

# Memorandum

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To	Andrew Heidel, Camille Guiriba, SFCTA	Date July 19, 2018
Copies	Keith Tanner, SFMTA	Reference number 262316
From	Chester Fung, Justin Walker, Arup	File reference 4-05
Subject	Lombard Crooked Street Data Collection Plan	

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## 1 Summary

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This memo outlines planned data collection in support of the Lombard Crooked Street Reservations and Pricing Study. Data collection will take place from July through August 2018.

Data collection will include:

- Traffic tube counters to report automobile traffic volumes on five blocks near the Crooked Street (ten total detectors)
- MotionLoft video detection devices to report pedestrian and vehicle volumes and dwell times taken via MotionLoft at two intersections (two camera detectors)
- Traffic travel time data from the Google Directions API to supplement the traffic counts directly taken by traffic tube counters
- Intercept surveys will target both motorists and pedestrians visiting the Crooked Street

Each method of planned data collection will contribute to the calculation of existing condition project metrics as indicated in Table 1 below.

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**Table 1- Project Metrics Under Existing Condition Informed by Data Collection Methods**

Goal	Metric	Data Collection Informs Existing Condition Metric?				
		Traffic Tube Counters	MotionLoft Cameras		Google Directions API	Intercept Surveys
			Auto Counts	Ped Counts		
Manage automobile congestion	Time vehicle queue extends west past Larkin St (1 block) in each hour of the week	✓			✓	
Maintain the livability of the surrounding neighborhood	Revenue generated	✓	✓		✓	
Manage pedestrian congestion	Spillover of pedestrians off sidewalk			✓		
Ensure traffic safety	Extent to which pick-ups/drop-offs block cable cars, pedestrians/crosswalks, or automobiles		✓			
Implement a financially viable solution	Revenue generated	✓	✓		✓	
Preserve tourism at a sustainable level	Number of visitors per day	✓	✓	✓	✓	

Appendix A (attached) indicates the planned schedule of data collection activities. Three options are presented; one final option will be selected upon confirmation of detector locations.

Appendix B (attached) indicates the planned installation locations of detectors in the field.

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## 2 Automobile Tube Counters

Traffic tube counters (ten total) will report automobile volumes at the beginning and end of five blocks near the Crooked Street. These blocks include:

- Lombard St, between Van Ness Ave and Polk St (two detectors)
- Lombard St, between Polk St and Larkin St (two detectors)
- Lombard St, between Larkin St and Hyde St (two detectors)
- Larkin St, between Chestnut St and Lombard St (two detectors)
- Larkin St, between Lombard St and Greenwich (two detectors)

The tube counters will report individual automobile movements (to ultimately be aggregated into automobile volumes) for approximately 72 hours on three consecutive days in July or August (including a Friday, a Saturday, and a Sunday). Detectors at these locations will capture the extent of most persistent automobile queuing related to the Crooked Street. This is informed by field observations taken on Saturday, June 25<sup>th</sup>, 2018 at approximately 5 PM (see Figure 1 below).

**Figure 1- Observed Persistent Automobile Queues (Saturday, June 25<sup>th</sup>, 2018, 5 PM)**



Exact locations proposed for traffic tube detectors are shown in the figure attached to this report.

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## 3 MotionLoft Detectors

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MotionLoft video detection devices (four total) will report pedestrian and automobile volumes and dwell times at two intersections. These intersections include:

- Lombard St and Hyde St (two detectors)
- Lombard St and Leavenworth St (two detectors)

For the purposes of planning data collection, the following range limitations were assumed for the MotionLoft cameras:

- Preferred maximum detection range: 50 feet (at greater ranges, the ability of MotionLoft cameras to track pedestrians decreases)
- Maximum angle of view: 120 degrees

The MotionLoft cameras will continuously report individual automobile and pedestrian movements (which will ultimately be aggregated into useful metrics) for approximately thirty days, spanning portions of July and August. Detectors at these locations will record the volumes, origin-destination pairs, dwell times, and intermodal conflicts of pedestrians and automobiles in the two intersections.

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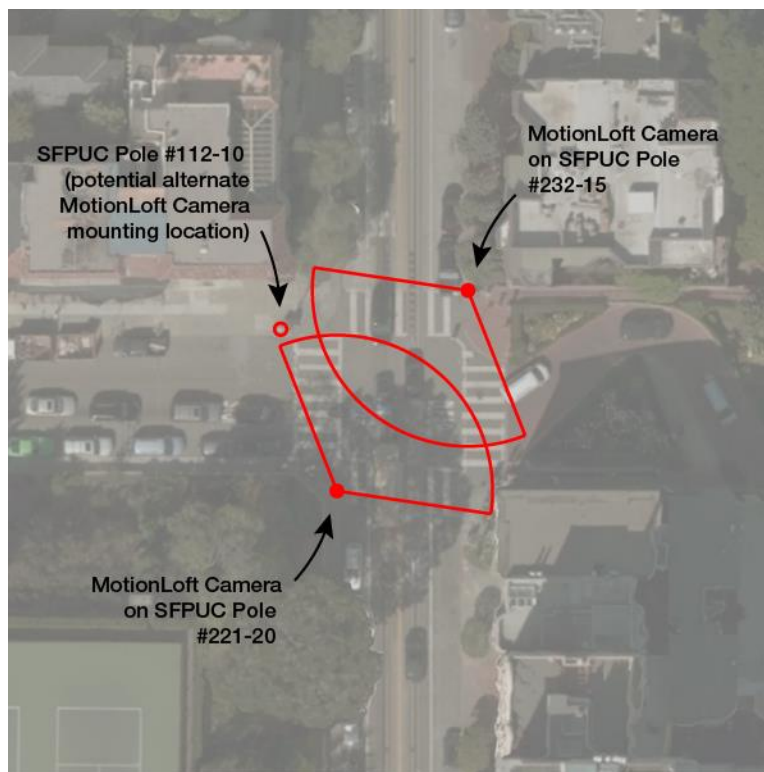
## 3.1 Lombard St and Hyde St

At the intersection of Lombard St and Hyde St, MotionLoft cameras (two total) will be deployed at two locations:

- SFPUC Pole #221-20 (southwest of the intersection)
- SFPUC Pole #232-15 (northeast of the intersection)

These locations are shown in Figure 2 below.

**Figure 2- Lombard St and Hyde St Recommended MotionLoft Camera Locations**



*Empty red circles indicate utility poles not used (shown for context).*

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## 3.2 Lombard St and Leavenworth St

At the intersection of Lombard St and Leavenworth St, MotionLoft cameras (two total) will be deployed. The final locations will be subject to both successful coordination with PG&E and confirmation of MotionLoft camera detection capabilities at specific heights and ranges. The preferred locations for these two cameras are:

- PG&E Pole northwest of the intersection
- PG&E Pole southeast of the intersection

These locations are shown in Figure 3 below.

**Figure 3- Lombard St and Leavenworth St Preferred MotionLoft Camera Locations**



*Empty red circles indicate utility poles not used (shown for context).*

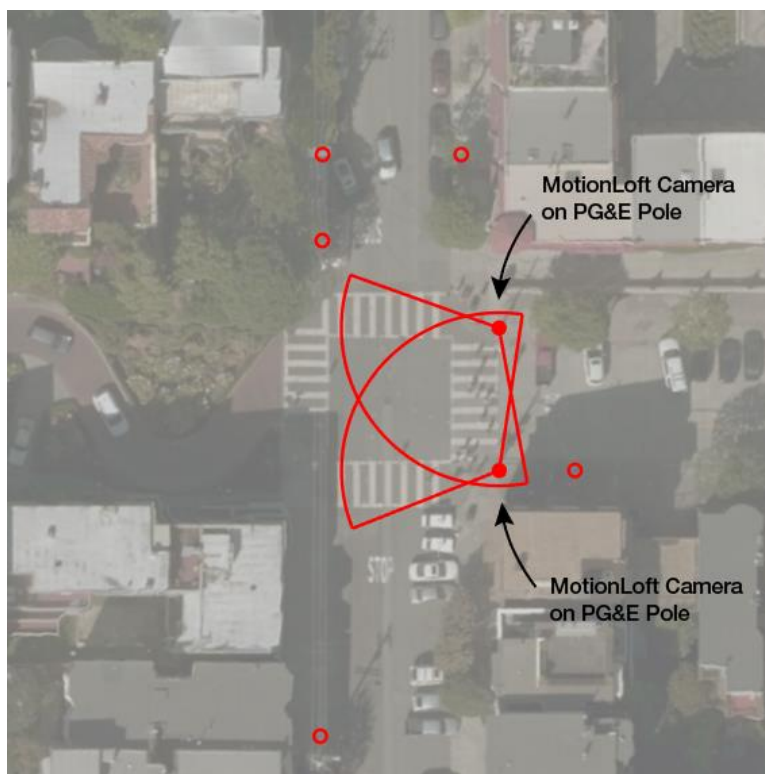
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Alternative camera locations (also on PG&E poles) are:

- PG&E Pole northeast of the intersection
- PG&E Pole southeast of the intersection

These locations are shown in Figure 4 below.

**Figure 5- Lombard St and Leavenworth St Alternative MotionLoft Camera Locations**



*Empty red circles indicate utility poles not used (shown for context).*

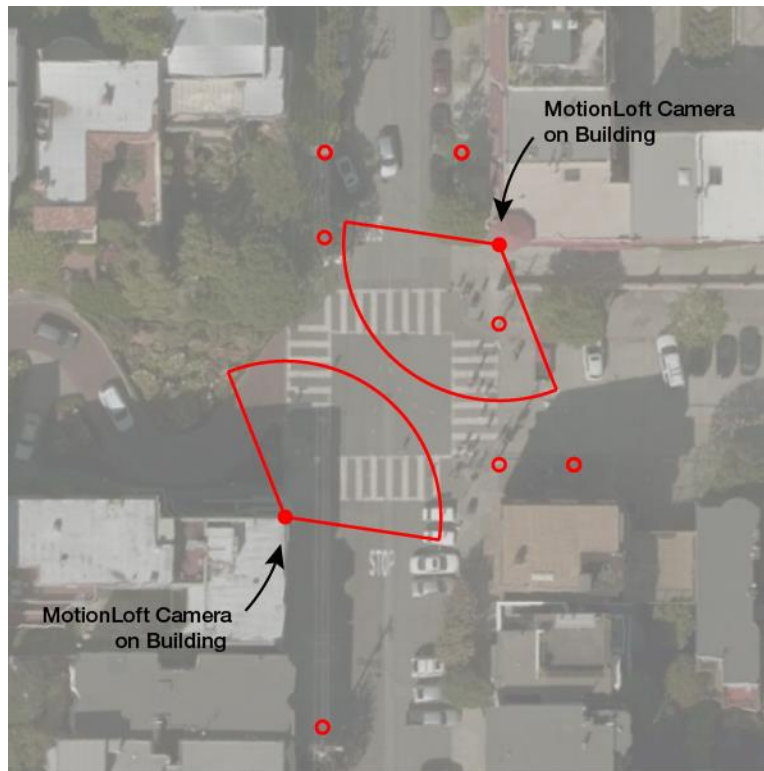
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Should coordination with PG&E prove unsuccessful, cameras could also potentially (with coordination with private property owners and occupants) be placed on buildings adjacent to the intersection at:

- The northeast corner of 1001-1011 Lombard St (building at the southwest corner of the intersection)
- The southwest corner of 2320 Leavenworth St (building at the northeast corner of the intersection)

These locations are shown in Figure 6 below.

**Figure 6- Lombard St and Leavenworth St  
Alternative MotionLoft Camera Locations (on Adjacent Buildings)**



*Empty red circles indicate utility poles not used (shown for context).*

Should MotionLoft cameras be unable to be placed either on PG&E poles or on buildings adjacent to the intersection, traditional traffic counts can be collected at Lombard St & Leavenworth St on a single Saturday (and, optionally, also on a Sunday). Under this approach, a video camera would be placed to record pedestrian and automobile traffic. The video would subsequently be reviewed by staff and traffic volumes and occupancies observed throughout the day would be manually recorded.



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## 4 Google Traffic Data

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The Google Directions API will be used to harvest real-time automobile traffic travel times for each link in the study area. The Google Directions API will report automobile travel times on each link every 15 minutes over the course of one month. These travel times will be used to identify automobile congestion levels and queuing on the links.

The Google Directions API travel times are intended to augment automobile traffic and queuing data directly observed in the field (by tube counters and MotionLoft cameras). These travel times will provide traffic data across more links and on more days than would be feasible via direct observation.

## 5 Intercept Survey

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We will administer an intercept survey in the field on two days in August (either two Saturdays or one Saturday and one Sunday) to motorists queuing for the Crooked Street. Exact details of the survey are outlined in a separate work product but are summarized here for informational purposes.

The exact dates of the survey will be dependent on the availability of individual staff. The survey will be administered with the goal of 400 respondents. The survey will either be administered on a computer tablet (i.e., and iPad or similar tablet) operated by survey staff.

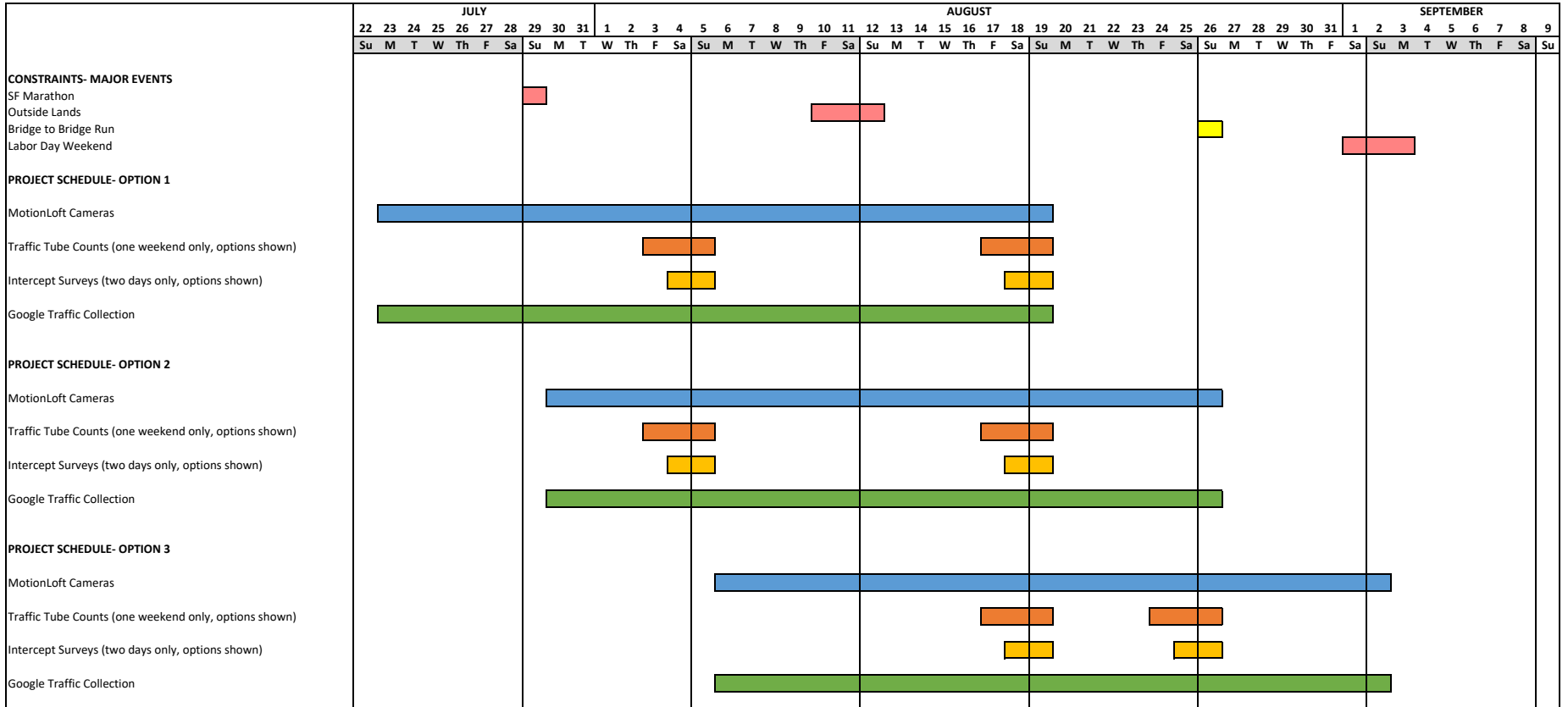
Survey questions will be refined in a separate work product, but an initial list of potential key questions follows:

- Home location (by county, state, country, or other high-level geography)
- Vehicle occupancy
- Willingness to use a reservation-based system to drive on the Crooked Street
- Willingness to pay various toll rates to drive on the Crooked Street
- Willingness to access the Crooked Street via non-automobile modes
- Willingness to access the Crooked Street at less popular times
- Likelihood to forego visiting the Crooked Street altogether

**LOMBARD DATA COLLECTION PLAN**




**Appendix A: Schedule**

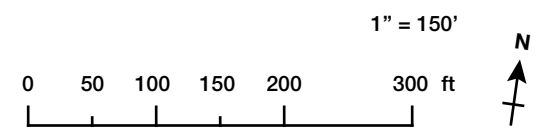
Last Updated: July 12, 2018





Aerial Imagery Credit: Bing Maps, USGS

-  Tube Counters
-  MotionLoft Camera and Field of View
-  Other Utility Pole / Streetlight



## Data Collection Plan

### Appendix B: Detector Locations