

Parking Search Time Data Guide

June 25, 2014

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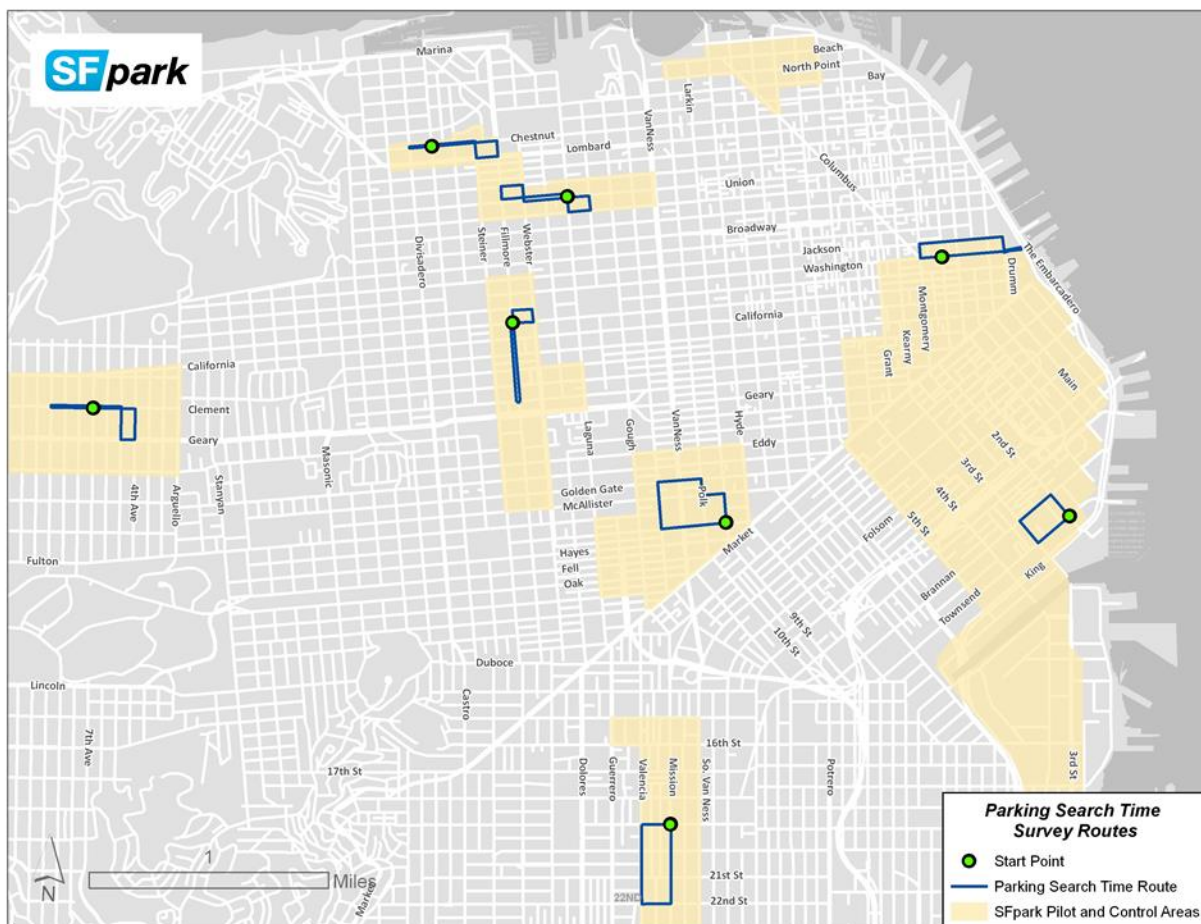
1 Introduction

Reducing the amount of time that drivers spend circling for parking constitutes one of the central goals of the SFpark pilot project. From fall of 2010 through spring of 2013, SFpark staff worked with consultants from Nelson\Nygaard to collect data in each of the pilot and control areas to measure the impact of the pilot project on parking search time.

As shown in Figure 1, surveyors followed a predefined route in each of the pilot and control areas. Simulating the behavior of drivers looking for a parking space, surveyors biked along each of the routes, recording elapsed time for each run. In total, this effort yielded over 6,000 usable parking search time survey runs.

This document provides critical information regarding the availability and use of this dataset.

Figure 1 Parking search time survey routes in city-wide context



1.1 Timeline

SFpark staff worked with consultants from Nelson\Nygaard hired to collect data over four data collection periods:

- Fall 2010: “Before 1”
- Spring 2011: “Before 2”
- Spring 2012: “Midpoint”
- Spring 2013: “After”

With the exception of the fall 2010 data collection period which was considered to be a test run, surveys throughout each pilot and control area were conducted at the same time to minimize seasonal differences in travel patterns.

1.2 Availability of Data

The complete dataset is available by request and includes all parking search time survey runs conducted for the evaluation of the SFpark pilot project. A data dictionary defining key elements of the data is listed in section 2.2 of this document, and included in the dataset itself as a separate worksheet. For all data requests and related inquiries, please contact info@sfpark.org and put “SFpark evaluation data request” in the subject line.

The parking search time file name, format and size are as follows:

- File name: SFpark_ManualSurveyData_ParkingSearchTime_20102013.xlsx
- File format: 2010 MS Office Excel workbook
- File size: 1.7 MB

2 Overview

This section provides information about the content of the dataset and business rules for use of the data.

2.1 Summary of Contents

The Excel Workbook

Usable data for all collection periods can be found on the “PST” tab in the Excel workbook. This tab includes the fall 2010 test runs and both bicycle and automobile survey runs. Use of fall 2010 survey runs is not recommended due to adjustments in data collection methodology and deployment from fall 2010 to spring 2011. An active filter has been applied to the “Data Collection Period” field to exclude fall 2010 data.

Unusable survey runs have been removed and include runs conducted during major events, rain, surveys conducted incorrectly, recorded incorrectly, and other issues. These issues are further discussed in section 4 of this data guide.

Attributes of the Data

For each collection period, data was collected in each pilot and control area on weekdays (a Tuesday, Wednesday, or Thursday) and on both weekend days for four time periods: 8:00am to 10:00am, 12:00pm to 2:00pm, 4:00pm to 6:00pm, 8:00pm to 10:00pm and (where meter operating hours extend into the evening) from 10:00pm to 12:00am.

Use the “Type of day” field to sort or filter by weekday, Saturday, and Sunday. Use “Timeband” to sort or filter by time period.

The start time for each survey run is documented (to the minute), using military time. Total parking search time is recorded in three fields: “Elapsed minutes”, “Elapsed seconds” and “Total time in seconds.”

Runs that exceeded 30 minutes are considered failed runs. In these cases, parking search time is recorded as 30 minutes / 1800 seconds. To filter for failed runs, use the “Failed run” field. Runs that were truncated due to the end of the survey period are identified as “Y2” in the “Failed run” field.

Failed runs are discussed in more detail later in this data guide.

Distance traveled to each found space is contained in the “Distance traveled” field. Units are in feet. The methodology used for calculating distance is detailed in section 3.2 of this data guide.

For each survey run in the dataset, the name of the pilot or control area is identified in the “Area” field, and the “Area type” field specifies whether it is a pilot or control area. Pilot and control areas consist of:

- Pilot Areas
 - Civic Center
 - Downtown
 - Fillmore
 - Marina
 - Mission
 - South Embarcadero
- Control Areas
 - Richmond
 - Union

Parking search runs were not conducted in Fisherman’s Wharf.

The “Meter ID,” “Blockface ID” and “Block ID” are identified for each survey run where the surveyor found a space. These ID fields correspond to unique ID fields in SFpark geospatial datasets for the parking space inventory (meters), blockfaces and blocks as well as the SFpark hourly occupancy by block dataset (SFpark_ParkingSensorData_HourlyOccupancy_20112013.xlsx).

Where applicable, space numbers for multi-space meters are also recorded.

All failed runs do not have values in the Meter ID, Blockface ID or Block ID.

Bicycle and Automobile Survey Runs

The primary dataset consists of bicycle survey runs. A small number of automobile survey runs were also conducted in order to calculate an adjustment factor for the bicycle runs. There are over 100 usable automobile survey runs in the spring 2011, 2012, 2013 datasets. An active filter has been applied to the "Mode" field to exclude automobile runs. The filter can be removed.

2.2 Data Dictionary

FIELD NAME	DEFINITION	EXAMPLE
Survey ID	A four digit unique ID given to each survey record on the PST data tab, ranging from 0001 to 9365.	9365
Data collection period	Period in which the survey was conducted	Spring 2011
Mode	Mode traveled for the survey run, either by bike or automobile	Bike
Surveyor	Initials of the surveyor who conducted the survey	LJ
Area	The pilot or control area where the survey was conducted	Union
Area type	States whether the route had been a pilot area or control area	Control
Date	Date that survey was conducted.	5/14/2011
Day of the week	Either Tuesday, Wednesday, Thursday, Saturday or Sunday	Saturday
Type of day	Categorized as a weekday, Saturday or Sunday	Weekday
Survey time period	The two-hour period in which the PST run was conducted: 8-10AM, 12-2PM, 4-6PM or 6-8PM	8PM-10PM
Timeband	The twenty-four hour military time corresponding to survey time periods	2000
Start time	The actual start time of each parking search time run	2015
AM/PM	Separate field for whether the parking search time run was conducted in the AM or PM	PM
Elapsed minutes	The duration of the parking search time, in minute	7
Elapsed seconds	The duration of the parking search time, in seconds, after the elapsed minutes	16
Total time in seconds	The total duration of the parking search time, in seconds	436
Laps	Completed laps	0
Failed run	A "Y" failed search means that the surveyor could not find a space after searching for 30 minutes; "Y2" indicates a failed run that started toward the end of the survey time period where the surveyor could not find a parking space before the end of the survey time period (i.e. started at 1:50pm and after 10 minutes still no available parking was found).	N
Meter post ID	Unique identifier for the found metered parking space	99999999
Blockface ID	Unique identifier for the side of the block where the surveyor found a parking space	5000002
Block ID	Unique identifier for the block where the surveyor found a parking space	500000
Multi-space number	Space number for multi-space meter pay stations	54
Address	Nearest address of the found parking parking space where a meter post ID could not be provided	2105 Fillmore St.
Distance traveled	Calculated field. Distance traveled, in feet, to the parking space. See data guide for methodology.	32
Blocks passed	Calculated field. Number of blocks passed along the route before the blockface where a space was found.	2
Speed	Calculated field. Speed of survey run in mph. Speeds for survey runs where surveyor found space on the first block are notably affected by assumptions in "distance traveled" calculations and are not recommended for use in analysis.	7.3
Found BF occupancy	Calculated field. The GMP (general metered parking) occupancy rate of the blockface where parking was found, taken from the SFpark data warehouse (sourced from parking sensors). Occupancy rate is an hourly average, as of the start of the survey run. Calculated as GMP occupied time / (GMP time - GMP unknown time) for each blockface. Occupancy data is available starting April 2011 only during metered hours; some parking sensors were not functioning on some blockfaces from April 2011 through December 2013. As such, some survey runs do not have occupancy data associated with them.	13.9
Route occupancy	Calculated field. The GMP (general metered parking) occupancy rate of all blockfaces passed prior to the blockface where parking was found, taken from the SFpark data warehouse (sourced from parking sensors). Occupancy rate is an hourly average, as of the start of the survey run. Calculated as GMP occupied time / (GMP time - GMP unknown time) for all blockfaces passed. Occupancy data is available starting April 2011 only during metered hours; some parking sensors were not functioning on some blockfaces from April 2011 through December 2013. As such, some survey runs do not have occupancy data associated with them.	79.2
Notes	Special incidences observed by the surveyor - such as temporary construction zones, broken meters, weather considerations, relocated bus tow-away zones, and anything else that may have affected typical parking patterns	
Area closures	Whether the data collection had been conducted when the route may have been impacted by a major or minor street closure. "Major - unaffected" indicates a run that was completed before major construction was encountered, where major construction may have affected longer runs during that survey period/area.	Minor
Special Events	Whether the data collection had been conducted during a major or minor special event	Minor

2.3 Business Rules

To analyze the parking search time data, users will want to look at survey runs by:

- Data Collection Period
- Type of day
- Timeband
- Area type and/or
- Area

Several other business rules apply to this dataset.

Fall 2010 Data Collection Period

Use of fall of 2010 survey runs is not recommended due to adjustments in data collection methodology and deployment after fall 2010. An active filter has been applied to the “Data Collection Period” field to exclude fall 2010 data. This filter can be removed.

Automobile Survey Runs

A small number of automobile survey runs were conducted in order to calculate an adjustment factor for the bicycle runs. However, the primary dataset consists of bicycle survey runs, which should be used for analyzing change over time and differences between pilot and control areas.

Area Closures

Area closures were categorized as “major” when at least half of the block had been closed off for street cleaning or special events during the survey. Area closures were categorized as “minor” when at least two parking spaces had been closed for reasons such as construction. When construction without signage was observed along the route, it was assumed that the construction had impacted the route all day. When construction was observed with signage, the listed time limits were applied to the data.

3 Methodology

In practice, drivers have different ways of searching for parking, and therefore take different search routes and experience varying search times for parking near the same destinations. To best estimate parking search time, pre-assigned starting points and carefully detailed search routes were used to ensure that data collection methodology was replicable, consistent and comprehensible by surveyors. Furthermore, the parking search time deployment plan specified an estimated number of surveys that could be completed in order to achieve a sample size large enough for drawing reliable generalizations.

3.1 Sampling Plans

For fall 2010, spring 2011 and spring 2012, data was collected on one weekday and on both weekend days. All weekday samples were collected on Tuesday, Wednesday, or Thursday to ensure that the data

was reflective of a typical weekday.¹ Weekend samples were collected on Saturdays and Sundays.² For fall 2010, spring 2011 and spring 2012, the sampling plan assumed that bike surveyors can collect an average of six data samples per hour—which equates to 12 samples per two-hour survey period, and a total of 144 parking search time “runs” (or samples) during each three-day iteration of the survey. The range of hours for data collection was designed to ensure that data from both the morning and evening peak commute periods were collected, in addition to other periods of high parking demand during non-work hours. Collecting data for several two-hour periods over the course of a day enabled a comparison of parking search time between times when parking meters are operational and times when meters are non-operational and/or had lower levels of enforcement.

In spring of 2013, sample size was adjusted to account for variation in parking search times by area and time periods to ensure that a minimum number of samples were collected.³

In all cases, surveys were not scheduled in locations with special events that could distort parking search time data—such as parades, street fairs, street cleaning, or major sporting events.

The sampling plans are shown below in Figures 3.1 and 3.2.

¹ Mondays and Fridays were excluded due to the atypical travel patterns on these days.

² Sundays are generally excluded from transportation data collection due to atypical travel patterns. However, data was collected on Sundays to ensure adequate weekend sample sizes and to learn more about Sunday travel patterns.

³ In places and times with very high parking occupancies, PST is far more variable and more observations are required to estimate true mean search time. Areas and times where average search time was relatively high across surveys were identified and used to adjust the sampling plan. Areas and time periods with average search times in excess of both thirty seconds and one minute were given new minimum sample size requirements. Minimum number of runs per area and time band were set using three thresholds: 12 runs (baseline from SDP), 20 runs (> 30 seconds average PST for both B2 and MP), and 30 runs (>1 minute average PST for both B2 and MP).

Figure 3.1 Sampling Plan for Each Survey Iteration for Fall 2010, Spring 2011 and Spring 2012

	Data Samples				Total Samples per 3-Day Survey Iteration
	Per period (2 hours)*	Per Weekday (4 periods)	Per Saturday (4 periods)	Per Sunday (4 periods)	
Pilot Areas					
Downtown	12	48	48	48	144
South Embarcadero	12	48	48	48	144
Mission	12	48	48	48	144
Civic Center	12	48	48	48	144
Fillmore	12	48	48	48	144
Marina	12	48	48	48	144
Pilot Subtotal	72	288	288	288	864
Control Areas					
Richmond	12	48	48	48	144
Union Street	12	48	48	48	144
Control Subtotal	24	96	96	96	288
Total (Pilot and Control)	96	384	384	384	1152

* Assumption: Surveyors collect an average of 6 samples per hour

Figure 3.2 Sampling Plan for Spring 2013

	12-2 PM	4-6 PM	8-10 AM	8-10 PM
Weekday				
Civic Center	12	12	12	12
Downtown	30	20	20	12
Fillmore	30	30	12	30
Marina	30	30	12	30
Mission	20	20	12	12
Richmond	20	20	12	20
South Embarcadero	30	30	20	30
Union	30	20	20	30
Sat, Sun (each)				
Civic Center	20	12	12	20
Downtown	30	20	20	20
Fillmore	30	30	20	20
Marina	30	30	20	30
Mission	30	30	12	30
Richmond	30	30	12	30
South Embarcadero	30	12	12	30
Union	30	30	20	30

To calibrate data collected by bicycle, the SFMTA conducted a small sample of parking search time surveys by automobile. Surveyors conducted eight parking search time “runs” by automobile on each of the eight survey routes established for the standard bicycle-based parking search time surveys. These surveys were conducted by automobile, on the same routes, using the same survey methodology, but not on the exact same days. A count of automobile and bicycle survey runs are shown in Figure 2.3b.

3.2 Distance

To calculate the distance field, SFpark staff and Oracle Consultants utilized the SFpark data warehouse and Oracle Business Intelligence tool as well as spatial data of PST routes, blockfaces, and the parking space inventory (meters).

Each survey run includes the meter post ID where parking was found as well as the number of laps completed. Distance is measured in feet and is measured to each meter post ID, accounting for the number of completed laps for each survey run. There are some exceptions that required a modified approach, as described in more detail below.

EXAMPLES

1. Standard approach

For a survey run in Inner Richmond with completed Laps = 1, where parking was found at meter post ID = 44040080 (corresponding blockface ID = 440402), total distance is calculated as 7,109 feet as shown in the tables below.

Table 1 - Distance of Blockfaces Passed

Blockface ID	Route Order	Route	Blockface Length
360051	1	Richmond	266
360041	2	Richmond	274
360031	3	Richmond	270
104031	4	Richmond	309
104033	5	Richmond	318
440402	6	Richmond	273
105032	7	Richmond	626
360042	8	Richmond	274
360052	9	Richmond	271
360062	10	Richmond	277
360072	11	Richmond	268
360082	12	Richmond	282
360081	13	Richmond	278
360071	14	Richmond	271
360061	15	Richmond	276
		Lap 1	4533
		Lap 2	1437

Table 2 - Distance to Meters

Blockface ID	Meter Post ID	Route	Distance to Meter
440402	440-40020	Richmond	46
440402	440-40040	Richmond	91
440402	440-40060	Richmond	137
440402	440-40080	Richmond	182
440402	440-40180	Richmond	228
440402	440-40200	Richmond	273
		Dist to Meter	182
		Total Dist	7109

2. Some survey runs do not have meter post IDs (999-9999 is used as a dummy meter post ID in these cases).

In these instances, an address and blockface ID has been provided instead. Distance to the “meter” is calculated as half the distance of that block.

For example, for a survey run in the Mission with Laps = 1, meter post ID = 999-9999 and Blockface ID = 568242, total distance is calculated as 5,175 feet as shown in the table.

Table 1 - Distance of Blockfaces Passed

Blockface ID	Route Order	Route	Blockface Length
568232	1	Mission	538
568242	2	Mission	548
568252	3	Mission	526
222322	4	Mission	279
222324	5	Mission	275
700101	6	Mission	538
700091	7	Mission	532
700081	8	Mission	537
219341	9	Mission	590
		Sum for Lap 1	4363
		Sum for Lap 2	538
		Dist to Meter	274
		Total Dist	5175

3. Survey runs with allowable parking on two sides of the street

The survey methodology requires surveyors to park only on the right side of the street, with one exception: one-way streets that are two lanes wide at most. Downtown is the only route with multiple one-way streets that are two lanes or less. A couple of other routes functioned as one-way streets with one to two lanes due to construction at the time.

Distance calculations take this rule into consideration and do not “double count” the distance of both sides of a block where the street is a one or two lane one-way street.

For a survey run where a surveyor found parking along the Downtown route on the second blockface (blockface ID = 571072) of the first lap (Lap = 0), at meter post ID = 571-07080, total distance is calculated as 516 feet as shown in the tables below.

Table 1 - Distance of Blockfaces Passed

Blockface ID	Route Order	Route	Blockface Length
720051	1	Downtown	442
720052	1	Downtown	
571072	2	Downtown	295
500041	3	Downtown	435
500042	3	Downtown	
500032	4	Downtown	289
2000001	4	Downtown	
500021	5	Downtown	315
500022	5	Downtown	
500011	6	Downtown	325
		Lap 1	442

Table 2 - Distance to Meters

Blockface ID	Meter Post ID	Route	Distance to Meter
571072	571-07060	Downtown	37
571072	571-07080	Downtown	74
571072	571-07100	Downtown	111
571072	571-07120	Downtown	148
571072	571-07140	Downtown	184
571072	571-07160	Downtown	221
571072	571-07180	Downtown	258
571072	571-07300	Downtown	295
		Distance to meter	74
		TOTAL DISTANCE:	516

4. Multi-space meters

Multi-space meters are meters where the user pays at a kiosk and places a ticket stub on their windshield. Meter post IDs for multi-space meters include both a meter ID and a space ID, and require use of a third look up table.

For a survey run where a parking space was found on the first block of the first lap (Lap = 0), blockface ID 446004, where multi-space pay station ID = 446-00004 and space number = 52, total distance is calculated as 48 feet as shown in the tables below.

Blockface ID	Route Order	Route	Blockface Length
446004	1	Civic Center	399
446012	2	Civic Center	396
446022	3	Civic Center	407
419042	4	Civic Center	320
419052	5	Civic Center	297
1000002	6	Civic Center	302
442061	7	Civic Center	395
442051	8	Civic Center	375
442052	8	Civic Center	375
612041	9	Civic Center	255
563031	10	Civic Center	404
542021	11	Civic Center	287
542011	12	Civic Center	286
Lap 0			0

Multi-space Pay Station ID	Space Number	Meter Post ID
446-00004	50	446-00500
446-00004	52	446-00520
446-00004	54	446-00540
446-00004	56	446-00560
446-00004	58	446-00580
446-00004	60	446-00600
446-00004	62	446-00620
446-00004	64	446-00640
446-00004	66	446-00660

Blockface ID	Meter Post ID	Route	Distance to Meter
446004	446-00480	Civic Center	16
446004	446-00500	Civic Center	32
446004	446-00520	Civic Center	48
446004	446-00540	Civic Center	64
446004	446-00560	Civic Center	80
Distance to Meter			48
TOTAL DISTANCE:			48

5. Failed runs with the “Y” or “Y2” flag

Distance is calculated for each lap completed plus half the distance of the final lap.

For a survey run in the Marina with Laps = 3, and Failed = Y, total distance is calculated as 14,462 feet as shown in the table.

Blockface ID	Route Order	Route	Blockface Length
354221	1	Marina	424
354211	2	Marina	450
354201	3	Marina	422
354202	3	Marina	422
415331	4	Marina	291
549212	5	Marina	445
663332	6	Marina	282
354212	7	Marina	446
354222	8	Marina	218
354224	9	Marina	234
354232	10	Marina	461
354231	11	Marina	459
Lap 1			4,132
Lap 2			4,132
Lap 3			4,132
Lap 4			2,066
Total Dist			14,462

Finally, to convert distance in feet to blocks passed, analysts may wish to use the average length of a block along PST routes in pilot and control areas, which is 370 feet.

3.3 Found Blockface Occupancy and Route Occupancy

Found Blockface Occupancy

The “Found BF Occupancy” field depicts the GMP (general metered parking) occupancy rate of the blockface where parking was found, taken from the SFpark data warehouse. This occupancy data is sourced from parking sensors. The occupancy rate is an hourly average, as of the start of the survey run. It is calculated as:

$$\text{GMP occupied time} / (\text{GMP time} - \text{GMP unknown time})$$

Occupancy data is available starting April 2011 only during metered hours; some parking sensors were not functioning on some blockfaces from April 2011 through December 2013. As such, some survey runs do not have occupancy data associated with them.

Route Occupancy

Route Occupancy is the average occupancy of all blockfaces passed by a surveyor on a given run. This metric is calculated consistent with the distance metric described in the previous section, with one exception:

- For one to two lane one-way streets, occupancy for both sides of the street is considered

3.4 Survey Deployment

Data collection spanned six pilot areas and two control areas. The map in Figure 1 shows the starting points and search routes for each area. The selected search routes exclude streets with peak-period tow-away zones and also exclude streets planned for closure due to construction. Once the routes had been refined, the search routes remained fixed for the pilot program after conducting the first survey. See Appendix B for more detailed maps of each individual study area.

In some areas, data collection had been impacted by special events and incidences that have been categorized as “Major” or “Minor.” Minor special events include rock concerts, theatre performances and convention events that occur year-round and impact areas such as Civic Center, Fillmore and South Embarcadero. Major special events include sporting events, street fairs and parades that typically happen less often and in larger magnitude—which happened in South Embarcadero during data collection due to Giants baseball games. All areas are also susceptible to incidences impacting parking behavior such as construction, street sweeping, fire emergencies and other incidences. Runs that were impacted by these incidents and special events are noted in the data tables, the notes field, and listed again in the overview tab.

While using pre-assigned starting points and search routes could not have precisely replicated all potential parking search behaviors, it provided a reasonable proxy for actual parking search times. Since SFpark staff is primarily interested in how the pilot area price changes have impacted parking search times, this method of data collection offered a consistent way to compare parking search times between areas and across data collection periods for each iteration of the survey.

Surveyors were trained to follow consistent rules that removed, to the extent possible, subjective judgments about when and if a space was open (details in Appendix A). Appendix C contains a full, detailed methodology for the survey and a sample data collection log used by surveyors. The parking search time methodology is reproduced as follows:

1. Timing of the surveys will be coordinated with rate adjustments so as to not overlap.
2. The surveys will be performed on bicycles along pre-defined survey routes.
3. Each route has a designated start point located at a major intersection; surveyors will begin each run at the near-side crosswalk of the intersection (See Figure 2.2).
4. Surveyors will note the start time and activate a stopwatch.
5. Surveyors will bicycle along the assigned route searching for a parking space. Surveyors will attempt to maneuver in traffic exactly as a passenger vehicle would while searching for parking and will follow all traffic laws.⁴ Surveyors will continue to ride along the pre-assigned route until they find a vacant legal parking space to accommodate a full-sized sedan (e.g., Honda Accord). Surveyors could not park in loading meter spaces until after 6pm or according to other specific meter guidelines.
6. Surveyors will be trained to follow consistent rules that remove, to the extent possible, subjective judgments about when and if a space is open. For example, one rule will be to not wait for drivers preparing to leave a parking space.
7. Once a suitable parking space is located, surveyors will turn the bicycle into the parking space (or to a "safe harbor" at the side of the road), stop the stopwatch, and note the elapsed search time to the second.. They will also record the number of times they passed the starting point before arriving at the vacant, legal parking space (i.e., the number of completed "laps" of the assigned parking search route).
8. Next, surveyors will note either the meter number of the metered space or the nearest physical address for unmetered spaces.
9. Surveyors will have up to 30 minutes to find a parking space. If the surveyor finds a parking space before the 30 minutes is up, they will return to the starting point and wait four minutes before starting another run.

⁴ Previous studies of parking search time have relied on surveyors riding bicycles and SFMTA desires to replicate that methodology. While on most of the survey streets, the speed limit for automobiles is 25 mph, studies have shown that drivers searching for parking typically slow to 12 mph, a comfortable speed for bicycles. SFMTA also believes that parking search time surveys conducted by bicycle will be safer than if conducted by automobile because they avoid double parking at the beginning of the survey (while surveyors take the start time and odometer reading). This methodology also reduces the equipment and personnel needs of conducting the survey, with a subsequent reduction in data collection costs.

10. If a parking space is not found within 30 minutes, the surveyor will record that search as a “failed search,” return to the starting point, and then start a new search immediately, without waiting four minutes.⁵

4 Known Issues

The following section notes potential data comparability issues to consider for use of the dataset.

4.1 Sample Sizes

During the Before 1 (fall 2010), Before 2 (spring 2011) and Midpoint (spring 2012) data collection efforts, Nelson\Nygaard staff followed the sampling plan (see Section 2.2) and collected a minimum of 144 samples per three-day iteration. However, due to various factors, the dataset does not have the exact number of time band samples assumed to be collected in Figure 2.

Worth noting is the Fillmore pilot area during the Before 2 collection period, which has a total of 127 observations covered over a weekend only. The weekday collection for the Fillmore pilot area was removed due to a flawed survey run where one of the surveyors began the route at an unidentifiable point on the wrong side of an intersection. Therefore, the dataset has no usable “Before 2” weekday data for Fillmore.

Figure 4.1 Unusable Data

Data Collection Period	Route	Date	Day Type	Time Periods	Reason	Notes
Before 2010	Civic Center	11/21/2010	Sunday	12pm, 4pm, 8pm	Construction	Grove from Larkin to Polk (1st block of route) no parking (11/19 to 11/21, 8am to 1159pm).
Before 2010	South Embarcadero	12/1/2010	Saturday	4pm, 8pm	Surveyor methodology - surveyor did not record elapsed time correctly.	
Before 2010	Union	11/21/2010	Sunday	4pm, 8pm	Surveyor methodology - ran route in opposite direction	
Before 2011	Civic Center	5/29/2011	Sunday	All	Holiday weekend	

⁵ A 30 minute cap on parking search time was chosen as a reasonable threshold for estimating the point when drivers will become frustrated and either (a) leave the area, (b) park in a garage or lot, or (c) park in an adjacent residential neighborhood. From a methodological perspective, it is also necessary to cap the time surveyors spend searching for parking, as it is possible that during peak times it may take much longer than 30 minutes to find a parking space, making it difficult for SFMTA to collect a sample size large enough to allow for statistical analysis.

Before 2011	Union	5/14/2011	Saturday	8am, 12pm	Surveyor methodology - ran route in opposite direction	
Before 2011	Fillmore	5/11/2011	Weekday	All	Surveyor methodology - surveyor did not run route according to map.	
Midpoint 2012	Downtown	4/21/2012	Saturday	8am, 12pm	Major street closures at middle of route Washington between Drumm and Clay (22 spaces), Clay to Battery (38 spaces)	
Midpoint 2012	Mission	All	All	All	Major construction on Mission Street.	

Additionally, a small sample of time bands in the Before 1, Before 2 and Midpoint data do not have any usable data due to surveyor methodological error and scheduling conflicts. As shown above, Figure 4.1 provides an overview of the collection periods, days and time periods with no usable data.

4.2 Automobile Parking Search Time Sample Sizes

The sampling plan for the parking search time survey conducted by personal automobile had specified that a minimum of 64 samples (eight per survey area) must be collected for the automobile PST survey. The Auto PST survey was implemented during the Before 1 (on weekdays), Before 2 (on Saturday and Sunday), and After (weekdays 8:00am-10:00am only) survey iterations.

Although the final dataset met the minimum sample size for both the Before 1 and After survey iterations, the eight Before 2 samples collected on the Civic Center route had been moved to the unusable table since they had been collected during the Memorial Day long weekend (Sunday, May 29, 2011), which went against the methodology.

4.3 Additional Considerations

Discussion of data missing from the usable “PST” table can be found in Figure 3. The following lists additional corrections and considerations for the usable data:

- Due to surveyor reliability issues, some samples for the “After” collection period had been re-collected in late July 2013.

- Since meter operating schedules in the South Embarcadero area had been extended in early 2013, a 10:00pm -12:00am survey period had been added for the survey area.
- The survey methodology stated that surveyors may find available parking on both sides of a one-way street only if the street is two or fewer lanes wide. On three lane one-way streets, they were only permitted to find a parking space on the right side of the street. However:
 - During Before 2 in Civic Center, construction along the route (BlockID 442051) created a two-lane one-way street. Samples collected on both sides of the street were included because the width of the street at the time of the survey met the methodological conditions.
 - A total of 54 parking search time runs across all four survey iterations were collected contrary to this direction and had been moved to the unusable tab. The entire day for surveyors who used the incorrect methodology had not been removed—which may bias the data toward longer average search times.
- A total of 35 parking search time runs across two survey iterations had been collected when a surveyor ran the end of their route incorrectly. These observations have been removed but the entire day for the surveyors who ran the last part of their route incorrectly has not been removed. Not doing so may bias the data toward shorter average search times.
- During the Before 2 data collection period, some surveys had been conducted during Giants games (“major” special event). The time bands that occurred during the games had been re-collected, but the dataset includes data from the days of the games outside of a four-hour buffer before and after the game had been played.
 - This includes data collected during the 8:00am-10:00am time band on 5/11/2011 and 9:00pm -10:00pm on 5/22/2011.
 - The average search times are comparable between the game day and non-game day samples collected during these times.
- In the entire dataset, five (5) multi-space meters in Civic Center (720-03000, 720-03002, 720-03004) and Downtown (571-00000, 571-00200) had different meter IDs in 2010 and 2011 than in 2012 and 2013. These meters are listed differently in the PST tab in the workbook, but the discrepancy has been highlighted in the notes field.
- Finding the first parking space on the Civic Center and Richmond routes have run times varying from two to 18 seconds, suggesting slight differences in survey implementation between surveyors.
- Some surveyors in the Midpoint collection period have found available parking spaces at meters right before the general parking times expired (before the meter became restricted). This does not necessarily reflect actual parking search behavior.

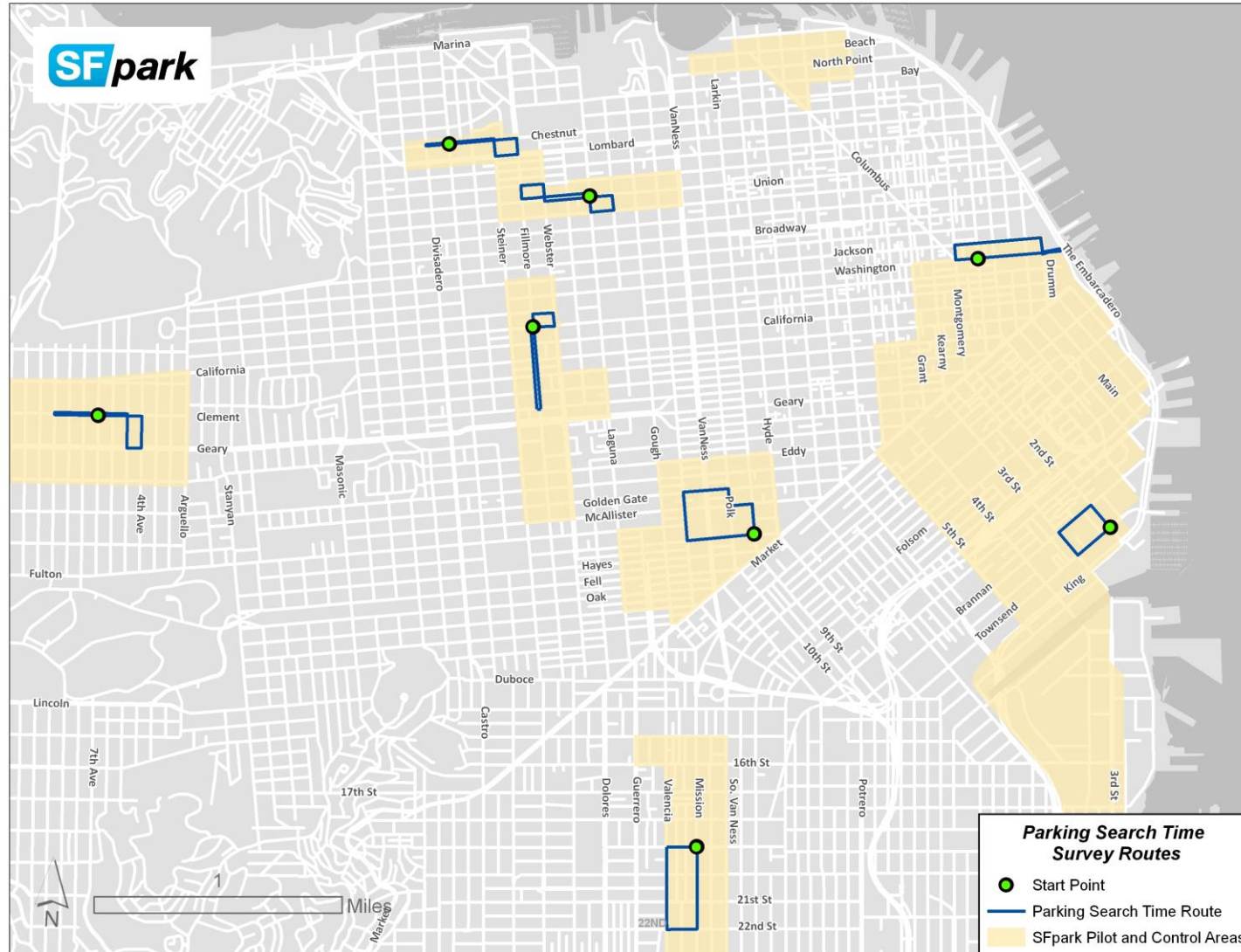
After the comprehensive QA/QC, some issues concerning the following data entry points had been resolved, grouped by survey type:

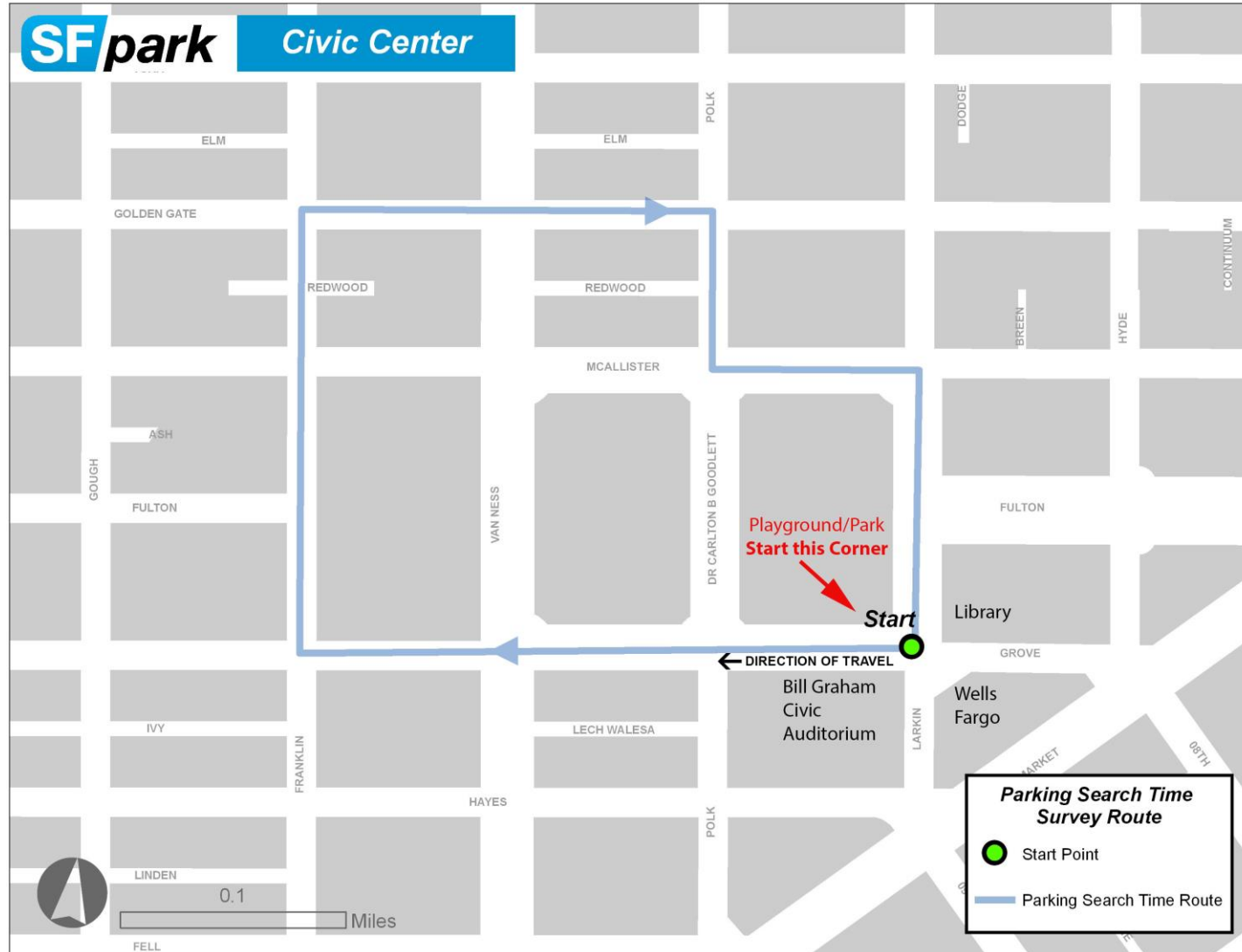
- Missing Meter Data

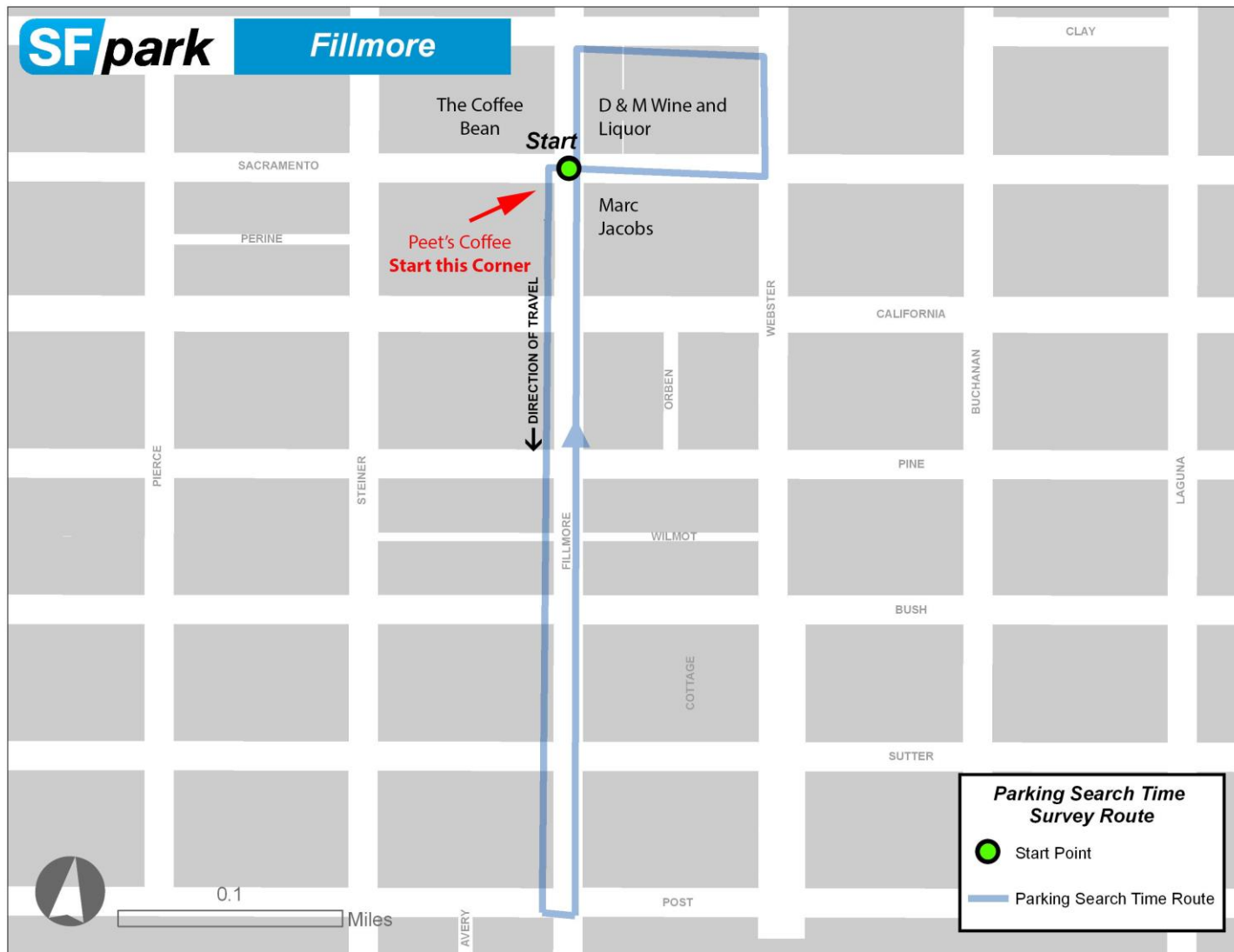
- Potentially mismatched survey area (e.g. addresses in area marked “Marina” look like they are for the Richmond route)
- Survey time period errors (e.g., “8-10PM” corrected to “8-10AM”)

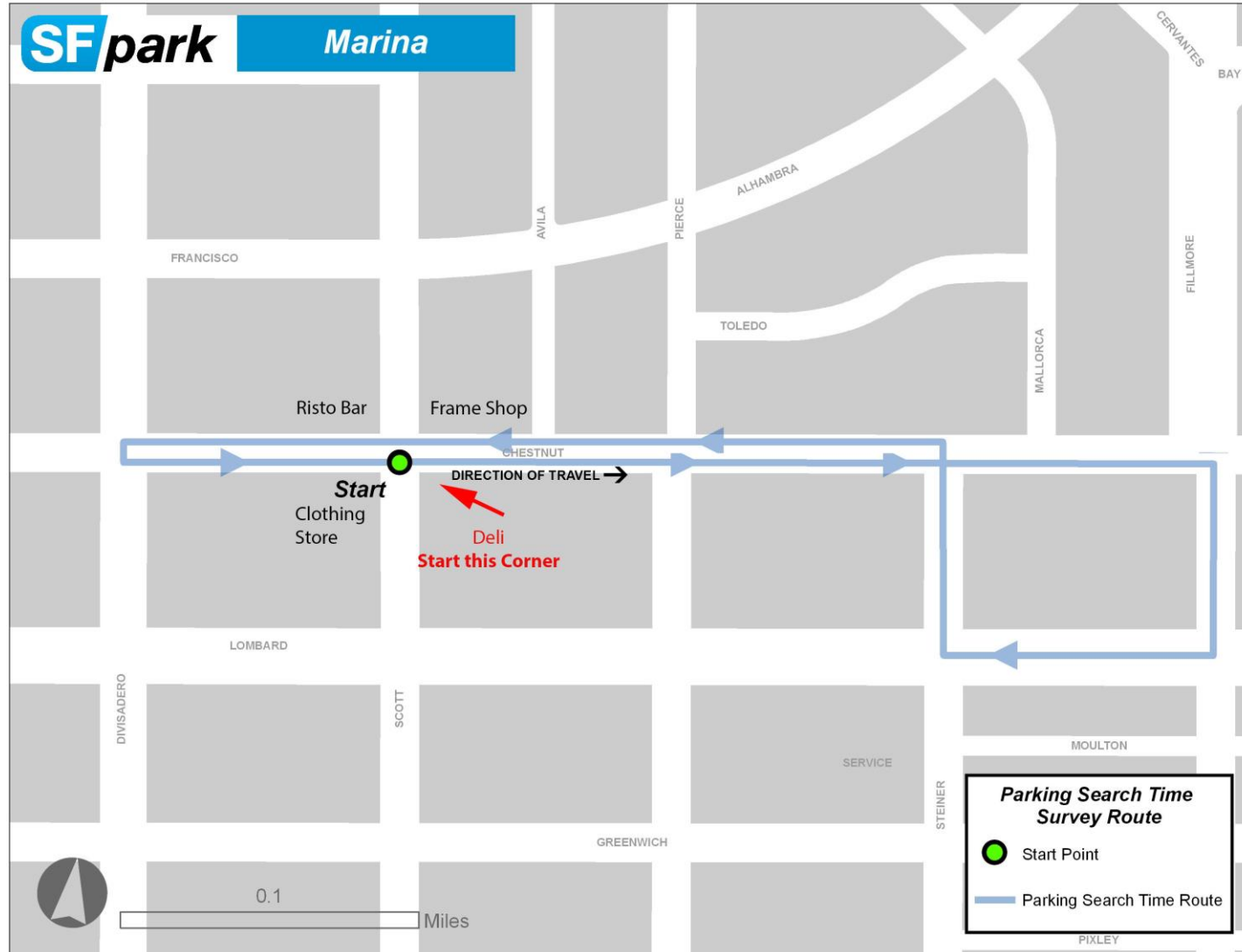
L:\Data Documentation\Data Guides\Parking Search Time\SFpark_DataGuide_Manual\SurveyData_ParkingSearchTime_PublicShare.docx

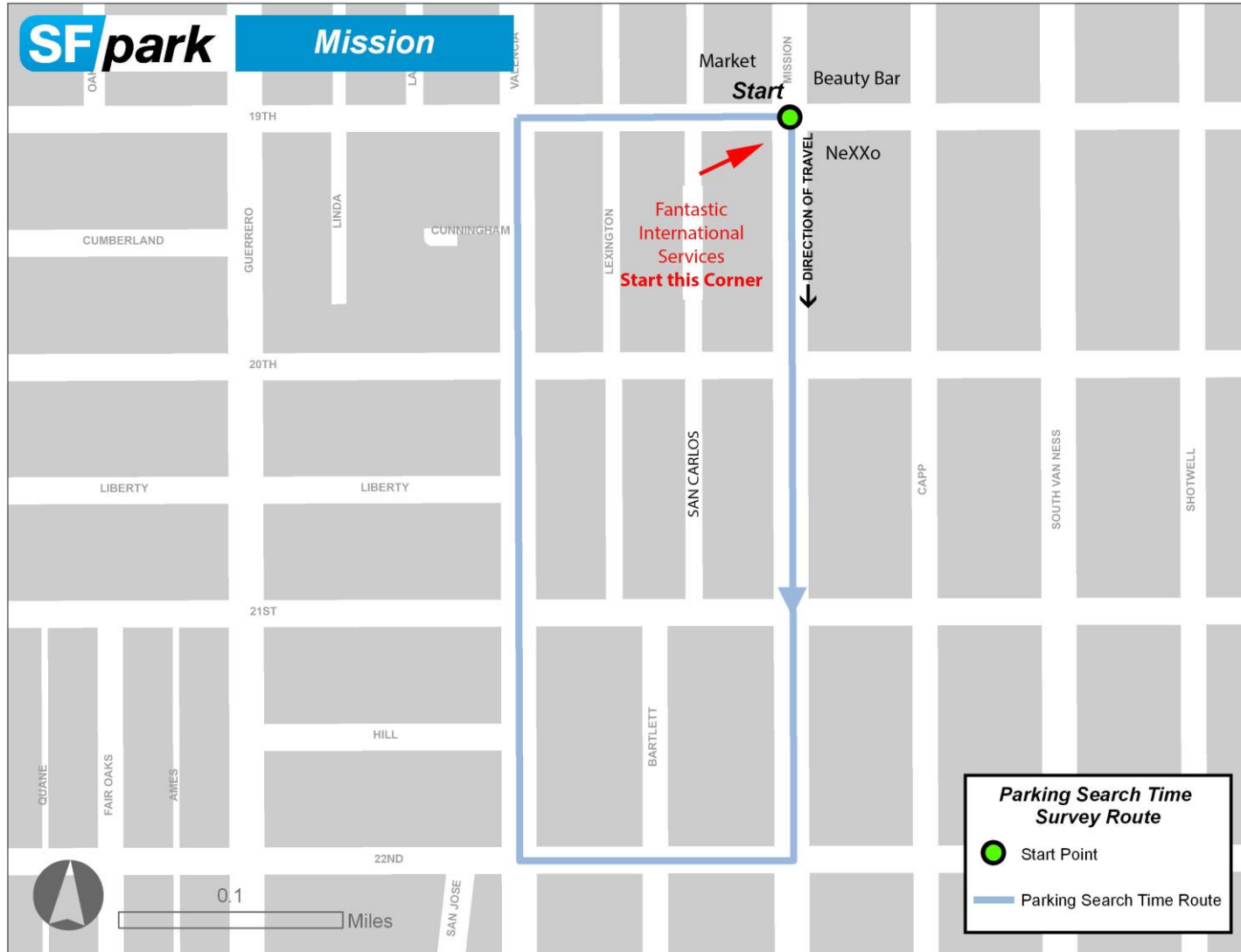
Appendix B: Survey Route Maps

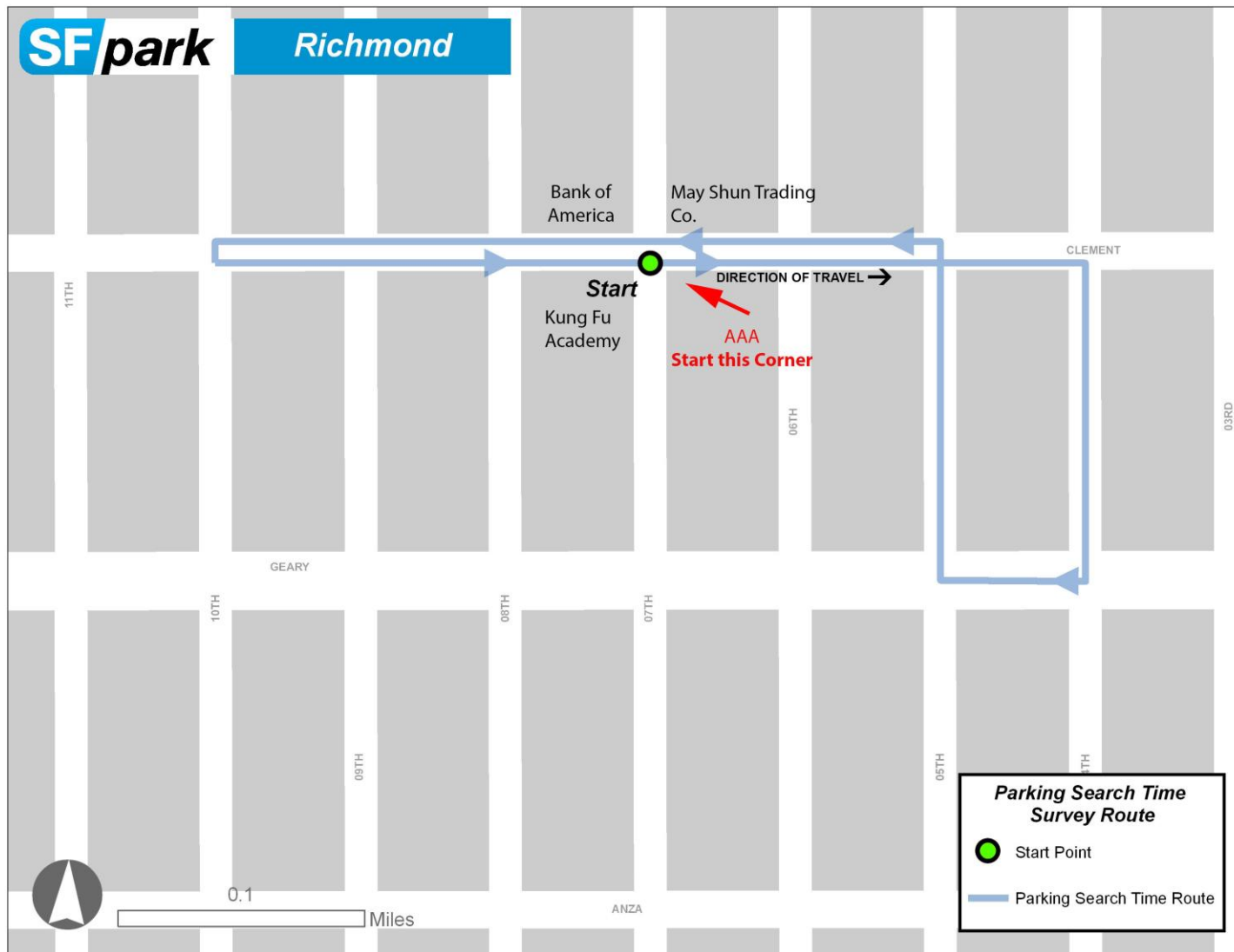


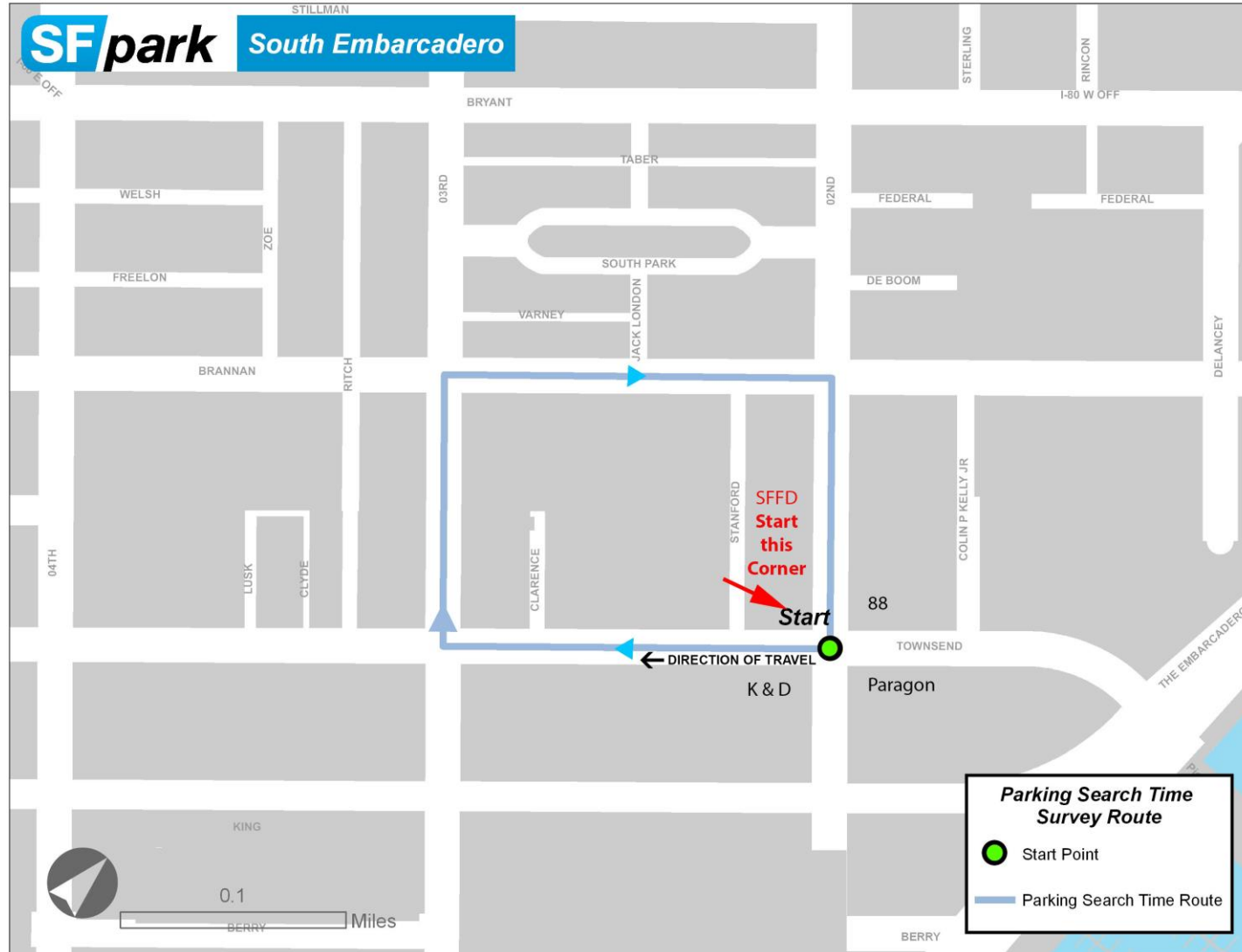


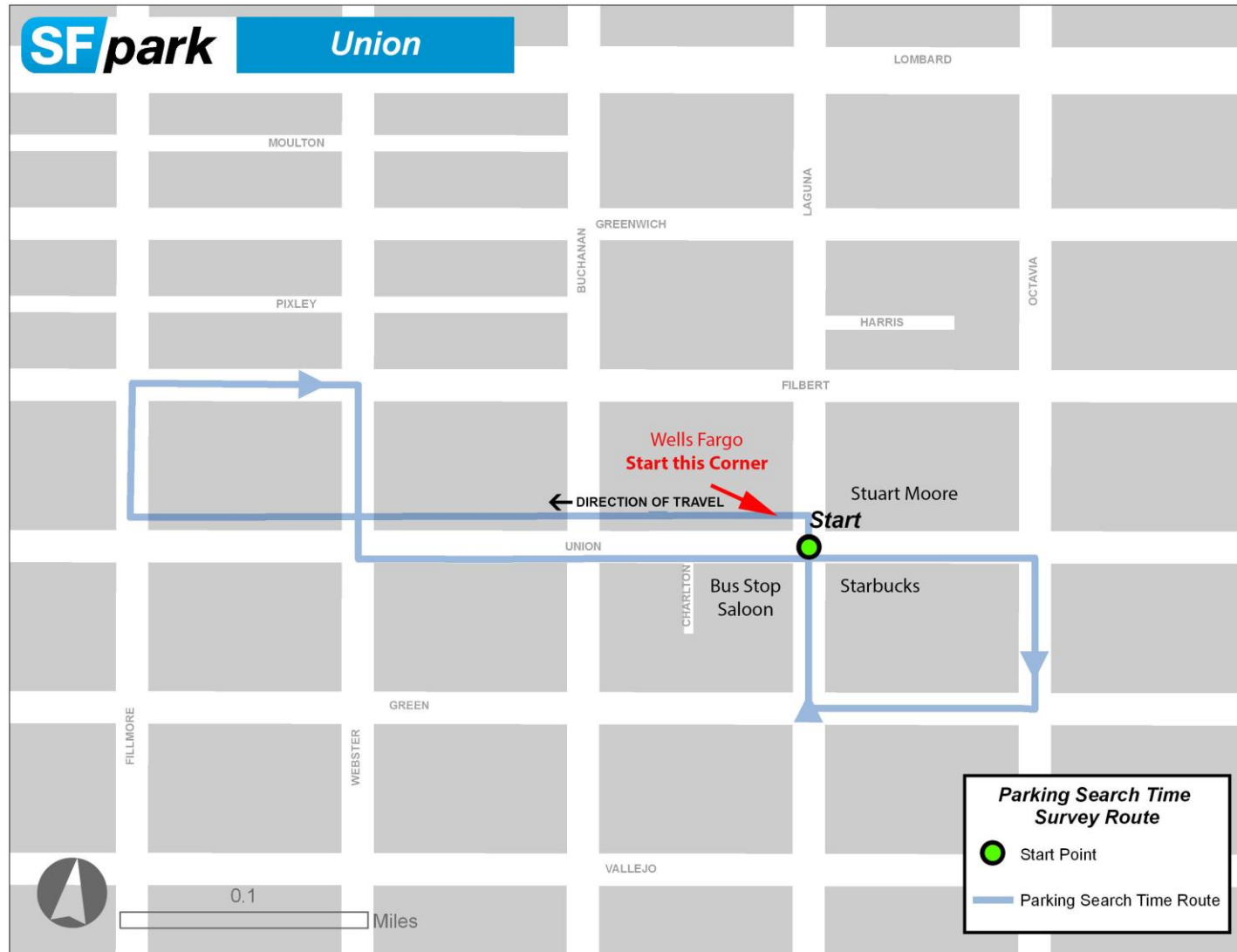












Appendix C: Methodology Instructions to Surveyors

Parking Search Time Survey Practical Instructions



The parking search time survey is meant to learn how long it typically takes a vehicle to find a parking space in each study area at different times and different days of the week. To test parking search time, ride your bicycle as a motor vehicle would, while search for parking along your assigned route. Your job is to follow the specific route, repeatedly during two survey periods in each shift, ending each search when you find an available and legal parking space, or after 30 minutes have elapsed. Each survey period is two hours long (8:00 AM-10:00 AM and 12:00 PM-2:00 PM for Shift 1, and 4:00 PM-6:00 PM, and 8:00 PM-10:00 PM for Shift 2). Please review and refer to the detailed instructions below.

Your field supervisor today is: _____ at _____ (cell).

Date: _____ Surveyor name: _____

Shift (circle): 7:30 AM – 2:30 PM 3:30 PM – 10:30 PM

Route: _____

What you'll need:

Bicycle, helmet, clipboard, pencil, orange vest, stopwatch, business cards of field supervisor, watch/clock

Methods:

1. Wear your helmet and orange or yellow reflective vest throughout the duration of your time working on this survey. All surveyors working shift 2 (3:30 PM to 10:30 PM need lights on their bike)
2. Review your detailed map to become familiar with the route.
3. Unless you arrive less than 15 minutes before the start of your first survey period (8:00 AM, for shift 1, or 4:00 PM for shift 2), ride the entire route once without collecting any data to become familiar with the route and any potential safety hazards or other issues (e.g. temporary street closure; street cleaning, etc.). If you identify a hazard or issue that you think may make it unsafe or impractical to travel the route by bicycle, please notify the supervisor listed above immediately. At the start of each survey period (e.g. 8:00 AM-10:00 AM, 12:00 PM-2:00 PM, 4:00 PM-6:00 PM, and 8:00 PM-10:00 PM), begin at the specified starting intersection with the stopwatch around your neck or wrist.
4. Record your start time (to the minute) on the data collection form; then quickly store your clipboard materials in your bag.

5. Start your stopwatch and then immediately proceed along your route by bicycle, searching for parking.
6. Where safe, operate the bicycle as you would a car, waiting in line at stoplights, taking the whole right lane when possible and moving in a linear path. At red lights, you may turn right after stopping (if no vehicles are ahead of you in the right turn lane and no vehicles are coming from your left). Pull your bike over into the first empty, legal parking spaces on your right side and stop your stopwatch. (See the attached handout, entitled "What to Look For," for examples of legal and illegal parking spaces. If you have a question about whether or not a particular parking space is legal, pull into the space on your bicycle and review any information on the meter, or associated sign [temporary or permanent], to identify whether or not the parking space is legal at the exact time that you are attempting to park there, before stopping your stopwatch [note: some spaces, especially load zones are legal to park in only after 6:00 PM, but the hours and restrictions vary by lot and by space, so be sure to review the sign before stopping your watch. Note that where there is a discrepancy between the sign and the curb painting/marking, the sign is the final indicator of the legality or illegality of parking in the associated space at that time of day].
7. Do not estimate or measure the time it would take a vehicle to parallel park.
8. If you do not find a space after **30 minutes** of searching, return to the starting intersection for your assigned route, by whatever route you prefer (walking, or operating as a bicyclist, if you prefer (e.g. passing cars on the right in a designated bicycle lane). If you have returned to the starting point after a 30 minute "failed search," begin a new search immediately (starting at # 4, above), **WITHOUT** waiting four minutes as you are required to do after each successful search (see # 11, below).
9. Step onto the sidewalk and pull out your clipboard. Fill in the "# laps" (If you have found a parking space before completing one full lap of the route, mark "0"), indicate whether the search was a "Failed search (yes/no)" (i.e. you did not find an available and legal parking space within 30 minutes), and if the space is legal to park in at the moment, note the "Meter ID #" or address, if there is no meter at the parking space you found. For parking spaces with multi-space parking meters, please note BOTH the parking space # (writing "S# _____"), AND the Meter ID # (writing "M# _____") in the appropriate column on the data collection form.
10. Start your stop watch and return to the starting intersection for your assigned route, by whatever route you prefer (walking, or operating as a bicyclist, if you prefer (e.g. passing cars on the right in a designated bicycle lane).
11. Once you've returned to the starting intersection, begin another parking search run **only after waiting until at least four minutes have passed since your last search ended.**

Tips:

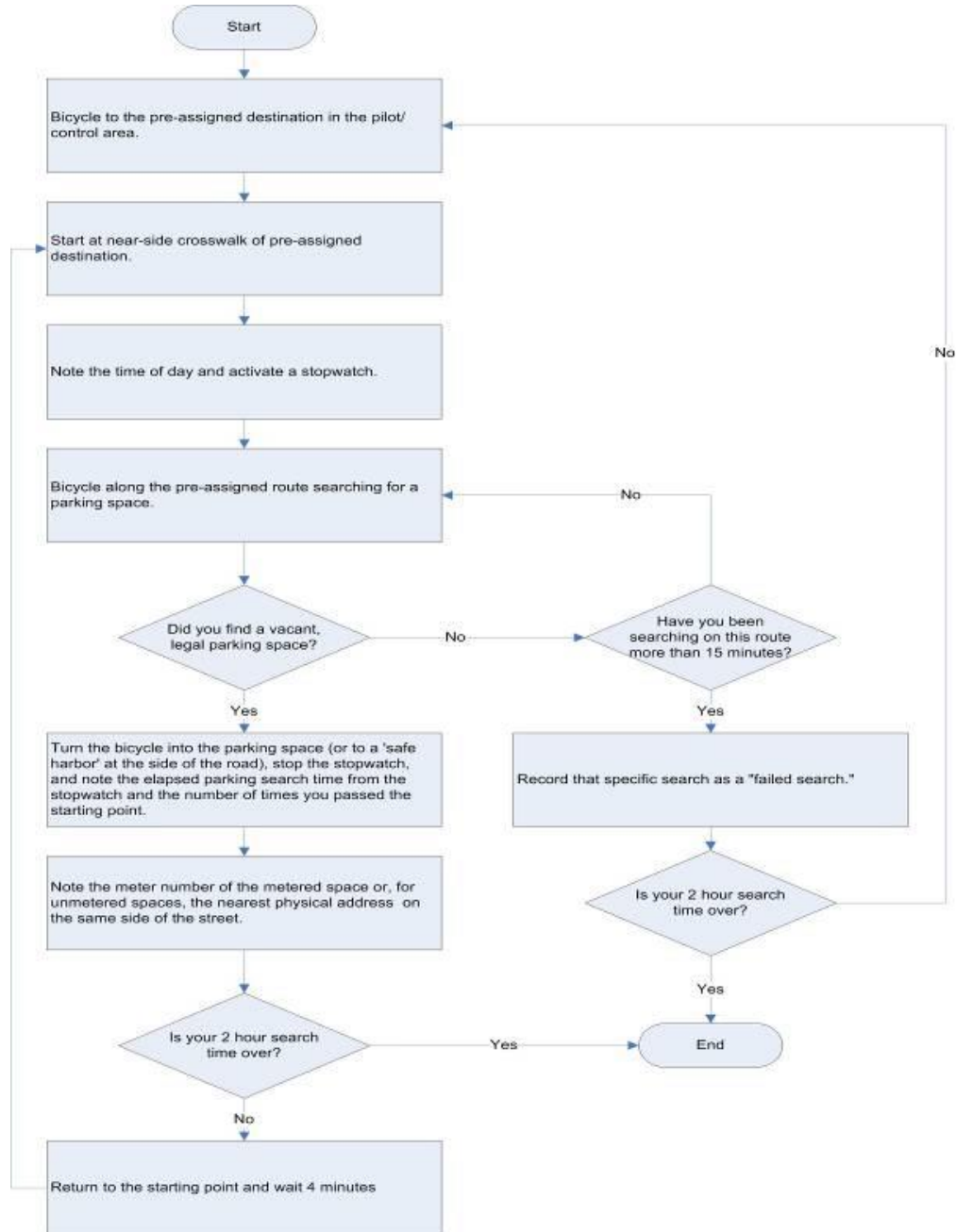
- Act like a car as much as possible while on your search. Take up the whole lane and wait in line at stop signs.

- Stow everything so you are as safe as possible
- When returning to your start point, feel free to get there however you prefer; walking is fine if it is fastest.

Problems/Contact:

- Time is of the essence.
- If someone asks what you are doing, tell them you are working on a time-sensitive survey collecting non-identifying information. If they press for more information, simply give them the business card of your field supervisor of that day.
- Call your field supervisor if you see a problem along your route, are unsure how to proceed, or have questions.
- Your field supervisor today is: _____ at _____ (cell).

Flowchart of Directions to Surveyors



Parking Search Time
What to look for:

You are looking for legal parking spaces, many of which may be metered.



*despite the curb cut,
this is a legal parking
space because it has a
meter- DO count it*

If you see a car preparing to vacate a spot, do not wait for it. Keep going.



If you are going down a one-way street, you can find parking on either side of the street if the road has one or two lanes.



*one-way street:
look for parking
on both sides*



*one-way street:
look for parking
on both sides*

If you are going down a two-way street, only find parking on your right hand side. Don't pull any U-turns to get to parking.



*two-way street:
only look on right
side*



*two-way street:
only look on right
side*



*two-way street:
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side*

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only look on right
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side*



*two-way street:
only look on right
side*

Be sure to check meter regulation details if you are not sure. Sometimes the same meter will have multiple roles throughout the day. If the space is available for "normal" parking at the time you are surveying, count it as parking supply. Regulations may change part way through your shift. For example, a space could be van-pool only until 9am, but if your shift is 8-10am, at 9am you'd start counting it as "normal" parking supply. When in doubt, just remember to pretend you are a regular vehicle seeking a legal, metered parking space.

Yellow Zones & Yellow/Red Meters



**Parking OK
Depending on
Time of Day**

Loading Zones and Meters

- Times vary
- In general, not a "legal" space during daytime hours
- M-Sat
- Often "legal" evenings and Sunday
- **Verify time of hours if you see a space available and log down**

Green Zones & Meters



Parking OK

Short-term Parking and Meters

- Legal spaces
- Generally only allow parking for shorter periods (e.g., 30 min)
- **PARKING OK HERE**

Red No Parking Zones



No Parking

Red curb

- No parking allowed
- **DO NOT park in these locations**

Blue Zones



No Parking

Disabled Parking

- No parking allowed
- **DO NOT park in these locations**

White Zones



No Parking

Passenger Loading Zone

- **DO NOT park in white zones**

Parking Search Time Survey Data Collection Form



Name: _____

Route: _____

Date: _____

Time (circle one): 8-10am 12-2pm 4-6pm 8-10pm

Survey Run	Start Time (Hour:Min)	Elapsed Time (min & sec)	Number of Laps	Failed Search? (Y/N)	Meter ID of found metered parking space OR Nearest address of found unmetered parking space		
Sample	8:15	1:36	0	N	60600190 S#3		
Search 0					Mark blocked at bottom of page.		
Search 1							
Search 2							
Search 3							
Search 4							
Search 5							
Search 6							
Search 7							
Search 8							
Search 9							
Search 10							
Search 11							
Search 12							
Search 13							
Search 14							
Search 15							
Search 16							
Search 17							
Search 18							
Search 19							
Search 20							
Blocked (reason)	Street	Start Street	End Street	# of spaces	Dates	Times	Notes

1. A failed search means that you could not find a vacant legal parking space able to accommodate an average-sized passenger vehicle after 30 minutes of searching.
2. Mark the number of times you passed the starting point in "laps". If you did not pass the starting point, mark "0" in "laps".