FTA RESEARCH
FEDERAL TRANSIT ADMINISTRATION

Mobility on Demand (MOD) Sandbox Demonstration: BART Integrated Carpool to Transit Access Program
Final Report

FEBRUARY 2020

FTA Report No. 0155
Federal Transit Administration

PREPARED BY
Jumana Nabti
Bay Area Rapid Transit District

U.S. Department of Transportation
Federal Transit Administration

Mobility on Demand (MOD) Sandbox Demonstration: BART Integrated Carpool to Transit Access Program

Final Report

Metric Conversion Table

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
NOTE: volumes greater than 1000 L shall be shown in m^3				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
ºF	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	ºC

REPORT DOCUMENTATION PAGE		*Form Approved* *OMB No. 0704-0188*
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.		

1. AGENCY USE ONLY	2. REPORT DATE February 2020	3. REPORT TYPE AND DATES COVERED Final Report, January 2017–March 2019
4. TITLE AND SUBTITLE Mobility on Demand (MOD) Sandbox Demonstration: BART Integrated Carpool to Transit Access Program, Final Report		**5. FUNDING NUMBERS** VT-2017-001

6. AUTHOR(S)
Jumana Nabti, Manager of Access Programs, BART

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Bay Area Rapid Transit District 300 Lakeside Drive Oakland CA, 94612 Metropolitan Transportation Commission Bay Area Metro Center 375 Beale Street, Ste. 800 San Francisco, CA 94105 Scoop Technologies, Inc. 22 4th Street, Floor 9 San Francisco, CA 94103	8. PERFORMING ORGANIZATION REPORT NUMBER FTA Report No. 0155
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Department of Transportation Federal Transit Administration Office of Research, Demonstration and Innovation East Building 1200 New Jersey Avenue, SE Washington, DC 20590	10. SPONSORING/MONITORING AGENCY REPORT NUMBER FTA Report No. 0155

11. SUPPLEMENTARY NOTES   [https://www.transit.dot.gov/about/research-innovation]

12A. DISTRIBUTION/AVAILABILITY STATEMENT Available from: National Technical Information Service (NTIS), Springfield, VA 22161. Phone 703.605.6000, Fax 703.605.6900, email [orders@ntis.gov]	12B. DISTRIBUTION CODE TRI-30

13. ABSTRACT
The Bay Area Rapid Transit District (BART), the Metropolitan Transportation Commission (MTC), and Scoop Technologies, Inc. (Scoop) partnered on a program to better integrate carpool access to public transit by matching transit passengers into carpools with a transit station as their destination using the carpool matching app Scoop and providing a seamless way to reserve and pay for highly-coveted parking spaces at BART stations. This report discusses how the project was developed and implemented and the project outcomes and lessons learned.

14. SUBJECT TERMS Mobility on demand, transit, carpool, heavy rail, station access, first mile/last mile, parking, app-based rides	15. NUMBER OF PAGES 100

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT None

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Acknowledgments

Abstract

The Bay Area Rapid Transit District (BART), the Metropolitan Transportation Commission (MTC), and Scoop Technologies, Inc. (Scoop) partnered on a program to better integrate carpool access to public transit by matching transit passengers into carpools with a transit station as their destination using the carpool matching app Scoop and providing a seamless way to reserve and pay for highly-coveted parking spaces at BART stations. This report discusses how the project developed, was implemented, and the project outcomes and lessons learned.

The Bay Area Rapid Transit District (BART), the Metropolitan Transportation Commission (MTC), and Scoop Technologies, Inc. (Scoop), a mobility technology company, partnered on a program to better integrate carpool access to public transit by matching transit passengers into carpools with a transit station as their destination using the carpool matching app Scoop and providing a seamless way to reserve and pay for highly-coveted parking spaces at BART stations. This project is one of 11 Mobility on Demand (MOD) Sandbox projects funded by the Federal Transit Administration (FTA). FTA's MOD Sandbox explores integrating innovative mobility concepts and solutions with transit in a real-world environment, in support of FTA's vision of MOD as an integrated network of safe, carefree, and reliable transportation options available to all. This report discusses how the project developed and was implemented and the project outcomes and lessons learned.

Project Background

BART is the fifth-busiest heavy rail rapid transit system in the US, carrying more than 430,000 daily riders. BART provides service in northern California in four Bay Area counties—Alameda, Contra Costa, San Francisco, and San Mateo. The BART system comprises 48 stations and provides access to many of the San Francisco Bay Area's key destinations for work, school, and recreation.

BART manages almost 50,000 parking spaces at 34 stations. Demand for parking is high, with the majority of spaces filling by 8:00 AM each weekday. According to a 2015 passenger profile survey, only about 0.8% of those parking at BART carpool with others to the station. As most vehicles remain parked all day, the majority of parking spaces serve just one patron, or two trips, per day.

BART's Legacy Carpool Program provides dedicated carpool spaces at 21 BART stations to patrons on a first-come/first-served basis. Carpools are enforced through a permit system and, when an enforcement officer is present, live observation of patrons as they park and exit their vehicles. This is not a high priority for BART parking enforcement; as a result, there is a high degree of fraudulent use, and carpool spaces are difficult to preserve for legitimate carpools.

The MOD partnership between BART, MTC, and Scoop was intended to expand carpool usage by providing a seamless way for users to match into a carpool, get a parking "permit," and pay for parking at BART. Other benefits of the program were to improve the efficiency of BART's parking resources by increasing the average number of patrons using each parking space, encouraging new and more frequent ridership, improving access to stations, and reducing peak core capacity issues as well as address enforcement issues.

Project Description

Scoop brings together neighbors and co-workers who are going the same way to work. Scoop's algorithm identifies the most efficient trip based on the fastest

route, nearby carpoolers, carpool lanes, and more. It provides flexibility by allowing users to schedule AM and PM trips separately to fit their unpredictable work schedules and to select ride or drive options to meet their daily needs. MTC and Scoop began working together in 2015 to promote carpooling in the Bay Area region using the Scoop app that matches drivers and passengers with similar origins and destinations into carpools, flexibly based on each individual's daily travel needs. In 2016, BART, MTC, and Scoop began working together to develop a pilot program that would use the Scoop app to match users going to BART stations into carpools. The pilot program provided a guaranteed parking space at the BART station to drivers who matched with a rider through the Scoop app. In turn, Scoop provided license plate numbers of matched drivers to BART on a daily basis, and BART used this information to help manage and enforce the program.

The pilot program initially launched at the Dublin/Pleasanton BART station in January 2017 and, through the MOD Sandbox grant, the program was able to expand to 17 stations during the course of the project. The grant was planned to more fully develop Scoop's app functionality in BART-specific ways by including BART stations as preset origins and destinations, integrating parking payments into the app, and pre-screening for wheelchair-accessible vehicles, as well as to market the program and increase the critical mass of users. Marketing was a key feature of implementing the program, with important roles played by all three partners.

Figure ES-1

Scoop to BART stations (Scoop to BART stations shown in green; stations marked in red do not have parking)

Project Results

The program was highly successful in terms of usage, with more than 140,000 person trips matched into carpools between January 2017 and June 2019. Usage gradually rose throughout the term of the project, with weekly and seasonal travel patterns similar to overall BART ridership. Usage varied significantly by station, with higher usage stations having the following characteristics:

- End of the line station or station with large "commute-sheds"
- Stations where parking demand is high as measured by daily parking fill time

High usage stations included Antioch, Dublin/Pleasanton, Orinda, and Warm Springs.

The project provided a significant improvement over enforcement by live observation. However, there were reports of fraudulent use by Scoop users that matched with a known carpooler (such as a spouse or housemate) and then drove to the station alone. Enforcement and verification of carpools was not a priority for Scoop and were not a focus of the program, so attempts by BART to track and address this issue were not successful.

Initial results of user surveys suggested that users carpooled through Scoop primarily to get a parking space and reduce the cost of their commute. Scoop carpoolers also reported riding BART more frequently as a result of the program, as shown in Figure ES-2.
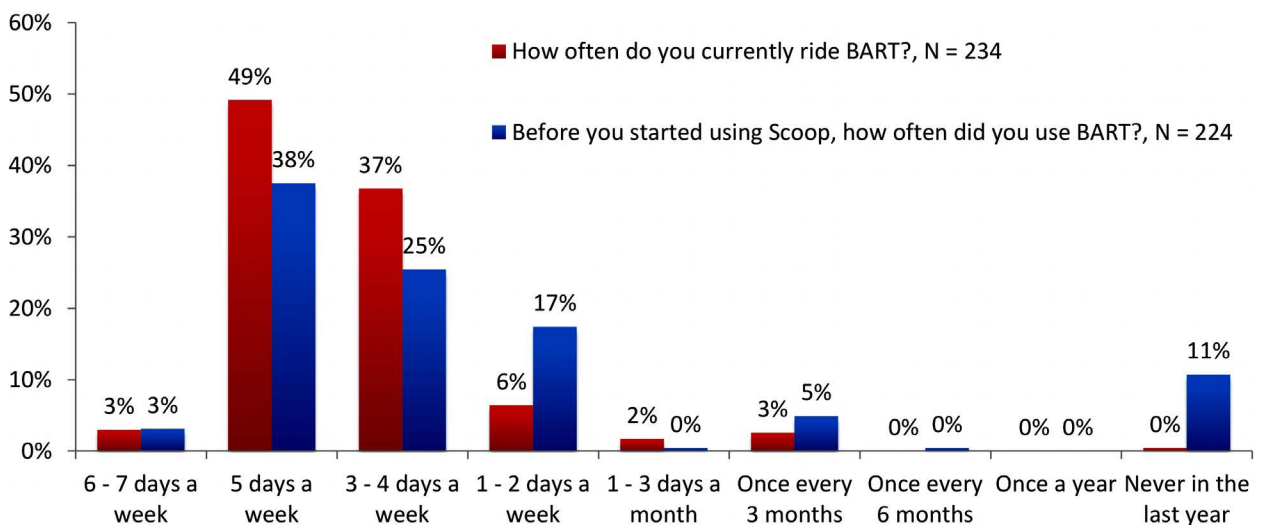
Figure ES-2 *Use of BART before and after using Scoop*

Project Evolution

In Fall 2017, Scoop informed BART and MTC that should the project continue beyond the pilot contract, which ended in June 2018, it intended to switch to a business model that it had been using with its enterprise clients. This entailed charging a fee per carpooler matched, which was later negotiated to a flat monthly fee for service. In determining whether to move forward with this proposal, BART assessed the proposed costs, strengths and weaknesses of the program, and the needs and goals for BART's parking and carpooling programs.

Around the same time, BART was developing its own smartphone app, with the intention of using that platform to provide a parking payment function. Rather than invest limited carpool funding into a monthly Scoop service fee that would not meet some critical needs, it was decided that funding would be better used to develop a function in the app for carpool parking payment and verification.

A contract addendum was signed to continue the Scoop program while the BART carpool app functionality was developed, providing a seamless continuation of carpool parking options. The Scoop to BART program ended at all stations on June 30, 2019.

The new BART carpool payment/verification function became operational on June 17 at the four most-used Scoop to BART stations—Antioch, Dublin/Pleasanton, Orinda, and Warm Springs. Other stations will be added to this feature once testing has been completed. In the meantime, because the contract with Scoop expired, carpoolers must use the Legacy Carpool Program until the new program expands to the remaining stations, estimated in 2020.

Project Evaluation

An independent evaluation was conducted by FTA's independent evaluation team, with research questions intended to assess whether the goals and objectives of the program were met. Results of this evaluation are available as part of a separate report entitled "Mobility on Demand (MOD) Sandbox: BART Integrated Carpool to Transit Access Program, Evaluation Report."

Introduction

Project Background

BART Parking

BART offers almost 50,000 parking spaces at 34 of its 48 stations to its patrons with the following parking options:

- **Daily Fee parking** – First-come/first-served spaces (approximately 35,000 spaces)
- **Permit Parking** – reserved spaces (approximately 12,000 spaces)
  - Single-day permit
  - Monthly permit
  - Airport/long-term permit
- **Carpool Parking** – first-come/first-served designated carpool spaces (approximately 900 spaces)

Demand for parking is high, and most Daily Fee spaces fill by 8:00 AM each weekday. Permits allow patrons to arrive at the station until 10:00 AM. Monthly permits are also in high demand, with more than 43,000 people on waitlists district-wide. Single-day permits are available two months in advance and typically fill up approximately two weeks ahead of time. Permits typically cost twice the amount as Daily Fee parking, with Daily Fee typically costing $3 per day and permits costing $6 per day.

Although parking is in high demand, surface parking is not considered the highest and best land use adjacent to rapid transit stations in terms of supporting ridership or other regional goals. In 2015, BART passed a station access policy that directs investments in access programs and infrastructure based on station typologies. Under this policy, investments in "urban" and "urban with parking" station typologies focus access investments on walking, biking, and transit rather than parking. There is also an effort to shift stations up the typology hierarchy to encourage station access via these modes in the future, even if the current facilities do not support them adequately. This is supported by Plan Bay Area, the regional transportation and land use plan that supports growth in housing and other land uses adjacent to transit.

Figure 1-1 *BART station access hierarchy and station typologies*

BART is in the process of reducing the overall parking supply district-wide by constructing transit-oriented developments on the surface parking lots of stations. Until now, most of these projects replaced surface parking with garages; however, projects currently making their way down the pipeline will reduce or eliminate parking capacity at stations. In an effort to maintain access for patrons who drive alone and park, the agency is interested in shifting access to non-drive modes and shift single-occupant vehicles to carpools. The thought is that this will maintain options for those who continue to drive and park while improving the efficiency, in terms of BART riders per parking space, of each parking space.

BART Legacy Carpool Program

According to a 2015 passenger profile survey, despite the high number of parking spaces, only about 0.8% of those parking at BART carpool with others to the station. Therefore, as most vehicles remain parked all day, the majority of parking spaces serve just one patron per day.

BART's Legacy Carpool Program provides dedicated carpool spaces at 21 BART stations to patrons on a first-come/first-served basis, at the Daily Fee parking rate of $3 per day at most stations. Each carpooler must place a permit, obtained by completing a form on the 511 Carpool Program website, on the vehicle dashboard. This program has resulted in a high proportion of fraudulent use, as single-occupant drivers can easily place two permits on their dashboard when they park. Preventing fraudulent use of these spaces requires live observation of passengers as they exit their vehicles, which is impractical given staffing resources. As a result, carpool spaces are difficult to preserve for legitimate carpools. Due to the failures of this program, expansion of the program was halted; there are no designated carpool spaces at a third of its stations, and there has been reluctance to expand the number of spaces at stations where the program does exist.

In addition to high fraudulent use, this program provides no way to efficiently gather data on the number of people carpooling. The permit obtained through the 511 website is valid for one year, and payment for carpool parking is not differentiated from Daily Fee parking. Without adequate data, it is difficult to prioritize or allocate funding resources to maintain the program.

The MOD partnership between BART, MTC, and Scoop was intended to expand carpool usage by providing a seamless way for users to match into a carpool, get a parking "permit," and pay for parking at BART, as well as to help BART address fraudulent use and enforcement issues. Other benefits of the program were to improve the efficiency of BART's parking resources by increasing the average number of patrons using each parking space, improving access to stations for those unable to drive, and reducing peak core capacity issues by allowing people to arrive at the station after Daily Fee parking is at capacity by offering a guaranteed parking space to carpoolers.

MTC's No-Cost Partnerships with Private Carpool-Matching Apps

In 2015, MTC's 511 Carpool Program initiated a no-cost partnership program with private carpool-matching apps. Through non-exclusive agreements, the 511 Carpool Program promoted private carpool-matching apps at no cost to the company. In return, the companies agreed to provide aggregated data on carpool trips made by users referred to them by the 511 Carpool Program. Through the course of this program, 511 not only promoted these companies to end users but also coordinated efforts to address regional transportation issues through collaboration among other government agencies involved in carpooling and congestion mitigation and the private carpool-matching app partners. The Scoop to BART program was born out of this partnership. There were several reasons that Scoop was selected as the partner for this pilot program, but the most important was that Scoop was the only one of 511's app partners that, at the

time, had a proven record of successfully matching a significant number of trips regionally.

Scoop Carpool Matching App

Scoop provides an app that matches drivers and passengers with similar origins and destinations into carpools. Scoop users schedule a morning carpool trip by 9:00 PM the night before and by 3:00 PM for an afternoon trip. After these cut-off times, Scoop runs its matching algorithm and provides the carpool matches to users within about 15 minutes.

In two-person carpools, the passenger pays the driver a fee that is approximately half the IRS mileage rate and pays Scoop $1.00. In three-person carpools, the full IRS mileage rate is split between both passengers, and both pay $1.00 to Scoop. Scoop allows three-person carpools on all routes and requires them on those with HOV3+ carpool lanes such as the San Francisco/Oakland Bay Bridge. Scoop also has enterprise contracts with employers and coordinates with public agencies to subsidize carpool trips by reducing costs for passengers and/or increasing payment to drivers.

In addition to having a proven record of matching high volumes of carpool trips, Scoop was also selected as the best option at the time for a pilot program with BART for the following reasons:

- Pre-scheduling trips allowed users time to find an alternate mode if they were not matched into a carpool.
- Pre-scheduling trips provided all license plate data to BART parking enforcement the night before.
- Beyond just a platform to match carpools, Scoop strategically manages its algorithms, marketing, and enterprise clients to maximize carpool matching potential.

Project Description

Scoop to BART Program

In 2016, BART, MTC, and Scoop began working together to develop a pilot program that would use the Scoop app to match users going to BART stations into carpools. The pilot program initially launched at the Dublin/Pleasanton BART station through a contract between BART and Scoop in January 2017. With funding from the MOD Sandbox grant, the program was able to expand to total of 17 stations under a second contract signed in August 2017. Funding from the MOD grant was used for marketing and improvements to Scoop's app functionality in BART-specific ways, such as adding BART stations as preset origins and destinations. Additional improvements were planned but not implemented, including integrating parking payment into the app and pre-screening for wheelchair-accessible vehicles.

The roles for each agency included the following:

- **Scoop**:
  - Carpool matching service
  - App enhancements to tailor the service to BART users
  - Provision of usage and enforcement data
  - Marketing collateral artwork
  - Outreach team support
- **BART**:
  - Program management and administration
  - Parking enforcement
  - Internal coordination with various BART departments
  - Press releases and public information
- **MTC/511 Carpool Program**:
  - Marketing and outreach
  - Government relations

How the Program Worked for Users

Users wishing to participate in the Scoop to BART program downloaded the Scoop app and registered. Drivers also provided their license plate number with their registration. Users scheduled their trip to a participating BART station through the app. Drivers were sent a PDF of the "Scoop Placard," as shown in Figure 2-1, to print out, which provided program rules, information on where

to park at their selected station, and a large image of the Scoop logo. Drivers matched into a trip were requested to park in the permit area of the BART station parking lot, where a space was guaranteed until 10:00 AM. They were also asked to place a printout of the placard on their vehicle dashboard.

Figure 2-1

Scoop to BART placard
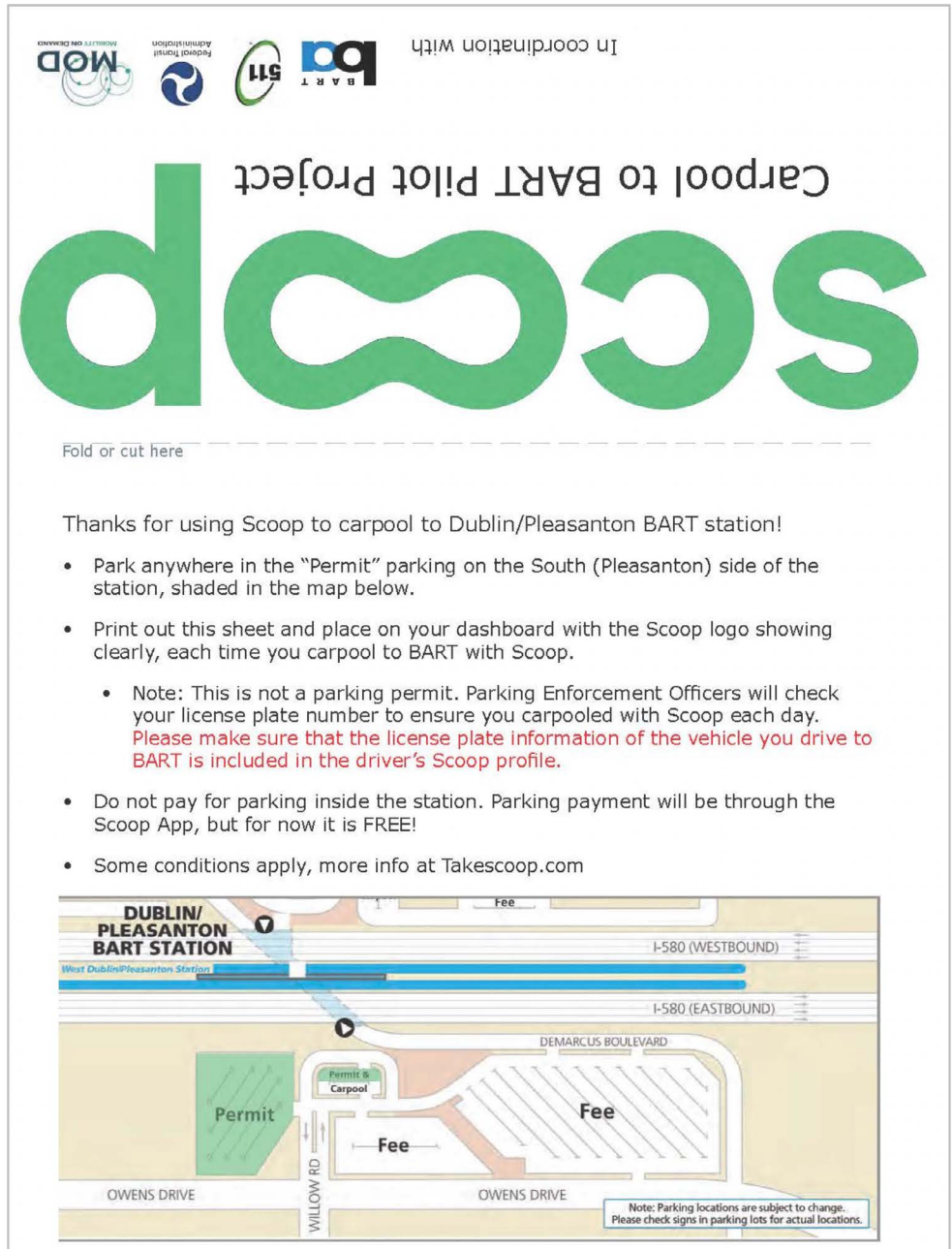
Program Incentives and Who Pays for Parking

The conversation around program incentives centered around providing either a *guaranteed* parking space or a *free* parking space for program users. The high demand for parking relative to supply means that a significant pain point for drive-and-park BART riders is finding a parking space. Parking payment was not eliminated for Scoop to BART users for several reasons including the following:

- Parking is an important source of revenue.
- Elimination of parking payment was not seen as a necessary incentive.
- Internal discussion and decision-making involved in making changes to parking payment for specific users would have distracted from other key program elements.
- Providing free parking for any type of user is not in keeping with BART's Access Policy.

Whereas the power of the term "free parking" was not lost on BART and Scoop staff, it was decided that "guaranteed parking" would attract more people to carpooling and made more sense within the broader logistics of the Scoop program. To make parking payment and enforcement more seamless, it was decided that Scoop would incorporate parking payment into the Scoop app and reimburse BART; more information on this feature is included in Section 3: Program Evolution.

The incentive for the Legacy Carpool Program was the provision of designated parking spaces in a prime location near the station entrance. These spaces were first-come/first-served for carpoolers at the Daily Fee rate of $3 per day. The change from "designated but first-come/first-served" spaces to "guaranteed" spaces meant that people could count on a parking space being available to them when they arrived; this was an important distinction for the Scoop program, in which people schedule their trip the night before on the assumption that they will find parking. Logistically, providing a guaranteed space means that the space must be signed and enforced.

With the hopes that the program would be successful and expand, BART was faced with either regularly needing to change signage to accommodate more carpool parking or incorporating the Scoop program into the permit area, which was already signed and enforced, and adjusting the number and types of permits sold. The latter was determined to be more flexible and cost-effective in the long run.

Enforcement includes ensuring that parking spaces had been paid (via one of several payment options) and that vehicles are in the correct designated locations (for several different permit types) according to BART policy. The logistics involved with checking both the payment and permit for the new Scoop program would have added significant effort for enforcement personnel, which are already

understaffed. Efforts were made to streamline the enforcement process so that providing a guaranteed space was feasible.

After considerable negotiation, BART and Scoop agreed that Scoop would provide a real-time online dashboard showing the license plates of drivers that had been matched into a carpool. Rather than enforcement staff also needing to check for parking payment, it was decided that Scoop would pay a $3 per day fee for each Scoop vehicle parked at BART until parking payment was incorporated into the Scoop app. This would also serve as an incentive for this work to be completed.

Program users were thus given the incentive of a guaranteed parking space that was temporarily free until payment was incorporated into the Scoop app. Once payment was required through the Scoop app, users would get a guaranteed parking space in the permit area for the discounted first-come/first-served Daily Fee rate.

Matching BART Carpoolers with Non-BART Carpoolers

One important operational consideration was whether carpoolers destined for BART could carpool with those not destined for BART. It was agreed that more people would be able to match into carpools if BART users could match with non-BART users going to nearby destinations. With limited parking availability, this could open the possibility of significant numbers of non-BART carpoolers using highly-sought-after parking spaces and limiting the benefits of increased efficiency in terms of riders per parking space. Staff assumed that there would be a relatively even match between BART drivers with non-BART passengers and non-BART drivers with BART passengers, essentially equalizing the impact on parking at the station. It was decided to move forward with allowing BART users to match with non-BART users and to collect data that would allow analysis of whether the numbers actually offset each other. More importantly, it gave peace of mind to BART users that they could match with anyone via Scoop and continue to take advantage of program incentives. Initial analyses showed that there were somewhat more people who drove and parked at BART with non-BART passengers than non-BART drivers that dropped a passenger off at BART. This difference was minor enough that it was not an important issue for BART staff.

Behind the Scenes

When Scoop ran its algorithm each evening and afternoon, the carpool match data was automatically uploaded to a real-time online data dashboard, shown in Figure 2-2. This included the license plate information for each Scoop driver parking at BART, by station. When parking enforcement officers saw the Scoop placard printout on the vehicle dashboard, they would know to check the online list to ensure that person had carpooled with Scoop that day. Those who did not or who failed to place the placard in the dashboard would receive a parking citation.

Figure 2-2

Scoop to BART searchable online enforcement list

Since the number of users matched into a carpool varied from day to day, usage was monitored, and permit spaces were reserved to ensure that there would be enough for the likely number of users. Any unused spaces typically filled at 10:00 AM when permit parking reverted to first-come/first-served parking. Permit spaces were reserved by adjusting the number of single-day and airport/long-term permits available for purchase or not backfilling monthly permits when they were cancelled. The program also took advantage of parking spaces made available by monthly permit holders who did not park at BART on any given day.

Launching the Program

The program was launched over time at a total of 17 stations. Marketing the program was an important element in the program's success, and focusing on a few stations at a time allowed staff to prepare the marketing program for each one. Initially, station launches were grouped two or three at a time to take advantage of efficiencies in marketing efforts. Later, stations were launched one at a time to allow a smaller, better trained outreach team to staff each launch.

Stations were selected to launch by agreement of the three partners. Factors included:

- Potential success of the station, based on station ridership, availability, and strength of Scoop service in that area
- Ability to reserve an appropriate number of permit parking spaces
- Political considerations such as stakeholders that felt strongly either for or against the program

Some stations were launched despite having a low projected demand for program use to increase availability of the program across station types, improve

access options to the stations, and test assumptions of program success. These stations were launched with reduced investment in high-cost marketing methods. Further detail on marketing strategy and distribution of high-cost marketing methods is discussed below. Most launch efforts were related to program marketing and outreach, described further below; however, other launch efforts included:

- Reserving an appropriate number of parking spaces for Scoop users; this was often a best guess considering the station's previous carpool usage and the catchment area of the station
- Ensuring BART station staff were aware of the program and launch efforts
- Scoop adding the station to its matching algorithm and defining the addresses or geographic area of the station

Figure 2-3

Scoop to BART stations

Note: Scoop to BART stations shown in green; stations marked in red do not have parking.

Table 2-1 *BART Stations in Scoop to BART Program*

Stations/Months	2017												2018												2019					
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
Dublin/Pleasanton	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Millbrae									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
San Bruno									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Concord										■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Pleasant Hill										■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Orinda											■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Rockridge											■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Union City													■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Colma															■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Daly City															■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
South San Francisco															■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Warm Springs																	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Lafayette																	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Walnut Creek																	■	■	■	■	■	■	■	■	■	■	■	■	■	■
North Concord																	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Antioch																	■	■	■	■	■	■	■	■	■	■	■	■	■	■
West Dublin																			■	■	■	■	■	■	■	■	■	■	■	■

Note: Blue shading represents months each station was part of program.

Program Marketing

Developing a critical mass of users is important for carpooling, which depends on a large user base to provide the best carpool matches. Marketing was seen as a critical part of project implementation. The marketing strategy was developed by all three partners working together and identifying the marketing strengths and resources available to each. Roles were identified and later adjusted based on these strengths and resources. The goal was to provide as many touch points as possible at a low cost. Stations were launched one or a few at a time so marketing efforts could focus on that station. An extensive outreach campaign was developed, including the following (see Figure 2-4 and Appendix A for examples):

- **BART press releases** were posted for each station launch, as news media often picked up stories based on their locality. These significantly increased the visibility of the program, especially as it was considered a positive effort by BART to ease parking capacity issues. These were also linked on MTC's news website.

- **In-station outreach teams** handed out postcards and answered questions at each station launch during morning and evening peak periods. The teams found that during morning peak periods, commuters were interested only in taking a postcard but often stopped back during evening peak periods to ask questions. It was important that outreach staff understood not only the Scoop to BART program but also how the Scoop app works, BART carpool policies, and other regional carpool options.

- **In-station advertising** was deployed at select stations, with the amount of advertising depending on the potential demand for the program at each station. After the first deployment, it was determined that budget would be better used by increasing street team outreach.

Figure 2-4 *Scoop to BART postcard handout*

- **Partner websites** featured messaging and information about the program on their websites. Webpages were intended to provide more extensive information on program details.

- **Passenger bulletins** were posted for each station launch that provided information in paper print-outs at stations as well as online news items.

- **Station platform digital displays** were used to provide messaging on the program at each station as it launched.

- **Email blasts** were sent to those on the BART monthly parking permit wait list, BART's Legacy Carpool Program permit holders, and those who had signed up for 511 Carpool information based on ZIP code and the likely commute-shed of the station.

- **A media kit and coordination with local governments** were developed by 511 with photos, sample social media posts, photos, and links to each partners' website and the program video to promote the program through their lists. These were sent by email to various representatives and staff people in local governments for launched stations. Depending on the staffing resources available, it was requested that they forward messages to neighborhood groups, City Council email lists, or other lists that they thought might be interested.

- **Social media** posts were released by Scoop, BART, and 511.

- **Banners** were installed at each station during its launch period that stayed up for at least a month and, if the opportunity was available, remained up for the remaining term of the program.

- **A-frame signage** was placed at each station to capture attention as people walked from their parked cars to station entrances.

- **Video news items** were created by MTC and included as a link to various websites and posts and provided information on why and how to use the program.

Responsibility for the marketing effort was shared across all three organizations and evolved over time based on staff availability, budget, and expertise. Each element of the marketing strategy required considerable background effort on the part of the program partners, such as designing and developing documents, analyzing email lists, writing press releases, coordinating with various external stakeholders and internal staff, updating websites, scheduling staff, and installing banners and A-frames to ensure launch success.

Table 2-2

Marketing Roles

	BART	511	Scoop
Marketing strategy	X	X	X
Writing of press releases	X	X	
Press coordination	X		
Design of marketing collateral (postcards, banners, A-frame inserts, in-station advertising)	Reviewed	Reviewed	X
Production of collateral	X	X	
Management/coordination of on-site deployment of banners, A-frames, in-station advertising, digital messaging	X	Some A-frames only	
In-station outreach		X	X
Coordination with local governments, including development and distribution of media kits		X	
Email blasts		X	
Photography and video		X	
Website and social media	X	X	X
Passenger bulletins	X		

Although most marketing efforts relied on the existing resources of the three partners and did not require significant budget to implement, outreach teams and in-station marketing did incur significant expense. Due to the high cost of in-station outreach and in-station advertising, the amount of these marketing efforts was distributed across stations according to the projected demand for the service based on station ridership, number of parking spaces, and parking fill times. Stations with a higher estimated demand received more in-station advertising and more in-person outreach time than those with lower projected demand.

Knowledge-Sharing

There was considerable interest in the Scoop to BART program. In addition to attendance on monthly MOD Sandbox grantee phone calls and in-person workshops, project partners presented the project at more than 20 webinars, conferences, employer-focused workshops, and meetings with specific jurisdictions interested in the program. Some knowledge-sharing activities focused on specific aspects of the program, such as marketing and partnerships with the private sector, and others provided an overview of the program.

Project Evolution

The following sections describe the major project elements that shifted over the course of the project.

Marketing Strategy and Implementation

A few changes took place in the marketing strategy over the course of the project. In-person outreach was initially managed by 511 through an existing contract for conducting outreach on carpool options and promotion. The firm developed the outreach protocols, coordinated Scoop's temporary outreach staff, and ensured that all materials were on-site, including tables and chairs, tablecloths, and postcards. It also ensured that signage was moved from one station to the next and coordinated with station agents to store materials on-site for the week of the launch. Outreach protocols included work hours, information they would need to learn, dress code, and other expectations. 511 managed temporary outreach staff hired by Scoop initially; for later launches, it provided and managed its own outreach staff, which had a greater knowledge of regional carpool options, BART operations, and the Scoop to BART program. To the public, outreach staff acted as agency representatives, so it was important that they were knowledgeable about the program and helpful and courteous to the public.

Staffing the in-person outreach affected the launch schedule. Initially, two or three stations were launched at a time, allowing staff to bundle various marketing tasks, such as email blasts and press releases. When the project shifted to using only 511 for outreach with its limited number of trained outreach staff, launches were scheduled one at a time to meet the needs of outreach staff scheduling.

Initially, a significant portion of the marketing budget was anticipated to go to in-station advertising. After the first advertising run, it was determined that the benefit of this marketing method was not high enough to justify the high cost. It was also determined that in-person outreach was more valuable, and it made sense to re-allocate budget from in-station advertising to provide more in-person outreach. Of the two most costly marketing methods, in-person outreach was critical, and advertising was not. Having person-to-person contact was important for answering questions about the program and to get through to people as they were trying to navigate their commute. During morning commute periods, outreach staff were considered successful if postcards made it into patrons' hands so they could look at it once they had passed through the faregates and boarded their train. During the evening commute period, people were more likely to stop and ask questions about the program or to have an outreach staff person walk them through downloading and registering for the app.

In-App Features

The Scoop to BART program contract included the addition of features in the Scoop app that would improve and further streamline the experience for users. These features included:

- **BART stations as "destinations"** – This was intended to allow users enter the name of the station rather than an address, which had previously been required, to schedule a carpool through Scoop. Rather than do this directly in their app, Scoop started using Google Places, allowing users to enter place names for a variety of destinations, not just BART stations. This met most Scoop to BART user needs; however, for popular destinations such as BART stations, often there are multiple listings for each station under Google Places, each with a slightly different definition. This created some confusion, such as providing directions to the opposite side of the station from where the parking was located for Scoop users. Scoop continuously refined the definitions of BART stations to ensure that its algorithm captured those destined for BART. This was important to ensure that program usage data were accurate and, more importantly, that the license plates of all drivers parking at BART were included in the data dashboard so users were not incorrectly cited.

- **Wheelchair-accessible vehicle option** – This was envisioned to be an option in which drivers could indicate they had a wheelchair-accessible vehicle or that a user needed one. Months into the contract, Scoop said that indicating preferences such as these was being considered on a broader scale but as a longer-term app enhancement. It was never incorporated into the app during the course of the program. Until this feature was implemented, Scoop offered to add the following statement to its Scoop to BART webpage to understand the scale of the demand for a feature such as this: "Want to participate but need a wheelchair-accessible option? No worries! E-mail us and we'll try to link you with a vehicle that fits your needs." Scoop informed BART that no users ever e-mailed it about a wheelchair-accessible option.

- **BART parking payment in the Scoop App** – This feature would have included a line item in the payment account portion of the Scoop app to pay for BART parking, allowing Scoop to BART users parking at BART to seamlessly pay for parking in the Scoop app rather than pay separately in the station or through other BART payment options. Scoop would then have provided a monthly bulk payment to BART for the number of carpoolers that parked at the participating BART stations.

The Scoop app includes line items for employer and public agency carpooling subsidies to reduce the cost for users and therefore encourage more carpooling. The Scoop to BART project was planned to include a separate line item for BART parking payment that would either be paid by the driver or split evenly

by all those destined for BART. One significant complication was that users who scheduled carpools only as drivers, and therefore received payment only from passengers, were not required to enter payment information in the Scoop app; they were required only to enter payment disbursement information when they wanted to transfer their money out of the Scoop app. If parking was to be paid by drivers only or split by drivers and passengers, this would require drivers to enter payment information. Rather than a simple change to add a line item to the payment portion, this would have required more significant changes to the Scoop app.

Early in the program, BART was undecided about whether it made sense to move forward with this feature considering these questions about who should pay. BART and Scoop met to discuss how this feature could work, but subsequent repeated requests for Scoop to move forward with this option or, at minimum, provide a schedule for implementation of this feature were left unmet. Since Scoop had control over app enhancements, it was agreed that Scoop would pay for parking until parking payment was added to the app. Ultimately, the feature was never included in Scoop's app.

Contract Terms

In late 2017, Scoop informed BART and MTC that should the project continue beyond the contract period (which ended in June 2018), it would require payment for its service similar to the business model it had been using with its enterprise clients. Until this point, both BART and 511 considered that the program, as structured, was a mutually-beneficial partnership for all three parties.

Scoop proposed a fee of approximately $4.00 per carpooler matched to BART. This meant a single car parked at the station with two people matched into a carpool by Scoop in the morning would cost BART $8.00. If that same vehicle also was used to carpool in the evening, the cost to BART would be $16.00 for a single parking space, at a net cost of $13.00 to BART, including the $3.00 parking payment by users. Through negotiations, the person trip fee was changed to a flat $20,000 monthly fee based on the person-trip fee and program usage at the time. This would have resulted in a $240,000 annual cost. This new proposed fee raised questions for BART:

- What does this fee include, and is the amount negotiable?
- Does a cost/benefit analysis support incentivizing carpooling in this context?
- Does it meet BART needs, policies, and long-term strategies?
- What are the risks and how can they be addressed?
- Is investing significant budget in a carpool program equitable as compared to the investment in other types of station access such as bus, bike, and walking.

Should BART invest significant budget in a program that subsidizes access to stations for high to very high-income users?

- Is this the best way to distribute budget to improve access to stations?
- What options are available?

Considering the cost of the contract and that other players had since entered the carpool matching market, this would need to go through a public RFP process, which would take time and may result in a change in program vendor and potentially the need to re-launch the program.

The Scoop to BART program had been successful at increasing the profile of carpooling to BART, matching people into flexible carpools, and providing a seamless way for people to carpool to and park at BART. Carpooling behavior increased significantly, at least at a few stations. On the other hand, there were anecdotal reports of people cheating, and staff felt that a stronger level of carpool verification was required. As parking becomes more restricted throughout the district in the future, fraudulent use will likely increase, and verification will become even more necessary.

Investing heavily in Scoop would likely mean that other carpool programs would not be prioritized due to cost and staff time. Those not able to find a carpool match through Scoop would not benefit from carpool incentives. Categories of carpoolers that cannot use the Scoop app include those carpooling outside of commute times or outside of the Scoop service area, those carpooling with known carpoolers, those who are unable to pay the Scoop-determined cost of a trip, and those without a smartphone. BART wanted the long-term carpool program to incentivize all types of carpoolers, regardless of how they found their carpool partners, and preferably there would be only one carpool program district-wide for ease of management and to provide standard program information to users.

Around the same time, BART was developing its own smartphone app, starting with real-time arrivals and a trip planner, as well as an account and wallet feature. A long-term goal was to incorporate payment for both Daily Fee and Permit parking into the BART app. After extensive discussion, staff concluded that it would be possible to also include payment and verification of carpools using faregate entry data from Clipper Cards, the Bay Area's multi-agency smart-chip fare media. This option was ultimately selected because it would better meet BART's needs in the long run at lower cost. Specific elements of this cost/benefit review included the following reasons:

- **Minimize financial risk to BART** – The potential increase in annual costs to $240,000 per year made BART staff very aware that cost adjustments such as this could take place each time the contract was renewed. Scoop was interested in single-year contracts, likely to maintain the flexibility that

is important for a start-up technology company. This flexibility was seen as financial risk to BART.

- **Program cost** – In addition to the proposed cost of Scoop service provision, any additional improvements to the program would have incurred added costs to BART, some of which were improvements that had been included in the initial contract but never implemented. In addition to payments to Scoop, significant project management costs were incurred by BART. Staff estimated that these costs would decrease once a contract was in place, but the $240,000 did not reflect the full cost of a future carpool program.

- **Other types of carpoolers** – BART staff was interested in broadening the program so it would be available to more types of carpoolers. The Scoop program does not meet the needs of carpoolers traveling outside of weekday peak periods, those without a smartphone (or more likely where only one person in the carpool had a smartphone), those outside Scoop's service area, or those who were not able to pay the amount specified by Scoop.

- **Improved verification of carpooling** – A main reason that BART embarked on this pilot program was to reduce fraudulent use of carpool parking incentives. Efforts were made by BART staff to close loopholes in the Scoop platform that allowed fraudulent use, but Scoop did not provide that functionality. With the likelihood that fraudulent use would become more of an issue in the future for BART, this was an important reason to find another solution.

- **Improved efficiency of parking enforcement** – With 46,000 parking spaces, safety and security priorities beyond parking enforcement, and high demand for parking resources, streamlining parking enforcement efforts translates to significant cost savings to BART. This can be done by consolidating programs and systems so that enforcement officers can easily check whether a parking space is used according to policy. To do this, BART requested that Scoop provide license plate data for vehicles that would be parking at BART in a manner that would allow it to be combined with other BART parking payment/verification data into a single user interface for officers to check rather than a separate dashboard list for Scoop. Scoop did not agree to provide this functionality.

- **Single cohesive parking program** – A long-term parking strategy of BART is to make information, payment, and verification of all parking options available through the BART app rather than through multiple websites, processes, and programs. This will allow more sophistication in the management of parking through type of parking, pricing, time of day, and day of week based on demand and various other district goals. Incorporating carpooling fully into a cohesive BART parking program makes the options more intuitive for users and a more powerful strategy for BART parking management.

Staff acknowledged the effort required to develop the BART app carpool payment/verification feature and the need to have a smooth transition from the Scoop to BART program to the new in-app carpool payment/verification program. The BART Board of Directors approved a contract amendment with Scoop in which BART would pay Scoop the negotiated flat monthly fee to extend the program as a short-term bridge until the new program could be launched. Due to various negotiation issues, the contract amendment was finalized and signed retroactively shortly before the Scoop to BART program was scheduled to end. The contract amendment included updates to the terms of the agreement, data metrics, and how the transition would be messaged by each party. The Scoop to BART program officially ended at all stations on June 30, 2019.

BART's New In-App Carpool Payment/ Verification Program

The carpool payment/verification function in BART's official app launched on June 17, 2019, at the four stations most used by Scoop to BART users—Antioch, Dublin/Pleasanton, Orinda, and Warm Springs. It was expanded to several additional stations in October 2019 and is anticipated to be available at all stations with parking by Spring 2020. Users at other stations are required to use the Legacy Carpool Program and park in designated carpool spaces until the carpool function is fully tested and expanded.

Under BART's new in-app carpool payment/verification program, each carpooler must download the official BART app and register for an account. This includes providing payment information and the Clipper Card number they use to enter station faregates. As part of carpool program registration, they are given a four-character Carpool ID, which is assigned to them permanently. Upon arriving at a station and parking, one person in the carpool must pay for carpool parking through the BART app by entering their parking space number and their carpool partner's four-character Carpool ID. Both carpoolers must then enter the station faregates within 20 minutes using the same Clipper Cards to enter the faregates that they used when registering their BART account. Carpoolers who do not enter within this time are given a "warning." Users are provided with an allotted number of warnings before they are automatically blocked from using the carpool parking/verification function. Warnings can be waived if necessary, but records of all warnings issued are saved and can be reviewed later to identify potential fraudulent use patterns.

The ability to enforce carpool parking without the need for live observation is a considerable benefit of this program. Users can still use Scoop to match into carpools, but they need to use the BART app to verify their carpool and pay for their parking space. If they are driving and parking, their carpool partner also needs to be a BART user. This is a significant change from the Scoop to BART program, which allowed people carpooling to BART to match with those

not carpooling to BART. Additional benefits of this new program include the following:

- Incentivized carpool parking will be available at all stations with parking, an additional 13 stations. This can be implemented without changes to signage at stations.

- BART can customize changes to the program as needed to meet parking management and enforcement needs.

- Carpool payment and verification are part of a larger effort to provide a cohesive and modernized parking program. Staff are currently working on incorporating payment for all parking options into the official BART app. Payment for Daily Fee parking will be available in the app in early 2020.

- All data are owned by BART, including enforcement data, which was not previously available for either the Legacy Carpool Program or the Scoop to BART program. This allows BART to better manage increasingly in-demand parking resources. A recent assessment of fraudulent use in the new carpool program showed that more than 90% of carpool parkers had two or more people in the vehicle.

- Fraudulent users are prevented from using the program.

Evaluation

As part of the Scoop to BART program contract, Scoop provided data to BART to be used during the course of the program for parking enforcement, to track the number of parking spaces that would need to be reserved for program users, and for planning and evaluation purposes.

An independent evaluation was conducted as required by Federal Public Transportation Law (49 U.S.C. § 5312 (e)(4)). The evaluation plan for this program was developed collaboratively between BART and FTA's independent evaluation team, with research questions intended to evaluate whether the goals and objectives of the program had been met. The inputs to this evaluation include data provided by Scoop, BART parking and ridership data, user surveys, and expert interviews with program managers from each partner organization. Results of this evaluation are available as part of a separate report, "Mobility on Demand (MOD) Sandbox: BART Integrated Carpool to Transit Access Program, Evaluation Report." The independent evaluation plan is provided in Appendix C and includes project goals, hypotheses, and the data metrics and calculations needed to determine whether the project made a significant impact toward achieving these goals. The final data metrics as included in the contract amendment between BART and Scoop are shown in Appendix D. User survey questions are provided in Appendix E.

Basic Usage Data

In lieu of providing detailed data analysis in this report, the following tables show aggregated program usage to give an indication of general scale and variation between stations.

Overall, program use showed gradual growth over the course of the program, with monthly variation reflective of normal weekly and monthly ridership patterns. Usage varied significantly between morning and evening peak periods, with morning trips comprising 80% of total person trips.

Variation by station was significant, with the highest use station, by far, being the Dublin/Pleasanton station with almost 100,000 person trips over the course of the program. This station is an end-of-line station with a commute shed that extends into the Central Valley and north to the southern suburbs of Sacramento. Traffic congestion along the 580 corridor is heavy, and the demand for parking at the Dublin/Pleasanton station is high. Scoop started matching carpools to this area first, so its user base was strong. Other stations that saw significant usage, although much lower than the Dublin/Pleasanton Station,

include Antioch, Orinda, Warm Springs, and, to some extent, West Dublin/
Pleasanton and Millbrae. All are end-of-line stations, except for West Dublin/
Pleasanton and Orinda. Antioch is a new station that opened in May 2018. Scoop
launched when the station opened, and parking was in high demand at this
station from its opening week with parking fill times around 5:30 AM.

Initial results of user surveys also suggested that users carpooled through
Scoop primarily to get a parking space and reduce the cost of their commute.
Scoop carpoolers also reported riding BART more frequently as a result of the
program, as shown in Figure 4-3.

Figure 4-1

*Scoop to BART
program use by
month, AM/PM*
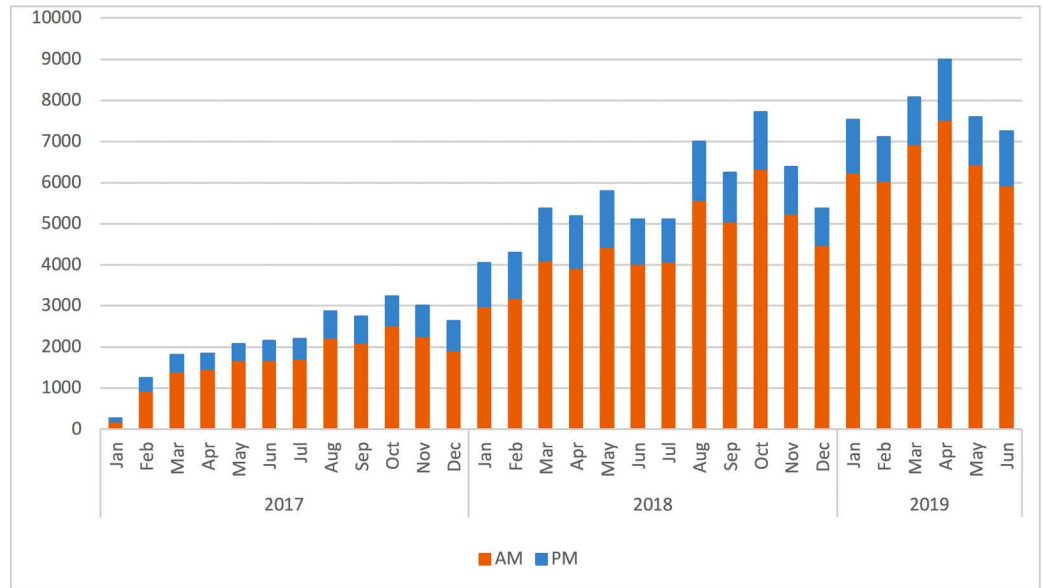
Figure 4-2

*Scoop to BART
person trips by
station, January
2017–June 2019*
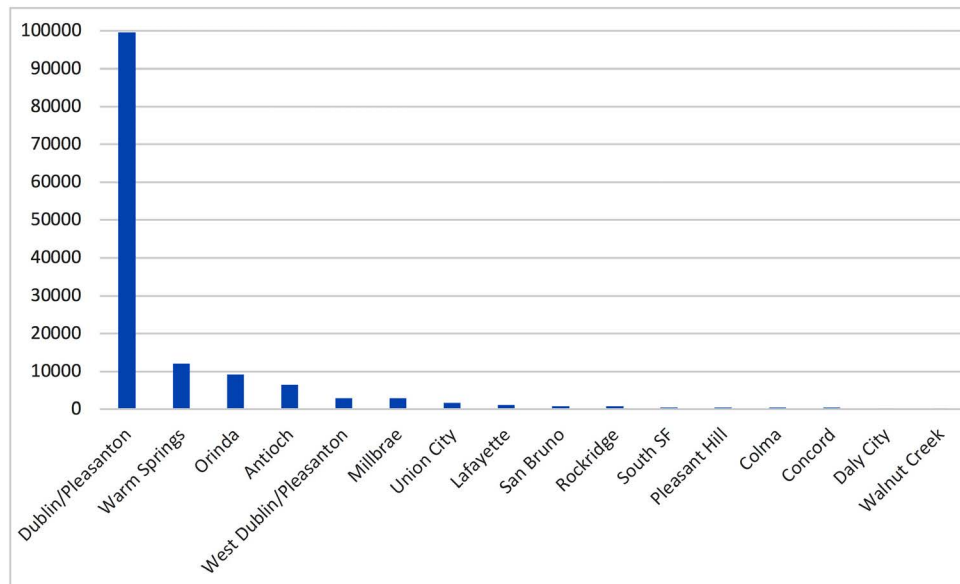
Table 4-1

Characteristics of Stations with Highest Levels of Scoop to BART Use

Column Title	End of Line Station	Parking Fill Time*	Other Factors
Dublin/Pleasanton	Yes	7:30 AM	On high congestion corridor, strong Scoop area
Antioch	Yes	5:45 AM	On high congestion corridor
Orinda	No	7:30 AM	On high congestion corridor, low first/last mile transit coverage
Warm Springs	Yes	8:00 AM	On high congestion corridor, strong Scoop area
West Dublin/Pleasanton	Yes	8:20 AM	On high congestion corridor, strong Scoop area
Millbrae	Yes	Does not fill	On high congestion corridor

Parking fill time is for first-come/first-served daily parking
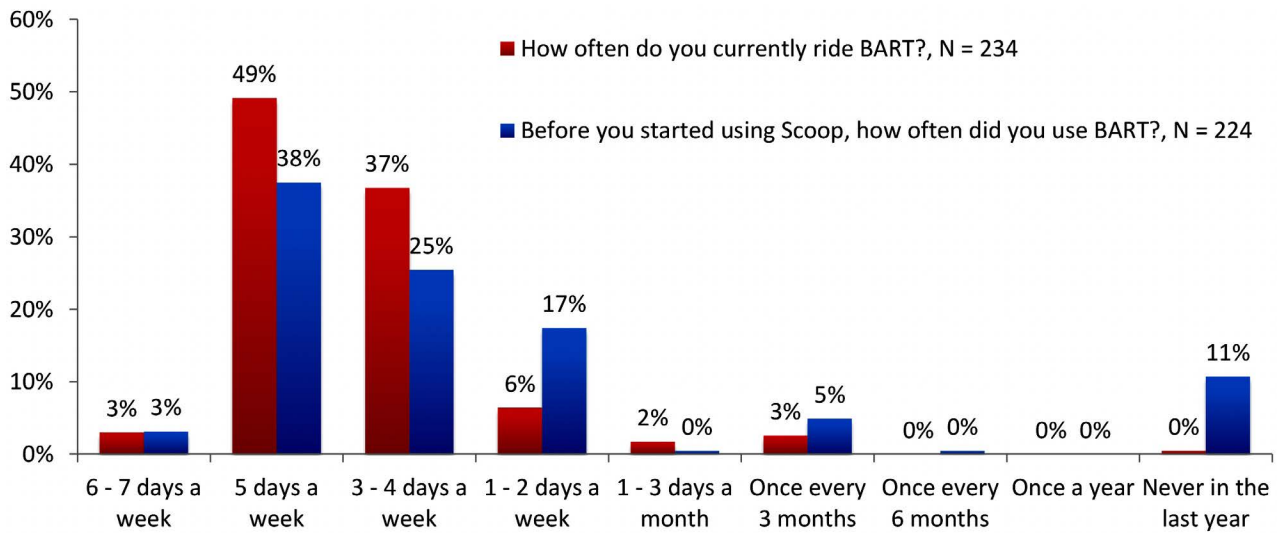
Figure 4-3 *Use of BART before and after using Scoop*

Conclusions, Lessons Learned, and Next Steps

Evolution of Carpooling as Key Access Strategy

As discussed in Section 3: Project Evolution, the Scoop to BART program ended on June 30th, 2019. Despite the program ending, BART staff consider it to be a success and an important step in the evolution of BART's carpooling and parking strategy. It raised the profile of carpooling as an important parking strategy, provided improved data on carpool usage, and made fraudulent use of carpool incentives more difficult for users. It is likely that without the Scoop to BART program, inclusion of carpool parking payment and verification into BART's in-app parking payment program would not have taken place, or would have taken place significantly later. With increasingly constrained parking resources, providing a guaranteed parking space for carpoolers essentially provides an option for those whose only way to access the station is to drive and park. They are guaranteed a parking space on condition that they bring another person with them. It also provides a way for those without a car to get to stations with poor transit access.

Many BART parking lots fill early in the morning, some as early as 5:45 AM. The Scoop to BART program (and indeed carpooling overall) was seen as an opportunity to improve access to stations with constrained parking resources. Due to long-term BART and regional policies, parking will become even more constrained district-wide in the future. Plan Bay Area, the regional transportation and land-use plan, calls for increased residential and commercial growth, with a focus on Priority Development Areas, which are primarily along high frequency transit routes. In response to this plan, an in order to use station area land resources to maximize ridership, BART is engaged in an ambitious effort to develop many of its surface parking lots into housing and commercial buildings. Some of the most recent development plans will not replace station parking in keeping with the BART Station Access Policy passed by the BART Board of Directors in 2015. This policy prioritizes investments in transit and active modes to access BART stations over investments in parking.

Challenges and Lessons Learned

BART staff have traced the most challenging elements of the program to a difference in organizational processes, expectations, priorities, and ways of conducting business between a large public agency transit operator and a small

technology start-up. Public agencies have specific processes to ensure that they meet equity, procurement, public outreach, and many other requirements; in general, these agencies have an interest in stable long-term programs with low financial risk but have difficulty making major changes quickly. Small technology companies are flexible and thrive on quickly adapting to market and investment changes, even if that means losing some early adopters or changing products. The following sections discuss issues and lessons learned in greater detail.

Carpool Program Development and Lessons Learned

Use highly-trained outreach staff. Outreach staff that were knowledgeable about not only the program but also how the program fit into the wider context of carpooling and riding BART was so useful that it made sense to have a smaller number of highly-trained outreach staff and to schedule station launches to fit their schedules. Having a smaller staff that can be well-trained and professional was more important than a larger staff that could be scheduled at any time but was less professional and not well-trained. Regardless of how involved they are in the larger program development, to users, outreach staff are the face of the program and the agency.

Use a variety of marketing methods, test high-cost methods for effectiveness. For marketing and outreach efforts, it was useful to try a variety of marketing methods that were then refined over the course of the project. In developing the marketing program, the resources that each agency could leverage that were not monetary were considered. For example, 511 regularly sends out email blasts to encourage carpooling so they had access to email lists of people that might be interested in the program, the capability to send emails to large groups, and the ability to parse these lists by ZIP code to ensure they were sent to the most relevant people. Scoop has design staff who were able to easily develop marketing collateral. BART has access to the media and press releases, regularly get picked up by local media outlets. The whole marketing strategy was built on how to have the greatest reach for the minimum cost outlay. In-station outreach and advertising were the two higher-cost marketing methods used. The in-station outreach was more successful in promoting program use, as it was more engaging with potential users. It also provided an opportunity for potential users to ask questions and download and register for the Scoop app with assistance if needed.

Equity and people with disabilities in carpooling. Part of the project scope included incorporating an ability to state preferences for people with disabilities. This scope was not well-defined, and the focus was initially on matching carpoolers in need of a wheelchair-accessible vehicle with a driver that has one. Since carpooling relies on a critical mass of people to provide quality matches, this was likely the most difficult disability to accommodate, as the likelihood that a person in need of a wheelchair-accessible vehicle would request

a trip at the same time and with a similar origin and destination as a person with a wheelchair-accessible vehicle is very low. It would have been more effective to address other issues that would have made the Scoop app and the Scoop to BART program more accessible, such as requirements and scope for service animals, chemical sensitivities, wheelchair users that do not require wheelchair-accessible vehicles, those with vision impairments, and language.

Partnership Issues and Lessons Learned

Project partners focused on how the priorities of each synchronized to make the project possible, but it would have been useful to have greater focus on the larger priorities of each organization during the program development phase. This led to conflicts when implementing some aspects of the program and when determining the timeline for implementation.

Carpool verification. It became increasingly clear that BART needed a carpool program with a strong verification element. During the program development phase, this was discussed, and it was clear that, technologically, carpools could be verified through the co-location of the two carpoolers' mobile phones. However, this aspect was not fully discussed and was not included in the contract. It later became more apparent that this would be needed by BART and that this was a low priority for implementation for Scoop.

Monetization, financial investment, and accommodating all types of carpoolers. Monetizing programs became a high priority for Scoop. This meant that the cost of the program to BART increased, and the likelihood that investing heavily in Scoop would mean that other carpool programs would not be prioritized due to cost and staff time. Those not able to find a carpool match through Scoop would not benefit from the guaranteed parking carpool incentives. Categories of carpoolers unable to use the Scoop app include those carpooling outside of commute times, outside of the Scoop service area, or with known carpoolers and those unable to pay the Scoop-determined cost of a trip and without a smartphone. BART wanted the long-term carpool program to incentivize all types of carpoolers, regardless of how they found their carpool partners. Multiple programs to address different types of carpoolers would have been possible if the investment in each was low.

Improved efficiency of parking enforcement. With 46,000 parking spaces, safety and security priorities beyond parking enforcement, and high demand for parking resources, streamlining parking enforcement efforts translates to significant cost savings to BART. This can be done by consolidating programs and systems so that enforcement officers can easily check whether a parking space is used according to policy. To do this, BART requested that Scoop provide the license plate data for vehicles that would be parking at BART in a manner that would allow it to be combined with other BART parking payment/verification

data into a single user interface for officers to check, rather than a separate dashboard list for Scoop. Scoop did not agree to provide this functionality. This was not an initial stated goal of BART, but it became increasingly important during implementation and expansion of the program.

Financial risk to BART. The potential increase in costs to $240,000 per year made BART staff very aware that cost adjustments such as this could take place each time the contract was renewed. Scoop was interested in single-year contracts, likely to maintain the flexibility that is important for a start-up technology company. This flexibility was seen as financial risk to BART.

Scope and Data Issues and Lessons Learned

Flexibility versus specificity. Although much of the program was developed prior to finalization of the contract, issues arose during the course of implementation that were not foreseen. This is likely in any project but particularly in experimental programs such as the Scoop to BART program. It would have been useful to agree on how to address unforeseen issues and include contractual terms and budget to address these issues as they arose.

Define metrics clearly in lay terms. Many mobility on demand providers often have few, if any, staff familiar with transportation concepts, planning, or working with a public agency. BART and 511 staff found that it was important to define metrics and other transportation concepts in lay terms to avoid miscommunication. For example, avoiding terms such as "trip" and defining more specific terms such as "vehicle trips" and "person trips" and what is meant by "passenger" was important. Other issues included what constitutes a qualifying carpool for the program, including whether a driver destined for BART could match into a carpool with a passenger not destined for BART could take advantage of the guaranteed parking incentive.

Include all data metrics details in the contract. Specific data metrics, including definitions, aggregations levels, provision format, schedule of data provision, data ownership, and sharing permissions were important details to include in the contract. These were negotiated as part of the contract, and the contract was frequently referenced as a guide for data provision during the project. When determining the data metrics to include in the contract, consider the metrics that are useful in administering the program as well as data that can assist with long-term strategic planning. For example, BART staff and directors were not convinced initially that carpooling could be a long-term strategy for addressing parking efficiency; however data provided as part of the program included both enforcement data and usage and mileage data which were useful in long-term planning efforts.

Administrative and Contractual Issues and Lessons Learned

Deliverables and Payment

Consider how payment is structured to allow flexibility while also ensuring that the scope is delivered. Payment on a deliverables basis rather than a time and materials basis can reduce scope-creep and provide added incentive for the deliverables to be completed. A side benefit is that this can also streamline the invoice review process. Flexibility can be added by including additional budget that can be used only with the sign-off of a budget amount, workplan, and schedule. If timelines are important, consider including financial incentives that encourage the company to meet the timelines.

Contract Compliance

Public agency contracting and reporting requirements. Many mobility on demand companies are not familiar with the requirements typically involved in partnering with public agencies. Contract and contract compliance, equity, and other legal requirements that were not anticipated by Scoop resulted in conflicts between partners. It would be useful to have trainings or training documents for mobility on demand companies interested in partnering with public agencies to ensure that they understand these requirements. Topics might include Title VI requirements, invoicing and invoice submission procedures, allowable expenses, required documentation, contracting requirements, and other legal issues.

Future-proof the contract. A number of issues with the Scoop to BART program could have been avoided if the contract had addressed the end of the contract period. The contract addendum signed retroactively in May 2019 addressed many of these issues, including roles and responsibilities for program close-out and deliverables needed prior to payment of the last invoice. However, it would have been useful if the original contract had included additional sections focused on the end of the contract term such as contract options and ability to extend the contract under the same terms if interested in continuing the program.

Marketing Materials
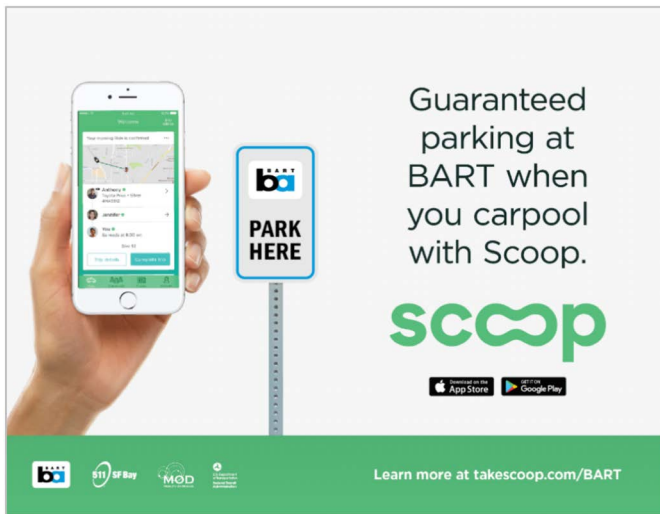
Figure A-1

In-station advertising

Figure A-2

Doorhangers

Figure A-3

Banners posted in stations
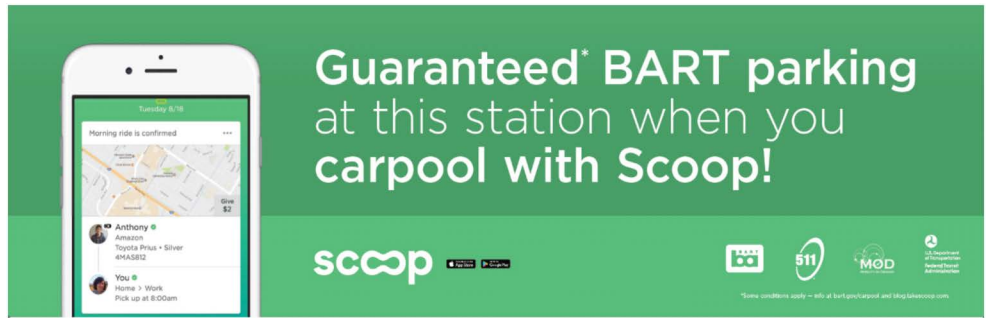
Figure A-4

Outreach teams

Figure A-5

Scoop to BART digital platform displays and A-frame signage
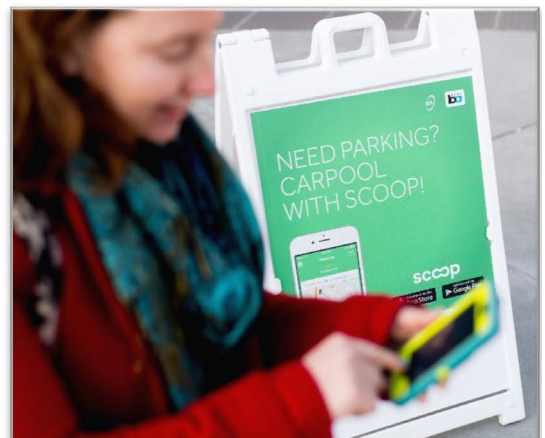
Example Media Kit

Carpool to BART Pilot Media Kit: Union City Launch

1. Site Links

Link Content	Link	Shortened Link
Info on 511 page	511.Org/Carpool-Vanpool/Carpool/BART	https://goo.gl/kWdqcy
Info on Scoop's page	medium.com/@takescoop/carpool-to-bart-59d8555e79a2	https://goo.gl/8N5FAA
Info on Scoop's blog	takescoop.com/bart	https://goo.gl/5KQcRr
Info on BART's page	http://www.bart.gov/guide/parking/carpool	https://goo.gl/KEvvJV
Download Scoop	www.Takescoop.com	https://goo.gl/7KwNbq
Press Release	511 to provide link to BART's press release	

2. Video

Video describing the program: goo.gl/UDvjMq

Please email [xx] if you would like the video file.

3. Social Media

These posts are meant to plug and play if you're busy but are by no means un-editable. If you want to edit them to have more of a localized message or endorsement, please do so! Images in the "image" column can be found at the FTP server.

Content	Image	Tags
PRE-LAUNCH (BEFORE FEB 12)		
Carpool to BART is expanding! Starting February 12, you can get guaranteed parking until 10am at the Union City BART station when you carpool with Scoop! Check out more info at: https://goo.gl/kWdqcy	FB C2B PHONE	@bartsf @511SFBay @TakeScoop
511 "Heads up" email to Union City ZIPS	See below	
POST-LAUNCH (AFTER FEB 12)		
Facebook		
BART's press release. To be provided by 511		@TakeScoop @bartsf @511SFBay
Get guaranteed parking until 10:00am at the Union City BART station when you carpool with the carpool app, Scoop *Link to BART's press release*	FB C2B BOARD	@TakeScoop @bartsf @511SFBay
Want guaranteed parking at Union City BART? Use @TakeScoop to get to the station. For sharing your ride, you'll be guaranteed parking until 10am! Start now!	TW C2B PHONE	@TakeScoop @bartsf @511SFBay

LinkedIn		
Check out the launch of @BART's new parking program at the Union City station: goo.gl/UDvjMq Commuters can now use @Scoop Technologies, Inc., to get guaranteed parking until 10:00 am. Try it today!	C2B_FBLink_logos	@ScoopTechnologiesInc @Bay Area Rapid Transit @Metropolitan Transportation Commission
Twitter		
Get guaranteed parking until 10:00 am at the Union City BART station when you share your ride on @TakeScoop! https://goo.gl/gFbD6n	TW C2B BOARD	@TakeScoop @SFBARTable @SFBART
Still waiting for a BART parking permit? At certain stations, the wait is over! Check out @BART's new parking program here: goo.gl/UDvjMq	Link to video: goo.gl/UDvjMq	@TakeScoop @SFBART

4. Email to employers near BART, with employees who might be interested:

Subject: Guaranteed Parking at Union City BART Station for Your Employees
Body:
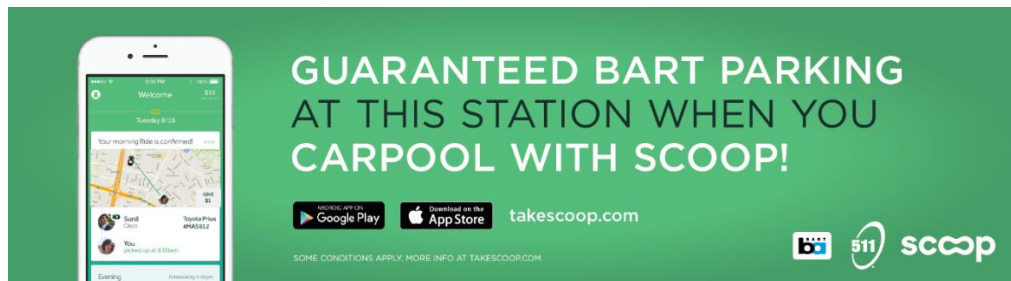
Image: Screen capture from banner art on FTP server

Hi (first name),

Do your employees rush to BART early in the morning to get a parking spot?

Beginning February 12, 2018, your employees can get guaranteed parking at the Union City BART station until 10:00 am when they carpool there with Scoop. The program has been operating successfully at Dublin/Pleasanton BART since January 2017 and has since been expanded to six additional stations.

Here's how:

1. *Visit **takescoop.com** and download the Scoop App on Android or iOS.*
2. *Set your work location to the Union City BART station.*
3. *Schedule your morning and afternoon trips. When you match, you'll be sent instructions on how to get your parking space.*

Are these not your BART stations? Stay tuned, this program will be expanding to more BART stations in the coming year! Click here [https://goo.gl/kWdqcy] for additional information.

Download the app here : https://goo.gl/7KwNbq

5. Email to people with ZIP codes near BART

Subject: Guaranteed Parking at Union City BART Station
Body:
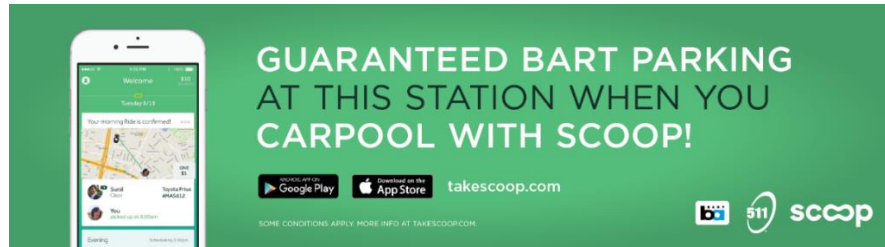
Image: Screen capture from banner art on FTP server

Hi (first name),

Do you rush to BART early in the morning to get a parking spot?

Beginning February 12, 2018, you can get guaranteed parking the Union City BART Station until 10:00 am when you carpool with Scoop. The program has been operating successfully at Dublin/Pleasanton BART since January 2017 and has since been expanded to six additional BART stations.

Here's how:

1. *Visit **takescoop.com** and download the Scoop App on Android or iOS.*
2. *Set your work location to the Union City BART Station.*
3. *Schedule your morning and afternoon trips. When you match, you'll be sent instructions on how to get your parking space.*

Don't see your BART station on this list? Stay tuned, this program will be expanding to more stations in the coming year! Click here [<-https://goo.gl/kWdqcy] for additional information.

Download the app: https://goo.gl/7KwNbq

6. FAQs

Q: Where will Scoop's Carpool to BART commuters park?
A: Scoop commuters can park anywhere in the "permit" parking areas at the station and put the parking placard they received from Scoop on their dash. BART Parking Enforcement will use this placard and the commuter's license plate to validate that they carpooled with Scoop that day. Information at goo.gl/KEvvJV.

Q: How do I pay for parking?
A: For a limited time, parking will be free when you carpool through this program.

Evaluation Plan

MOD

MOBILITY ON DEMAND

MOD SANDBOX DEMONSTRATIONS INDEPENDENT EVALUATION

BART INTEGRATED CARPOOL TO TRANSIT ACCESS PROGRAM EVALUATION PLAN

NEED PARKING?
CARPOOL
WITH SCOOP!

U.S. Department of Transportation

Federal Transit Administration | ITS Joint Program Office

Produced by Booz Allen Hamilton
U.S. Department of Transportation
Federal Transit Administration
Office of the Assistant Secretary for Research and Technology, Intelligent Transportation
Systems Joint Program Office

Notice

1. Report No. **FHWA-JPO-18-650**	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle MOD Sandbox Demonstrations Independent Evaluation (IE) Bay Area Rapid Transit (BART) Integrated Carpool to Transit Access Program Evaluation Plan		5. Report Date April 2018	
		6. Performing Organization Code	
7. Author(s) Gustave Cordahi, Susan Shaheen, Elliot Martin		8. Performing Organization Report No.	
9. Performing Organization Name and Address Booz Allen Hamilton 8283 Greensboro Drive McLean, VA 22102 Transportation Sustainability Research Center - UC Berkeley 2150 Allston Way #280 Berkeley, CA 94704		10. Work Unit No. (TRAIS)	
		11. Contract or Grant No. DTFH61-12-D-00041	
12. Sponsoring Agency Name and Address U.S. Department of Transportation Federal Transit Administration Office of the Assistant Secretary for Research and Technology, ITS Joint Program Office 1200 New Jersey Avenue, SE Washington, DC 20590		13. Type of Report and Period Covered Final Report	
		14. Sponsoring Agency Code	

15. Supplementary Notes
Steven Mortensen, FTA Task Manager Robert Sheehan, ITS JPO Task Manager

16. Abstract
The Mobility on Demand (MOD) Sandbox Demonstration Program provides a venue through which integrated MOD concepts and solutions – supported through local partnerships – are demonstrated in real-world settings. For each of the 11 MOD Sandbox Demonstration projects, the MOD Sandbox Independent Evaluation includes an analysis of project impacts from performance measures provided by the project partners, as well as an assessment of the business models used. This report constitutes the Evaluation Plan for the BART Integrated Carpool to Transit Access Program Sandbox project. It includes the following chapters: project overview; evaluation approach and process; evaluation schedule and management; and data collection & analysis plan.

17. Keywords Mobility on demand, MOD, sandbox, shared mobility, mobility as a service, independent evaluation, transit, carpooling		18. Distribution Statement	
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages 38	22. Price

Form DOT F 1700.7 (8-72)   **Reproduction of completed page authorized**

Table of Contents

List of Tables

List of Figures

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

vi | BART Integrated Carpool to Transit Access Program Evaluation Plan

Chapter 1. Project Overview

This chapter gives a brief introduction to the San Francisco Bay Area Rapid Transit (BART) Integrated Carpool to Transit Access Program that will be evaluated through this independent evaluation.

Introduction

BART is the fifth-busiest heavy rail rapid transit system in the United States, carrying more than 430,000 daily riders. BART provides service in Northern California in four Bay Area counties: Alameda County, Contra Costa County, San Francisco County, and San Mateo County. The BART system is comprised of 107 miles of track, 46 stations, and 669 revenue vehicles. It provides access to many of the San Francisco Bay Area's key destinations for work, school, and recreation. BART has over 3,400 employees and a combined annual capital and operating budget of over $1.5 billion.

Project Scope

BART, the Metropolitan Transportation Commission (MTC), and Scoop Technologies, Inc. (Scoop), are partnering on a program to better integrate carpool access to public transit by matching passengers with a transit station as their destination, and providing a seamless way to reserve and pay for highly-coveted parking spaces at BART stations.

BART offers 48,000 parking spaces at 34 of its 46 stations. The parking mix at BART includes "daily fee" first come/first served spaces (approximately 35,000 spaces), permit spaces (approximately 12,000 spaces), and a small number of carpool spaces (approximately 900 spaces). Demand for parking is high and the majority of spaces fill by 8am each weekday. However, only about 0.8 percent of those parking at BART carpool with others to the station, according to a 2015 passenger profile survey. Therefore, as most vehicles remain parked all day, the majority of parking spaces serve just one patron per day.

MTC operates BART's legacy carpool permitting program, which provides dedicated carpool spaces at 21 BART stations. Unfortunately, this legacy carpool program is unsuccessful, as first-come/first served carpool spaces are difficult to preserve for legitimate carpools. Preventing fraudulent use of these spaces by single occupancy vehicles requires live observation of passengers as they exit their vehicles, which is impractical given staffing resources. As a result, BART does not provide dedicated carpool spaces at one-third of its stations and has been reluctant to expand the number of spaces at stations where the legacy carpool program does not exist.

The MOD partnership between BART, MTC and Scoop allows BART to address some of the issues that were previously limiting BART from expanding carpooling options. Scoop provides an app that matches drivers and passengers with similar destinations into carpools. MTC and Scoop had already been working together since 2015 to promote carpooling in the Bay Area region. In 2016, BART, MTC and Scoop began working together to develop a pilot program which would use the Scoop app to match users going to BART stations into carpools and as an incentive would guarantee a parking space at the BART station.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

BART Integrated Carpool to Transit Access Program Evaluation Plan | **1**

Since the number of users matched might vary from day to day, in order to provide flexibility, matched drivers are allowed to park anywhere in BART's permit parking areas. Permit spaces are reserved for permit holders and matched Scoop drivers until 10am, offering passengers more flexibility about when to arrive at the station. Scoop provides license plates of matched drivers to BART on a daily basis and BART uses this information to enforce the program.

The pilot program initially launched at the Dublin/Pleasanton BART station in January 2017 and through the MOD Sandbox grant, the program is able to expand to additional stations. The grant will also be used to more fully develop Scoop's app functionality in BART-specific ways by including BART stations as preset origins and destinations, integrating parking payments into the app, and pre-screening for wheelchair-accessible vehicles. Grant funds will also be used to market the program and increase the critical mass of users.

The total project funding is $521,000, including $358,000 in USDOT funds from the MOD Sandbox grant and $163,000 in matching funds from the three project partners.

Key Partners

BART is partnering with Scoop and MTC.

Project Timeline

The main milestones for the BART program are captured in the timeline below. Please note that the evaluation timeline is provided in a later chapter of this report.

1. **January 23, 2017** – Launch of Pilot Scoop Demonstration at the Dublin/Pleasanton BART Station (pre-grant pilot)

2. **February 14th, 2017** – Agreement Execution Date for MOD Sandbox grant with the USDOT

3. **September 2017** –Demo Start: Launch of MOD Field Demonstration at the Millbrae and San Bruno BART stations. The program will continue to roll out at 2 stations per month through June 2018.

4. **June 2018** –Field Demonstration of launch program complete

5. **October 2018** – Final Project Report submitted by the BART team to USDOT.

BART will collect data that is relevant to this MOD demonstration between January 2017 and June 2018. This data will be shared with the Independent Evaluation (IE) team for conducting the evaluation. More details on data collection planning is provided in Chapter 3 of this report.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

2 | BART Integrated Carpool to Transit Access Program Evaluation Plan

Chapter 2. Evaluation Approach and Process

For each of the 11 MOD Sandbox projects, the IE team developed an evaluation framework in coordination with the project team. The framework is a project-specific logic model that contains the following entries:

1. **MOD Sandbox Project** – Denotes the specific MOD Sandbox project.

2. **Project Goals** – Denotes each of the project goals for the specific MOD Sandbox project. The project goals capture what each MOD Sandbox project is trying to achieve.

3. **Evaluation Hypothesis** – Denotes each of the evaluation hypotheses for the specific MOD Sandbox project. The evaluation hypotheses flow from the project-specific goals.

4. **Performance Metric** – Denotes the performance metrics used to measure impact in line with the evaluation hypotheses for the specific MOD Sandbox project.

5. **Data Types and Sources** – Denotes each of the data sources used for the identified performance metrics.

6. **Method of Evaluation** – Denotes the quantitative and qualitative evaluation methods used.

This chapter details the evaluation approach and process, as finalized in the evaluation logic model for the BART MOD Sandbox project. This includes project goals, evaluation hypotheses, performance metrics, data types and sources, and methods of evaluation.

Project Goals

The project goals denote what BART is aiming to achieve through the MOD Sandbox demonstration. The project goals include the following:

1. Increase total carpooling to BART stations

2. Increase utilization of parking spaces by carpool vehicles

3. Reduce the costs of enforcement for carpool spaces at BART stations

4. Reduce the rate of fraudulent use of carpool spaces

5. Spread out the arrival of BART riders over the morning peak commute period

6. Increase vehicle occupancy rate of vehicles parking at BART stations

7. Induce increased carpooling by helping people to carpool to BART stations that otherwise would not

8. Reduce vehicle miles travelled (VMT) and greenhouse gas (GHG) emissions from travel

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

BART Integrated Carpool to Transit Access Program Evaluation Plan | 3

9. Increase BART ridership

10. Reduce traveler cost

11. Increase revenue relative to long run (operational) BART cost of implementation

12. Produce lessons learned through stakeholder interviews.

The project goals set the foundation for the evaluation hypotheses.

Evaluation Hypotheses

The evaluation hypotheses flow from the project-specific goals, and denote what should happen if each project goal is met. The evaluation hypotheses include the following:

1. Carpooling to stations increases following the implementation of the Scoop pilot project.

2. The utilization of parking spaces by carpooling vehicles increases after the project is implemented.

3. The cost of enforcement per carpool space declines with no sacrifice in enforcement quality.

4. The number of instances of illegal use of carpool spaces per total carpool spaces available will be lower than before the pilot initiation.

5. The distribution of legal arrivals to carpool spaces will be closer to uniform distribution between the hours 6 am and 10 am than before the pilot.

6. The number of persons per vehicle parking space at BART stations increases after the program.

7. The technological changes to carpooling have caused people who would have driven alone to carpool to BART stations instead.

8. The expansion of Scoop to additional BART stations will lower VMT and reduce GHG emissions that would have occurred in its absence.

9. Overall ridership increases as a result of the Scoop program.

10. Scoop application users reduce their cost of travel relative to their previous method of travel to BART or commuting.

11. The enforcement and abuse of Scoop permits are low, and the fraud rate is low (less than 5 percent).

12. The marginal cost to BART for implementing the program is less than the revenue earned from additional ridership.

13. The process of deploying the project will produce lessons learned and recommendations for future research and deployment.

The success of each evaluation hypothesis is measured by the performance metrics described below.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

4 | BART Integrated Carpool to Transit Access Program Evaluation Plan

Performance Metrics

The performance metrics are used to measure impact in line with the evaluation hypotheses for the BART IE. These performance metrics include the following:

- Total number of carpooling riders to each BART station
- Number of verified carpool vehicles at each BART station
- Cost and time spent on carpool enforcement per carpool space
- Total number of citations given to illegal carpool vehicles over time for each station
- Carpool arrival by station by hour
- Number of persons per vehicle parking at each BART station
- Estimated total number of people who would be driving alone to work without project
- Measured travel behavior change and estimated emissions change
- Ridership at all stations over time
- Cost of travel by users prior to Scoop
- Measured fraud rate of Scoop permits by station
- Estimated revenue gain from ridership increases and parking exceed the marginal cost incurred by BART to implement the Scoop program
- Lessons learned and recommendations.

The performance metrics will draw from a set of data sources that are specific to the project.

Data Sources

The following data sources are used for the data collection for the BART IE:

- Scoop Usage Database
- Parking Lot Usage
- Parking Enforcement
- BART Ridership Data
- BART Cost/Revenue Data
- User Surveys
- Interview Data.

Data Elements

The following data elements are used for the performance metrics that are defined for the BART IE:

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

BART Integrated Carpool to Transit Access Program Evaluation Plan | 5

- Count of people carpooling to BART stations by station by hour
- Spaces occupied by carpooling vehicles before and after pilot by station by day
- Hours of labor devoted to carpool enforcement
- Count of cumulative carpool spaces available by station by day
- Citations per station per day
- Counts of illegal use of carpool spaces
- Arrivals of carpool vehicles by station by hour
- Number of single occupancy vehicles (SOVs) parking
- Number of carpool vehicles parking
- Carpool vehicle occupancy
- Total number of spaces utilized
- Survey of program users
- Activity data of Scoop user origin and destinations (from user survey)
- BART ridership
- BART rider origin and destination stations
- BART fares
- BART enforcement of parking spaces (citations)
- Marginal costs incurred by BART (operational)
- Stakeholder interview results.

Data Sources Mapping

The following diagram shows the mapping of data sources, data sets, and performance measures that will be used in the independent evaluation of the BART MOD Demonstration. As shown, the datasets include both quantitative and qualitative data, and will be submitted to the USDOT Public Data Hub.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

6 BART Integrated Carpool to Transit Access Program Evaluation Plan
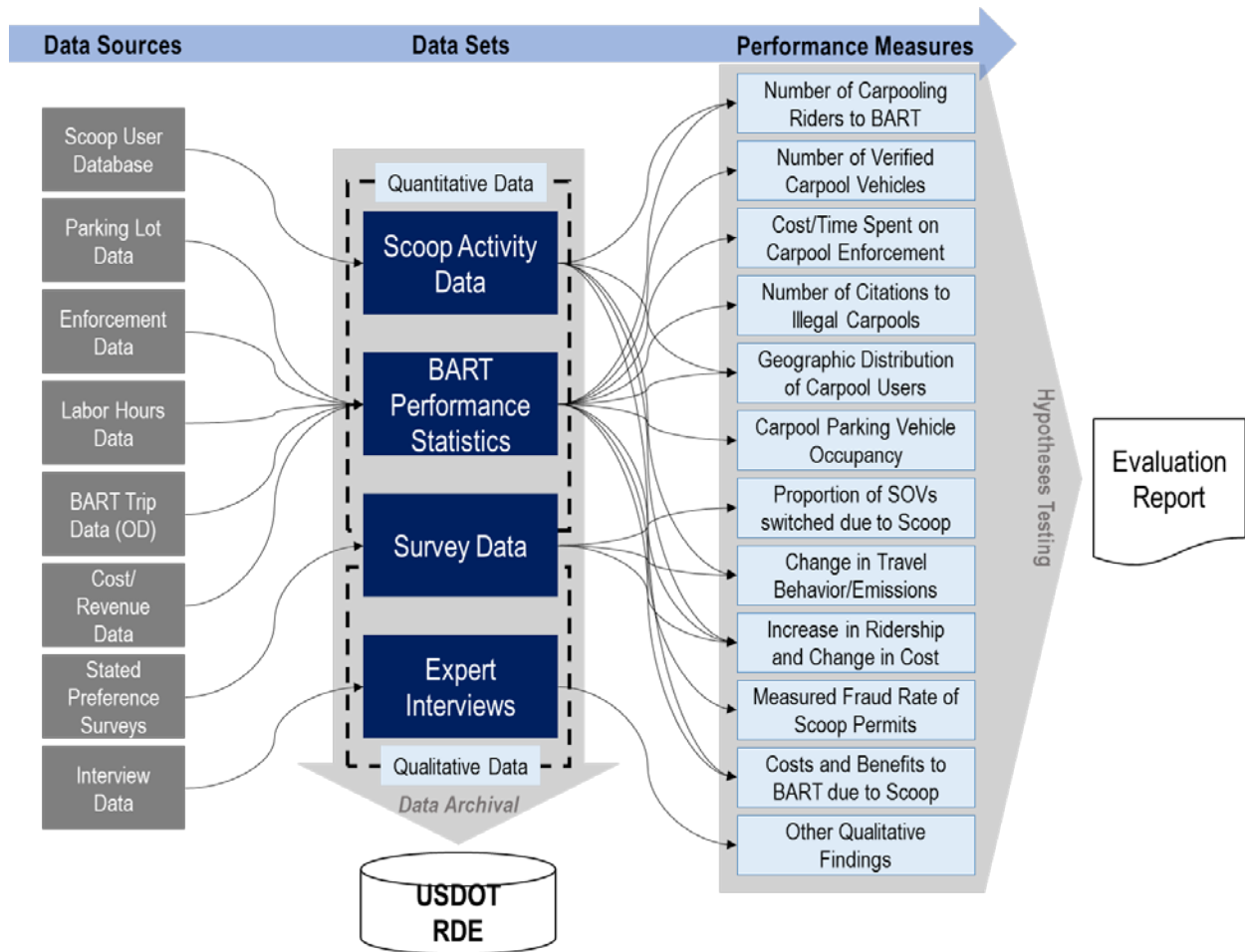
Figure 1. Map of Data Sources, Data Sets, and Performance Measures

Methods of Evaluation

The quantitative and qualitative evaluation methods used in the BART IE include the following:

- Time series and cross-sectional analysis
- Statistical analysis, expert interviews
- Survey analysis
- Survey and activity data analysis
- Survey and revenue analysis
- Summary of expert interviews.

Further details about the analysis methods by evaluation hypothesis are provided in Chapter 3.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

BART Integrated Carpool to Transit Access Program Evaluation Plan | 7

Evaluation Logic Model

Table 1 below represents an extract from the final BART evaluation logic model. Building on the project goals, the logic model lists evaluation hypotheses, performance metrics, and data sources for the BART project.

Table 1. Evaluation Hypotheses, Performance Metrics, and Data Sources for the BART Sandbox Project

Evaluation Hypothesis	Performance Metric	Data Elements	Data Sources
1. Carpooling to stations increases following implementation of the Scoop pilot project	Total number of carpooling riders to each BART station	Count of people carpooling to BART stations by station by hour	Scoop data/license plate logs
2. Utilization of parking spaces by carpooling vehicles increases	Number of verified carpool vehicles	Spaces occupied by carpooling vehicles before and after pilot by station by day	BART parking data/scoop license plate logs
3. The cost of enforcement per carpool space declines with no sacrifice in enforcement quality	Cost and time spent on carpool enforcement per carpool space	Hours of labor devoted to carpool enforcement; count of cumulative carpool spaces available by station by day	BART parking enforcement
4. The number of instances of illegal use of carpool spaces per total carpool spaces available will be lower than before the pilot initiation	Total number of citations given to illegal carpool vehicles over time	Citations per station per day	BART parking enforcement
5. The distribution of legal arrivals to carpool spaces will be closer to uniform distribution between the hours 6 am and 10 am than before the pilot	Carpool arrival by station by hour	Arrivals of carpool vehicles by station by hour	Scoop data logs

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

8 | BART Integrated Carpool to Transit Access Program Evaluation Plan

Evaluation Hypothesis	Performance Metric	Data Elements	Data Sources
6. The number of persons per vehicle parking at BART stations increases after the program	Number of persons per vehicle parking at BART	Number of SOVs parking, number of carpool vehicles parking, carpool vehicle occupancy, total number of spaces utilized	BART parking data
7. The technological changes to carpooling have caused people who would have driven alone to carpool to BART stations	Estimated total number of people who would be driving alone to work without project	[Self-reported] Number of people who would be driving alone to work without project	User survey
8. The expansion of Scoop to all BART stations will lower VMT and reduce GHG emissions that would have occurred in its absence	Measured travel behavior change and estimated emissions change	Scoop user origin and destinations, Average emissions per person per mile	User survey Scoop data
9. Overall ridership increases as a result of the Scoop program	Ridership at all stations over time	Ridership data time-series of stations	BART farebox data
10. Users of the Scoop application reduce their cost of travel relative to their previous method of travel to BART or commuting	Cost of travel by users prior to Scoop	[Self-reported] Fare paid by users to commute, BART fare tables	User survey BART data
11. Enforcement and abuse of Scoop permits are low. The fraud rate is low (less than 5%)	Measured fraud rate of Scoop permits	Number of illegally used Scoop permits per station per day	BART parking enforcement/Scoop license plate logs
12. The marginal cost to BART for implementing the program is less than the revenue earned from additional ridership	Estimated revenue gain from ridership increases and parking exceed the marginal cost incurred by BART to implement the Scoop program	Ridership, revenue, marginal costs incurred by BART (operational)	BART, MTC, Scoop Data
13. The process of deploying the project will produce lessons learned and recommendations for future research and deployment	Lessons learned and recommendations	Qualitative documentation from stakeholder interviews	Stakeholder interviews

Documentation and Reporting

The IE team will develop an evaluation report for this MOD Sandbox demonstration project. The report will include a summary of major findings of the project in the executive summary section, followed by multiple sections providing demonstration details, evaluation hypotheses, data collected, analysis performed, findings, and results. The results will be reported through a mix of exhibits including tables, graphs, and charts.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

10 BART Integrated Carpool to Transit Access Program Evaluation Plan

Chapter 3. Evaluation Schedule and Management

This chapter provides details on the evaluation project schedule and other details on the management of the evaluation project.

Evaluation Schedule

Figure 2 shows the IE schedule from the beginning of the quantitative and qualitative data collection that spans throughout the demonstration period and leads to the analysis, whose results are included in the site-specific evaluation report. Note that interim data spot checks and sample analyses will be performed throughout the demonstration period to proactively mitigate data-related risks.
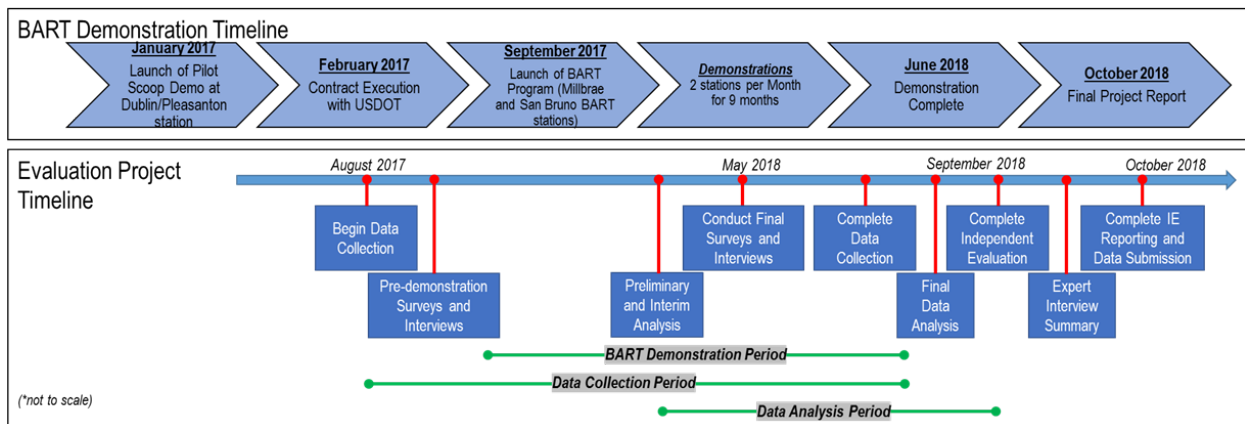
Source: Booz Allen Hamilton, February 2018

Figure 2. MOD Sandbox Evaluation and Demonstration Schedule

Data relevant to the program will be collected between January 2017 and June 2018. This data will be shared with the IE team for evaluation purposes. More details on the data types, elements, and collection timeframes are provided in Chapter 4.

Roles and Responsibilities

The three main entities involved in the evaluation and their corresponding high-level roles are as follows:

- **The site team** coordinates the collection of the requested evaluation data from the various project partners throughout the demonstration period, and transfers the data to the IE team.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

BART Integrated Carpool to Transit Access Program Evaluation Plan | **11**

- **The IE team** supports the site team in defining the requested data elements. This team also performs analysis using the data provided by the site team.

- **The USDOT team** supervises the work and provides support for topics that encompass more than one site (e.g., coordination with transportation network companies who are partnering with several Sandbox sites).

Data Transfer and Storage

Various types of qualitative and quantitative data sources are involved in the evaluation, as specified in Chapter 4. Figure 3 below shows the overall data collection framework, including the steps and parties involved in data design, collection, transfer, and storage.

Data Needs
Identified by the IE team with support from the BART team in the project-specific **Evaluation Logic Model**

Data Collection Details
Identified by the IE team with support from the BART team in this project-specific **Evaluation Plan** (Data Collection & Analysis Section)

Baseline and Demonstration Data
Collected by the BART team with support from the IE team in line with the Data Collection Plan; then transferred to the **IE Data Repository**

Data Analysis
Performed by the IE team using the data collected by the site team and transferred to the **IE Data Repository**

Data Submission to the Data Hub
Sanitized data prepared for submission to the **USDOT's Public Data Hub** by the IE team

Figure 3. BART Data Collection Framework

Data Collection Responsibilities

Table 2 denotes the data collection responsibilities for the various data types required for the evaluation.

Table 2. Data Type and Data Collection Responsibilities for BART Sandbox Evaluation

Data Type	Data Collection Responsibilities
Scoop Activity Data	• Collected by the BART team and transferred to the IE team (alternatively, access to the data can be given to the IE team, as appropriate)
Survey Data	• Survey questions are developed by the IE team in collaboration with the BART team • Surveys are administered by the BART team

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

12 | BART Integrated Carpool to Transit Access Program Evaluation Plan

Data Type	Data Collection Responsibilities
	• Survey responses are transferred by the BART team to the IE team (alternatively, access to the data can be given to the IE team, as appropriate)
BART Statistics	• Collected by the BART team and transferred to the IE team (alternatively, access to the data can be given to the IE team, as appropriate).
Expert Interviews	• Interviewees are identified by the IE team in collaboration with the BART team • The IE team is connected to the interviewees by the BART team • The IE team conducts the expert interviews via phone or in person

Risk Management

The IE team will continually monitor risk in an ongoing process throughout the demonstration period and identify the best resources within the team to address each risk.

Some of the main risks involved in the evaluation are included below.

Schedule:

The IE team will maintain a demonstration tracking schedule to track and contact the demonstration teams for data and documentation. The team will keep an up-to-date integrated schedule that reflects updates from the site teams on a constant basis. Components of the evaluation reports will be created throughout the demonstration period, as the data and documentation for the project becomes available. The site team should inform the IE team of any changes in schedule that could affect the overall evaluation schedule (e.g., delays in the demonstration schedule).

Data Quality Assurance:

The IE team will perform spot checks on the data as it is being collected throughout the demonstration period to proactively manage risks related to data quality. This will allow the following:

- Avoiding insufficient data on performance of MOD demonstration to reliably estimate impacts and/or benefits

- Addressing challenges in empirical data including lack of consistency, biases, and incompleteness

- Identifying and controlling sources of error

- Consideration of quality and quantity issues in data collection

- Ensuring data privacy and proprietary protections in line with human subjects' protections

- Consideration of confounding factors.

Table 3 includes risk mitigation strategies that will be employed to ensure the availability of the requested data types for the evaluation.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

BART Integrated Carpool to Transit Access Program Evaluation Plan | **13**

Table 3. Data Type and Risk Mitigation Strategies for BART Sandbox Evaluation

Data Type	Risk Mitigation Strategies
Scoop Activity Data	• The BART team will include the data needs/requirements in the agreement with Scoop • The BART team will ensure that the needed data is collected from Scoop and transferred to the IE team
Survey Data	• The BART team will ensure that participants in the pilot are willing to take the surveys
BART Statistics	• The BART team has access to the requested BART statistics and can provide these to the IE team
Expert Interviews	• The BART team will facilitate the connection between the IE team and expert interviewees, and will help in getting their commitment to participate in the interviews

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

14 BART Integrated Carpool to Transit Access Program Evaluation Plan

Chapter 4. Data Collection & Analysis Plan

This chapter describes the plan for data collection and analysis for the BART MOD Sandbox project evaluation. It summarizes the data that needs to be collected, and how that data should be processed and delivered to the IE team. Where possible, the IE team will help the Sandbox project team with processing the data in order to get the requested data format to conduct the calculations necessary for the evaluation. Any personally identifiable information will need to be removed when present in the data.

The data collection plan follows the evaluation logic model, with each data field discussed in association with a hypothesis and performance metrics. Certain types of data collected address multiple hypotheses. In cases where the data structure is the same for more than one hypothesis, the plan refers to the data structure for a hypothesis already described.

Most demonstration data (i.e., data provided by Scoop or BART about Scoop activity) should be provided from the beginning of the pilot demonstration period. The IE team also requests that data about general BART activity, such as ridership and citations, be provided back to 2015 if possible. This request for longer time series of activity that existed before and after the pilot demonstration is made to help discern background trends that may have been present before the project and continued through it. Naturally, any data collected as a result of the pilot demonstration itself, can only be produced from the beginning of the data collection period. All hypotheses will be evaluated at the BART station level, when data permits. An aggregate analysis will be performed on system-wide impacts as well.

Table 4 summarizes the data types, data elements, collection periods, and hypothesis alignment for the BART Sandbox project evaluation. The table is followed by a more detailed data collection and analysis plan for each evaluation hypothesis.

Table 4. Data Type, Data Elements, Period of Collection, and Hypothesis Alignment for BART Sandbox Project Evaluation

Data Type	Data Elements	Period and Frequency of Data Collection	Hypothesis Alignment
Scoop Activity Data	• Count of people carpooling to BART stations by station by hour • Driver trip miles (i.e., the cumulative distance from driver's home to the final destination) • Passenger/rider miles saved (i.e., the cumulative distance a passenger saves when they carpool with another driver)	To the extent possible, Scoop data is requested from the start of Scoop activity at each station, to help identify longer running trends that might be underlying leading up to the project.	1, 2, 5, 6, 8, 10, 12

Data Type	Data Elements	Period and Frequency of Data Collection	Hypothesis Alignment
		Demonstration data is requested for the period extending throughout the BART Sandbox demonstration.	
Traveler Survey Data (*sample survey is provided in Appendix A*)	Survey questions addressing: • Demographics • Location of home and work (in terms of neighborhood/zip code, not addresses) • Travel behavior • Change in travel behavior as a result of Scoop • Use of Scoop • Vehicle ownership	Implemented by BART quarterly throughout the pilot demonstration period	7, 8, 10
BART Statistics	• Number of carpooling spaces available at each station before and after the pilot • Before Scoop implementation: BART-provided baseline estimates of designated "carpool" space occupancy, which is present at some of the stations; baseline estimates for number of carpooling vehicles • After Scoop implementation: BART-provided estimates for its existing carpool spaces (plus activity data provided by Scoop) • Data on the number of spaces available for carpooling by station over time • Enforcement labor hours before and after the pilot implementation. • Number of citations given to illegal carpool vehicles per day • BART parking counts and capacity measurements • Ridership data describing origins and destinations by time (origin and destination pairs by day) • BART fare tables • Parking revenue data by day from participating stations.	Where relevant, data is requested from the year 2015 to the start of the project, to help identify longer running trends that might be underlying leading up to the project.	1, 2, 3, 4, 5, 6, 9, 10, 11, 12

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

16 | BART Integrated Carpool to Transit Access Program Evaluation Plan

Data Type	Data Elements	Period and Frequency of Data Collection	Hypothesis Alignment
	• [Estimate of the] operational costs that have been incurred for the duration of the pilot		
Expert Interviews	Qualitative documentation from stakeholder interviews	Conducted six months or more after the launch of the demonstration	13

Detailed Data Collection and Analysis Plan by Evaluation Hypothesis

Hypothesis 1: Carpooling to stations increases following implementation of the Scoop pilot project.

Performance Metric: Number of carpooling riders to BART

Data Elements & Sources:

- **Baseline estimates for number of carpooling vehicles before Scoop.**

  The IE team recognizes that BART has limited data tracking carpooling activity prior to the implementation of the Scoop pilot project. BART can provide baseline estimates for number carpooling, but cannot provide details such as count per station per hour. This data will be used to understand carpooling activity to the degree possible before Scoop implementation. If possible, the data is requested from the year 2015 to the start of the project, to help identify longer running trends that might be underlying leading up to the project.

- **Count of people carpooling to BART stations by station by hour**

  To measure whether carpooling activity increases as a result of the project, the IE team proposes tracking the count of people carpooling to the stations by hour over the course of the project. Scoop is providing BART with data on carpooling activity by station over time. The IE team has been provided access to the dashboard displaying this data, which allows for downloads of individual trip activity by timestamp. This data has the following fields:

  trip_time: is the time stamp of the trip to nearest 15 minutes

  matched_flag: is whether the trip was matched (all reported trips are matched)

  cancelled_flag: indicates whether the trip was canceled, this happens sometimes

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

BART Integrated Carpool to Transit Access Program Evaluation Plan | **17**

mode: indicates whether the person is a looking to be a driver or either (driver or rider)

is_driver: a Boolean variable indicating whether the trip record belongs to the driver

license_plate: a vehicle ID of the carpooling that can be used to evaluate repeat activity over time

carpool_size: number of people in the vehicles

bart_station: the BART station at which the trip ended.

The IE team will use the data to evaluate carpool data over time.

Analysis Procedure:

The analysis procedure will evaluate the baseline estimates for number of carpooling vehicles before Scoop. The levels of carpooling before the implementation of Scoop will be compared against levels following implementation. Comparison will be made using Scoop data, and averages will be compared using the t-test (if permitted by the baseline data). If the average carpooling following Scoop implementation is higher and statistically different from the baseline estimates, then it suggests a confirmation of the hypothesis. This comparison will be done over several periods during the implementation. In addition, the trend in Scoop data will be evaluated and regressed against trend variable in a standard ordinary least squares (OLS) regression. If the trend coefficient is positive and statistically significant, it will suggest increased carpooling over time, confirming the hypothesis. Other variables may be added to regression mode to control for external factors. The analysis may be disaggregated to the station level, where the hypothesis is confirmed for some stations and unconfirmed for others. This will be done if the data permits (it should be done for this hypothesis).

Furthermore, a system-wide aggregation will also be evaluated. As described below, the phased implementation will result in two stations being added to the Scoop system each month. By analyzing the carpool data by station for the entire timeline of deployment, the project team can analyze the before-and-after data for stations as and when the deployment happens. Quantitative analysis will also yield results on near-term impacts of most stations and long-term impacts on the initial set of stations.

Hypothesis 2: Utilization of carpooling spaces by actual carpooling vehicles increases

Performance Metric: Number of verified carpool vehicles.

Data Elements & Sources:

- **Before Scoop: BART-provided baseline estimates of designated "carpool" space occupancy, which is present at some of the stations.**

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

18 | BART Integrated Carpool to Transit Access Program Evaluation Plan

BART will provide baseline data of estimates of carpool space occupancy. This data may be derived from the baseline data provided for Hypothesis 1.

- **After Scoop Implementation: BART will have both its ongoing carpool program for designated "carpool" spaces plus the Scoop program data in which carpoolers will be parking in the "permit" area.**

    BART will provide estimates for its existing carpool spaces *plus* activity data provided by Scoop. This latter data is described in Hypothesis 1.

- **Number of spaces utilized by carpooling vehicles at each station before and after the pilot**

    To calculate occupancy, BART will provide data on the number of spaces utilized by carpooling vehicles by station over time (if it changes).

<u>**Analysis Procedure:**</u>

The analysis procedure will follow a pattern similar to that proposed for Hypothesis 1, with application of the t-test and a regression model to determine if differences in before-and-after utilization of carpooling spaces changed. The data described above will be transformed into variables describing utilization over time.

Hypothesis 3: The cost of enforcement per carpool space declines with no sacrifice in enforcement quality.

<u>**Performance Metric:**</u> Cost and time spent on carpool enforcement per carpool space.

<u>**Data Elements & Sources:**</u>

- **Hours of labor devoted to carpool enforcement**

    BART will provide enforcement labor hours before and after the pilot implementation. Data is requested starting in 2015.

- **Number of carpooling spaces available at each station before and after the pilot**

    This is the same data as described in Hypothesis 2.

<u>**Analysis Procedure:**</u>

The analysis of this hypothesis will depend on the continuity of the data and its resolution. Several approaches are possible. The preferred procedure is similar to that outlined in Hypothesis 1, which can be followed if the data permits enough observations to produce a statistically significant sample before and after the pilot. Otherwise, a general trend can be evaluated over time and modeled with a regression model, where enforcement hours are the dependent variable. The approach will be numerical, but the exact method will be contingent on the time and space resolution of the data that BART has available.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

BART Integrated Carpool to Transit Access Program Evaluation Plan **19**

Hypothesis 4: The number of instances of illegal use of carpool spaces per total carpool spaces available will be lower than before the pilot.

> **Performance Metric:** Number of citations given to illegal carpool vehicles over time

> **Data Elements & Sources:**

- **Citations per station per day**

  > BART will provide data on citations given each day. However, BART does not enforce every station every day. BART will provide data that is available in this regard. Data is requested starting in 2015.

- **Any count of illegal use of carpool spaces**

  > Scoop may be able to provide some information on enforcement. However, engaging in fraudulent activity with Scoop is somewhat difficult to do by design. Scoop drivers would have to get regularly matched with a rider that is "in" on it, and then have that rider agree to not ride with them every day. Since the rider would be paying the driver, some financial arrangement would have to compensate the rider's participation in the fraud. Because driver does not control the match process, this would seem difficult to do. It might only be doable through planning between spouses who share a home location and income. The IE team will evaluate whether there is any Scoop data that can investigate whether fraud is occurring with its system.

> **Analysis Procedure:**

> The data will be processed into a count of illegal use of carpool spaces over time, before and after the pilot. The time-series of citation data will be analyzed using statistical tests such as the t-test for evaluating average citations before and after the pilot. The data will be processed to consider "citations per carpool vehicle" to control for any increased carpooling activity. Regression models may be applied if needed to confirm any trends in citation activity. However, statistical tests of before-and-after activity may be sufficient to confirm this hypothesis. This hypothesis may only be evaluated at the aggregate level, since it is unclear whether citation activity will be frequent enough at the station level to produce statistically valid samples.

Hypothesis 5: The distribution of legal arrivals to carpool spaces will be closer to uniform distribution between the hours 6 am and 10 am than it was before the pilot.

> **Performance Metric:** Carpool arrival by station by hour

> **Data Elements & Sources:**

- **Arrivals of carpool vehicles by station by hour**

  > This data will be exactly the same as the data structured for Hypothesis 1.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

20 BART Integrated Carpool to Transit Access Program Evaluation Plan

- **Baseline estimates for number carpool before Scoop**

    This data will be exactly the same as the data structured for Hypothesis 1.

Analysis Procedure:

This hypothesis can be evaluated in several ways. Non-parametric tests can be applied to evaluate whether the before-and-after distributions are different. But this is all that can be determined statistically from such tests. Ultimately, the IE team wishes to determine whether the distribution of arrivals will be closer to the uniform distribution than the distribution of arrivals before the pilot. The Kolmogorov-Smirnov (KS) Goodness-of-Fit Test can be applied to evaluate the nearness of the before distribution to the uniform distribution. The same test can be applied to the distributions after the pilot. The resolution of the data will determine the degree to which further statistics can be applied. For example, the Scoop data will permit a series of many KS tests to be made, which would allow for hypothesis testing on the test statistics themselves. The evaluation of the test statistic over time can be used to determine if the distribution of arrivals is converging to a distribution that looks more uniform than earlier in the pilot or before it. The distribution of arrivals will be characterized in this analysis, and data permitting, the analysis will be executed at the station level.

Hypothesis 6: The number of persons per vehicle parking at BART stations increases after the program

Performance Metric: Number of persons per vehicle parking at BART.

Data Elements & Sources:

- **Number of SOVs parking**

    This data will be derived from BART parking counts and capacity measurements. It is unlikely that BART has any data source that can determine number of SOVs parking at its lots. BART can inform the IE team if this assumption is incorrect. Rather, it will be assumed that each BART station parking fills to capacity each day. BART is at record ridership and this is a reasonable assumption today. The number of SOVs parked at each BART station will be the difference between the estimated carpooling activity at each station and the nameplate non-carpool capacity of parking at BART. That is, any vehicle that is not a permitted carpool via Scoop or via the pre-existing carpool permit regime will be considered an SOV. Data from Scoop will need to be able to detail which carpooling vehicles park at BART. This requires an extension of the data described in Hypothesis 1, with Boolean variables embedded within the trip level data that determine whether riders and drivers finished the trip at BART.

- **Number of carpool vehicles parking**

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

BART Integrated Carpool to Transit Access Program Evaluation Plan | **21**

This data will be determined by a summation of carpool parking data provided by BART and the activity data provided by Scoop as described in Hypothesis 1.

- **Carpool vehicle occupancy**

  This data will be provided by the Scoop activity as described in Hypothesis 1.

- **Total number of spaces utilized**

  This data will be provided by the Scoop activity as described in Hypothesis 1, as well as any parking data that BART has with respect to carpool parking, SOV parking, and station parking lot capacity.

Analysis Procedure:

This hypothesis will be evaluated in a manner that is similar to Hypothesis 1, using variables transformed to determine the level of SOV parking and carpooling vehicles.

Hypothesis 7: The technological changes to carpooling have caused people who would have driven alone to carpool to BART stations instead.

Performance Metric: Number of people who would be driving alone to work without the project.

Data Elements & Sources:

- **Survey of people who carpool to BART via Scoop**

  The IE team is currently providing input into surveys being conducted by BART. In this continued collaboration, the IE team will assist in surveying Scoop users to evaluate how they would have traveled in the absence of the Scoop project.

  The survey will ask questions about demographics, location of home and work, travel behavior, change in travel behavior as a result of Scoop, use of Scoop, and vehicle ownership.

Analysis Procedure:

The survey analysis will evaluate the distribution of responses to questions asked of respondents. It is expected that survey responses will show a distribution of behavioral impacts across the sample population. The survey responses will evaluate the share of respondents who indicate that the Scoop pilot is impacting behavior. The survey questions will be designed to be "causal" or "attributional" in nature. That is, respondents must attribute their behavioral change to the presence of Scoop as an enabler, and indicate that the alternative action would have been the drive alone mode to work or to the BART station.

Hypothesis 8: The expansion of Scoop to all BART stations will lower VMT and reduce GHG emissions that would have occurred in its absence.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

22 BART Integrated Carpool to Transit Access Program Evaluation Plan

Performance Metric: Measured travel behavior change and estimated emissions change.

Data Elements & Sources:

- **Survey of people who carpool to BART via Scoop**

    The data collected from this survey will be part of same effort as described in Hypothesis 7.

- **Activity data of Scoop user origin and destination (or trip distance)**

    The activity data provided by Scoop will contain data on Driver Trip Miles, which is the cumulative distance from driver's home to final destination, as well as Rider Miles Saved. The Rider Miles Saved will be that traveled between their pick-up point and their drop-off point. If there are three people in the carpool (including the driver), it would describe the sum of miles for both riders, but not the driver. The miles that are calculated by Scoop are the Google maps distance between the rider pick-up and drop-off points. This data will be available at an aggregate level by month.

Analysis Procedure:

The analysis will evaluate the distribution of responses to questions asked of respondents. It is expected that survey responses will show a distribution of behavioral impacts across the sample population. The survey responses will evaluate the share of respondents who indicate that the Scoop pilot is changing behavior. The survey questions will be designed to be "causal" or "attributional" in nature. That is, respondents must attribute their behavioral change to the presence of Scoop as an enabler, and indicate that the alternative action would have been the drive alone mode to work or to the BART station.

Hypothesis 9: Overall ridership increases as a result of the Scoop program.

Performance Metric: Overall ridership increases as a result of the Scoop program.

Data Elements & Sources:

- **Ridership data by station by hour or by day**

    The IE team would also seek BART ridership data by day to determine if increases in ridership are correlated with increases in carpooling activity as seen in the Scoop data. Ridership data would be preferred to describe origins and destinations by time. If the data can be rendered in station origin and destination (OD) pairs by day; that would be the most complete representation of activity. Each row would be an OD pair (e.g., El Cerrito-Berkeley, each column would be a time slice). If data is not available at this resolution, summation of origins and destinations by day, without pairs, is likely sufficient for the analysis.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

BART Integrated Carpool to Transit Access Program Evaluation Plan | **23**

The time frame for this data would be requested for the beginning of 2015 to the end of the project term. Data well before the project establishment provides a baseline to evaluate existing trends and avoid attributing activity that is the result of broader trends to the project.

Analysis Procedure:

This analysis will take ridership data and Scoop activity data and evaluate whether they are correlated over time. The analysis will model ridership as the dependent variable in a regression model and Scoop activity will serve as the independent variable. Other control variables, such as time-trend, seasonal dummy variables will also be included in the model to distinguish outside effects that may influence ridership. If the Scoop activity coefficient is statistically significant after controlling for other known factors, the hypothesis will be considered confirmed. This hypothesis will be evaluated at the station level.

Hypothesis 10: Users of the Scoop application reduce their cost of travel relative to their previous method of travel to BART or commuting.

Performance Metric: Cost of travel by users prior to Scoop.

Data Elements & Sources:

- **User survey**

    The data collected from this survey will be part of the same effort as described in Hypothesis 7. This data will support the calculation of a travel cost function for respondents across a variety of modes.

- **Activity data of Scoop users**

    Activity data, as described for Hypothesis 8, can be used to estimate the costs (or revenue) to Scoop users. This data can be used to support an evaluation of Scoop costs.

- **BART fare tables**

    The BART fare tables will be used to calculate the full cost of the trip and compare against the costs of alternative modes.

Analysis Procedure:

This hypothesis requires the combination of survey data with Scoop activity data. Since the survey is a sample, it will describe how respondents would have traveled in the absence of Scoop for a sample of the population. This will inform mode shift for population level estimates. The population level data will be derived from Scoop activity data. This data will be used to estimate the costs that users are experiencing with Scoop. When combined with the mode shift data derived from the survey, the analysis will estimate the change in cost experienced within the sample and for the population more

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

24 BART Integrated Carpool to Transit Access Program Evaluation Plan

broadly. Translation of the results to the population level analysis may encounter barriers that limit the analysis. If the survey analysis cannot be appropriately scaled to the population (e.g., for lack of representativeness or other limitations), this hypothesis may only be evaluated using data from the survey sample. The approach will remain the same, in that a calculation of cost of using Scoop will be compared against the alternative mode that the respondent would have taken.

Hypothesis 11: Enforcement and abuse of Scoop permits are low. The fraud rate is low (less than 5 percent).

Performance Metric: Measured fraud rate of Scoop permits

Data Elements & Sources:

- **Scoop detection of permit violation**

    This data will be the same as described in Hypothesis 4.

- **BART enforcement citation data**

    The IE team would use any citation data provided by BART to evaluate whether trends in citations have changed as a result of the project. Data is requested starting in 2015.

Analysis Procedure:

    The data will be transformed into a fraud rate, which controls for increased carpooling activity. The analysis will evaluate whether the average fraud rate is lower than 5 percent over time. The test and the time frames evaluated will depend on the structure and frequency of the data. Assuming a large enough sample size of observations, the t-test will be applied to evaluate whether the fraud rate is statistically less than 5 percent. An analysis of citation trends and regression analysis may also be applied depending on the data structure from BART and Scoop.

Hypothesis 12: The marginal cost for BART for implementing the program is less than the revenue earned from additional ridership.

Performance Metric: Estimated revenue gain from ridership increases and parking exceed the marginal cost incurred by BART to implement the Scoop program.

Data Elements & Sources:

- **Ridership data by station by hour or by day**

    This data would be the same as detailed in Hypothesis 6. If the data contains full origin-destination specifications, it can be used to derive BART revenue.

- **Activity data of Scoop users**

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

BART Integrated Carpool to Transit Access Program Evaluation Plan | **25**

Activity data, as described Hypothesis 8, can be used to estimate the increase in carpooling activity that results from the program.

- **BART revenue**

  If BART revenue cannot be derived from provided ridership data and fare tables, then the IE team would request BART to provide revenue data by day from participating stations.

- **Marginal costs incurred by BART (operational)**

  BART will provide an estimate of the operational costs that have been incurred for the duration of the pilot.

Analysis Procedure:

The analysis will estimate the revenue gained from the ridership gained through Scoop activity. This estimate will be derived from a combination of activity data and ridership data. It may use a regression model to inform the marginal contribution of Scoop activity to ridership, or another approach may be applied with the support of the survey data. The marginal contribution of Scoop activity to ridership must be scaled to the population of system users, since the marginal costs incurred by BART will be measured at this level. The exact approach for this will be dependent in part on the resolution of BART data available. Once an estimate of the contribution that Scoop has made to system ridership is generated, and revenue derived from that, it will be compared with the reported marginal costs incurred by BART to determine if it is higher or lower.

Hypothesis 13: The process of deploying the project will produce lessons learned and recommendations for future research and deployment.

Performance Metric: Qualitative documentation from stakeholder interviews

Data Elements & Sources:

- **Stakeholder interviews**

  This data is qualitative in nature. The project team will identify members that can be available to interview with the IE team. The project team should specify at least three people with enough knowledge on the project to talk candidly about its successes and challenges. The IE team will interview these candidates to understand the lessons learned from project implementation.

  Suggested interviewees are listed in Table 5 below.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

26 BART Integrated Carpool to Transit Access Program Evaluation Plan

Table 5. Suggested Interviewee Name, Role/Affiliation, and Contact Info

Interviewee	Role/Affiliation	Contact Info
Nikki Foletta, BART	Grant Manager	nfolett@bart.gov
Jumana Nabti, BART	Program Manager	Jnabti@bart.gov
Jonathan Sousa, Scoop	Scoop Contact	sousa@takescoop.com
Shannon Hake, 511/MTC	Outreach Coordinator	Shannon.hake@wsp.com

- **Data collection period:**

  This data collection will be conducted at six months after the launch of the Scoop pilot, but it may be conducted later. It will be conducted as late as possible such that all implementation lessons learned are captured during the interviews.

Analysis Procedure:

An expert interview protocol will be developed. The interviews will be conducted and synthesized from notes and recordings into a summary describing key insights from experts directly involved in the project.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

BART Integrated Carpool to Transit Access Program Evaluation Plan | **27**

Appendix A. Selected Draft Survey Questions

This section presents draft questions for the survey of app users. These survey questions are subject to revision and not all questions are presented. These questions provide examples of the proposed structure of selected key questions. The survey questions will be revised and augmented with input from the BART project team.

1. How often have you used Scoop when traveling to or from BART?

   o More than 4 times a day
   o 2 to 4 times a day
   o Once a day
   o 4 to 6 days per week
   o 1 to 3 days per week
   o Every other week
   o Once a month
   o Less than once a month
   o Never.

2. How often do you currently ride BART?

   o More than 4 times a day
   o 2 to 4 times a day
   o Once a day
   o 4 to 6 days per week
   o 1 to 3 days per week
   o Every other week
   o Once a month
   o Less than once a month
   o Never.

3. How often do you currently use Scoop?

   o More than 4 times a day
   o 2 to 4 times a day
   o Once a day
   o 4 to 6 days per week
   o 1 to 3 days per week
   o Every other week
   o Once a month
   o Less than once a month
   o Never.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

BART Integrated Carpool to Transit Access Program Evaluation Plan | 28

4. Before you started using Scoop, how often did you use BART?

   o More than 4 times a day
   o 2 to 4 times a day
   o Once a day
   o 4 to 6 days per week
   o 1 to 3 days per week
   o Every other week
   o Once a month
   o Less than once a month
   o Never.

   As a result of Scoop, would you say that you ride BART:

   o Much more often; more often; about the same; less often; much less often; I have changed how much I ride BART, but not because of Scoop; I did not ride BART before and do not ride it now.

   As a result of Scoop, would you say that you drive your personal vehicle:

   o Much more often; more often; about the same; less often; much less often; I have changed how much I drive a personal vehicle, but not because of Scoop; I did not ride before and do not ride it now.

5. By about how many miles per month do you **think that your personal vehicle driving has increased?**

   o Miles per month: <Drop-down menu, Less than 10, 20, then increments of 20 to 500, more than 500>

6. By about how many miles per month do you **think that your personal vehicle driving has decreased?**

   o Miles per month: <Drop-down menu, Less than 10, 20, then increments of 20 to 500, more than 500>

7. As a result of Scoop, would you say that you travel by bus:

   o Much more often; more often; about the same; less often; much less often; I have changed how much I use the bus, but not because of Scoop; I did not ride the bus before and do not ride it now.

8. Are you currently on the waitlist for a BART parking permit?

9. Why did you decide to take Scoop to or from BART? (please select all that apply)

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

BART Integrated Carpool to Transit Access Program Evaluation Plan | **29**

10. Do you regularly take Scoop TO a BART station, FROM a BART station, or both?

Section 2: Non-Scoop Travel

11. When you take Scoop TO a BART station, how do you travel FROM that station on your return trip?
12. When you take Scoop FROM a BART station, how do you return to that station?

Section 3: Your Most Recent Scoop Trip

13. What day was this trip?
14. Approximately what time did you start this Scoop trip?
15. Were you the driver or a rider on this most recent Scoop trip to or from BART?
16. Did you go TO or FROM a BART station with Scoop on this trip?

Section 4: Your Scoop Trip TO BART

17. Which BART station did you take Scoop to?
18. Did you begin this Scoop trip from your home or from another location?
19. What is the address (or nearest intersection of streets) of this starting point?
20. What was the purpose of your BART trip?
21. At which BART station did you exit the system on this trip?
22. After exiting BART, where was your destination located?
23. If Scoop had not been available, how would you have gotten to BART for this trip?
24. How did you return from the BART station that you took Scoop to?

Section 54: Your Scoop Trip FROM BART

25. At which BART station did you enter the system?
26. Before entering BART, what was the location of your starting point?
27. What was the purpose of your BART trip?
28. At which BART station did you exit the system on this trip?
29. Did you begin this Scoop trip from BART or from another location?
30. After taking Scoop, where was your destination located?
31. If Scoop had not been available, what mode of travel would you have used to get to your final destination for this trip?
32. How did you return to the BART station that you took Scoop from?

Section 6: Follow Up (if questions 22/30 were answered that the trip would not have been taken)

33. How would you have gotten to your destination instead of taking BART?

Section 7: About You

34. Do you own or lease a car?
35. What is the make/model/year of the car that you drive?
36. Please indicate your gender.
37. In what year were you born?
38. What is the highest level of education you have completed?
39. What is your race or ethnicity?

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

30 BART Integrated Carpool to Transit Access Program Evaluation Plan

40. What was your total annual household income in 2016 before taxes? (Your household includes people who live with you and with whom you share income.)
41. Including yourself, how many people live in your household? (Your household includes people who live with you and with whom you share income.)

Section 8: Conclusion

42. Please provide any comments or suggestions on the Scoop to BART program. You can elaborate here on how Scoop has impacted how you travel and provide any information you feel was not covered by the question in this survey.
43. If you would like to be entered into a drawing to win a $50 BART ticket, please enter your name and email address here.

U.S. Department of Transportation
Federal Transit Administration
Intelligent Transportation Systems Joint Program Office

BART Integrated Carpool to Transit Access Program Evaluation Plan | 31

U.S. Department of Transportation

Data Metrics Provided by Scoop

The following excerpt of the contract addendum between BART and Scoop shows the data metrics provided by Scoop as agreed by the two parties.

7. A data dashboard which includes, the following information for each driver trip to a BART station in the program:
   a. trip date,
   b. license plate, and
   c. BART destination station
   d. number of people destined for BART that are in each vehicle parking at BART.

8. The dashboard will also include the following data aggregated by date, station, and AM/PM:
   a. total number of trip requests,
   b. number of matched one-way trips,
   c. number of wheelchair users or users with special accommodations requesting a ride once data becomes available,
   d. number of vehicles parking at BART,
   e. total vehicle miles traveled, and
   f. total passenger miles traveled for those in the program.

9. The following data for each person trip requested to/from BART on a monthly basis. Each monthly report will include data for the full program period to account for any changes in the data. For each trip requested, data will include:
   a. trip date
   b. trip pick up time,
   c. matched mode (driver, rider)
   d. license plate,
   e. BART destination station (or origin station for trips originating at BART),
   f. full trip distance for driver
   g. shared trip distance (at least one passenger in vehicle)
   h. matched flag,
   i. cancelled flag,
   j. total people in vehicle during trip, including driver (whether or not destined for BART)
   k. total people in vehicle during trip, including driver (destined for BART)

User Survey Questions

Scoop to BART User Survey

As we come to the end of our partnership with Scoop, BART would like to learn more about how the Scoop to BART program was used. Your responses will help us evaluate the program and improve our carpool incentives as we transition to our new Carpool to BART program (see further info at bart.gov/carpool). This survey should take about 5 minutes to complete.

After you complete the survey, you will have the chance to enter to win one of two $50 BART tickets!

* Required

1. **How have you used Scoop when traveling to or from BART?** *
   Mark only one oval.

   ◯ I have taken Scoop TO a BART station

   ◯ I have taken Scoop FROM a BART station

   ◯ I have taken Scoop BOTH TO and FROM a BART station

   ◯ I have NEVER taken Scoop either TO or FROM a BART station   *After the last question in this section, stop filling out this form.*

2. **How often do you currently ride BART?**
   Mark only one oval.

   ◯ 6 - 7 days a week

   ◯ 5 days a week

   ◯ 3 - 4 days a week

   ◯ 1 - 2 days a week

   ◯ 1 - 3 days a month

   ◯ Once every 3 months

   ◯ Once every 6 months

   ◯ Once a year

   ◯ Never in the last year

3. **How often do you currently use Scoop?**
   Mark only one oval.

   ◯ More than once a day

   ◯ 5 days a week

   ◯ 3 - 4 days a week

   ◯ 1 - 2 days a week

   ◯ 1 - 3 days a month

   ◯ Once every 3 months

   ◯ Once every 6 months

   ◯ Once a year

   ◯ Never in the last year

4. **Before you started using Scoop, how often did you use BART?**
   Mark only one oval.

   ◯ 6 - 7 days a week

   ◯ 5 days a week

   ◯ 3 - 4 days a week

   ◯ 1 - 2 days a week

   ◯ 1 - 3 days a month

   ◯ Once every 3 months

   ◯ Once every 6 months

   ◯ Once a year

   ◯ Never in the last year

5. **As a result of Scoop, would you say that you ride BART:**
   Mark only one oval.

   ◯ Much more often

   ◯ More often

   ◯ About the same

   ◯ Less often

   ◯ Much less often

   ◯ I have changed how I ride BART but NOT because of Scoop

   ◯ I do not ride BART now, and did not before I started using Scoop

6. **As a result of Scoop, would you say that you drive your personal vehicle:**
   Mark only one oval.

   ⬭ Much more often

   ⬭ More often

   ⬭ About the same

   ⬭ Less often

   ⬭ Much less often

   ⬭ I have changed how much I drive but NOT because of Scoop

   ⬭ I do not drive now, and did not before I started using Scoop

7. **As a result of Scoop, would you say that you travel by bus:**
   Mark only one oval.

   ⬭ Much more often

   ⬭ More often

   ⬭ About the same

   ⬭ Less often

   ⬭ Much less often

   ⬭ I have changed how much I ride the bus, but NOT because of Scoop

   ⬭ I do not ride the bus now, and did not before I started using Scoop

8. **Are you currently on the waitlist for a BART parking permit?**
   Mark only one oval.

   ⬭ Yes

   ⬭ No

   ⬭ Don't know

9. **Why did you decide to take Scoop TO or FROM BART? (please select all that apply)**
   Check all that apply.

   ☐ Speed: Scoop was faster than my alternative travel option

   ☐ Safety: Scoop was safer than my alternative travel option

   ☐ Cost: Scoop was cheaper than my alternative travel option

   ☐ Cost: I can offset my travel costs by making some money through driving

   ☐ Social: I like sharing my ride with others

   ☐ Parking Permit: I was able to get a BART parking permit by using the Scoop program

   ☐ Arrival Flexibility: I was able to arrive at the BART station later and still get a parking space

   ☐ Alternative to Driving: I was able to take Scoop as a rider rather than driving to the BART station and parking

   ☐ Access: I do not have access to a car and a ride is the next best option

   ☐ Accessibility: I cannot drive and a ride is the next best option

   ☐ Other: _____

10. **Do you regularly take Scoop TO a BART station, FROM a BART station, or both?**
    Mark only one oval.

    ⬭ I regularly take Scoop TO a BART station only

    ⬭ I regularly take Scoop FROM a BART station only

    ⬭ I regularly take Scoop both TO and FROM a BART station

    ⬭ I do not take Scoop to or from BART regularly

11. **If you do not get matched via Scoop, how do you get to or from the BART station?**
    Mark only one oval.

    ⬭ I drive alone to the BART station and park

    ⬭ I carpool with friends/family to the BART station and park

    ⬭ I take a bus or other public transit to the BART station

    ⬭ I take a private shuttle to the BART station

    ⬭ I am dropped off or picked up by friends/family at the BART station

    ⬭ I take Uber/Lyft to the BART station

    ⬭ I take a taxi to the BART station

    ⬭ I walk to the BART station

    ⬭ I bicycle to the BART station

    ⬭ I use another mode of transportation to the BART station

    ⬭ If I am not matched via Scoop, I do not travel to the BART station

Skip to question 12.

Your Most Recent Scoop Trip

Please think about your most recent trip to or from a BART station with Scoop.

12. **What day was this trip?** *
    Mark only one oval.

    ( ) Monday

    ( ) Tuesday

    ( ) Wednesday

    ( ) Thursday

    ( ) Friday

    ( ) Don't remember

13. **Approximately what time did you start this Scoop trip?**

    _____

    Example: 8:30 AM

14. **Were you the driver or a rider on this most recent Scoop trip to or from BART?** *
    Mark only one oval.

    ( ) Driver

    ( ) Rider

15. **Did you go TO or FROM a BART station with Scoop on this trip?** *
    Mark only one oval.

    ( ) I went TO a BART station   *Skip to question 16.*

    ( ) I went FROM a BART station   *Skip to question 24.*

    ( ) Neither - I've never used Scoop to get to or from BART   *Stop filling out this form.*

Skip to question 33.

Your Scoop Trip to BART

Please think about your most recent trip to BART via Scoop.

16. **Which BART station did you take Scoop to?** *
    Mark only one oval.

    ( ) Antioch

    ( ) Colma

    ( ) Concord

    ( ) Daly City

    ( ) Dublin / Pleasanton

    ( ) Lafayette

    ( ) Millbrae

    ( ) North Concord

    ( ) Orinda

    ( ) Pleasant Hill / Contra Costa Centre

    ( ) Rockridge

    ( ) San Bruno

    ( ) South San Francisco

    ( ) Union City

    ( ) Walnut Creek

    ( ) Warm Springs/South Fremont

    ( ) West Dublin/Pleasanton

    ( ) Other

17. **Did you begin this Scoop trip from your home, or from another location?**
    Mark only one oval.

    ( ) Home

    ( ) Work

    ( ) Other: _____

18. **What is the address of this starting point?**
    Enter address OR a nearby intersection. Please
    also enter the city.

    _____

19. **What was the purpose of your BART trip?**
    Mark only one oval.

    ⬭ Commute to/from work

    ⬭ School

    ⬭ Airplane trip

    ⬭ Sports event

    ⬭ Visit friends/family

    ⬭ Medical/dental

    ⬭ Shopping

    ⬭ Restaurant/bar

    ⬭ Theater/concert

    ⬭ Other

20. **At which BART station did you exit the system on this trip?** *
Mark only one oval.

- ◯ 12th St. / Oakland City Center
- ◯ 16th St. Mission
- ◯ 19th St. / Oakland
- ◯ 24th St. Mission
- ◯ Antioch
- ◯ Ashby
- ◯ Balboa Park
- ◯ Bay Fair
- ◯ Castro Valley
- ◯ Civic Center / UN Plaza
- ◯ Coliseum
- ◯ Colma
- ◯ Concord
- ◯ Daly City
- ◯ Downtown Berkeley
- ◯ Dublin / Pleasanton
- ◯ El Cerrito del Norte
- ◯ El Cerrito Plaza
- ◯ Embarcadero
- ◯ Fremont
- ◯ Fruitvale
- ◯ Glen Park
- ◯ Hayward
- ◯ Lafayette
- ◯ Lake Merritt
- ◯ MacArthur
- ◯ Millbrae
- ◯ Montgomery St.
- ◯ North Berkeley
- ◯ North Concord / Martinez
- ◯ Orinda
- ◯ Pittsburg / Bay Point
- ◯ Pittsburg Center
- ◯ Pleasant Hill / Contra Costa Centre
- ◯ Powell St.
- ◯ Richmond
- ◯ Rockridge
- ◯ San Bruno
- ◯ San Leandro
- ◯ South Hayward
- ◯ South San Francisco
- ◯ Union City
- ◯ Walnut Creek
- ◯ Warm Springs
- ◯ West Dublin / Pleasanton
- ◯ West Oakland
- ◯ None - I did not take BART as part of this trip

21. **After exiting BART, where was your destination located?**
Enter address OR a nearby intersection. Please also enter the city.

_____

22. **How did you return from the BART station that you took Scoop to?**
Mark only one oval.

- ◯ I took Scoop FROM the BART station as well
- ◯ I drove alone from BART
- ◯ I took a bus or other public transit from BART
- ◯ I took a private shuttle from BART
- ◯ I was picked up by friends/family at BART
- ◯ I took Uber/Lyft from BART
- ◯ I took a taxi from BART
- ◯ I walked from BART
- ◯ I bicycled from BART
- ◯ Other
- ◯ I did not take BART for my return trip

23. **If Scoop had not been available, how would you have gotten to BART for this trip?** *
Mark only one oval.

- ◯ I would NOT have taken BART for this trip   *Skip to question 32.*
- ◯ Driven alone to BART and parked   *Skip to question 33.*
- ◯ Carpooled with family/friends to BART and parked   *Skip to question 33.*
- ◯ Taken a bus or other public transit to BART   *Skip to question 33.*
- ◯ Taken a private shuttle to BART   *Skip to question 33.*
- ◯ Dropped off by family/friends at BART   *Skip to question 33.*
- ◯ Taken Uber/Lyft to BART   *Skip to question 33.*
- ◯ Taken a taxi to BART   *Skip to question 33.*
- ◯ Walked to BART   *Skip to question 33.*
- ◯ Bicycled to BART   *Skip to question 33.*
- ◯ Other   *Skip to question 33.*

Skip to question 33.

Your Scoop Trip FROM BART
Please think about your most recent Scoop trip from a BART station.

24. At which BART station did you enter the system, before starting your Scoop trip? *

Mark only one oval.

- ⬭ 12th St. / Oakland City Center
- ⬭ 16th St. Mission
- ⬭ 19th St. / Oakland
- ⬭ 24th St. Mission
- ⬭ Antioch
- ⬭ Ashby
- ⬭ Balboa Park
- ⬭ Bay Fair
- ⬭ Castro Valley
- ⬭ Civic Center / UN Plaza
- ⬭ Coliseum
- ⬭ Colma
- ⬭ Concord
- ⬭ Daly City
- ⬭ Downtown Berkeley
- ⬭ Dublin / Pleasanton
- ⬭ El Cerrito del Norte
- ⬭ El Cerrito Plaza
- ⬭ Embarcadero
- ⬭ Fremont
- ⬭ Fruitvale
- ⬭ Glen Park
- ⬭ Hayward
- ⬭ Lafayette
- ⬭ Lake Merritt
- ⬭ MacArthur
- ⬭ Millbrae
- ⬭ Montgomery St.
- ⬭ North Berkeley
- ⬭ North Concord / Martinez
- ⬭ Orinda
- ⬭ Pittsburg / Bay Point
- ⬭ Pittsburg Center
- ⬭ Pleasant Hill / Contra Costa Centre
- ⬭ Powell St.
- ⬭ Richmond
- ⬭ Rockridge
- ⬭ San Bruno
- ⬭ San Leandro
- ⬭ South Hayward
- ⬭ South San Francisco
- ⬭ Union City
- ⬭ Walnut Creek
- ⬭ Warm Springs
- ⬭ West Dublin / Pleasanton
- ⬭ West Oakland
- ⬭ None - I did not take BART as part of this trip

25. Before entering BART, what was the location of your starting point?

Enter address OR a nearby intersection. Please also enter the city.

_____

26. What was the purpose of your BART trip?
Mark only one oval.

- ⬭ Commute to/from work
- ⬭ School
- ⬭ Airplane trip
- ⬭ Sports event
- ⬭ Visit friends/family
- ⬭ Medical/dental
- ⬭ Shopping
- ⬭ Restaurant/bar
- ⬭ Theater/concert
- ⬭ Other

27. At which BART station did you exit the system on this trip (i.e. the station at which your Scoop trip began)? *
Mark only one oval.

- ⬭ Antioch
- ⬭ Colma
- ⬭ Concord
- ⬭ Daly City
- ⬭ Dublin / Pleasanton
- ⬭ Lafayette
- ⬭ Millbrae
- ⬭ North Concord
- ⬭ Orinda
- ⬭ Pleasant Hill / Contra Costa Centre
- ⬭ Rockridge
- ⬭ San Bruno
- ⬭ South San Francisco
- ⬭ Union City
- ⬭ Walnut Creek
- ⬭ Warm Springs /South Fremont
- ⬭ West Dublin / Pleasanton
- ⬭ Other
- ⬭ None - I did not take BART as part of this trip

28. What was the final destination of this trip?
Mark only one oval.

- ⬭ Home
- ⬭ Work
- ⬭ Other: _____

29. After taking Scoop, where was your final destination located?
Enter address OR a nearby intersection. Please also enter the city.

_____

30. **If Scoop had not been available, what mode of travel would you have used to get from BART to your final destination for this trip?** *
    Mark only one oval.

    ⬭ I would not have taken BART for this trip   *After the last question in this section, skip to question 32.*

    ⬭ Driven alone from BART   *After the last question in this section, skip to question 33.*

    ⬭ Carpooled with family/friends from BART   *After the last question in this section, skip to question 33.*

    ⬭ Taken a bus or other public transit from BART   *After the last question in this section, skip to question 33.*

    ⬭ Taken a private shuttle from BART   *After the last question in this section, skip to question 33.*

    ⬭ Picked up by family/friends   *After the last question in this section, skip to question 33.*

    ⬭ Taken Uber/Lyft from BART   *After the last question in this section, skip to question 33.*

    ⬭ Taken a taxi from BART   *After the last question in this section, skip to question 33.*

    ⬭ Walked from BART   *After the last question in this section, skip to question 33.*

    ⬭ Bicycled from BART   *After the last question in this section, skip to question 33.*

    ⬭ Other   *After the last question in this section, skip to question 33.*

31. **If you took Scoop from BART in the afternoon, how did you initially get to the station in the morning? Or if you took Scoop from BART in the morning, how did you return to the station in the afternoon?**
    Mark only one oval.

    ⬭ I took Scoop to the BART station as well

    ⬭ I drove alone to BART

    ⬭ I took a bus or other public transit to BART

    ⬭ I took a private shuttle to BART

    ⬭ I was dropped off by family/friends at BART

    ⬭ I took Uber/Lyft to BART

    ⬭ I took a taxi to BART

    ⬭ I walked to BART

    ⬭ I bicycled to BART

    ⬭ Other

    ⬭ None - I did not take BART as part of this trip

    Skip to question 33.

Follow Up
You said that you wouldn't have taken the BART trip if Scoop hadn't been available to get to or from the BART station.

We'd like to know how you would have traveled instead of taking BART. Please answer the following question for your entire trip (origin to destination).

32. **How would you have gotten to your destination instead of taking BART?**
    Mark only one oval.

    ⬭ Driven alone to my destination and parked

    ⬭ Driven with family/friends to my destination and parked

    ⬭ Gotten dropped off at my destination by someone that I know

    ⬭ Taken a bus or other public transit to my destination

    ⬭ Taken a private shuttle to my destination

    ⬭ Taken Uber/Lyft to my destination

    ⬭ Taken a taxi to my destination

    ⬭ Bicycled to my destination

    ⬭ Walked to my destination

    ⬭ Would not have made the trip

    ⬭ Other

About You
Now we have a few questions that will help us categorize the results of this questionnaire.

33. **Do you own or lease a car?**
    Mark only one oval.

    ⬭ Yes

    ⬭ No

34. **What is the make/model/year of the car that you drive?**

    _____

35. Please indicate your gender.
Mark only one oval.

- ◯ Female
- ◯ Male
- ◯ Other: _____

36. In what year were you born?

_____

37. What is the highest level of education you have completed?
Mark only one oval.

- ◯ Less than high school
- ◯ Currently in high school
- ◯ High school/GED
- ◯ Some college, currently not enrolled
- ◯ Currently in 2-year college
- ◯ 2-year college
- ◯ Currently in 4-year college
- ◯ 4-year college
- ◯ Currently in post graduate degree
- ◯ Post-graduate degree

38. What is your race or ethnic identification? (check all that apply)
Check all that apply.

- ☐ American Indian or Alaska Native
- ☐ Asian or Pacific Islander
- ☐ African American/Black
- ☐ Hispanic, Latino or Spanish origin
- ☐ Caucasian/White
- ☐ Other: _____

39. Do you speak a language other than English at home?
Mark only one oval.

- ◯ Yes
- ◯ No

40. If yes, please specify the language you speak at home:

_____

41. If yes, how well do you speak English?
Mark only one oval.

- ◯ Very well
- ◯ Well
- ◯ Not well
- ◯ Not at all

42. What was your total annual household income in 2018 before taxes? (Your household includes people who live with you and with whom you share income.)
Mark only one oval.

- ◯ Under $25,000
- ◯ $25,000 - $34,999
- ◯ $35,000 - $39,999
- ◯ $40,000 - $49,999
- ◯ $50,000 - $59,999
- ◯ $60,000 - $74,999
- ◯ $75,000 to $99,999
- ◯ $100,000 to $149,999
- ◯ $150,000 to $199,999
- ◯ $200,000 or more

43. **Including yourself, how many people live in your household? (Your household includes people who live with you and with whom you share income.)**
Mark only one oval.

- ( ) 1
- ( ) 2
- ( ) 3
- ( ) 4
- ( ) 5
- ( ) 6 or more

Conclusion

44. **How did you first learn about the Scoop to BART program?**
Mark only one oval.

- ( ) Outreach staff at a BART station
- ( ) I received an email about the program
- ( ) Banner or advertisement at a BART station
- ( ) TV news
- ( ) Online news article or newspaper
- ( ) Facebook
- ( ) Twitter
- ( ) Friend/family
- ( ) Through the Scoop app
- ( ) Scoop website
- ( ) BART website
- ( ) MTC or 511 website
- ( ) Other: _____

45. **Please provide any comments on the Scoop to BART Program or the new pay by app Carpool to BART program. You can elaborate here on how the Scoop to BART program has impacted how you travel, and provide any information you feel was not covered by the questions in this survey.**

_____
_____
_____
_____
_____

46. **If you would like to be entered into a drawing to win one of three $50 BART tickets, please enter your name and email address here:**
Your information will be kept confidential and will only be used for the purposes of selecting a winner.

_____
_____
_____
_____
_____

U.S. Department of Transportation

Federal Transit Administration