITIONS**




unlikely. LOS F conditions are defined as those where each pedestrian has less than eight square feet of space. Under LOS F conditions, walking speeds are severely restricted, there is frequent unavoidable contact with other pedestrians, and cross or reverse-flow movements are virtually impossible. Figure 16 "Crooked Street Pedestrian Crowding Conditions" visualizes pedestrian crowding LOS within the zones shown in Figure 15, based on observations conducted in July 2015.

In the interior of the block, where pedestrian crowding is LOS A, pedestrians have ample space to move along desired paths and at desired speeds. On the intersection corners at the west and east ends of the Crooked Street, pedestrian conditions are generally more crowded, with the lowest LOS grades on the four corners immediately adjacent to the Crooked Street. The southeast corner of Lombard Street and Hyde Street (Hyde East) and the northwest and southwest corners of Lombard Street and Leavenworth Street (Leavenworth West) experienced LOS F pedestrian crowding conditions during the peak occupancy time at 3:00 PM on Saturday.

Figure 16 also presents observed pedestrian spill-over from the sidewalk into the street during peak occupancy. Constant pedestrian spill-over is differentiated from PCO-controlled pedestrian spill-over based on the level of fluctuation in pedestrian presence at those locations. Constant pedestrian spill-over was observed on all but one of the corners at the intersections at the west and east ends of the Crooked Street. Due to a lack of sufficient sidewalk space, reflected in crowding conditions of LOS C or lower, pedestrians occupy adjacent street space. The boundaries of the adjacent street space were observed to be the extent of excess pavement that lies outside of the typical vehicle path of travel at the corners, and pedestrian presence in the spaces did not interfere with vehicle operations.

PCO-controlled pedestrian spill-over was observed at the top of the Crooked Street in the east crosswalk (Hyde East) and at the bottom of the Crooked Street in the east and west crosswalks (Leavenworth East and Leavenworth West). At these locations, pedestrians take advantage of the breaks in vehicle traffic created by PCO control to observe the Crooked Street and take pictures from the best vista points at the top and bottom of the hill. Pedestrians generally vacate the crosswalks when vehicle traffic resumes, with the exception of the east crosswalk at Lombard Street and Leavenworth Street. Vehicle volumes are very low on Lombard Street east of Leavenworth Street, so pedestrians occupy the crosswalk space most of the time, moving only when a vehicle infrequently inches its way through.

## VEHICLE VOLUMES AND SPATIAL PATTERNS

As shown in Figure 17, vehicle volumes on the Crooked Street are relatively high compared to capacity for much of the day. The capacity of the Crooked Street is limited because of its geometry, and fluctuates also based on the conditions on cross streets (particularly Hyde, on which the Cable Car runs) and traffic management activities by SFMTA Parking Control Officers who are present at both ends of the block during peak summer hours on Friday-Sunday. The Crooked Street usually operates at about 250 vehicles per hour, going as high as 300 vehicles per hour in isolated circumstances. By comparison, the 2000 Crooked Street Task Force report observed a capacity of 350 vehicles per hour during the May 1999 Labor Day weekend, and the June 2014 SFMTA traffic counts measured a maximum of 383 vehicles per hour in the evening after the closure hours.[6] One possible explanation for the lower hourly vehicle volumes on the Crooked Street may be that PCOs, for safety and operational reasons, prioritize keeping traffic moving on Hyde Street to avoid negatively impacting the Hyde Street cable car, which cannot stop on the steep mid-block grades on Hyde Street. Prioritizing operations on Hyde Street essentially reduces the capacity on Lombard Street.

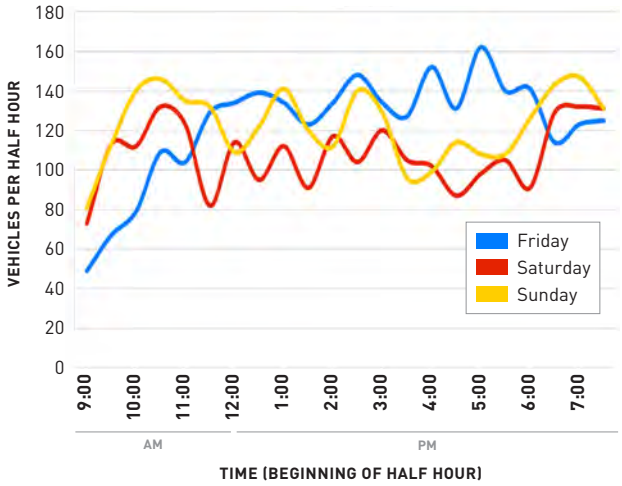
When the Crooked Street is at vehicle capacity, further increases in vehicle demand will manifest themselves in the propagation of the vehicle queue, which is examined later in this section. On all three days, demand is relatively lower at 9:00 AM but approaches capacity by about 11:30 AM on Friday, 10:30 AM on Saturday, and 10:00 AM on Sunday.

Demand is more peaked on Fridays, gradually increasing until tapering off starting around 6:30 PM. By contrast, Saturday and Sunday are more volatile, but remain within the same range throughout the day through the end of observations at 8:00 PM, with overall the highest volume on Sunday.

While the hourly capacity of the street appears to be lower than in previous years, the overall level of vehicle demand has certainly increased. The Average Daily Traffic (24 hour vehicle count) in 1999 for the Crooked Street was 1,560 vehicles. By contrast, ADT reached 2,630 in 2013. In 2014, the day before the first closure weekend saw 3,723 vehicles, and the Saturday of the closure still saw 2,751 vehicles (since the street was only closed from 12:00 PM–6:00 PM). In summer 2015, up to 2,700 vehicles were observed just between the hours of 9:00 AM to 8:00 PM.

6 The 383 vehicles per hour was observed from 8:00 PM–9:00 PM on a Saturday, when the effective capacity of the Crooked Street may have been higher due to lower volumes of cross-traffic on Hyde in the late evening. Lower volumes of cross-traffic mean that eastbound traffic on Lombard faces less of a bottleneck at the entrance to the Crooked Street, the intersection of Lombard and Hyde.

**FIGURE 17. VEHICLE VOLUMES PER HALF HOUR (9AM-8PM)**




Vehicle queue lengths and travel times on Lombard Street were recorded in summer 2015. The hourly queue lengths and estimated travel times to the Crooked Street entrance are presented in Figure 18 (next page). During the morning hours, vehicle queue lengths were less than one block, and the time to reach the Crooked Street was under six minutes. Vehicle queue lengths and travel times to the Crooked Street began to increase around 12:00 PM. They reached a maximum between 4:00 PM and 6:00 PM, with queues extending west of Van Ness Avenue and travel times to the Crooked Street reaching over 20 minutes, before tapering off into the evening.

Based on July 2015 observations, the estimated time required to travel on Lombard Street from Van Ness Avenue to the Crooked Street entrance is between 16 and 22 minutes, reflecting a faster queue service rate than that observed in 1999, when vehicles were observed to wait 35 to 40 minutes to clear the same queue length.

The combination of high pedestrian volumes and high vehicle congestion can lead to pedestrian-vehicle conflicts on and around the Crooked Street. While low traffic speeds from congestion mean that severe vehicle-pedestrian collisions are infrequent, traffic operations can create stressful conditions for pedestrians and motorists. Among all vehicles entering or exiting the Crooked Street from 9:00 AM–8:00 PM on one peak July weekend, 3.4% (266 vehicles) were delayed when entering the Crooked Street at Lombard and Hyde because of tourists standing in the roadway, even though PCOs were present for the majority of these hours. At the bottom of the Crooked Street, at Lombard and Leavenworth, 1.5% of vehicles (120 vehicles) were delayed from exiting the Crooked Street.

Vehicle turn restrictions are in place on Hyde Street for safety and operational reasons. Left turns from south-

**FIGURE 18. AVERAGE VEHICLE QUEUE LENGTH ON LOMBARD STREET**


bound Hyde Street onto Lombard Street are prohibited at all times to avoid vehicle queues forming that could block the southbound cable car, which is unable to stop mid-block on the steep grades of Hyde Street. Over the course of Friday-Sunday 9:00 AM–8:00 PM, 2.4% of all cars that accessed the Crooked Street (190 vehicles) did so via this illegal left turn.

Right turns from northbound Hyde Street onto Lombard Street are also prohibited at times by PCOs' discretion. While PCOs are present, there is often a temporary sign indicating no right turns except for local access. This ensures that a vehicle queue to visit the Crooked Street does not impact the northbound cable car operations on Hyde Street, and also provides reliable local access for residents who are exempted from the restriction. Residents of both the Crooked Street and blocks west emphasized that their ability to make right turns from either direction on Hyde Street was critically important to them, since these turning movements allow them to access their homes without waiting in the vehicle queue for the Crooked Street.

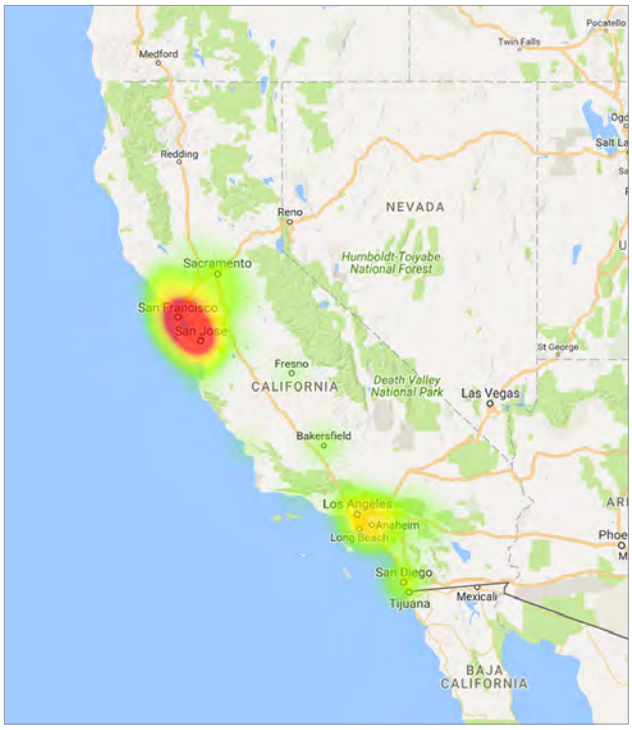
## VEHICLE PROFILE

License plates and occupancy of 416 vehicles entering the Crooked Street was collected during peak Friday and Saturday visitor hours (12:00 PM–6:00 PM). As shown in Table 5, just over half of all vehicles entering the Crooked Street were visitors in either California rental cars or out of state cars. Privately owned out of state vehicles cannot be distinguished from out of state rental cars, but both categories primarily represent non-local visitors. The other half was privately owned vehicles registered in California.

**TABLE 5. VEHICLE TYPES**

| VEHICLE TYPE | COUNT | PERCENT |
|---|---|---|
| Private (CA) | 198 | 48% |
| San Francisco | 30 | 7% |
| Elsewhere in Bay Area | 113 | 27% |
| Elsewhere in California | 55 | 13% |
| Rental cars (CA) | 145 | 35% |
| Out of State | 73 | 18% |
| **Total** | **416** | |

**FIGURE 19. CITY OF REGISTRATION FOR PRIVATE CALIFORNIA VEHICLES VISITING LOMBARD'S CROOKED STREET**




Among private California vehicles, more than half were from the nine-county Bay Area outside of San Francisco, about half as many were from the rest of California, and the smallest share was from San Francisco. The composition of vehicles on the street has changed dramatically since the 1999 figures from the Crooked Street Task Force report. San Francisco drivers were twice as large a share (13%), and those from elsewhere in the Bay Area were also more significant (41%). Visitors from elsewhere in California or other states, currently 31%, comprised 40% in 1999.

The most dramatic difference is an increase in rental cars, whose share has increased by a factor of almost six since 1999 (6% in 1999). Today, 35% of vehicles on the Crooked Street are California rental cars. The vast majority (89%) of those rental cars were owned by Enterprise, Hertz, or Avis, with Enterprise alone representing 42% of rental cars.

Figure 19 shows the city of registration of privately registered California vehicles on the Crooked Street.

Vehicles driving the Crooked Street were generally high occupancy. The average occupancy of vehicles was 3.42 passengers (median: three passengers), and only 4% of vehicles were single-occupant, while 45% of vehicles had four or more passengers. The occupancy of vehicles did not vary substantially by vehicle type.

## INTERCEPT SURVEY

An intercept survey was developed to better understand visitors to the Crooked Street. The survey was administered verbally by SFCTA staff using iPads to record responses from visitors. The full survey was administered to pedestrian visitors, and a smaller subset of the survey was administered to passengers in automobiles waiting in the queue. The full survey had 15 questions and was designed to take less than five minutes to complete.

The survey was administered in person on the Crooked Street on Friday, July 10, 2015 and Saturday, July 11, 2015, and received 296 responses (122 from pedestrians and 174 from vehicle passengers), all of whom were visitors to the street. It was administered in English, Spanish, French, Mandarin, and Cantonese.

What are the access modes to the Crooked Street? Are they correlated at all with where people are staying?

Among the respondents intercepted on foot, there was a variety of access modes used to arrive at the Crooked Street. As shown in Table 6, by far the most popular way to arrive at the Crooked Street was on foot, with 49% of visitors who were intercepted on the sidewalk having walked, while 28% arrived by private or rental cars, 13% took transit, and only 5% arrived by tour bus drop-off nearby.

The access modes were somewhat different depending on what neighborhood the respondent was staying in due to the relative convenience of different modes by neighborhood. Tourists staying in nearby Fisherman's Wharf were particularly likely to walk (71%) or take the cable car (14%). Those who lived in the Bay Area were particularly likely to come by private car (57%). The most popular neighborhood among tourists was Union Square, and from there 66% had walked, 14% took a Muni bus, 3% the cable car, and 7% a tour bus; none arrived in a privately owned car, and only 7% used rental cars.

**TABLE 6. ACCESS MODES TO THE CROOKED STREET (FOR PEDESTRIANS)**

| ACCESS MODE | MODE SHARE |
|---|---|
| Walk | 49% |
| Private car (parked here) | 14% |
| Rental car | 14% |
| Cable Car | 8% |
| Muni Bus | 5% |
| Tour bus drop-off nearby | 5% |
| Taxi | 2% |
| TNC (Lyft, Uber) | 2% |
| Dropped off | 1% |

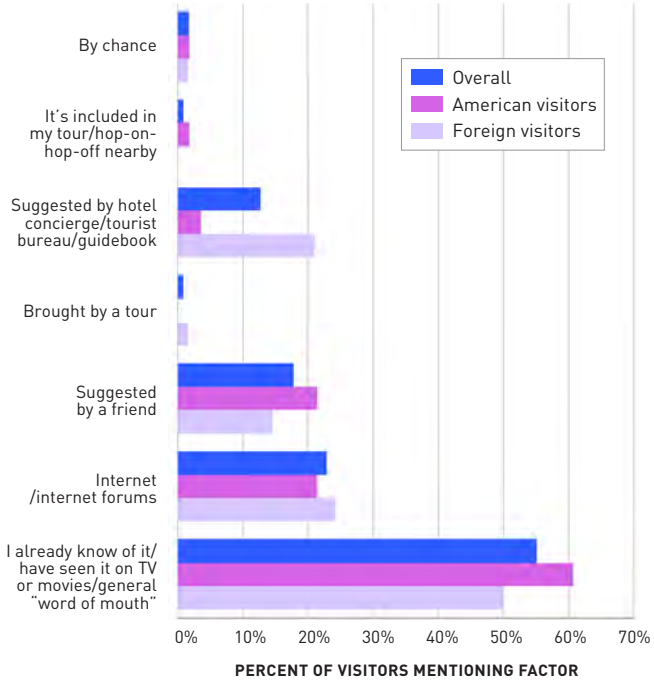
Why did people who drove make that choice? What about users of other modes?

The majority of people who drove a private or rental car to the Crooked Street said they did so because it was convenient (64%), with 39% also stating that they already had a car available to them, and 12% saying that public transportation was a slow or inconvenient option. Convenience could mean many different things—for some tourists, driving is convenient because they are going to or from other more distant destinations or ones poorly served by transit (such as Napa). Tourists travelling in larger groups also tended to choose driving as an access mode. The average group size among pedestrians arriving by private or rental car was 4.9, while the average group size for all other access modes was 3.2, with this difference being highly statistically significantly different (p–0.000).

Among those who walked or took the cable car or Muni bus, half said that they chose that mode because it was fun and enjoyable. Those who walked also cited its convenience (41%) and difficulty parking or lack of a car (7%). As is shown further below, the convenience of walking likely stems from the fact that many tourists are visiting businesses and attractions nearby before and after their visit to the Crooked Street, making walking the easiest access mode.

Those who took Muni or the cable car also cited their convenience (27%), the difficulty of parking in the area (13%), avoiding traffic (13%), and suggestions by their hotel concierge, tourist bureau, or a guidebook (13%).

**FIGURE 20. HOW TOURISTS RECEIVE INFORMATION AND LEARN ABOUT THE CROOKED STREET**




How do people get information about and decide to visit the Crooked Street? How influential are tour groups or buses and official visitor information?

Tourists cited many different ways that they received information about and decided to visit the Crooked Street, but by far the most common response was that they already knew about the Crooked Street through general cultural knowledge (images in films and TV) or word of mouth; 55% of tourists overall said this, while the rates were 61% for American tourists and 50% for foreign tourists.

Internet forums were the second-most important source of information for all visitors, with more than 20% of all tourists saying they consulted internet forums. Hotel concierges, tourist bureaus, and guidebooks were mentioned by more foreign visitors than American visitors (21% of foreign tourists compared to 4% of American tourists).

Tours on foot or nearby tour bus drop-offs seemed to play a very minor role on the block overall in comparison to the majority of visitors who arrive at or learn about the Crooked Street by other means. Overall, only 6.6% of tourists visiting on foot either said they learned about the Crooked Street from a tour or tour bus drop-off nearby, or reported a tour bus as their travel mode for arriving at the street. This was slightly higher for foreign versus American tourists, with 7.9% of foreign tourists interacting with a tour in some way regarding either their information or travel mode to the street, compared to 5.1% of American tourists.

What is the feasibility of any type of reservation system? How likely are visitors to receive information in advance?

Overall, tourists were very flexible in what time they chose to visit the Crooked Street, but were not enthusiastic about using a reservation system for their visit.

Overall, 97% of visitors said they were either "very" or "somewhat" flexible on the time they could choose to visit the Crooked Street, with the vast majority being "very" flexible (82%). However, visitors were relatively evenly split on whether they would be willing to visit if they were required to make an appointment, with about one third each saying "yes," "no," or "maybe."

As shown in Figure 20, only a somewhat small subset of visitors mentioned learning about and deciding to visit the Crooked Street by consulting internet forums, hotel concierges, tourist bureaus, or guidebooks. Since the most significant way tourists learned about the Crooked Street was through general knowledge/portrayals in TV and movies/word of mouth, there would need to be very proactive messaging to tourists to ensure awareness of any reservation

system if implemented. Active messaging through rental car companies could be effective in reaching many tourists who choose to drive—as shown in the vehicle profile analysis, 35% of cars driving down the Crooked Street were California rental cars, with 89% of those being just Enterprise, Hertz, or Avis.

Survey respondents were able to make comments at the end of the survey, and the most common comment that was made was in response to the question they were asked about whether they would be willing to make a reservation. One person said, "They can't require reservations for a public street!" Another said they wouldn't mind reservations if some type of perk were attached, while another said they wouldn't mind reservations as long as they didn't have to pay.

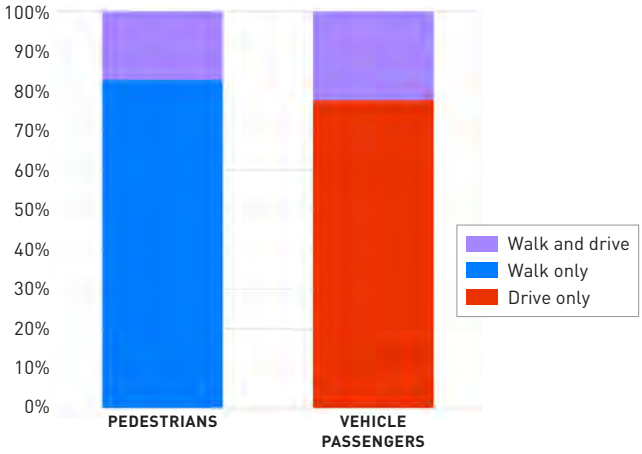
What kinds of places are tourists going to or from before and after their visit?

This question is examined to assess whether there are common destinations that a potential shuttle could serve if this were considered to be a useful strategy.

The vast majority of those visiting the Crooked Street on foot were coming from and going to other attractions or businesses (75% coming from and 80% going to), with at least half of those tourists (41% and 43%) coming from or going to attractions or businesses in nearby neighborhoods such as the Marina, Russian Hill, and Fisherman's Wharf. This popularity of nearby destinations is also reflected in tourists' access mode choice. As shown earlier, 49% of pedestrians on the Crooked Street got there by walking.

A substantial number of tourists came to the Crooked Street from their hotels (21%), but many fewer were returning to their hotels after (5%).

**FIGURE 22. MODES OF VISITING: WALKING, DRIVING, OR BOTH**



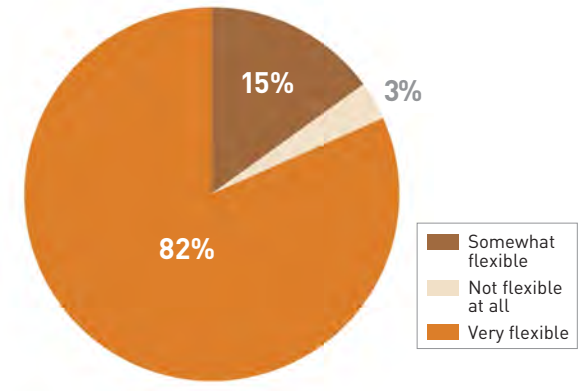

Does allowing people to drive down the Crooked Street divert some people away from visiting on foot? Are there differences between these two groups of tourists?

Pedestrians and vehicle passengers in the queue were asked if they were only driving, only walking, or both walking and driving down the Crooked Street as part of their visit.

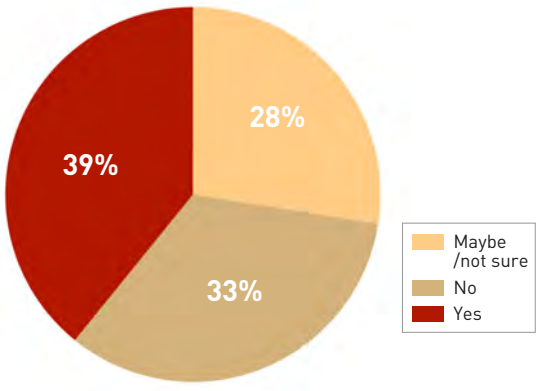
Interestingly, the majority of visitors, including those coming in vehicles, are unimodal. About 80% of both visitors on foot and in vehicles (83% and 78%, respectively) reported that they were only walking or only driving down the Crooked Street.

Among those who did both walk and drive down the Crooked Street, 74% said it was "somewhat" or "very" important for them to drive down, suggesting that it is a valued experience for tourists. People who were driving down the street versus walking were also somewhat different. Among those only driving, 37% were from California (including 22% Bay Area); among those only walking, 17% were from California (11% Bay Area). By contrast, foreign

**FIGURE 21. VISITOR FLEXIBILITY AND WILLINGNESS TO VISIT WITH APPOINTMENT**




SCHEDULING FLEXIBILITY




WILLINGNESS TO VISIT WITH APPOINTMENT

**FIGURE 23. VISITOR VOLUME INDEX FOR FISHERMAN'S WHARF, AUGUST 2014-JULY 2015**

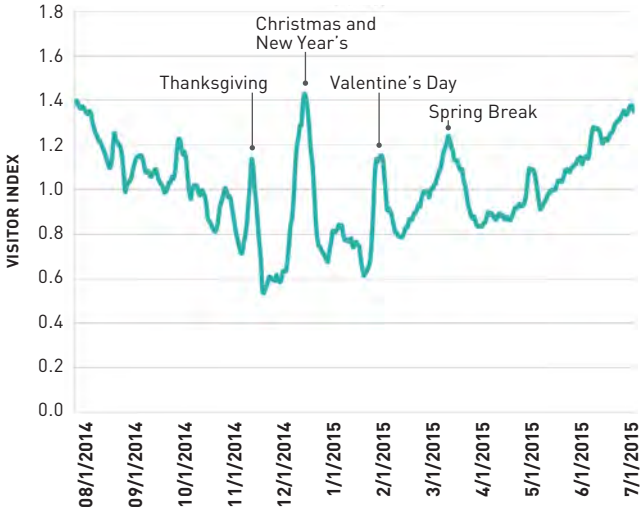
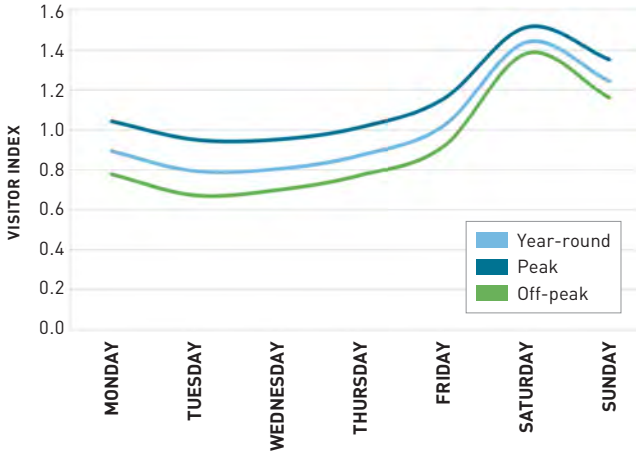



**FIGURE 24. VISITOR VOLUME INDEX BY DAY OF WEEK FOR FISHERMAN'S WHARF, AUGUST 2014-JULY 2015**




tourists were 23% of those only driving and 58% of those only walking on the Crooked Street.

The walking and driving behavior of visitors to the Crooked Street makes it likely that allowing people to drive down the Crooked Street does reduce the total number of people walking on the street. The vast majority of vehicle passengers only drive down the Crooked Street. If the street were closed to vehicle traffic and, for example, only a quarter of those vehicles continued to come to visit the Crooked Street, that would still result in a net increase in the number of pedestrians visiting the Crooked Street.

The count data analyzed earlier showed that 9,614 people visited on foot and approximately 8,078 by vehicle (in 2,362 vehicles) on a busy Saturday. Applying the intercept survey results, this means that about 6,267 people visited the street only by car, a substantial portion of whom would likely switch to visiting on foot if the street were closed to vehicles.

## TOURISM: SEASONAL, WEEKLY, AND DAILY PATTERNS

Many residents and stakeholders asserted that tourist visitation to the Crooked Street has increased in recent years and is less seasonally peaked than in the past. Direct counts of visitor levels for the Crooked Street aside from those already presented are not available, but visitor volumes are available for Fisherman's Wharf, shown in Figure 23. Since survey results indicated that many visitors to the Crooked Street also visit or stay near Fisherman's Wharf, this volume data is likely correlated to show similar peaks and valleys to the volumes on the Crooked Street.

The visitor index shows the level of average weekly visitation as a ratio to the median visitor volume. As such, a value of 1.0 is the same as the median visitor volume, meaning that half of days were busier than this level and half were less busy.

There are still overall trends in tourism levels at Fisherman's Wharf, with December and January in particular having the lowest tourism volumes of the year outside of holiday periods. However, high levels of tourism do indeed occur year round. During the traditional off-peak season, there are large spikes above the median level of tourism around Thanksgiving, Christmas and New Year, Valentine's Day, and the end of March which is typically the time of schools' spring breaks.

Figure 24 shows the visitor volume index (defined the same as above) by day of week. Patterns by day of week are essentially the same throughout the year. Tuesdays and Wednesday have the lowest visitor volumes. By comparison, Mondays and Thursdays are about 10% higher, Fridays about 30% higher, Saturdays about 80% higher, and Sundays about 60% higher.

Figure 25 (next page) shows the counts of visitors observed by hour at Fisherman's Wharf during the same week as pedestrian counts were collected for Lombard's Crooked Street. Unlike the data for the Crooked Street, data at Fisherman's Wharf is collected continuously 24 hours per day, so this data can supplement the understanding of general levels of tourism demand during a peak summer week outside the 9:00 AM–8:00 PM timeframe of Lombard Street's data.

In general, Figures 24 and 25 shows the same patterns of overall peak demand as Lombard Street, with the highest demand occurring on Saturdays, and Fridays still being noticeably busier than Mondays through Thursdays. Across

all days of the week, tourism is at a similar level at 8:00 AM and increases relatively constantly until 1:00 PM, though at a faster rate on the weekends. Demand tapers off about an hour earlier on weekdays compared to Friday through Sunday, and weekend demand at Fisherman's Wharf is substantial until 11:00 PM.

## PARKING CONDITIONS

In interviews, residents indicated that on-street parking availability was not a primary concern in the neighborhood. Though surveys showed that the Crooked Street does attract a number of visitors that park on-street nearby and experience the block on foot, residents perceive that visitor's relatively short time spent in the neighborhood contribute to a high rate of turnover among blockfaces subject to Residential Parking Permit (RPP) restrictions. Additionally, many residents have access to and utilize private off-street parking for their own vehicles, and often are not in the position to find a space on the street.

In September 2015, SFMTA collected parking occupancy data for a number of the blocks surrounding the Crooked Street. Overall, this data validated the experiences that residents reported in interviews. For the data collected on a Saturday afternoon at 2:00 PM, one of the peak times for visitors to the Crooked Street, parking occupancy on the blocks nearest to the Crooked Street ranged from 67% (Lombard, between Leavenworth and Jones) to 94% (Leavenworth, between Greenwich and Lombard). No blocks immediately adjacent to the Crooked Street were 100% occupied during this data collection. Blocks also varied in the percentage of parked vehicles displaying an 'A' Permit, the zone permit required to park for longer than two hours on most blocks, from 12% (Leavenworth, between Greenwich and Lombard) to 60% (Leavenworth, between Chestnut and Lombard).

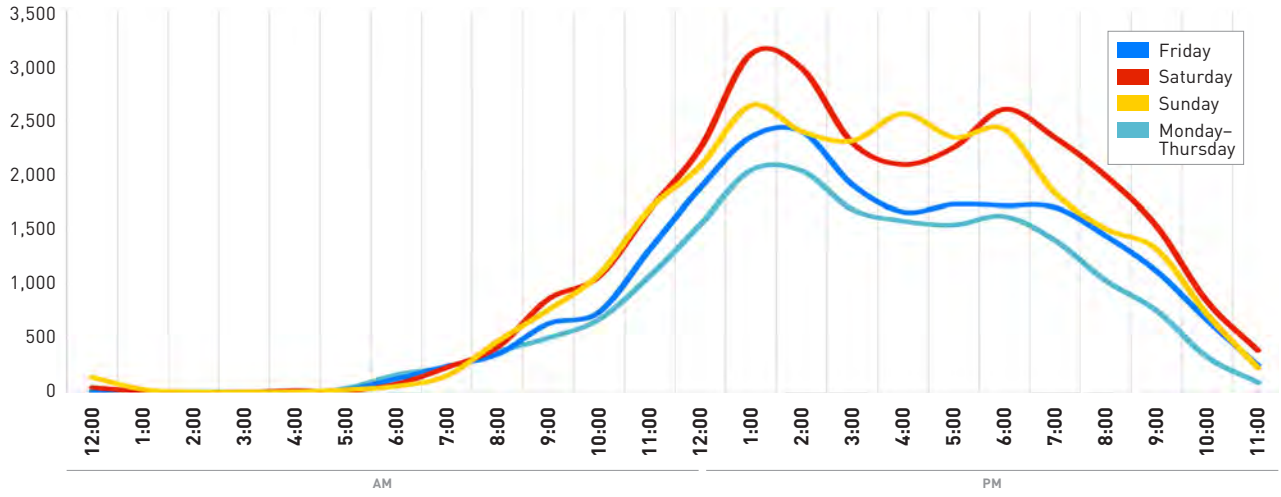
The average on-street occupancy in the broader Russian Hill neighborhood during the same Saturday 2:00 PM timeframe was 85%, which generally equates to one or two open spaces per block. Overall resident occupancy (determined by those vehicles displaying a valid 'A' Permit) was 51%.

## SAFETY AND COLLISIONS

A review of recent collision data confirms that the Lombard/Hyde and Lombard/Leavenworth intersections are not a significant hot spot for pedestrian safety based on a vision zero analysis. However, as noted previously, the combination of high pedestrian volumes and high vehicle congestion can lead to the perception of frequent pedestrian-vehicle conflicts on and around the Crooked Street. While low traffic speeds from congestion mean that severe vehicle-pedestrian collisions are extremely infrequent, traffic operations can create stressful conditions for both people walking and people driving.

Additionally, cable car operators face many challenges when traveling northbound on Hyde Street to approach the intersection at Lombard Street and Hyde Street. For safety and operational reasons, the cable car operators must stop in the middle of the intersection; however, stopping in this location blocks through traffic on Lombard and the south crosswalk across Hyde. Additionally, during peak times, the cable cars often find themselves and stop-and-go traffic, which is problematic since repeated stops and starts can fray cables in the street. Frayed cables can result in the cable cars being dragged forward if not caught as part of the cable's continuous inspection. Despite the presence of PCOs, pedestrian and vehicle crowding in the intersection remains a hazard for the cable car operators and many operators have reported near-misses as a result of both pedestrians and vehicles not obeying the traffic regulation signage or the PCO's directions.

**FIGURE 25. VISITOR VOLUME BY TIME OF DAY FOR FISHERMAN'S WHARF, JULY 13-19, 2015**



# V. FINDINGS

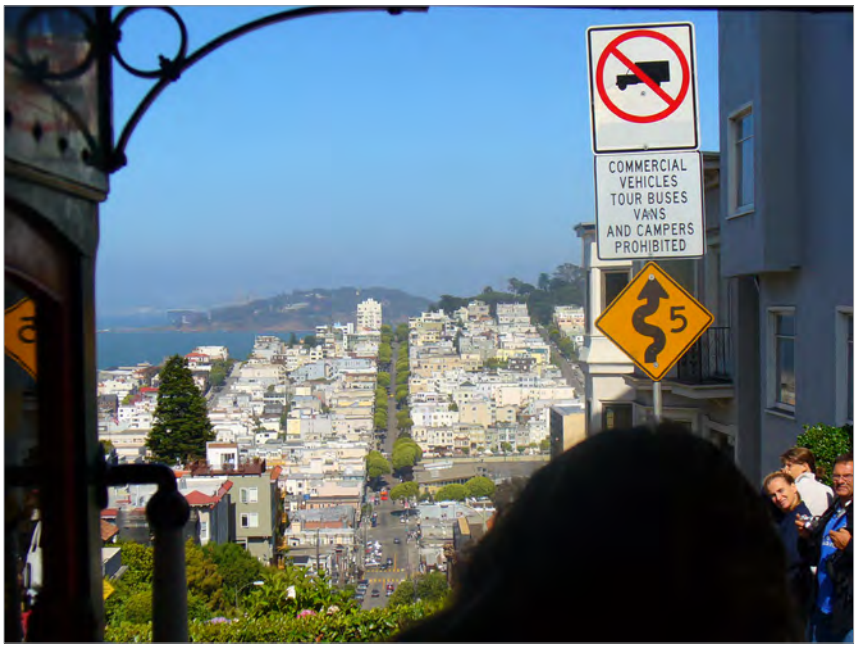
There have been several past attempts to better understand the issues relating to the transportation and livability concerns on and around the Crooked Street. The most recent full study of the challenges around vehicle and pedestrian congestion on the Crooked Street was completed in 2000, which provided key information on traffic and pedestrian volumes, vehicle origins, effectiveness of enforcement, and other key indicators. SFMTA revisited this Crooked Street study in 2013, and, in June 2014, conducted a temporary street closure, with the intent of preventing queuing and conflicts with pedestrians. SFMTA conducted traffic counts during the closure finding that while the street closure pilot reduced the queue during the actual hours of the closure, much demand was pushed to the hours just before and after the closure was in effect.

This study, in summer 2015, collected data through several methods such as camera-based data collection, on-street observation, visitor surveys, and resident interviews to gather visitor volumes, counts, and specific vehicle and pedestrian behaviors; a vehicle profile of the occupancy and origins of vehicles driving down the Crooked Street; an intercept survey of visitors on foot and in vehicles; and, an analysis on parking conditions and safety. This data collection effort yielded several key findings related to each project goal. A discussion of the goals and their related findings is explored in more detail below.

**MANAGE PEDESTRIAN CONGESTION:** The data collected proved that the crowding and congestion on the Crooked Street is most similar to the congestion seen in a downtown area, not a residential neighborhood. Despite this, congestion levels are inconsistent, meaning that there are many peaks and valleys in the number of visitors arriving at any time. These peaks do not consistently align with the observed arrival of tour groups, cable cars, or other vehicles. Additionally, during peak periods (10:00 AM–6:00 PM), pedestrian congestion is present not only on the Crooked Street, but around it as well. The pedestrian congestion spills over into adjacent crosswalks, particularly at the Lombard and Leavenworth intersection.

**MANAGE AUTO CONGESTION:** During peak periods, a significant queue forms along Lombard Street west of Hyde, as cars wait to access the Crooked Street. At its peak, this queue can stretch past the Lombard and Van Ness intersection and take over 20 minutes to traverse by car. The queue also affects the vehicle circulation and resident access on not just Lombard, but also Larkin, Polk, Van Ness, and other neighborhood streets. Additionally, for those visitors that arrive by car but choose not to wait in the queue, vehicle loading and parking activity creates congestion and blocks sidewalks and driveways at the top and bottom of the block.

**ENSURE TRAFFIC SAFETY:** An analysis of collision data shows that the Crooked Street is not a Vision Zero Safety Concern—that is, there is not an abnormally high incidence of collisions on the block or at the intersections at both ends. While this result could be a result of the congestion and low speeds, both pedestrians and drivers report that the area is stressful to navigate and does not feel safe during congested conditions. Additionally, the presence of Parking Control Officers may also contribute to increased safety.




**MAINTAIN ACCESS TO THE CROOKED STREET BLOCK:** Within the last few years, residents of the Crooked Street were given a path to bypass the queue when PCO's began restricting right turns from NB Hyde to the Crooked Street to residents only. As a result, resident access on the Crooked Street has improved. Visitors, however, continue to queue and load/unload their vehicles in ways that block driveways on Lombard and neighboring streets. A lack of designated loading zones contributes to the parked and loading vehicles which block many of the driveways on the surrounding streets.

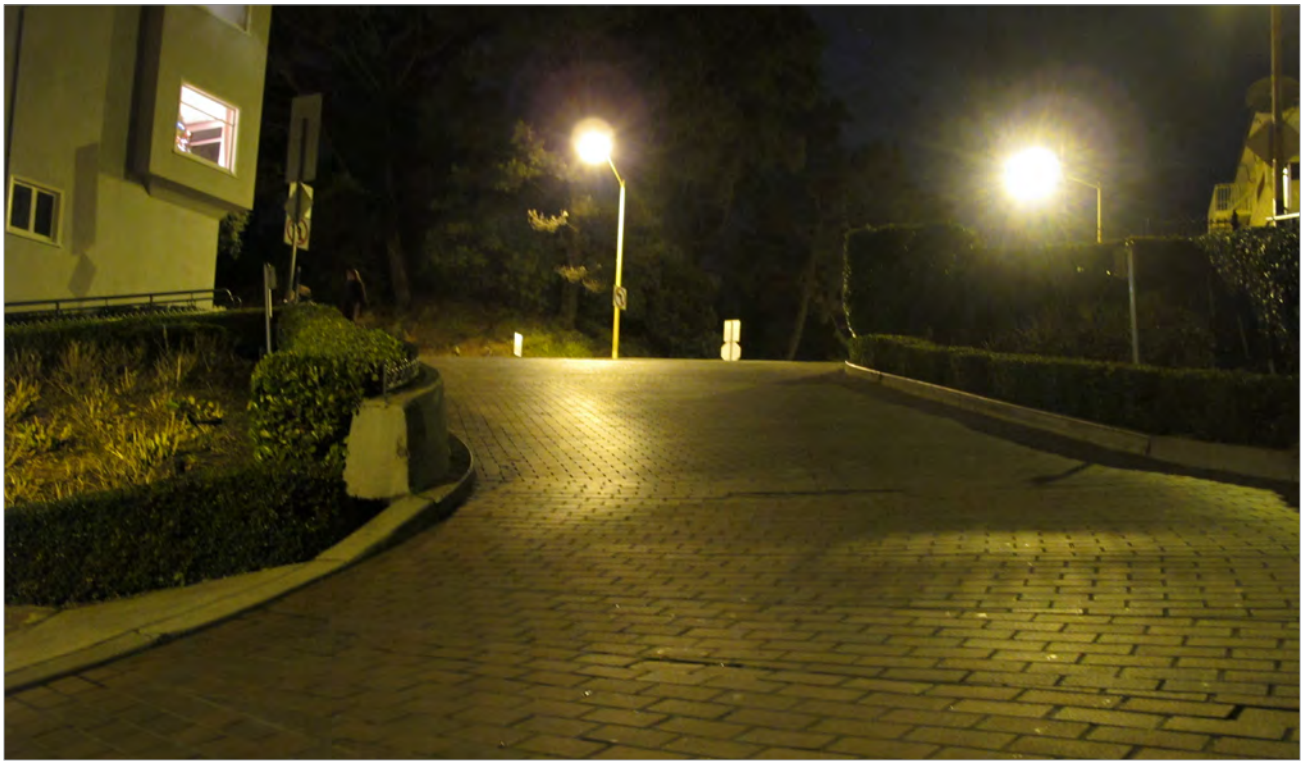
**MAINTAIN LIVABILITY OF THE SURROUNDING NEIGHBORHOOD:** The primary livability concern of residents of the Crooked Street neighborhood was pe-

destrian visitor behavior. Residents expressed that parking availability is not a significant concern on and around the block. It is the pedestrian crowding and vehicle loading that creates circulation, as well as potential safety issues, while also threatening the livability of the area for nearby residents.

**PRESERVE TOURISM:** Given the unique characteristics of the Crooked Street, the block will likely remain a tourist destination; however, it is important to balance the resident livability concerns with the preservation of tourism. The volume of visitors at Lombard Street is comparable to other regional attractions such as Fisherman's Wharf or Muir Woods, though both of these locations have a dedicated management agency to assist in organizing visitors and minimizing neighborhood impacts.

## VI. NEXT STEPS

The results of this existing condition analysis will be used to develop and evaluate a list of potential interventions and improvements that could help address some of the key issues and concerns on the Crooked Street and surrounding blocks. Once this initial list is developed, the project team will conduct outreach to residents on and around the Crooked Street through an open house in summer 2016, as well as solicit feedback through an online survey. This outreach will help shape the potential solutions and assist in determining what recommendations are carried forward to development for implementation.



# Appendix B:
# Managing Access to the Crooked Street.
# Initial Alternatives Evaluation Memorandum

July 20, 2016

## OVERVIEW

The San Francisco County Transportation Authority (SFCTA) is leading a study on managing access to the "Crooked Street" at the request of Supervisor Mark Farrell, District 2, as part of the Neighborhood Transportation Improvement Program (NTIP), a program established to fund community-based neighborhood-scale planning efforts, especially in underserved neighborhoods and areas with vulnerable populations (e.g. seniors, children, and/or people with disabilities). The purpose of the study is to identify and evaluate a range of options to manage visitor access and circulation on Lombard Street between Hyde and Leavenworth streets while maintaining the character of the block and avoiding spillover effects into adjacent streets.

## EXISTING CONDITIONS KEY FINDINGS

In the summer of 2015, SFCTA collected data on existing conditions on and around the Crooked Street through several methods such as camera-based data collection, on-street observation, visitor surveys, and resident interviews. Data collected included visitor volumes, counts, arrival modes, specific vehicle and pedestrian behaviors, a vehicle profile of the occupancy and origins of vehicles driving down the Crooked Street, and an analysis on parking conditions and safety. This data collection effort yielded several key findings related to each project goal:

- **Manage Pedestrian Congestion**: Crowding and congestion on the Crooked Street is most similar to the congestion seen in a downtown area, not a residential neighborhood. Despite this, congestion levels are inconsistent, meaning that there are many peaks and valleys in the number of visitors arriving at any time. These peaks do not consistently align with the observed arrival of tour groups, cable cars, or other vehicles. Additionally, during peak periods (10AM-6PM), pedestrian congestion is present not only on the Crooked Street, but around it as well, particularly at the Lombard and Leavenworth intersection.
- **Manage Auto Congestion**: During peak periods, a significant queue forms along Lombard Street west of Hyde, as cars wait to access the Crooked Street. At its peak, this queue can stretch past the Lombard and Van Ness intersection and take over 20 minutes to traverse by car. The queue also affects vehicle circulation and resident access on not just Lombard, but also Larkin, Polk, Van Ness, and other neighborhood streets. Additionally, for those visitors that arrive by car but choose not to wait in the queue, vehicle loading and parking activity creates congestion and blocks sidewalks and driveways at the top and bottom of the block.

- **Ensure Traffic Safety**: An analysis of collision data shows that the Crooked Street is not a Vision Zero Safety Concern – that is, there is not an abnormally high incidence of collisions on the block or at the intersections at both ends. While this result could be a result of the congestion and low speeds, both pedestrians and drivers report that the area is stressful to navigate and does not feel safe during congested conditions. Additionally, the presence of Parking Control Officers (PCOs) may also contribute to increased safety.
- **Maintain Access to the Crooked Street Block**: Residents of the Crooked Street have been given exclusive right to make right turns from northbound Hyde to the Crooked Street, so resident access on the Crooked Street has improved. Visitors, however, continue to queue and load/unload their vehicles in ways that block driveways on Lombard and neighboring streets. A lack of designated loading zones is a contributing factor.
- **Maintain Livability of the Surrounding Neighborhood**: The primary livability concern of residents of the Crooked Street neighborhood was pedestrian visitor behavior. Residents expressed that parking availability is not a significant concern on and around the block. It is the pedestrian crowding and vehicle loading that creates circulation problems, as well as potential safety issues, while also threatening the livability of the area for nearby residents.
- **Preserve Tourism**: Given the unique characteristics of the Crooked Street, the block will likely remain a tourist destination; however, it is important to balance the resident livability concerns with the preservation of tourism. The volume of visitors at Lombard Street is comparable to other regional attractions such as Fisherman's Wharf or Muir Woods.

A full discussion of key findings is included in the Existing Conditions Memorandum for this study.

## INITIAL SCREENING OF ALTERNATIVES

The results of the existing condition analysis have been used to develop and evaluate a list of potential interventions and improvements that could help address some of the key issues and concerns on the Crooked Street and surrounding blocks. Table 1 (next page) lists these alternatives and presents their expected impact on key indicators for determining the success of the goals of this study as well as whether each will advance for further analysis.

**Table 1. Scoring Results for Potential Crooked Street Intervention and Improvement Alternatives**

| | | Manage Auto Congestion | | Manage Pedestrian Congestion | Maintain Access to the Crooked Block | | Preserve Tourism | Ensure Safety | Financially Viable Solution | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alternative Name | Description | Address Vehicle Queues | Address Vehicle Loading Issues | Address Pedestrian Crowding | Resident Access | Visitor Access | Impact on Tourism | Impact on Traffic Safety | Requires Management Organization? | Cost | Advance for Further Analysis | Notes |
| **Education and Encouragement** | | | | | | | | | | | | |
| Education Campaign/ Partnerships with SF Travel and tour operators | Create active relationships or programs between the Crooked Block residents and SF Travel or tour operators. | O | O | + | O | + | + | O | N | $ | Y | This alternative may help create a better, more respectful, and aware visitor culture, but may have a limited impact on vehicle and pedestrian congestion. |
| Education efforts targeted at rental car agencies, hotel concierges, tourist bureaus, etc. | Outreach to car rental agencies, hotel concierges, tourist bureaus, guidebooks, and others to encourage them to give information to tourists about the best way and time to visit Lombard Street and how to be a respectful visitor. | + | + | + | O | + | + | O | N | $ | Y | This alternative may help create a better, more respectful, and aware visitor culture, but may have a limited impact on vehicle and pedestrian congestion. |

| | | Manage Auto Congestion | | Manage Pedestrian Congestion | Maintain Access to the Crooked Block | | Preserve Tourism | Ensure Safety | Financially Viable Solution | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alternative Name | Description | Address Vehicle Queues | Address Vehicle Loading Issues | Address Pedestrian Crowding | Resident Access | Visitor Access | Impact on Tourism | Impact on Traffic Safety | Requires Management Organization? | Cost | Advance for Further Analysis | Notes |
| Publicize Vermont Street | Attempt to split visitor demand between two Crooked Streets in order to reduce congestion on Lombard Street. | O | O | O | O | O | + | O | N | $ | N | This alternative could create a second problem on Vermont Street, and the momentum and history of the Lombard "Crooked Street" as a tourist attraction (in close proximity to other attractions) will be very difficult to overcome. |
| **Changes to Access and Allocation of Space** | | | | | | | | | | | | |
| Pedestrianize the "Crooked Street" | Restrict access to the "Crooked Street" to pedestrians only, except for resident vehicles and public vehicles. | + | - | - | - | O | + | - | N | $ | Y | This alternative could exacerbate pedestrian congestion, limit resident vehicle access, and may require state legislation. |
| Close the street to non-resident pedestrians and vehicles | Restrict access to the "Crooked Street" to pedestrians only, except for resident vehicles and public vehicles. | + | + | - | + | - | O | O | Y | $$ | N | Closing the street to non-resident pedestrians and vehicles would remove the "Crooked Street" as a destination and would require state legislation. |

| | | Manage Auto Congestion | | Manage Pedestrian Congestion | Maintain Access to the Crooked Block | | Preserve Tourism | Ensure Safety | Financially Viable Solution | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alternative Name | Description | Address Vehicle Queues | Address Vehicle Loading Issues | Address Pedestrian Crowding | Resident Access | Visitor Access | Impact on Tourism | Impact on Traffic Safety | Requires Management Organization? | Cost | Advance for Further Analysis | Notes |
| Cable car transfer | Create a system whereby visitors can ride the cable car to the Crooked Street, walk down the Crooked Street, and then return downtown on the cable car via a single fare payment. | O | + | O | O | + | O | O | N | $ | N | The cable car transfer does not alleviate vehicle congestion, but it may alleviate loading issues. However, there is not significant excess cable car capacity during peak times and the Muni visitor passport is already an available product that would not differ significantly. |
| Shuttles/Rideshare | Require visitors to congregate off-site and visit the Crooked Street via shared-ride vehicles to reduce vehicle queuing. | + | + | - | O | - | O | + | Y | $$ | Y | The program administration and enforcement plans must be determined during the next phase. |
| Engineering improvements to increase pedestrian safety | Physical improvements such as bulb-outs, barriers, or traffic control at Leavenworth and Hyde intersections in order to delineate pedestrian and vehicle space. | O | + | + | + | + | O | + | N | $ | Y | This alternative could be effective in addressing pedestrian, driver, and transit conflicts and near misses. |

| | | Manage Auto Congestion | | Manage Pedestrian Congestion | Maintain Access to the Crooked Block | | Preserve Tourism | Ensure Safety | Financially Viable Solution | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alternative Name | Description | Address Vehicle Queues | Address Vehicle Loading Issues | Address Pedestrian Crowding | Resident Access | Visitor Access | Impact on Tourism | Impact on Traffic Safety | Requires Management Organization? | Cost | Advance for Further Analysis | Notes |
| Formalized loading/unloading zones | Create formalized loading and unloading (white curb) zones to allow vehicles to pick up and drop off passengers outside of travel lanes and driveways. | + | + | O | + | + | O | + | N | $ | Y | Creating formalized loading/unloading zones will directly address vehicle loading issues; however, enforcement of this alternative must be determined during the next phase. |
| Reverse direction of the Crooked Street | Reverse the direction of the Crooked Street to go uphill rather than downhill. | O | O | O | O | O | O | - | N | $ | N | If similar numbers of people continue to drive, the queue could back up to Columbus Avenue, also a major street for vehicles and transit. Uphill travel would also result in reduced visibility at the Lombard & Hyde intersection, compromising pedestrian and cable car safety. |
| Straighten the "Crooked Street" | Remove the “Crooked Street” and repave it as a straight street. | + | + | + | + | - | - | + | N | $$$ | N | Given the momentum and history of the Lombard Crooked Street as a tourist attraction and local icon, it will be very difficult to straighten the Crooked Street as this would remove the intrinsic qualities that allow it to function as both. |

| | | Manage Auto Congestion | | Manage Pedestrian Congestion | Maintain Access to the Crooked Block | | Preserve Tourism | Ensure Safety | Financially Viable Solution | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alternative Name | Description | Address Vehicle Queues | Address Vehicle Loading Issues | Address Pedestrian Crowding | Resident Access | Visitor Access | Impact on Tourism | Impact on Traffic Safety | Requires Management Organization? | Cost | Advance for Further Analysis | Notes |
| Buy out all residents | Purchase all homes from residents along the Crooked Street and convert them to non-residential uses. | O | O | O | - | + | - | O | N | $$$$ | N | Buying out all of the residents would destroy the residential component of the block. |
| **Managing and Shaping Demand** | | | | | | | | | | | | |
| HOV 4+ | Require all vehicles to contain at least 4 occupants when traveling down the Crooked Street in order to alleviate congestion. | + | - | - | O | + | - | O | N | $$ | N | Most vehicles traveling down the Crooked Street already have a high level of occupancy. Enforcement would need to be determined. |
| Off-site ticketing | Require visitors to purchase/acquire a ticket with a time slot for visiting the Crooked Street in order to reduce congestion during peak visitor times. | + | O | + | + | - | + | + | Y | $ | Y | The program administration and enforcement plans must be determined during the next phase |

| | | Manage Auto Congestion | | Manage Pedestrian Congestion | Maintain Access to the Crooked Block | | Preserve Tourism | Ensure Safety | Financially Viable Solution | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alternative Name | Description | Address Vehicle Queues | Address Vehicle Loading Issues | Address Pedestrian Crowding | Resident Access | Visitor Access | Impact on Tourism | Impact on Traffic Safety | Requires Management Organization? | Cost | Advance for Further Analysis | Notes |
| Charge vehicles | Charge a fee to vehicles driving down the Crooked Street. | + | - | - | O | O | - | O | Y | $$ | Y | Pricing might be costly to implement but could generate revenue to cover costs and additional services such as PCOs, landscaping, etc. However, charging vehicles a fee may not mitigate congestion as many visitors may still drive to the "Crooked Street", and demand may be inelastic. |
| Charge pedestrians | Charge a fee to pedestrians walking down the Crooked Street. A queue could be formed along the northern edge of Sterling Park on Lombard west of Hyde. | - | - | + | - | - | - | O | Y | $$ | N | Pedestrian fees are deeply unpopular with the public and elected officials and may require state legislation. |
| **Enhancing Safety and Enforcement** | | | | | | | | | | | | |
| More extensive Parking Control Officer "PCO" Program | Implement an extensive program of PCOs to direct traffic, shepherd pedestrians, and monitor parking. | O | + | + | + | + | O | + | N | $$ | Y | The revenue sources to fund this program have not yet been determined. |

| | | Manage Auto Congestion | | Manage Pedestrian Congestion | Maintain Access to the Crooked Block | | Preserve Tourism | Ensure Safety | Financially Viable Solution | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alternative Name | Description | Address Vehicle Queues | Address Vehicle Loading Issues | Address Pedestrian Crowding | Resident Access | Visitor Access | Impact on Tourism | Impact on Traffic Safety | Requires Management Organization? | Cost | Advance for Further Analysis | Notes |
| Permanent Support for Ambassadors Program | Create a permanent fund for a Lombard Ambassadors program. | O | O | O | + | + | + | O | Y | $$ | Y | The revenue sources to fund this program have not yet been determined. |
| Add security cameras to the street | Install security cameras that could be used by SFPD to issue citations for reckless driving and other dangerous behavior. | O | O | O | O | O | O | + | Y | $ | Y | Adding security cameras provides a relatively low - cost way to provide more SFPD enforcement on Lombard Street. |
| Add "10B" police officers to the Crooked Street. | "10B" police officers are off-duty overtime officers that are sometimes hired by merchant groups to perform enforcement. Unlike private security, they are police officers and can write citations. | O | + | O | + | O | O | + | N | $$ | Y | The revenue sources to fund this program have not yet been determined. |
| **Other** | | | | | | | | | | | | |

| | | Manage Auto Congestion | | Manage Pedestrian Congestion | Maintain Access to the Crooked Block | | Preserve Tourism | Ensure Safety | Financially Viable Solution | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alternative Name | Description | Address Vehicle Queues | Address Vehicle Loading Issues | Address Pedestrian Crowding | Resident Access | Visitor Access | Impact on Tourism | Impact on Traffic Safety | Requires Management Organization? | Cost | Advance for Further Analysis | Notes |
| Pursue a Green Benefit District for the Block | Similar to a business improvement district, residents could vote to form a Green Benefit District. | O | O | O | O | O | O | O | Y | $ | Y | While this alternative will have no direct impact on transportation issues, a Green Benefit District can provide a dedicated funding source for gardening, Ambassadors, security, etc. |
| Do nothing | Undertake no actions or improvements for the "Crooked Street" at this time. | O | O | O | O | O | O | O | N | N | N | While this is the cheapest option, it will not address current concerns. |

## ALTERNATIVES ADVANCING TO ANALYSIS

### Education and Encouragement

- Education Campaign – SF Travel is an association of tourism and hospitality partners promoting San Francisco as a destination for conventions and leisure travel. Because of this role, a partnership with SF Travel to educate both its member organizations and the traveling public more broadly about how and when to access the Crooked Street, as well as how to be respectful when visiting the Crooked Street, could address a number of livability and visitor behavior concerns on and around the Crooked Street. A preliminary education campaign strategy is under development, and finalization and implementation of this strategy will require SF Travel's input to ensure success.
- Outreach to tourism vendors – As the front-line source of information, tourist information centers, hotel concierges, map and guidebook publishers, tour operators, and car and bike rental companies should be equipped to disseminate accurate and timely information about tourist attractions. The education campaign strategy referenced above will identify tourism vendors most relevant to the Crooked Street and how to reach out to them with information about access to the Crooked Street that they can pass on to their customers.

### Changes to Access and Allocation of Space

- Pedestrianize the Crooked Street – At the request of Lombard Street area residents, SFMTA conducted the temporary closure of a two-block portion of eastbound Lombard Street between Larkin and Leavenworth streets in the summer of 2014. The closures took place over five weekends and closure times coincided with summer PCO deployment hours, approximately 12 noon to 7 PM. PCOs and other uniformed city staff used temporary measures such as portable signs and enforcement vehicles to achieve the closures.

  The trial closure was successful in removing the queueing that occurred on Lombard Street west of the Crooked Street [Figures 1 and 2, next page] and clearing the gridlock at the intersection of Van Ness and Lombard. Sidewalks were less crowded and there were fewer vehicular/pedestrian conflicts during the closure. On the other hand, the closure also led to more drivers looking for parking in an area where parking is already limited, and to vehicular traffic being dispersed to time periods before and after the closures. It was also noted that the closure may have been more successful if it had coincided with a program like the Ambassadors program that was introduced in August 2015.

Figure 1. Westward view of Lombard from Hyde before temporary closure.

Figure 2. Westward view of Lombard from Hyde during temporary closure.

- Limit access to shuttles and shared-ride vehicles – This intervention would require visitors to park and congregate at a designated off-site location from which a shuttle or shared-ride vehicle

would transport them to the Crooked Street. The next phase of this study will need to determine:

- How funding would be provided for the operation of shuttles or shared rides
- Whether these shuttles operate year-round or only during peak visitation months
- What parking restriction measures would be needed in the area surrounding the Crooked Street during shuttle/shared-ride operation
- Enforcement needs when parking restrictions are in place
- Whether a licensing or permitting system would need to be developed to limit pick-up/drop-off access only certain shuttle or shared-ride operators

As an example, Muir Woods is a Bay Area tourist destination with similar visitation rates and a shuttle program that could serve as a model for the Crooked Street. Muir Woods' program requires visitors to park at an off-site lot close to major transportation corridors and board a shuttle that transfers them directly to the front gate. While areas with excess parking are more limited within San Francisco, there may be opportunities to use parking infrastructure at and around Fisherman's Wharf to allow visitors to leave their cars and visit multiple attractions.

- Engineering improvements – Bulb-outs, barriers, or traffic control installations could be effective in addressing conflicts and near-misses between pedestrians, drivers, and transit. Bulb-outs and extensions of the sidewalks at the intersections of Lombard and Hyde, as well as Lombard and Leavenworth, are easily conceptualized based on the pedestrian spillover observed and documented during data gathering for the Existing Conditions Memo [Figures 3-6].

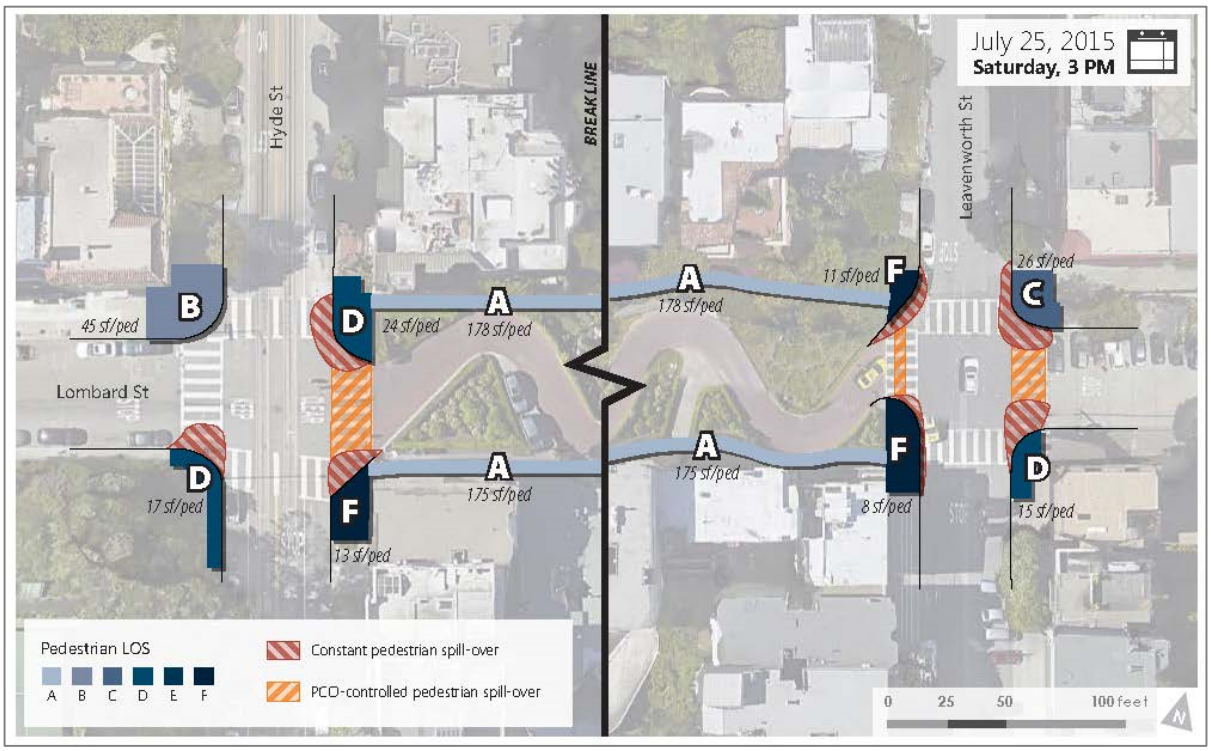



Figure 3. Existing Pedestrian Crowding Conditions

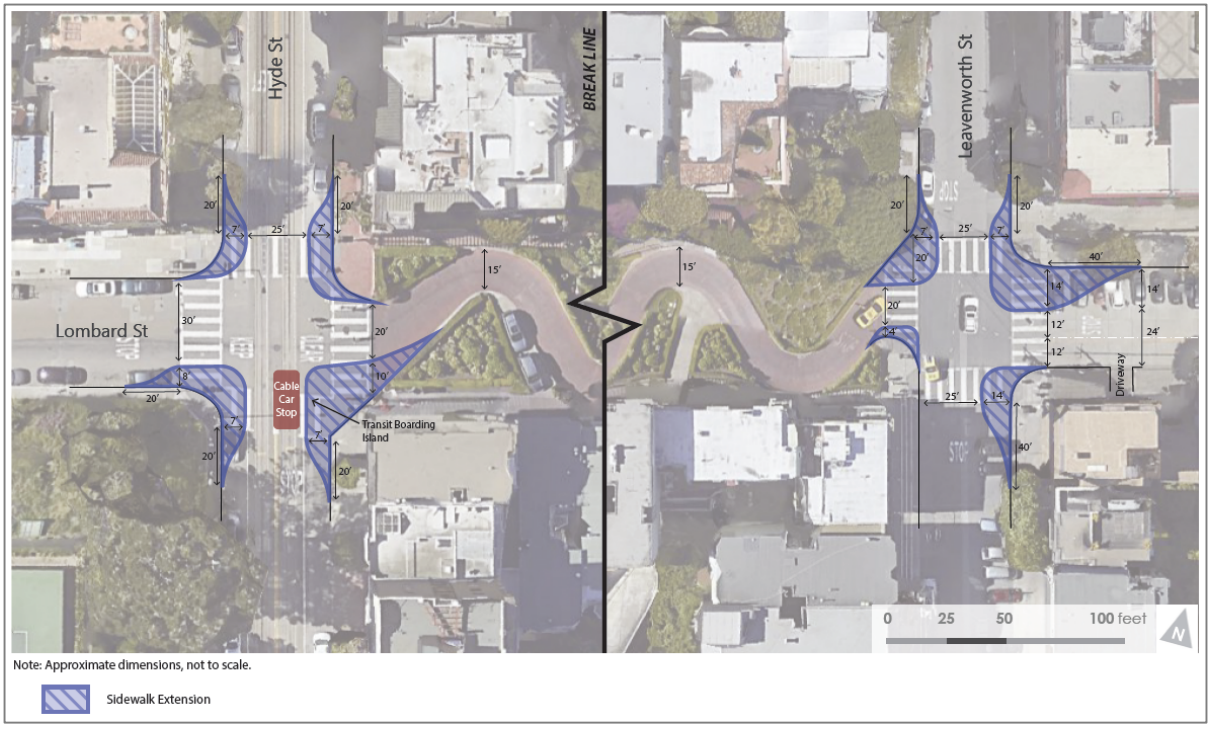



Figure 4. Conceptual Design 1 for Sidewalk Extensions (see appendix for full-size drawing)


Figure 5. Conceptual Design 2 for Sidewalk Extensions (see appendix for full-size drawing)

Note that Figure 5 incorporates the closure to vehicles of one approach to the Lombard and Leavenworth intersection in order to create a pedestrian "viewing area." This treatment is under consideration because it is already the crosswalk that is most consistently blocked by pedestrians, traffic volume is low and diversions would only affect one block, and it would formalize a primary area for visitors on foot to congregate rather than in other areas that can't accommodate as many pedestrians.

The sidewalk extension areas shown in Figures 4 and 5 could initially take the form of painted pedestrian refuges. If as a pilot the extension areas work well to address both pedestrian crowding and conflicts with vehicles and transit, they can later be upgraded to raised-curb bulb-outs. As of this writing, painted extensions are estimated to cost $20,000 per intersection and raised-curb extensions are estimated to cost $200,000 per intersection.

- Redirecting vehicle traffic via wayfinding signs – To address vehicle queueing and traffic congestion in the neighborhood, a system of wayfinding signage could be installed to guide vehicles to the back of the queue on eastbound Lombard in a manner that discourages approaches to the queue from Polk, Larkin, and Hyde Streets [Figure 6]. This strategy assumes that there are permanent restrictions against right and left turns from Hyde onto Lombard.

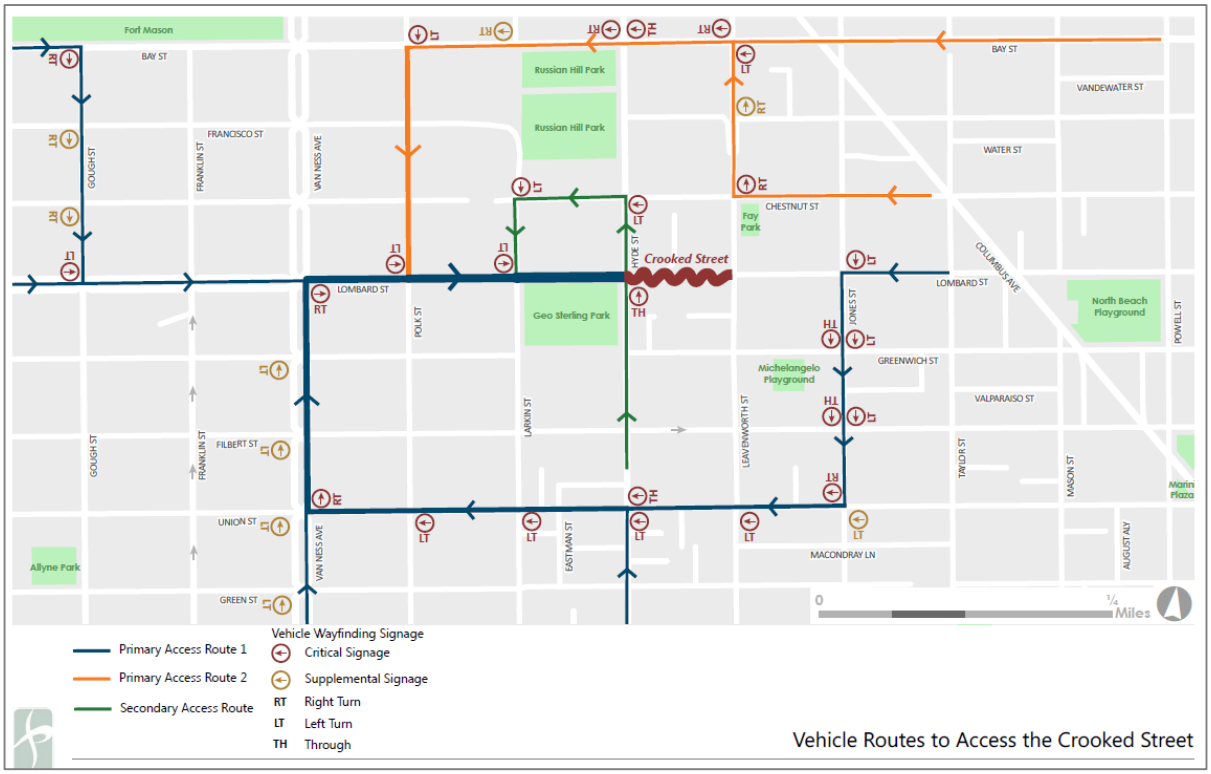



Figure 6. Concept for Vehicle Access Routes with Wayfinding Signage (see appendix for full-size drawing)

- Create formalized loading zones – In order to address unorganized and illegal loading and unloading behavior in the vicinity of the Crooked Street, a preliminary investigation into potential designated loading and unloading zones for both passenger vehicles (private cars, taxis, and TNCs) and tour operators was conducted. In determining the location of passenger loading zones, for both tour buses and private vehicles, the following constraints were considered:

- Minimize conflicts with Muni bus routes and cable cars;
- Avoid locations with bike lanes to prevent blockage of the bike lane;
- Avoid curb cuts;
- Avoid very residential/quiet streets and locations in front of residential buildings/homes;
- Avoid areas that are currently congested and/or experience long queues to the Crooked Street (e.g. Lombard Street west of the Crooked Street); and
- Look for locations with on-street parking that could be removed to accommodate a loading zone.

The preliminary investigation has identified five potential bus loading zone locations and five additional potential private vehicle loading zone locations adjacent to and near the Crooked Street. [Figure 7, next page] None of these locations meets all of the above criteria, and enforcement aspects for this alternative must be determined during the next phase. See appendix for more details on potential new loading zones.


Figure 7. Potential loading zones for tour buses and private vehicles (see appendix for full-size drawing)

**Managing and Shaping Demand**

Using an electronic system to manage reservations and/or price access to the Crooked Street for vehicles would be one of the most direct ways to manage auto congestion, including the vehicle queues that form at peak periods. This section details the assumptions, feasibility, potential visitor experience, and additional studies needed to advance this concept.

- Background assumptions
  - Implementation of some or all of the engineering improvements noted in the section above, including consolidating vehicle access to a single approach via the 1100 block of Lombard Street just west of Hyde.
  - Price levels must be clear and messaged well in advance.
  - Managing the demand must be done via both price (to manage volume) and time slot reservation (to shift arrivals away from peaks). The system can be implemented initially as a zero-cost reservation system, with a fee only for those without reservations.
  - The primary goal of the system will be to manage demand, not generate revenue. Access should be priced according to this goal.
- Technical feasibility
  - A reservation and pricing system is technically feasible for the Crooked Street.
  - All-electronic tolling, using license plate recognition (such as on the Golden Gate Bridge), FasTrak, or a combination of the two allows for a system with minimal visual impacts.
  - A website, mobile app, and other channels can be created to manage reservations, ticketing, and pre-payment of access fees.
  - An operator of a pricing system for the Crooked Block would need to develop or contract for a back-end processing system. Given the size and volume of the vehicles at the Crooked Block, contracting with an existing provider, such as the FasTrak regional service center, is likely the most feasible path forward.
  - See appendix for more technical details.
- Visitor experience
  - Visitors using rental cars would be provided information on Crooked Street pricing at the rental counter. A local marketing campaign would be conducted to make sure Bay Area residents were informed.
  - Before visiting the Crooked Street via car, visitors would visit a website or app to select a day and time (offered in 30-60 minute increments) to visit the street, registering with their license plate number. Since the street generally processes about 220 vehicles per hour, this many or fewer slots could be reserved. Pre-reserving fewer slots would allow for those that arrive without a reservation.
  - Signage along the approaches to the Crooked Street would advise that reservations are required and provide the web address at which to make one, along with an indication of what the price will be for those who choose to continue without a reservation.
  - When a preregistered vehicle enters the Crooked Block, their license plate information will be read using automated cameras, and checked against the database. If a match is made, the system will verify payment and the transaction is complete.

- If a non-preregistered vehicle enters the street, the license plate will be read and the system will recognize the need to collect the non-reservation price. If the vehicle has a FasTrak or FasTrak account associated with its license plate, the fee would be charged to the FasTrak account. Otherwise, an invoice would be generated and mailed to the registered owner, much like the system in place at the Golden Gate Bridge1. Unpaid invoices would be subject to fees.

- Required technical and policy follow ups
  - What times of day should the pricing and/or reservations scheme operate?
  - What is the correct number of slots to allow for pre-reservation per hour? (Or, how many people will still arrive without a reservation, even if it means paying more?)
  - What are the appropriate prices for various times of day? How many different times of day should have different prices?
  - What will the impact on pedestrian congestion be? Will people crowd the sidewalks if they are discouraged from using their cars, or will they just shift their car visit to a different time?
  - What, if any, discounts will be available to residents of the Crooked Street?
  - What legislation will be required to enable pricing access to the street?
  - What level of environmental review under CEQA/NEPA will be required for such a system?

  An expanded feasibility study would be required to answer these and other questions, and could follow the conclusion of this study if this alternative is recommended to move forward. It is expected that this alternative would require wide-ranging engagement with various stakeholders (residents, visitors, local and statewide elected officials, the local tourism industry, etc.) throughout its development.

### Enhancing Safety and Enforcement

The following alternatives are expected to have generally positive impacts on traffic safety, maintaining access to the Crooked Block, and vehicle un-/loading issues. Revenues from an admission fee could be used to pay for these programs, but otherwise revenue sources to fund these enhancements have not yet been identified.

- Enhance the Parking Control Officer program – An enhanced PCO program would increase the number PCOs, extend the number of days out of the year they can be deployed, and/or increase the number of hours per deployment day.
- Create a permanent fund for the Lombard Ambassadors program – Ambassadors are individuals hired under a contractor to focus on cleaning, safety, and hospitality. They also serve as the eyes and ears for enforcement officers. An Ambassadors Program was launched on the Crooked Street in August 2015 but has no permanent source of revenue.
- Add security cameras – Installing security cameras would be a relatively low-cost way to support SFPD citations for reckless driving and other dangerous behavior, provided SFPD officer time is available to review camera footage.

[1] See http://goldengate.org/tolls/

- Utilize "10B" police officers – 10B officers are off-duty police officers that are sometimes hired on an overtime basis by merchant groups to perform enforcement. Unlike private security, they can issue citations, and unlike PCOs, are empowered to issue moving violations.

**Other**

- Pursue a Green Benefit District for the block – A green benefit district is way for residents to directly invest, usually via a parcel tax, in the beautification and greening of their neighborhood. An example is the Dogpatch and NW Potrero Hill Green Benefit District (www. http://dnwph-gbd.org/). This alternative would have no direct impact on transportation issues, but could provide a dedicated funding source for landscaping maintenance, Ambassadors, security, and other amenities associated with public spaces. The San Francisco Board of Supervisors would need to approve a resolution to establish a green benefit district.

## NEXT STEPS

The information in this report will be used to solicit input from partner agencies and the public and develop a recommended set of improvements to and around the Crooked Block.

## APPENDICES

Begin on next page.

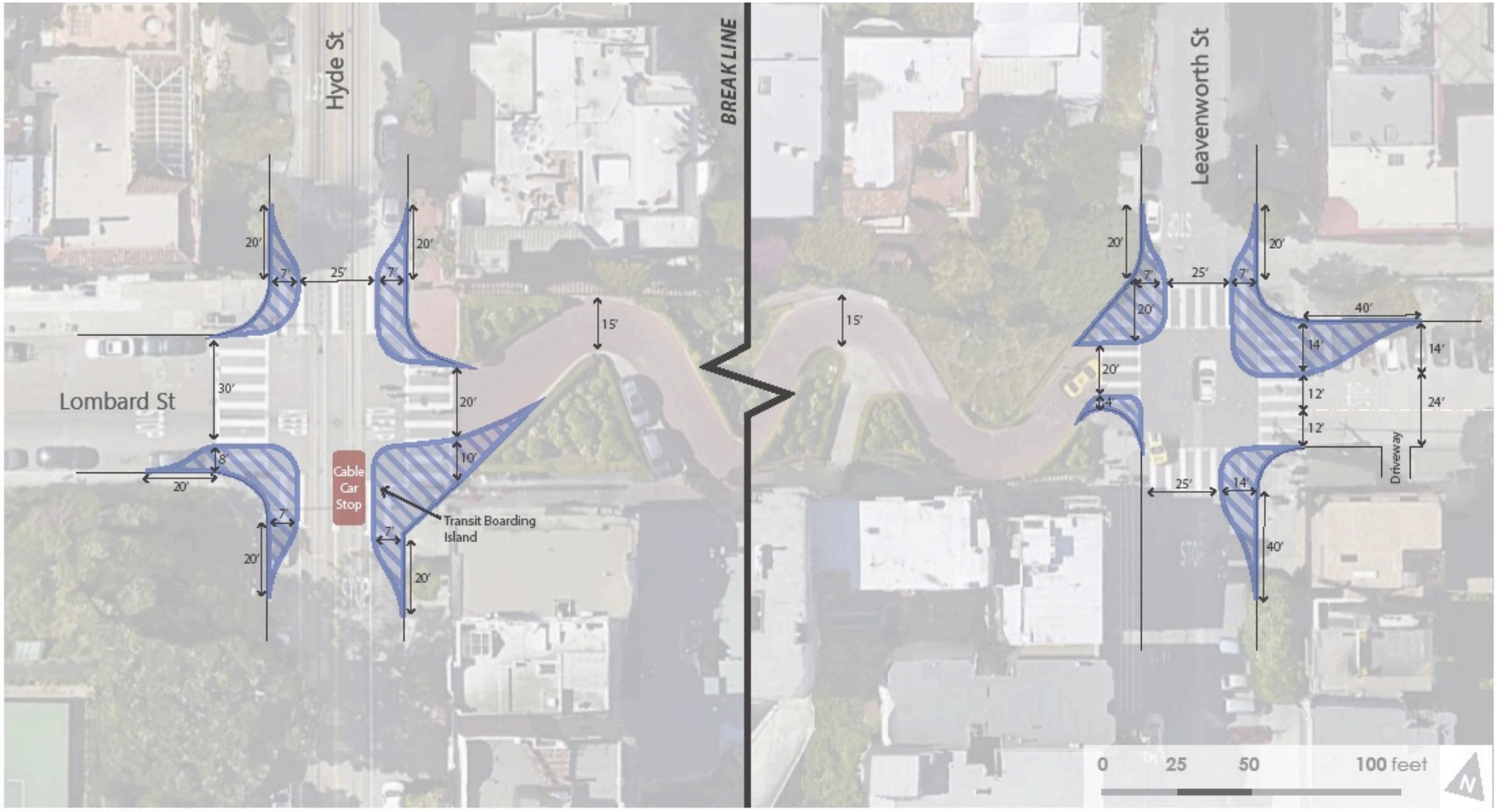
A. Sidewalk Extensions Concept 1

B. Sidewalk Extensions Concept 2

C. Passenger Loading Zones Considerations Memo

D. Potential Locations for Passenger Loading Zones

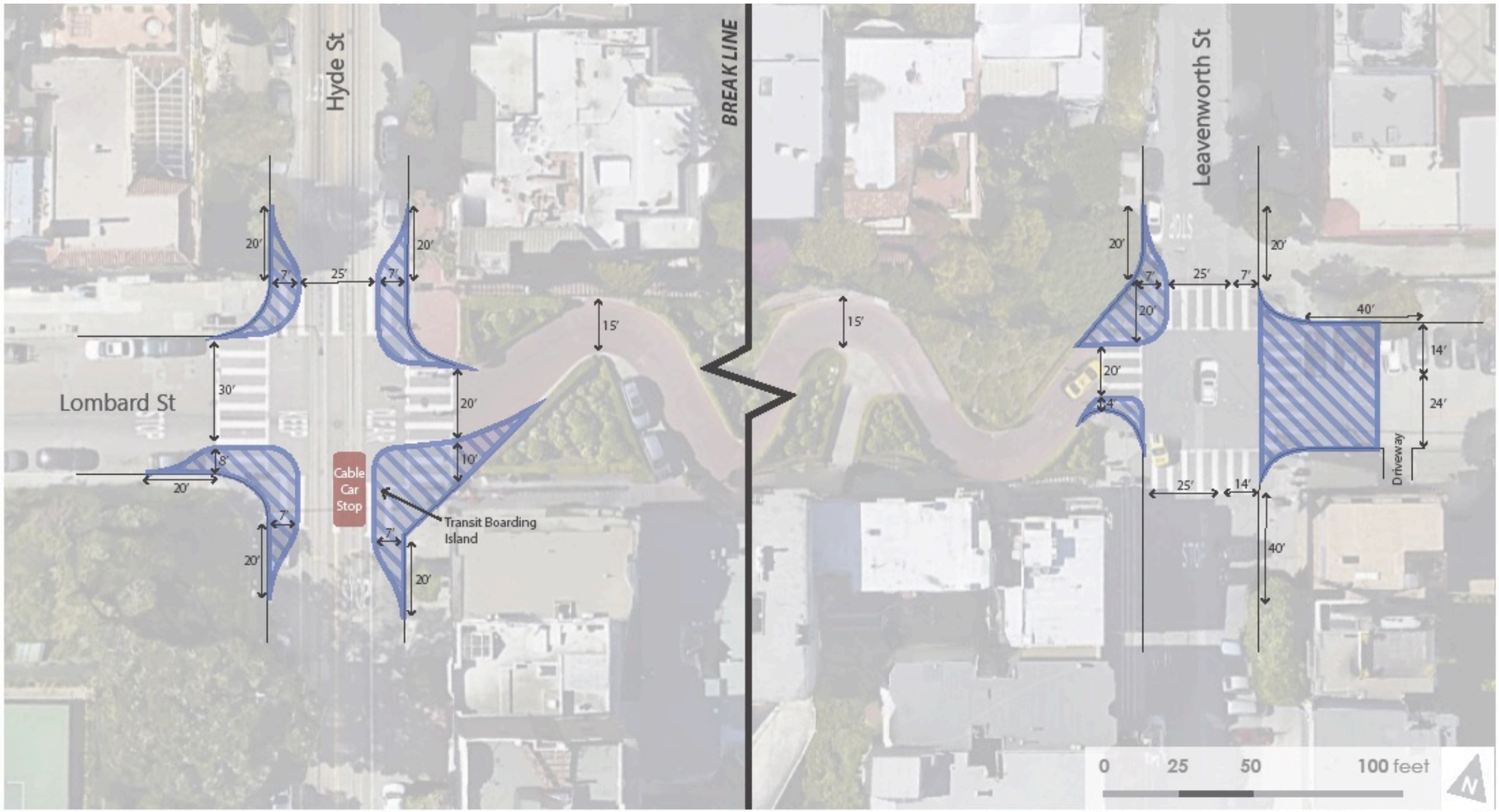
A. SIDEWALK EXTENSIONS CONCEPT 1




Note: Approximate dimensions, not to scale.

Sidewalk Extension

B. SIDEWALK EXTENSIONS CONCEPT 2




Note: Approximate dimensions, not to scale.

Sidewalk Extension

C. PASSENGER LOADING ZONES CONSIDERATIONS

# MEMORANDUM

Date: May 16, 2016

To: Andrew Heidel – San Francisco County Transportation Authority

From: Dana Weissman and Ingrid Ballus Armet – Fehr & Peers

**Subject: Passenger Loading Zones Considerations for the Crooked Street**

*SF15-0840*

---

This memorandum presents a list of general considerations for identifying suitable locations for passenger loading zones for private vehicles and tour buses with passengers going to the Crooked Street. Potential locations and their specific considerations, including pros and cons for each location, are also provided. This memorandum accompanies the graphic *Passenger Loading Zones and Vehicle Routes to Access the Crooked Street*.

## *Overall considerations*

In order to determine the location of passenger loading zones, for both tour buses and private vehicles, the following items were considered:

- Minimize conflicts with Muni bus routes and cable cars;
- Avoid locations with bike lanes to prevent blockage of the bike lane;
- Avoid curb cuts;
- Avoid very residential/quiet streets and locations in front of residential buildings/homes;
- Avoid areas that are currently congested and/or experience long queues to the Crooked Street (e.g. Lombard Street west of the Crooked Street); and
- Look for locations with on-street parking that could be removed to accommodate a loading zone.

## *Potential Passenger Loading Zones*

### Tour Bus Loading Zones

### 1. South side of Bay Street, between Hyde Street and Larkin Street, adjacent to Russian Hill Park.

Tour buses would approach from Van Ness Avenue and continue east on Bay Street after dropping off/picking up passengers.
Potential loading zone length: 60-410 feet

Existing parking conditions: parallel parking
Potential parking spaces repurposed: 3-21 spaces
Pros:

- Adjacent to a park, with no residential uses.
- Bay Street is a wide street that would facilitate maneuvers by large tour buses.
- Could be very long, spanning the entire block (approximately 410 feet).

Cons:

- Steep hill on Hyde Street for tourists to walk up to the Crooked Street.

## 2. North side of Bay Street, between Columbus Avenue and Leavenworth Street.

Tour buses would approach from Columbus Avenue and turn back onto Columbus Avenue via northbound Leavenworth or continue west on Bay Street to Van Ness Avenue after dropping off/picking up passengers.
Potential loading zone length: 60-130 feet
Existing parking conditions: parallel parking
Potential parking spaces repurposed: 3-7 spaces
Pros:

- Adjacent to a Travel Lodge, with no residential uses.
- Bay Street is a wide street that would facilitate maneuvers by large tour buses.
- Distance and steepness of the hill to walk to the bottom of the Crooked Street is comparable to the one currently walked by tourists from tour buses that drop off at Columbus Avenue and Chestnut Street.

Cons:

- Loading zone is on a hill.
- Shortest proposed tour bus loading zone (approximately 130 feet).

## 3. East side of Larkin Street, between Lombard Street and Greenwich Street, adjacent to Geo Sterling Park.

Tour buses would approach northbound on Larkin Street and turn left on Lombard Street or continue straight on Francisco Street towards destinations west of the Crooked Street, or turn right on Chestnut Street towards destinations east of the Crooked Street.
This location could also be considered for private vehicle passenger loading.
Potential loading zone length: 60-270 feet
Existing parking conditions: parallel parking
Potential parking spaces repurposed: 3-14 spaces
Pros:

- Adjacent to a park, with no residential uses.
- Potential for very long zone, to span the entire block (approximately 270 feet).
- Only one block away from the Crooked Street.

Cons:

- Area currently restricted to tour buses.

- Buses directed through residential/quieter streets.
- Potentially difficult for tour buses to negotiate the streets leaving the zone due to narrowness and steepness of the surrounding streets.

## 4. West side of Taylor Street, between Columbus Avenue and Lombard Street.

Tour buses would approach from Columbus Avenue and turn onto southbound Taylor Street. After dropping off and picking up passengers, buses would continue southbound on Taylor Street and turn left onto eastbound Lombard Street to reach Columbus Avenue again.
Potential loading zone length: 60-170 feet
Existing parking conditions: parallel parking
Potential parking spaces repurposed: 3-9 spaces
Pros:

- Tour bus loading/unloading operations would move away from Columbus Avenue, which is already busy with many other modes, including cable cars and Muni bus routes.
- Flat sections of Lombard Street and Taylor Street.
- Distance and steepness of the hill to walk to the bottom of the Crooked Street is comparable to the one currently walked by tourists from tour buses that drop off at Columbus Avenue and Chestnut Street.
- No adjacent residential uses.

Cons:

- Adjacent and nearby merchants may oppose this zone due to parking removal.
- Left turn onto Taylor Street from Columbus Avenue could be difficult for large tour buses.

## 5. North side of Lombard Street, between Columbus Avenue and Taylor Street.

Tour buses would approach from Columbus Avenue and turn onto westbound Lombard Street. After dropping off and picking up passengers, buses would turn right onto northbound Taylor Street to reach Columbus Avenue again.
Potential loading zone length: 60-165 feet
Existing parking conditions: perpendicular parking
Potential parking spaces repurposed: 8-21 spaces
Pros:

- Tour bus loading/unloading operations would move away from Columbus Avenue, which is already busy with many other modes, including cable cars and Muni bus routes.
- Flat sections of Lombard Street and Taylor Street.
- Distance and steepness of the hill to walk to the bottom of the Crooked Street is comparable to the one currently walked by tourists from tour buses that drop off at Columbus Avenue and Chestnut Street.
- Existing parking is perpendicular, which allows for a wide loading zone.
- No adjacent residential uses.
- Location is on Lombard Street, which makes visitors feel they are very close to their destination.

Cons:

- Adjacent and nearby merchants may oppose this zone due to parking removal.
- Turns onto Lombard Street from Columbus Avenue could be difficult for large tour buses.

## Private Vehicles

### 1. West side of Jones St, immediately north of Chestnut Street.

Potential loading zone length: 60-90 feet
Existing parking conditions: parallel parking
Potential parking spaces repurposed: 3-5 spaces
Pros:

- Adjacent to San Francisco Art Institute. No neighbors on that side of the street that would be inconvenienced by loading activity.
- Only two blocks away from the Crooked Street.
- Adjacent to a proposed Primary Access Route. Private vehicles would already be directed that way with wayfinding signage.

Cons:

- Only 90 feet long (approximately).

### 2. North side of Lombard Street, immediately east of Larkin Street.

Potential loading zone length: 60-120 feet
Existing parking conditions: parallel parking
Potential parking spaces repurposed: 3-6 spaces
Pros:

- Only one block away from the Crooked Street.

Cons:

- On a steep hill.
- Directs vehicles onto Hyde Street, a route we are trying to avoid due to conflicts with cable car operations and existing congestion.
- Vehicles would be required to drive past the Crooked Street to reach this location, which may draw drivers to pick up and drop off at the corner of Hyde Street and Lombard Street instead.
- In front of residential buildings. Neighbors may oppose due to parking removal and added tourist activity in front of their homes.

### 3. East side of Leavenworth Street, immediately north of Lombard Street (the Crooked Street).

Potential loading zone length: 60-120 feet
Existing parking conditions: parallel parking
Potential parking spaces repurposed: 3-6 spaces
Pros:

- Immediately next to the Crooked Street. This would help prevent misbehavior by providing direct access to visitor destination.
- On the flat portion of Leavenworth Street.

- Not in front of pedestrian access to residential building.

Cons:

- Possible conflicts with vehicles turning left out of the Crooked Street to go northbound on Leavenworth Street.
- Adjacent to residential building. Neighbors may oppose it due to parking removal.

## 4. East side of Jones Street, immediately north of Lombard Street.

Potential loading zone length: 60-100 feet
Existing parking conditions: parallel parking
Potential parking spaces repurposed: 3-5 spaces
Pros:

- Adjacent to a proposed Primary Access Route. Private vehicles would already be directed that way with wayfinding signage.

Cons:

- Adjacent to residential buildings. Neighbors may oppose due to parking removal.

## 5. North side of Greenwich Street, west of Hyde Street.

Potential loading zone length: 60-110 feet
Existing parking conditions: perpendicular parking
Potential parking spaces repurposed: 8-12 spaces (one ADA)
Pros:

- Dead-end street, which would allow for the entire section of the street to be dedicated as a loading/unloading area for the Crooked Street.

Cons:

- Not being on a street with traffic flowing through may encourage people to park instead of using the area for passenger loading only.
- Would removing parking possibly reserved for Geo Sterling Park.
- Adds tourist activity to a neighborhood/residential/quiet dead-end street. Neighbors may oppose.
- Adjacent to residential buildings. Neighbors may oppose due to parking removal.

D. POTENTIAL LOCATIONS FOR PASSENGER LOADING ZONES


Passenger Loading Zones and Vehicle Routes to Access the Crooked Street

# Appendix C: Pricing Management Strategy – Conceptual Design Memorandum

## PROBLEM DEFINITION

Lombard Street is known for the one-way block on Russian Hill between Hyde and Leavenworth Streets, where eight sharp turns are said to make it the crookedest street in the world, and as a result, the street draws many visitors from both near and far.

As overall tourism levels have increased in recent years, so have the number of tourists on the Crooked Street. The demand for access to the Crooked Street by vehicle has increased tremendously and it normally reaches its highest levels on weekends between the hours of 1 PM and 5 PM. The demand causes consistent blockages of Muni services from vehicles turning right off of Van Ness Avenue at the intersection with Lombard. Queues form since the traffic volumes from the west are higher than the capacity of the Crooked Street. Vehicle traffic on the Crooked Street operates one-way eastbound, though the surrounding blocks of Lombard have two-way traffic. Many people drive down the street each day and San Francisco Parking Controls Officers (PCOs) staff the intersections at either end of the Crooked Street during summer weekend peak visitor hours to keep vehicles moving, limit conflicts with the cable car on Hyde Street, and enforce parking regulations to keep travel lanes clear.

## MANAGING ACCESS TO THE CROOKED STREET

In its efforts to manage the access to the Crooked Street, the Transportation Authority is leading a Neighborhood Transportation Improvement Program (NTIP) study to manage visitors' access and circulation on the Crooked Street.

The Authority's goals of managing the demand during the peak periods, reducing the queue, and encouraging visitors to access the facility at lesser demand periods are used in developing the strategy.

A number of potential solutions/strategies were examined by the Crooked Street Task Force. One of the alternatives enumerated in the evaluation report to consider for future action is to implement congestion pricing, or charging a variable toll to drive down the Crooked Street. This report has further investigated the implementation of this strategy as well as a non-pricing strategy.

### STRATEGY

One of the strategies is to implement a "admission fee" where a fee will be charged for all visiting vehicles. The strategy calls for charging all vehicles accessing the Crooked Street a predetermined price based on the observed demand. The price can change dynamically based on the demand or change based on "time of the day" demand using historic demand data. The price will reach its preset maximum rate at the peak periods in order to deter vehicles from accessing the facility and to reduce the queue.

## ISSUES AND CONCERNS

### *Admission Fee Rate:*

When deciding the rate of the admission fee, a comparison to other similar facilities will be made. A time-of-day admission fee plan is recommended to encourage visitors to access the Crooked Street when demand is low instead of at peak times.

### *Enforcement: Full Rate vs Discounted Rate*

To encourage visitors of the Crooked Street to pre-register or reserve a calendar spot, a discounted admission fee will be offered. The discounted fee can be set at a certain percentage of the full cost. The cheaper the amount of the discounted fee, the more visitors will be drawn to pre-register. The number of spots available for pre-register can be limited based on the capacity of the street network at and around the Crooked Street.

Visitors who choose not to pre-register or make reservation to access the facility will pay the full price. The full price will be assessed against the owner of the vehicle as the license plate of the vehicle will be recorded by the License Plate Recognition (LPR) cameras or by FasTrak transponder. An agreement with either Bay Area Toll Authority (BATA), who manages the toll collections of the Bay Area Toll Bridges, or an agreement with California Department of Motor Vehicles to have access to the owner records of the vehicles will be required.

## GEOMETRICS

The conceptual design of this strategy calls for the elimination of the right turn movement from Hyde Street to Lombard Street.

## HOW IT WORKS

A website or app, which provides available times to visit the facility and the ability to pay the admission fee, will be developed to allow the visitors to reserve a time slot and pay the admission fee. For example, a calendar with 100 available time slots per 30 minutes with the corresponding admission fee will be available to choose from for registration purposes.

Registration will be made by entering the vehicle license plate and/or FasTrak account number and the fees can be paid by either using FasTrak or a credit card number. The confirmation will then be registered in the database. While the LPR system does not necessarily need the FasTrak system, FasTrak can be helpful for people who can't pay with a credit card.

The visitor will then proceed to the facility and drive through the queue. Once the visitor's car enters the facility, two License Plate Recognition cameras will record the license plate. The system will verify the license plate and a "Valid / Not Valid" sign will flash. The "Valid" sign means that the vehicle is pre-registered and the "admission fee" at the registration time will be charged. A "Not Valid" sign means that the vehicle did not register or the system could not get a very clear image of the license plate. The back office will verify the matter and act accordingly. If the issue is due to not registering, a notice of not pre-registering and the need to pay the full admission fee. The message on this sign could be customized depending on the communication strategy developed for consistency.

If pre-registration is made with FasTrak account, a FasTrak reader placed on the existing lighting post will read the FasTrak transponder mounted on the vehicle's windshield. The license plate will be used to

verify the registration of the vehicle, while the FasTrak transponder will be used to create the payment transaction.

Messaging signs to inform the visitors of the facility of the admission fee price, where to pre-register, and the fee for visiting without a reservation will be placed at several tourist attraction sites in the city, i.e. Union Square, Fisherman's Wharf, Coit Tower, Palace of Fine Arts, … etc. Signs will be placed at the intersections of Lombard Street with Van Ness Avenue, Columbus, and Hyde Streets. Signage on Van Ness Avenue will be kept to a minimum because it is Caltrans right-of-way.

Vehicle Detection System (VDS)* will be used to monitor traffic on the Crooked Street and video cameras will be used to monitor the queues on Lombard and Hyde streets. The traffic data gathered from the VDS's can be used to adjust the admission fee to deter vehicles from entering the facility, and using the traffic pattern to determine future "admission fee" rates.

*Microwave Vehicle Detection System (MVDS) is recommended for this application. Other VDS's are Loop detectors, and Sensys,

## QUEUE MANAGEMENT

Previous traffic studies related to the operation of the Crooked Street have been completed, the most recent one in 2015. At a peak hour on Saturday in July 2015, the Crooked Street handled 230 vehicles. The capacity of the street is limited because of geometry and fluctuates also based on the conditions on cross street and traffic management activities by PCOs. The Crooked Street usually operates at 250 vehicles per hour, going as high as 300 vehicles per hour in isolated circumstances. When the Crooked Street is at vehicle capacity, increases in demand will manifest themselves in the propagation of the vehicle queue.

The studies also recorded the vehicle queue lengths and travel times on Lombard Street. The travel time on Lombard Street from Van Ness Avenue and the Crooked Street as reported in the 2015 study is between 16 and 22 minutes. The queue sometimes extends west of Van Ness Avenue.

Taking the traffic studies data into account (maximum capacity of the Crooked Street, travel time through, number of vehicles in the queue, number of vehicle dispersed between Van Ness Avenue and Hyde street) will help in managing the queue as the admission fee can be adjusted to deter visitors from entering the facility. The LED signs could display a higher admission fee that may deter travelers from using the facility, or try to pre-register for available time, or try to use public transit, or walk.

The deployment of vehicle detection devices along Lombard Street between Van Ness Avenue and Hyde Streets will transmit traffic data to the system. A queue pattern can be generated from the data and scenarios to change the time-of-the day fee can be developed and evaluated to determine the impact of reducing the queue.

## METHODOLOGY FOR CHANGING THE ADMISSION FEE

As mentioned previously, the Crooked Street capacity, and the traffic and the queue patterns from previous studies will be used to determine the baseline time-of-the day admission fee. The vehicle detection devices will collect and transmit the traffic data and new patterns will be developed. The patterns will then be evaluated and admission fee can be adjusted accordingly. We recommend evaluating the patterns in October and implementing the new admission fee in April of the following year.

## TECHNOLOGICAL NEEDS

The following technological devices will be needed for the system. Models will be decided at a later date as upgrades to the devices is continuous.

License Plate Recognition Cameras
Tolling/Admission Fee Controller
FasTrak Reader with Antenna
Vehicle Detection System (VDS)
Video Detection Cameras (PTZ)
Wireless Modem
DSL Primary Modem
LED – Dynamic Messaging Signs
Servers
Communication Network
Solar Power with Batteries

## OPERATIONS

A back office is needed to provide the following services:

- Monitor the system, traffic, and queue
- Respond to customers and resolve any claim/issue
- Provide regular site inspection and maintenance
- Handle all accounting issues
- Generate and present traffic, queue and revenue reports

## AUTHORITY TO ASSESS TOLL OR ADMISSION FEE

An existing or new operating authority will need to be identified, and will need to obtain legislation to toll the facility. The process may take up to two years and will require a plan of managing the net revenue that is left after reimbursing the operational and maintenance costs along with some reserve to replace the devices and enhance the facility.

An "Admission Fee" may be considered a fee imposed by a local ordinance approved by the Board of Supervisors.
Further research by the legal counsel is needed to determine the mechanism the Transportation Authority can use to apply the "toll/admission fee".

## AGREEMENTS

The operating agency will need to enter into an agreement with BATA for using FasTrak collecting devices handling accounts and providing customer service.

## NEXT STEPS

### Surveys

Public input and feedback of the "admission fee" strategy is very important in the decision-making process. Outreach with the community and other stakeholders will need to be open and consistent throughout the design and implementation process.

A Passive Survey of recording the license plates along with the traffic data can be performed once approval to pursue this alternative is received. This survey will provide traffic data, vehicle trends (demand), and vehicle origins of the visitors of the Crooked Street. The vehicle origins will assist in setting up the policies with regards to reserving space and collecting the full and/or discounted fee.

An Intercept Survey or Active Survey is based on asking the visitors/users of the facility direct questions about the strategy. The responses will be used to develop the business rules, policies, and ordinances. This survey can take place immediately as the team can develop the questions to test visitors willingness to pay, shift mode, or visit at another time. Stated preference surveys, as these are known, are standard practice in determining pricing strategies for a number of different types of facilities.

### Civil Design

Minor civil design is needed to provide details for poles (if needed), signs, and controllers.

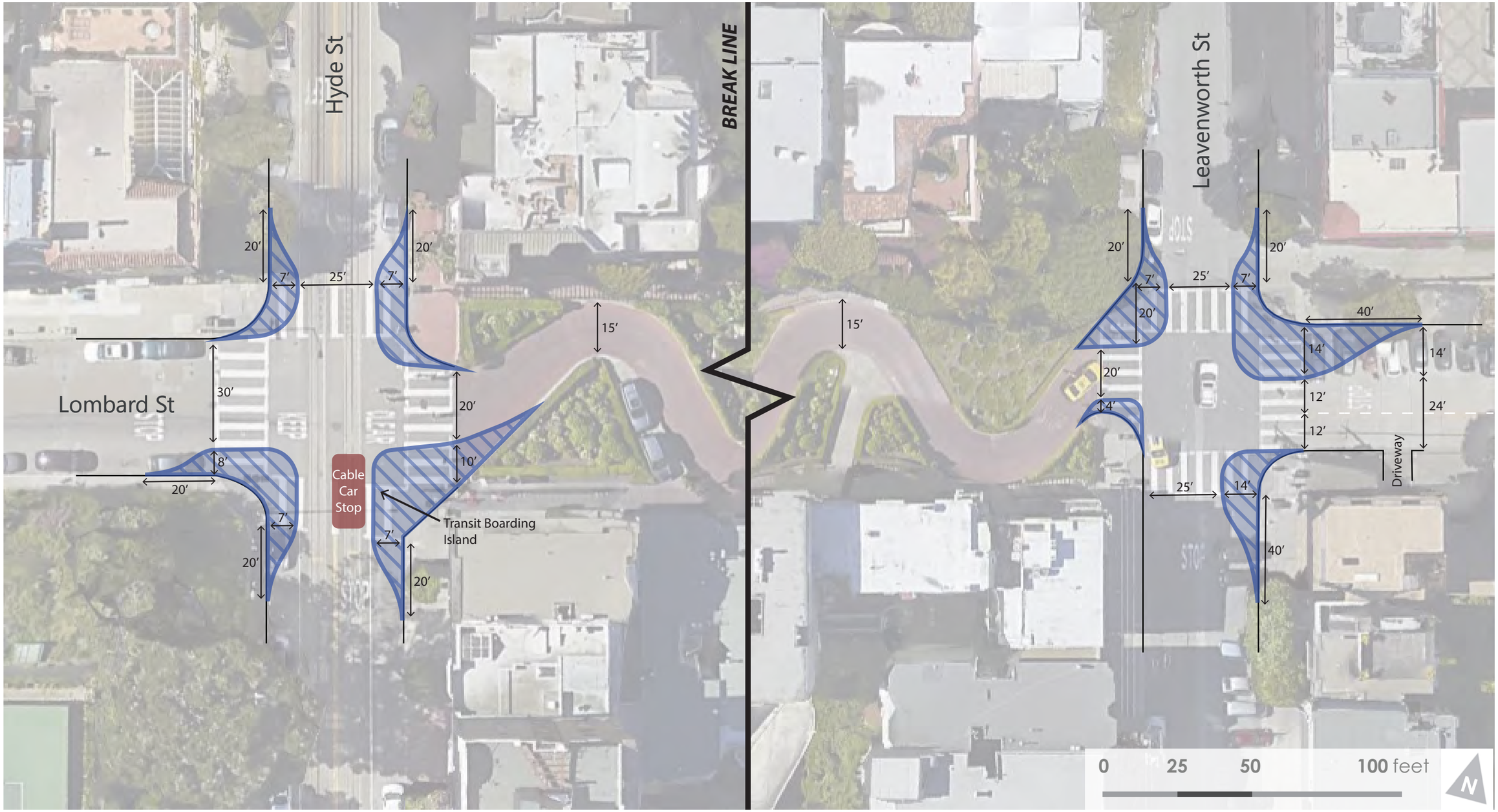
### System Integrator

An algorithm to manage the queue and register the vehicles using the established business rules and policies will be developed by a System Integrator (SI). The SI will be responsible for the development of the design, procurement and deployment of the equipment, testing, interacting with BATA Regional Customer Service Center, and operating the system. Procurement of the system integrator can start as soon as the authority from State Legislators is received.

### Public Education

While the system is being developed, a marketing and public education plan needs to be developed. The plan will clearly state the goals of the project; inform the public of system mechanics; provide the means for contacting customer service; and the plan to invest any net revenue to improve the facility.

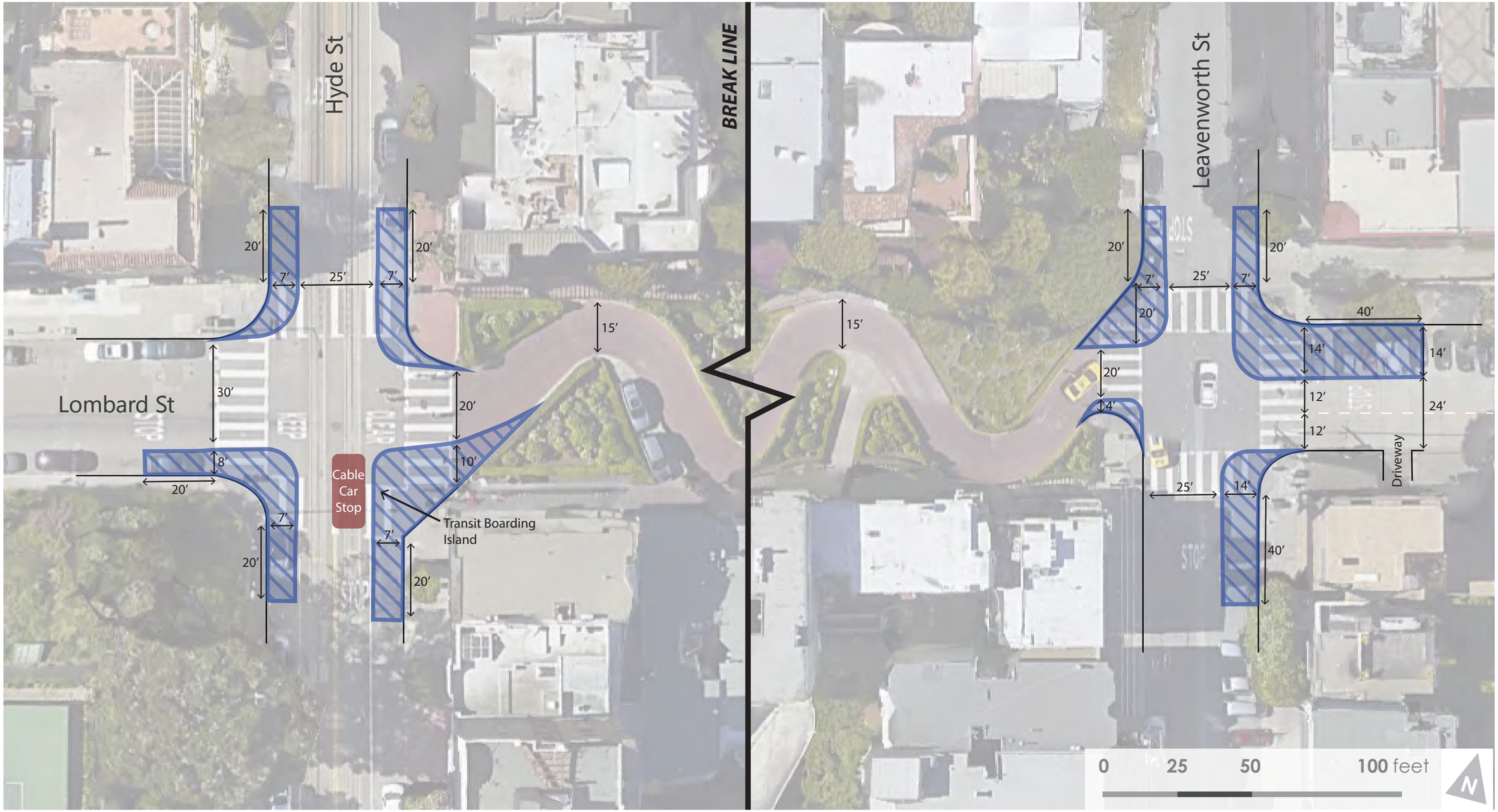
# Appendix D: Conceptual Drawings




Note: Approximate dimensions, not to scale.

Sidewalk Extension

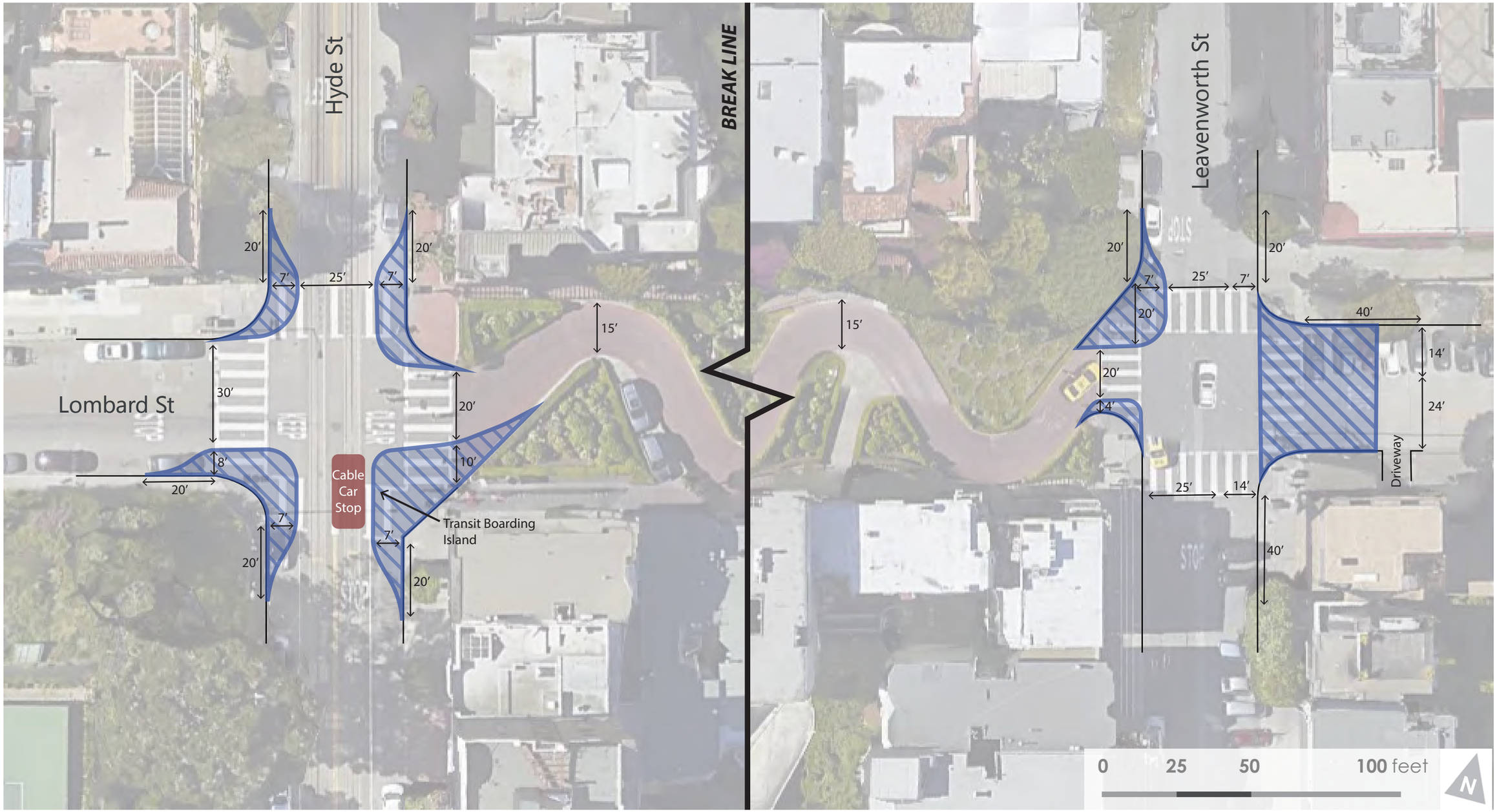
## Crooked Street Intersection Conceptual Designs - Option 1-A




Note: Approximate dimensions, not to scale.

Sidewalk Extension

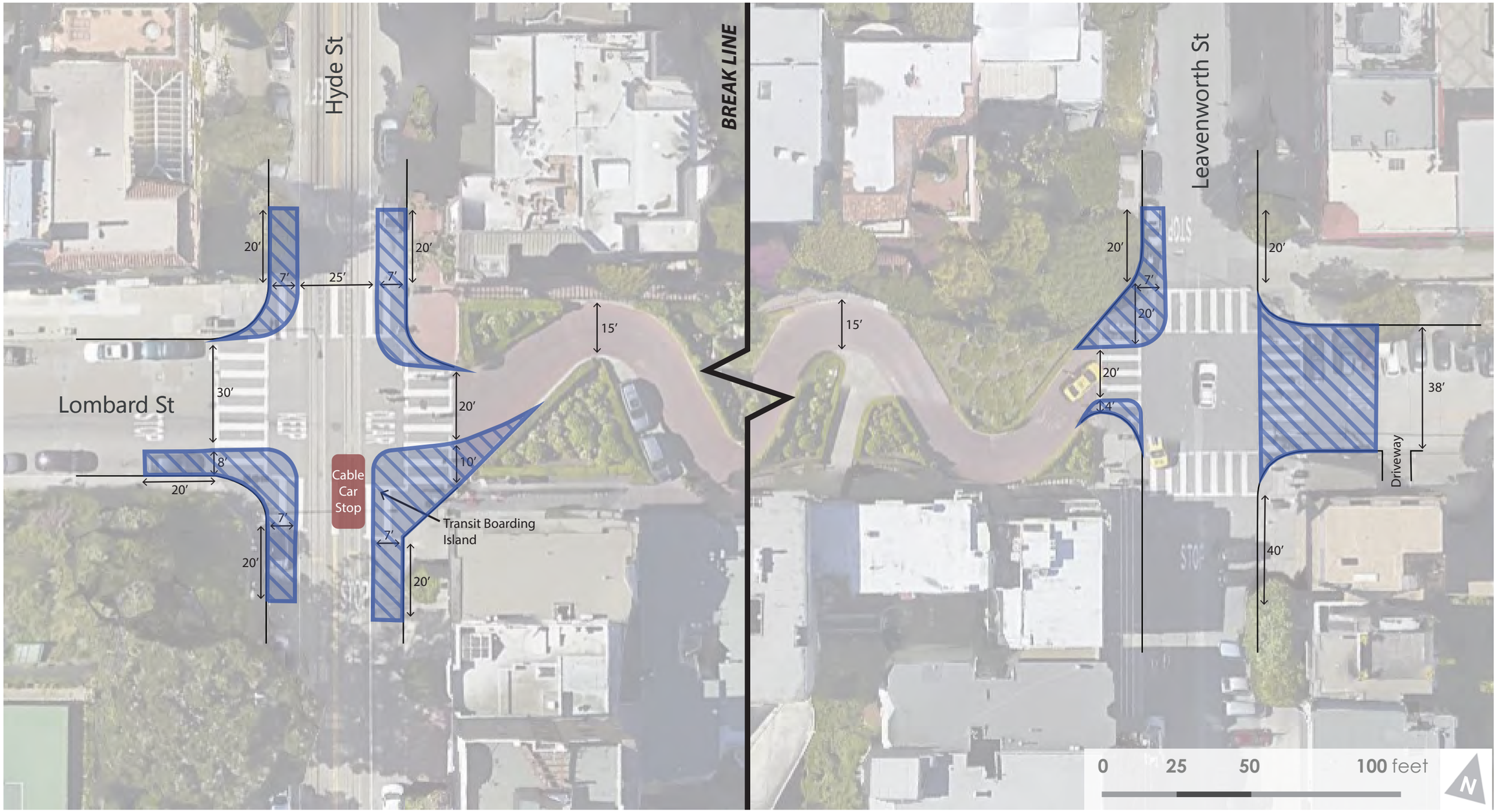
## Crooked Street Intersection Conceptual Designs - Option 1-B




Note: Approximate dimensions, not to scale.

Sidewalk Extension

## Crooked Street Intersection Conceptual Designs - Option 2-A




Note: Approximate dimensions, not to scale.

Sidewalk Extension


Primary Access Route 1

Primary Access Route 2

Secondary Access Route

Potential Loading Zones for Tour Buses

Potential Loading Zones for Private Vehicles

# Passenger Loading Zones and Vehicle Routes to Access the Crooked Street


Primary Access Route 1

Primary Access Route 2

Secondary Access Route

Vehicle Wayfinding Signage

Critical Signage

Supplemental Signage

**RT** Right Turn

**LT** Left Turn

**TH** Through

# Vehicle Routes to Access the Crooked Street

# Appendix E1: Lombard Crooked Street Outreach: Key Feedback Following September 13, 2016 Open House

**Total Respondents:** 107 in-person, 376 online (potential for duplicates); 483 Total

**Where respondents live:**

- 9%: On the Crooked Block
- 80%: Around the Crooked Block
- 4%: Do not live, but work (mostly online)
- 7%: Neither live nor work (mostly online)

**Ranking of Goals:**

| In Person: | Online: |
|---|---|
| 1. Manage Auto Congestion<br>2. Maintain Livability<br>3. Manage Pedestrian Congestion<br>4. Ensure Traffic Safety<br>5. Implement Financially Self-Sustaining Solution<br>6. Maintain Access to the Crooked Street<br>7. Preserve Tourism | 1. Maintain Livability<br>2. Manage Auto Congestion<br>3. Ensure Traffic Safety<br>4. Manage Pedestrian Congestion<br>5. Maintain Access to the Crooked Street<br>6. Implement Financially Self-Sustaining Solution<br>7. Preserve Tourism |

**Does the existing conditions information reflect your experience?**

- 80-90% Yes, however, write in comments suggested showing issues beyond just Lombard/Hyde and Lombard/Leavenworth and the Lombard queue.

**PCO Effectiveness:**

| In Person: | Online: |
|---|---|
| • 27% find current PCO deployment effective | • 59% find current PCO deployment effective |

*Note: Most who added comments suggested they were doing the best they could with limited resources, with requests for either more PCOs or a supplement of sworn officers. Others used this space to request citation and enforcement of existing regulations.*

**Ambassador Effectiveness (Online Only):**

- 60% find Ambassador program effective, however, 72% would like it to be made permanent (most comments indicated with expanded hours and/or better training).

**Pedestrian Space Improvements (Bulb-Outs):**

| In Person: | Online: |
|---|---|
| • 23% support Concept 1 or Concept 2<br>  ○ 12% Concept 1<br>  ○ 11% Cocnept 2 | • 54% support Concept 1 or Concept 2<br>  ○ 28% Concept 1<br>  ○ 20% Concept 2<br>  ○ 7% Both |

**Vehicle Routes and Wayfinding:**

| In Person: | Online: |
|---|---|
| • 20% support | • 40% support |

*Note: Substantial negative feedback received from Yick Wo community demonstrating concern for routing on Jones passing by Yick Wo Elementary School.*

**Right-turn Restriction on Hyde (Online Only):**

- 78% Support

**Loading Zones:**

| In Person: | Online: |
|---|---|
| • 17% support | • 36% support |

*Note: Many respondents had issues with some or all of the loading zones as proposed. Additionally, many called for better enforcement and/or management of existing loading zones on Columbus and illegal usage of the bus stop at Hyde and Union.*

**Education & Engagement Strategy (Online Only):**

- 61% support, but many express doubts of efficacy.

**Pricing & Reservations:**

| In Person: | Online: |
|---|---|
| • 61% support<br>  ○ 12% Reservation Only<br>  ○ 49% Fee or Fee/Reservation | • 55% support<br>  ○ 5% Reservation Only<br>  ○ 50% Fee or Fee/Reservation<br>  ▪ 10% Fee Only |

*Note: Many expressed doubt about the efficacy of this to manage traffic, but did view as a way to generate revenue to support services in the area.*

**Enforcement Options (Online Only):**

- 73%: Increased PCO presence (more hours, more PCOs, more intersections)
- 59%: SF Police Department officers
- 58%: Increased Ambassador presence (more hours, more Ambassadors, more coverage)
- 56%: Security Cameras
- 22%: Other

**Green Benefit District:**

| In Person: | Online: |
|---|---|
| • 48% Support | • 39% Support |

*Note: Most opposed expressed belief that this is an issue that Hotel Tax or General Fund revenue should address.*

# Appendix E2: Lombard Crooked Street Second Public Outreach: Key Feedback After November 17, 2016 Open House

**Total Respondents:**

64 in-person, 75 online (potential for duplicates); 139 Total

**Where respondents live:**

- 11%: On the Crooked Block
- 83%: Around the Crooked Block
- 4%: Do not live, but work (mostly online)
- 3%: Neither live nor work (mostly online)

**Pedestrian Space Improvements (Bulb-Outs):**

| In Person: | Online: |
|---|---|
| • 31% support Concept 1 or Concept 2<br>  ○ 10% Concept 1<br>  ○ 21% Concept 2 | • 69% support Concept 1 or Concept 2<br>  ○ 35% Concept 1<br>  ○ 25% Concept 2<br>  ○ 9% Both |

**Vehicle Routes and Wayfinding (In-Person Only):**

- 21% support

*Note: Respondents had concerns about the effectiveness of this solution. Some suggested that signage would not be followed unless there would be penalties or fine. Some also suggested that the signage should be translated into different languages in order to be understood by tourists from around the world.*

**Right-turn Restriction on Hyde (Online Only):**

- 83% Support

**Education & Engagement (Online Only):**

- 52% support, but many express doubts of efficacy.

*Some respondents doubted about the effectiveness of this suggestion, which they feel would still drive more tourists to come to the crooked street and could not solve the congestion problem.*

**Tolling & Reservations:**

| In Person: | Online: |
|---|---|
| • 82% support<br>  ○ No Support of Reservation Only<br>  ○ 81% Fee or Fee/Reservation<br>  ▪ 16% Fee Only | • 74% support<br>  ○ 7% Reservation Only<br>  ○ 67% Fee or Fee/Reservation<br>  ▪ 7% Fee Only |

*Note: Some respondents questioned about the management and enforcement of the toll system and expressed concerns about special regulation for residents living in the neighborhood. Some suggested using surge pricing to manage the demand, and some noted that the enforcement of toll system would add burden to the surrounding limited residential parking.*

Ranking:

1. Double Parking
2. Blocking Driveways
3. 8 or more Passenger Van Restriction on Neighborhood Streets
4. Parking on the Sidewalk
5. Misuse of Loading Zones and/or Muni Stops by Tour Vehicles

## Most Common Violations Residents Experience (Online Only):

*Note: Other violations include tourists standing at the intersection down the Crooked street that severely block the intersection, and littering is another major concern from residents living in the neighborhood.*

## Preferred Enforcement Options (Online Only):

- 77%: Increased PCO presence (more hours, more PCOs, more intersections)
- 54%: SF Police Department officers
- 42%: Increased Ambassador presence (more hours, more Ambassadors, more coverage)
- 40%: Security Cameras
- 26%: Other