

Shared Mobility in the City of Saint Paul
How Dockless Bicycles and E-Scooters Can Promote Equity, Improve Right-of-Way Management, and Foster Connectivity Throughout the City.

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Dockless Mobility in the City of Saint Paul

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Improve Right-of-Way Management, and Foster Connectivity Throughout
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Executive Summary

In the fall of 2018, the City of Saint Paul, Minnesota added two new forms of shared mobility to its transportation system: dockless bicycles and electric scooters. These new mobility options have been rapidly growing in popularity across the United States and can provide users with a fun and flexible transportation option. Dockless bicycles and e-scooters have a lower impact on the environment and can help reduce carbon emissions typically generated car driving. Privately owned and operated, mobility vendors provide and manage dockless bicycles and scooters which allow users to locate, pay-for, and unlock a ride all from a smartphone application. Dockless bicycles and scooters are a new form of transportation that many cities have been working to effectively integrate into their existing transportation infrastructures, including the City of Saint Paul. Much like other cities, **the City of Saint Paul has a limited understanding of the existing conditions and emerging practices for managing dockless mobility in terms of: safety and equity, utilization and land use, right-of-way management, and how it interacts with other modes of transportation.**

Review of the existing conditions and academic literature indicate that because shared mobility technology is so new and rapidly developing, there is still much to learn about how to best integrate dockless bicycles and scooters. The City of Saint Paul has taken active steps to adapt ordinances and regulations and internal documents and procedures to address challenges learned during its shared mobility pilot phase in 2018. Additionally, the City obtained trip data from mobility vendors in order to understand how users were commuting throughout the city. For the first time in this report, the data collected from mobility vendors was analyzed using GIS software to identify trends and patterns in ridership among Saint Paul residents and visitors. Review of the existing conditions and data indicate that **addressing barriers to equity and determining how to effectively manage the right-of-way are critical components to ensuring the continued success of shared mobility in the City in the future.**

User data showed that some **neighborhoods throughout Saint Paul have not had the same access to shared mobility options as other locations such as the high-density, downtown area.** Interviews conducted with key transportation and city stakeholders revealed that **ensuring equitable access for all residents should be a top priority.** Equitable access includes access in payment and utilization, such that any resident or visitor regardless of their neighborhood or economic status should have an equitable opportunity to utilize shared mobility options. Furthermore, in order to identify shared mobility right-of-way management strategies, a case study analysis of other U.S. and international cities was conducted to understand how other cities have addressed common right-of-way concerns such parking and sidewalk riding which has been prevalent in Saint Paul as well.

In order for the City of Saint Paul to continue to integrate shared mobility into its transportation system, a series of recommendations were provided to **address equity barriers, effectively manage the right-of-way, and improve internal processes for managing data, engaging the public, and evaluating shared mobility's presence in the city.** It is critical that the City of Saint Paul establish its policy goals for shared mobility and communicate them with city staff, mobility vendors, and the public. As a result, the City of Saint Paul will be well prepared to learn from its challenges, celebrate successes, and serve as a shared mobility transportation leader.

Problem Statement & Scope

Problem Statement

The City of Saint Paul, Minnesota like many other cities, has a limited understanding of the existing conditions and emerging practices for managing dockless mobility in terms of safety and equity, utilization and land use, right-of-way management and its interactions with other modes of transportation.

In order to address this problem statement, there will be:

1. A review of the current literature on dockless mobility and presentation of the existing conditions in the City of Saint Paul.
2. Emerging practices and case studies for right-of-way management of dockless mobility in comparable cities both nationally and internationally.
3. Recommendations for how dockless mobility can more effectively integrate into Saint Paul's transportation plan both now and in the future.



Image 1: Lime Dockless Bicycle

Research Scope:

The research scope was narrowed to focus on three primary dockless mobility elements: Right-of-Way Management, Equity & Data Analysis of Vendor Data collected during the 2018 dockless mobility pilot.

This scope was designed to reflect the most urgent dockless mobility management needs by the City of Saint Paul. Additionally, interviews with stakeholders and academic research confirmed that while safety, utilization, and dockless mobility's interaction with other transportation modes are important components in order to the City to be most effective in the short-term, the city needs to have clear plans for its internal processes and right-of-way management and ensure that dockless mobility is equitable for all residents and visitors.

Key Terminology

Definitions:

Shared Mobility: Transportation services and resources that are shared among users, including carsharing, ridesharing, bikesharing and scooter sharing among others²²

Dockless Mobility: Forms of mobility that are enabled via technology, such as unlocking a device, making a reservation (usually via app), and paying for its use. Most commonly refers to dockless bicycles and e-scooters .

Docked vs Dockless: In bikesharing, bicycles are either ‘docked’ where a bike is picked up and returned to a fixed station which secures a bicycle between uses or dockless which enables users to unlock and lock the bicycles via phone application and does not require a fixed bicycle station.

Mobility Vendors: Private companies which own, manage, and collect fees from users for usage of the dockless bicycles and e-scooters via payment in a cell phone application. They establish contracts with cities in which to operate and deploy the mobility modes.



Image 3: Lime E-Scooter in Dallas



Image 2: Docked & Dockless Bikes

Section 1: Existing Conditions

This section provides an overview of the existing conditions of shared mobility in Saint Paul. This analysis provides a brief overview of the emergence of shared mobility in the city, an analysis of mobility vendor data, case studies, and summary of academic literature on dockless bicycles and scooters.

1. Background on the City of Saint Paul

While bike sharing has been established in cities throughout the nation and the globe for some time, new shared mobility technology, specifically dockless bicycles and e-scooters has been deployed in many major U.S. cities and have quickly grown in popularity among its users. According to the City of Saint Paul (2018), residents and visitors can benefit from having multiple options to choose from when determining how to travel around the city and for some time, the City has provided residents and visitors with docked bicycles. Previously, the City was served by Nice Ride Minnesota, a bike-sharing service which provided docked bike options for both Saint Paul and Minneapolis. However, following a Request for Proposals (RFP) process in the summer of 2018, Lime was selected as the only dockless bike-service provider to have a license to operate in Saint Paul.

In August of 2018, Saint Paul began to incorporate new options into the City’s transportation system: dockless bikes and e-scooters. As mobility vendors expressed interest in providing their services to the city, the City Council considered the opportunities that these new shared mobility modes presented to connect riders to Saint Paul landmarks such as Como Zoo and Conservatory, its vibrant downtown and Capitol and to existing transportation modes such as the METRO Green Line. The City Council decided to unanimously approve an e-scooter pilot program which would allow an unlimited number of vendors to operate e-scooter systems. Each mobility vendor would be permitted to operate up to 150 scooters during the pilot process. As a result of this process, the City established contracts with two mobility vendors, Neutron Holdings Inc, Lime (“Lime”) and Bird Rides Inc (“Bird”) to provide dockless bicycles and e-scooter transportation options to residents. Due to Minnesota winter weather constraints, the pilot program ended on November 30, 2018.

Staff from a variety of City departments have played an active role in the management of this new shared mobility. The Public Works Department established an informal shared mobility Working Group consisting of the Public Works Director and Public Work Planners, Director of Parks and Recreation, Communication Lead, City Attorneys, the Chief Resilience Officer, and the Commander from the Saint Paul Police Department. The Working Group has helped established new city ordinances based on its pilot experience. The City is now in a position to evaluate the successes and challenges of their shared mobility pilot, evaluate data collected by mobility vendors, and focus on improving integration of new dockless technology both now and in the future.

2. Analysis of 2018 Mobility Vendor Data:

2.1 Data Collection & Analysis Methods

Mobility vendors are required to provide the City with rider data, per the terms of their contracts, which includes information about the number of rides for the previous month, the average number of bikes/scooters in operation, safety reports, repair information, distribution and heat mapping, and a summary of consumer complaints. Until now, the City has not had the opportunity to review and analyze the ridership data following the 2018 pilot. Geographic Information System (GIS) software has been utilized to understand and identify ridership trends and patterns in the City. The mobility data does not include personal, identifiable consumer information. However, due to infrequent data logging by the device GPS units, sometimes as infrequently as every five minutes, many trips were inaccurately recorded with identical origins and destinations.

2.2 Quantitative Findings

Based on the dockless mobility data from Lime and Bird, from August to November 2018, spatial analysis and statistics were conducted to better understand the ridership and usage in the City of St. Paul. There were a total of 80,355 trips, specifically 64,316 scooter trips and 16,039 bike trips.

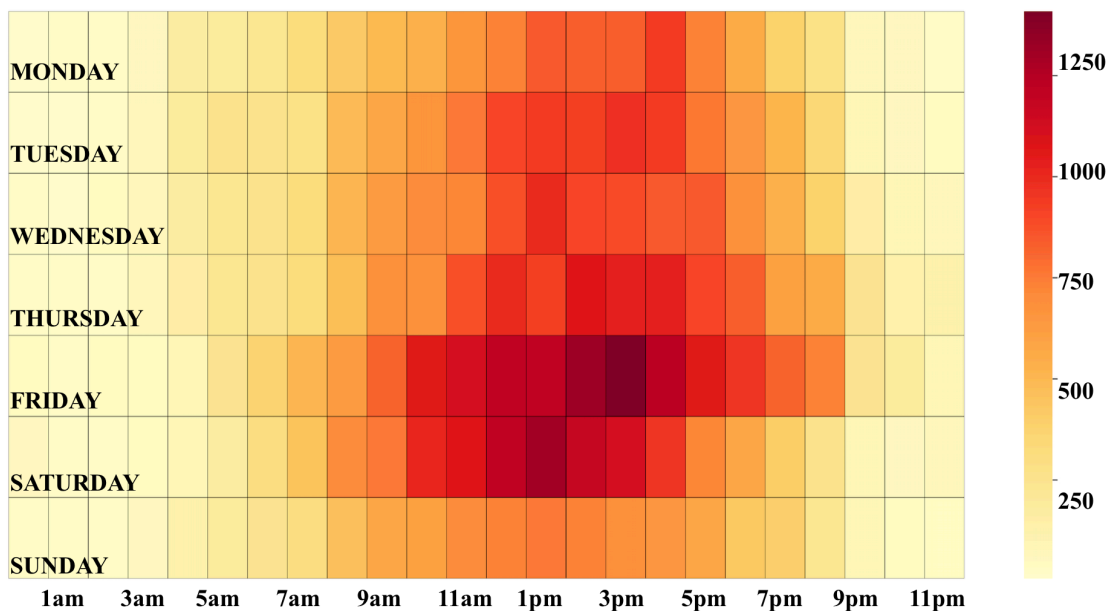


Figure 1: Number of Trips by Week and Time

Figure 1 shows the usage of dockless mobility in the week and the day. The peak usage of dockless mobility is on Friday and on most days between the hours of 1-3pm.

Figure 2 below shows the usage of scooters and bikes in each month from August to November 2018, September contributed most to the total trips with 21,058 scooter trips and 7,502 bike trips. The average trip distance is 0.96 miles for scooter, and 0.86 miles for bike. About 46% of the trip distance is below a quarter mile, and about 14.5% of trips are above 2 miles (Figure 3).

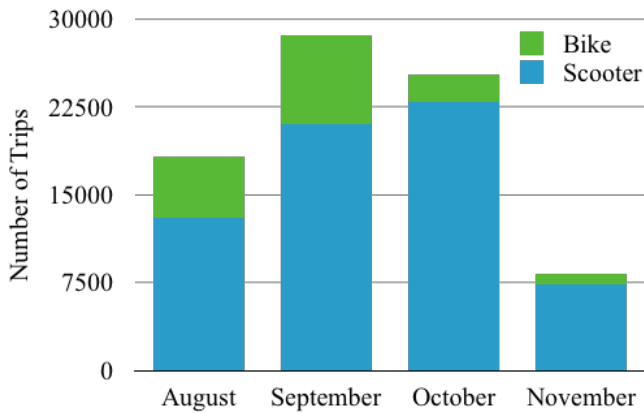


Figure 2: Number of Trips by Month

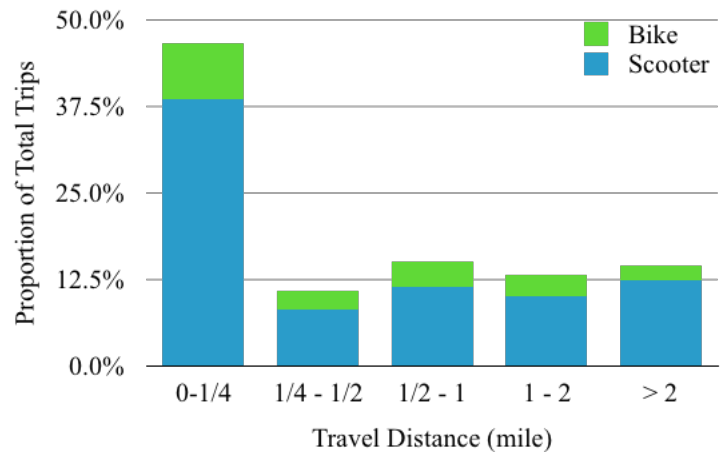


Figure 3: Travel Distance of Dockless Mobility

The average trip duration is 24 minutes for scooters, and 20 minutes for bikes. About 30% of trips durations are less than 5 minutes. Over 50% of trips durations are less than 10 minutes and only about 7.5% of trips are more than an hour (Figure 5). Figures 6 and 7 present the spatial distribution of origin and destination points of scooters and bikes at the census tract level. These maps show how many trips start or end in certain census tracts from August to November. Note the uneven spatial distribution within the City of Saint Paul with more than half of trips located in the Downtown area.

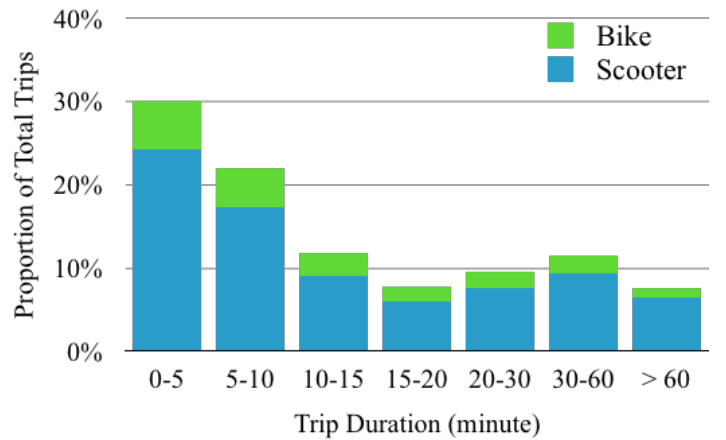


Figure 4: Trip Duration

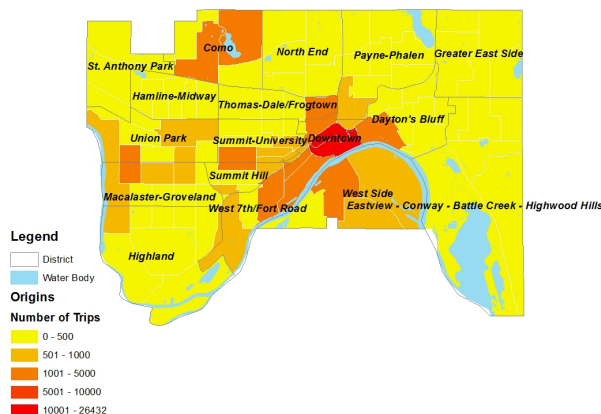


Figure 5: Origins of Dockless Mobility

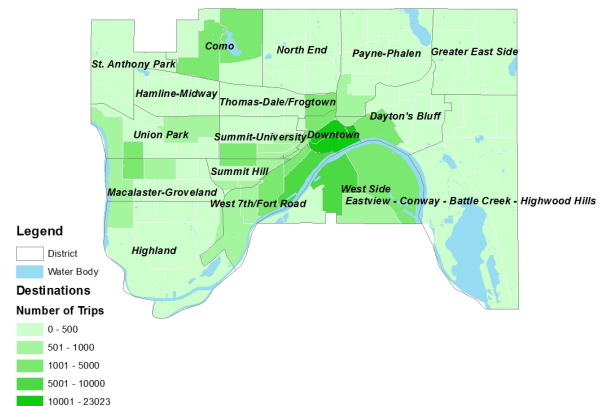


Figure 6: Destination of Dockless Mobility

3. Stakeholder Analysis & Contribution

3.1: Identifying Key Stakeholders:

As the City of Saint Paul endeavors to enhance dockless mobility’s services, the City can utilize a stakeholder analysis to “produce fundamental decisions and actions that shape and guide what the organization is, what it does, and why it does it”⁵. Table 1 shows an initial list of stakeholders which play a key role both internally and externally to dockless mobility management. Additionally, this list of stakeholders was used to identify potential sources for interview in order to obtain information regarding the existing conditions. The stakeholders are divided into two categories – the internal stakeholders and external stakeholders (*See Table 1*). The internal stakeholders are all entities or individuals within the City of Saint Paul who are directly involved in or impacted by the dockless mobility implementation and management. Whereas, the external stakeholders are those entities, organizations or individuals that are not directly involved but care about, interested in or are affected by the shared mobility management and regulation outcomes. Moreover, these external stakeholders can serve as “watchdogs” and help aid in coalition forming, either in expressing support or concerns.

Table 1: Stakeholder Analysis

Internal Stakeholders <i>(those who are directly involved)</i>	External Stakeholders <i>(those who are indirectly involved but care about the issue)</i>
<ol style="list-style-type: none"> 1. The City Mayor 2. Public Works Department 3. St. Paul Working Group 4. Dept. of Planning & Economic Development 5. St. Paul Parks Department 6. St. Paul Police 7. St. Paul City Attorneys 8. Mobility Vendors (Lime & Bird) 	<ol style="list-style-type: none"> 1. Surrounding Cities 2. University of Minnesota 3. St. Paul Business Community 4. Mobility Competitors 5. Metro Transit 6. MN State Government/ MnDOT 7. The Media 8. Researchers 9. City Residents & Users 10. The Disability Community 11. The Next Generation 12. District Councils

3.2. Stakeholder Interviews

In order to better understand the opportunities and challenges that dockless mobility presents to the City of Saint Paul and to gather information to support existing conditions findings and recommendation, interviews with stakeholders were been conducted in a semi-structured fashion.

Identification of Stakeholders: Stakeholders were identified by Reuben Collins, Transportation Planner and Engineer with the City of Saint Paul Public Works Department. However, stakeholders were also identified using the stakeholder analysis tool in Table 1. Stakeholders were contacted via email and the authors of this report shared information about the purpose of the interview to obtain their consent. Additionally, all stakeholders were informed that their names and titles would be part of the final report [*see Appendix 2*].

Conducting the Interviews: In total, 15 interviews with key stakeholders were conducted. In most cases the interviews were performed either in person or via telephone. Interviews were typically led by one individual with other team members taking notes or providing follow-up questions. All interviews were led with a general interview guide [*see Appendix B*], however not all questions were asked of all stakeholders. Notes collected during the interview were typed into documents and categorized based on themes, such as safety, equity, right-of-way management, etc. Key themes and findings were used to understand dockless mobility technology and its emergence in the city, identify existing conditions, and support the development of recommendations.

Key Trends Identified by Stakeholders: A high level summary of themes that emerged from the stakeholder interviews have been provided in Appendix B. In general, stakeholders emphasized the importance of ensuring there is an equitable focus on providing shared mobility in the City. Additionally, many stakeholders cited a lack of infrastructure as a major barrier and concern for public safety. Scooters in particular are required to be ridden in bicycle lanes, rather than on sidewalks as most users did during the pilot. Many parts of the City do not have bicycle lanes and those that do, don't have clearly marked lanes. Stakeholders also frequently referenced the need for the City of Saint Paul to collaborate with other cities and to learn from others, either formally or informally. Some stakeholders suggested that the City of Saint Paul develop consistent vendor contracts or perhaps Joint Powers Agreements with the City of Minneapolis in the future. Stakeholder trends and comments have been a vital resource to understanding the existing conditions including the evolution of dockless mobility in the City and identifying areas of strength and future improvement.

4. Review of the Current Literature Regarding Dockless Mobility

Shared mobility technology is new and rapidly evolving and as a result there has been limited academic research published recently regarding its impact on the transportation system in the long-term. Most research to date has been geared toward understanding the impact and utilization of docked bicycle sharing, primarily internally, in cities such as China where bicycle sharing has boomed. Most literature regarding e-scooters has been published within the last year. High level summaries of academic literature have been outlined in order to explore the emergence of shared mobility, safety and equity concerns, how the mobility is utilized, right-of-way management emerging practices, its connections to existing transportation modes, and broad level policy implications.

4.1 The Growth & Emergence of New Mobility Technology

Electric scooter and bike sharing companies have been rapidly growing in popularity across the United States and some claim they have provided an independent alternative to cars¹. These dockless bikes and scooters are a recent addition to the mobility sector of the sharing economy, which emerged in countries like China in late 2015 with the aim of “complementing urban mobility and contributing to urban sustainability”⁴¹. Many authors have mentioned that these new dockless additions have the potential to increase public transportation usage which could lead to better health outcomes in urban populations. Bike and scooter share could improve health, reduce travel times and costs associated with accessing opportunities throughout a city and have the potential to normalize the image of cycling, among others^{30;19}.

There has been an increase in shared mobility because private mobility companies have seen the value of integrating simple mobile payment and GPS device tracking which can lead to valuable user data. In order to maximize profits, venture capitalists provide the financial support and dockless mobility companies are in charge of the operations and working with the cities; this business model has led to the rapid expansion of dockless mobility alternatives across the U.S.³⁵ Some researchers have categorized this rapid growth in dockless mobility as a “Smart Transition” whereas mobility is “framed as a personalized service available on demand with individuals having instant access to a system of clean, green, efficient, and flexible transportation to meet their needs”¹⁵. The researchers argue this new transition will lead to increased consumer choice, reduce consumer costs, and infrastructure and other vehicles will be used more efficiently. However, there are still concerns about the longevity of these companies and how the data will be used in the future.

4.2 Addressing Concerns about Safety & Equity

With the emergence of this new dockless technology, there have been growing concerns by citizens and public officials about the safety and equity impact of these bikes and scooters. Public officials have a vested interest to ensure that this technology does not create or widen current community disparities. As the City of Seattle Transportation Equity Plan indicates, a city often revered for its management of this technology, “equitable development is an approach to creating healthy, vibrant communities” which includes programs and policies that meet the needs of marginalized populations and reduce disparities¹³. This can be done by prioritizing investment in effective and affordable transportation options. Many researchers have worked to understand who has access to dockless mobility options, specifically bikeshare, as the scooter usage is still emerging. Researchers have found the neighborhoods with more bikes had more college-educated residents, more community resources, and higher incomes³⁰. Moreover, dockless bike systems tend to favor those with smartphone access, with the primary uses being young, highly educated males and females^{19;20}. This research mirrors what has been present in Saint Paul with many of the denser areas such as the downtown and Como Park having increased access. Additionally, areas such as Macalester-Groveland where the University of Saint Thomas is located has seen more accessibility.

The NACTO looked at equity programming as of June 2018 and found that the City of Minneapolis did have equity programming in its policies for dockless mobility³¹. The study did not reference St. Paul, however due to the proximity of the two cities it is important to consider and identify parallels. Minneapolis established equity programming in regard to hiring, payment, and public outreach. For example, shared mobility companies have worked to provide a range of programs for low-income individuals to access the dockless technology. Equity programming should consider all residents and visitors in the city and how to increase their accessibility.

Safety concerns have continued to grow as news reports of e-scooter crashes and fatalities have started to be more publicized. Additionally, there is mixed literature and public awareness on the use of helmets. While many cities and mobility companies do indicate the importance of wearing helmets, research has shown that bikeshare users are less likely to wear a helmet than a private bike rider in the same city^{1;19}. However, many stakeholders indicated that concerns about safety were in regard to the speed of the technology, especially on sidewalks, where the technology was frequently interacting with slow moving pedestrians. While safety is a key priority, in the City of Saint Paul, primary concerns about safety will be reduced if the right-of-way is properly managed and if public education clarifies where users should utilize the technology.

4.3 Understanding Utilization of Shared Mobility

Current literature shows that bike share usage, in particular, can vary dramatically. Fishman identifies trends in usage showing that weekday usage peaks between 7 am–9 am and 4 pm–6 pm, while weekend usage is strongest in the middle of the day¹⁹. Users are busier in the warmer months, which generally confirms the relationship between weather and propensity to cycle found in research on private bike riding. The most common trip purpose for bikeshare appears to be somewhat dependent on the type of user. Furthermore, because bikes and scooters are not permanently docked and can be easily located, there is an increase in short-distance travel compared to docked options^{28;2}. Other researchers looked at trip distance and distance in cities such as Boston, Washington D.C., and Chicago and found that geographical boundary does restrict the movement of users, with the mean distribution between 0.29 and 0.36 miles for commuting trips and 0.12 to 0.21 miles for touristic trips²⁴.

4.4 How to Manage the Right-of-Way for Shared Mobility

Many cities have struggled to clarify where the dockless bikes and scooters can be ridden. According to the City of Saint. Paul, scooters must follow the rules of the road and should never be ridden on sidewalks except when entering or exiting a scooter from the parked position⁴⁰. Moreover, the mobility companies are responsible for collecting the scooters from the right-of-way each night. Scooters can be parked on paved or unpaved boulevards and must maintain a minimum of 5 feet pedestrian walkway at all times. Moreover, there is also growing concern about the impact on the safety of those with disabilities, as there have been reports of bikes and scooters frequently blocking sidewalks, which is a concern for cities American’s with Disabilities Act adherence³. However, there is still uncertainty as to how large the impact is of scooters and bikes blocking sidewalks both Saint Paul and in other cities. For example, in a San Jose, California study, researchers decided to take pictures of scooters and note if they were parked correctly during a specified time period. After locating and documenting 530 parked scooters, researchers found that surprisingly 90% of the scooters parked did not disrupt pedestrian traffic and 97% of them were parked upright¹⁷.

In order to aid the City in their right-of-way management, a few cities have been selected as case studies to understand emerging practices. Additionally, perspectives from national transportation organizations have been included to provide additional insights and methodologies. Furthermore, in order to better understand the existing conditions and draw on practical experiences from other cities regarding dockless mobility in the U.S and internationally, 7 cities were identified to review what types of shared mobility were present in each city and to identify each of the city’s existing right-of-way management strategies in general and specifically for parking. Two cities were selected for further in-depth analysis and can be found in Appendix C.

Table 3: Case Studies for Right-of-Way (ROW) Management

City	Shared Mobility Types	Right-of-Way Management Strategies	Parking Strategies
Austin, TX	Dockless Bicycles & E-Scooters	Established Basic Ordinances which requires users to stay on the right-of-way; Utilizes geofencing technology to limit scooter speed and yield to pedestrians. ⁸	Scooters must be parked at bike racks or designated scooter parking areas ^{7;25}
Chicago, IL	Dockless Bicycles	Chicago Municipal Code requires dockless bicycle riders to utilize protected bike lanes when possible.	No designated parking area ⁹
Los Angeles, CA	Dockless Bicycles & E-Scooters	Developed a Technology Action Plan which takes digital inventory of curbs, parking meters, and curb paint among others in the right-of-way. Piloting a Mobility Data Specification tool that will enable real-time tracking of e-scooters and dockless bicycles.	Parking between the curb and walkway or furniture zone. Requires Mobility Vendors to Share a Parking Plan as part of Contract. City Ensures compliance through data shared from vendors and regular sweeps to check and document parking compliance. ^{26;27}
Minneapolis, MN	Dockless Bicycles & E-Scooters	Established a modal priority framework that prioritizes right of way use in the following order: walking, biking, transit, and driving cars. Existing framework has not been updated to reflect e-scooter usage.	Complies with design standards and best practices established by Access Minneapolis (Design Guidelines); NACTO Street Design Guide, AASHTO, and MnDOT Local Route Standards ^{10;11}
Santa Barbara, CA	Dockless Bicycles Only; E-Scooters Banned	Established City Ordinances; City staff may be required to locate and remove improperly parked bicycles in order to maintain a safe and orderly right-of-way.	Bicycles must be parked in a bike rack or along the sidewalk. ¹²
Seattle, WA	Dockless Bicycles Only; E-Scooters Banned	Bicycles can operate anywhere on the public roadway; preference for utilization in bicycle lanes, shared lanes, and climbing lanes. City of Seattle is still developing a ROW system for scooters.	Piloting a Program for Designated Bicycle Parking Spots ^{32;33}
Tianjin, China	Dockless Bicycles Only	Established a policy framework for managing dockless bicycles; established clear roles for staff for monitoring and addressing issues.	Geofencing Established for Parking Bicycles ^{21;22}

4.5 Shared Mobility Connecting with other Transportation Modes

Bike and scooter sharing have the potential to connect users with other modes of transportation. In the case of Saint Paul, users can be better connected to the Green Line Light Rail route as well as numerous bus lines. Transportation literature shows that bike and scooter sharing can address the “last mile problem” which is the distance from one’s stop on public transportation to their destination^{18:35}. Dockless mobility options enable users to “gain short-term access to transportation modes on as needed basis”¹⁸. Some of the stakeholders had mixed reactions to this issue, with some believing it dockless mobility does better connect people to transit whereas others argue the technology is too new and it is hard to tell if in the long-run dockless mobility really connects users to transportation. Since academic literature is just now emerging on shared mobility technology, many studies have not been conducted to analyze the impact of the last mile problem and the utilization of dockless bicycles and scooters. As time goes by, and more cities produce the results of their piloting, more information will be available in the future to determine if shared mobility reduces the last-mile problem or if there is no impact.

4.6 Public Policy Implications: Regulations & Data Management

Shared mobility regulation, management, and data analysis has been a challenge for cities across the United States. Some researchers have worked to demonstrate the importance of governmental input in implementation of this new technology. Stakeholders, city governments, and communities, need to be organized in a local way to ensure the success of bike and scooter sharing²⁰. Many cities were caught off guard when mobility companies launched their scooters and did not have the regulatory frameworks to respond accordingly. Benner stated that if a “city doesn’t figure out where the [regulatory] holes are, the private sector will” and that companies will “exploit that weakness”. Cities need to be clear about their long-term goals for safety, equity, and mode shift, and that collaborating and learning from other cities experiences can help address issues as they arise, especially in Saint Paul². As the NACTO indicated, some cities may find that dockless mobility operate in their jurisdictions “in a managed and orderly fashion and support city goals” while others may decide that mobility companies “impede or detract from local policy goals and should be limited or banned”³¹. Furthermore, because dockless scooters and bikes are so new, they may be operating in a “regulatory grey-area” which allow them to take over a city, if city officials are not quick to respond.

The research is unclear as to if dockless bikes and scooters, and more importantly the data that they hold really benefit cities. According to Bordenkircher & O’Neil data sharing is possibly the most beneficial externality offered by dockless and has the potential to shape cities in the future in terms of infrastructure and city planning³. One interviewee agreed and mentioned that the user data has the power to guide decision-making for infrastructure investments. Other researchers agree that data is the most valuable commodity, and data is the “knowledge upon which the power to control the marketplace is built”¹⁵. Because this technology is so new and rapidly evolving, now is the time for policymakers and city officials to decide what their goals are for this dockless mobility technology, what regulations they need, how they plan to use the data, and to begin coordinating and learning from other cities.

Summary of the Existing Conditions:

The academic literature shows that the core components of dockless mobility: safety and equity, utilization and land-use, right-of-way management, interactions with other modes of transportation and public policy are important factors a city should consider when incorporating dockless mobility into its transportation infrastructure.

Safety & Equity:

In Saint Paul, the existing conditions show that primary concerns about safety and equity are around how users are accessing and using the bikes and scooters throughout the city. Stakeholders and literature indicate that user safety is important as well as is the safety of those pedestrians who often share the same space as riders. Additionally, ensuring that all people in the city can have equitable access to the technology. Ultimately, safety and equity concerns will be reduced as long as the City of Saint Paul implements a clear right-of-way management plan that considers safety by having clear guidelines for parking and utilization and promotes equitable access for all people.

Utilization & Land-Use

The data provided by mobility vendors in Saint Paul mirrors the findings in the academic literature. Users are more active during the warmer months, especially in September as seen in the pilot phase and most trips on both scooters and bikes tend to be shorter distances. More research and data analysis will be needed to determine the user's purpose for utilizing both bikes and scooters for their primary transportation mode.

Right-of-Way Management:

Case studies of seven cities show that there are many options available for managing the right-of-way and for determining parking options. Some cities have utilized technology to manage parking such as geofencing or digital inventory whereas other cities have decided to use more tangible parking options such as clearly dedicated parking spaces or zones. Additionally, many cities are still exploring best options for managing the right-of-way, but many have relied on their existing infrastructures such as bike lanes, ordinances, and transportation plans to reflect their goals for the right-of-way.

Interactions with Other Modes of Transportation:

Stakeholders and the academic literature agree that it is too soon to know if dockless mobility is connecting users to other modes of transportation. There is anecdotal evidence that users in Saint Paul utilize dockless mobility to connect to the METRO green line that runs through the downtown. However, more analysis of the mobility vendor data will be needed to do in the future when more information is available.

The City of Saint Paul can use this information to develop a better understanding of its existing conditions and consider areas in the future where more information will need to be collected specifically in regard to utilization and land-use and dockless mobility's interactions with other modes of transportation. The City can prepare to utilize this information to take the next steps in managing dockless mobility.

Section 2: Vision

This section identifies the vision of the future for the City of Saint Paul for its shared mobility. In the future, all residents and visitors will reap the benefits of shared mobility's integration into the city's transportation system.

The Future of Shared Mobility in Saint Paul

Vision Statement:

In 2039, the City of Saint Paul serves as a model for other cities because of its seamless integration of innovative and sustainable shared mobility options. All residents and visitors reap the benefits of effective and efficient right-of-way management and equitable and accessible transportation options that easily connect them throughout the city and beyond.

It's early May 2039 and the City of Saint Paul, Minnesota is known for its impressive transportation structure and diversity in shared mobility options. The City features a user-friendly transportation infrastructure for all its residents and visitors; with all residents regardless of location or socioeconomic status having equal access to their various transit options. The City has improved their street designs and right-of-way by incorporating designated shared mobility spaces and redesigning sidewalks, bike lanes, and roadways for its users to easily accommodate the various types of transportation. The City of Saint Paul is thriving, and residents and visitors are more connected than ever. The diverse transportation modes have reduced cars on the road, smog in the city, and has created new opportunities for all people [see Appendix D for more stories of future residents].

**Shared Mobility
will Reduce Equity
Barriers**

**Right-of-Way
Management will be
Effective and
Efficient**

**Shared Mobility
Options will
Improve
Connectivity**

Section 3: Action Plan

In order for the City of Saint Paul to effectively address emerging shared mobility transportation options, such as dockless bicycles and scooters, the following recommendations have been outlined to aid the city in achieving its long-term vision. Each section begins with a goal statement, justification and stakeholder support, as well as specific information regarding steps for implementation including timeline and financial commitment in dollars for each recommendation. Recommendations address barriers to equity, right-of-way management and improving internal processes.

Purpose of the Action Plan

It is important to acknowledge that the shared dockless mobility technology outlined in this report is evolving rapidly and the City will continue to face new challenges in the future as other technologies emerge. The City of Saint Paul can take actionable steps now to ensure that dockless bicycles and scooters are safe, inclusive, and seamlessly integrated into the city's overall transportation system and ensure that City staff are informed and prepared to address concerns as they arise. To meet overarching and long-term transportation and infrastructure goals, the City must focus on short term planning and considering long term strategies. Promoting equity in transportation throughout the city will benefit all residents and visitors and lead to increased opportunities for all. Also, with new transportation modes coming in the future, the City must be prepared to manage the right-of-way to accommodate the new technology. Lastly, the internal process recommendations provide support to City staff efficiently manage the dockless mobility within the city government both now and in the future.

If the City of Saint Paul decides not to implement the aforementioned action plan this could lead to: decreased future opportunities and reduced equity for users, vendor uncertainty around city goals, concerns by residents regarding safety and ordinance compliance, lack of accommodation for dockless mobility in existing City infrastructure plans and reduced competitiveness with comparable cities. However, the City of Saint Paul now has an opportunity to reflect on their experiences and to gain a competitive edge. This action plan will enable the City to improve its strategic planning and internal evaluation, increase public education, foster peer-to-peer relationships, and improve communication with vendors leading to a more effective and seamlessly managed transportation network.

Critical Policy Recommendation

Critical Recommendation

The City of Saint Paul must Establish Policy Goals for Dockless Mobility

Justification & Stakeholder Support: Before the City of Saint Paul is able to implement the recommendations proposed in this action plan, the City must first establish its policy goals for dockless mobility. Interviews conducted with key city stakeholders and mobility vendors indicated that many people are unclear as to what the city's policy goals are for dockless mobility and ultimately what the city is trying to accomplish. Without clear, communicable goals, the effectiveness of the action plan outlined is limited. Mobility vendors indicated it is unclear as to what the city's goals are, but if the City had goals the vendors would be more than willing to comply. Additionally, of the people interviewed, only a small number were able to identify possible city goals for dockless mobility. It was clear that across stakeholders there was not one common understanding of the policy goals. Policy goals are critical in guiding courses of action and future planning in the city. These goals should reflect on how the city sees the integration of dockless mobility into its existing transportation network. Proposed guidelines for developing and communicating policy goals have been outlined below.

Policy Goals Should:

1. Be concise and clearly outline a vision for the future integration of dockless mobility in the City.
2. Align with the City of Saint Paul's overarching goals, mission and vision for its transportation future.
3. Be developed in conjunction with staff who are most familiar with the successes and challenges of dockless mobility in the city.
4. Incorporate an equity component keeping in mind all of Saint Paul residents and visitors.
5. Communicated and shared with internal staff, the public, and mobility vendors and reflected in easily accessible public documents and vendor contracts.
6. Be flexible enough to be revised in the future; goals should be clear enough to offer a path forward but should also be flexible as needed to incorporate new information learned in the future.

1. Addressing Barriers to Equity

Justification & Stakeholder Support:

Shared mobility transportation options, specifically dockless bicycles and scooters are more likely to be distributed by vendors to university campuses, downtown areas, and near existing multi-modal transportation systems such as light rail stations. These areas tend to be denser and more accessible to a range of potential users. However, this current distribution does not effectively meet the transportation needs of all residents and visitors throughout the City of Saint Paul. As our data analysis of trip start and end points show (see Figure 5&6), there is a gap in usage by many parts of the city. Stakeholders most commonly highlighted the following areas as having the greatest need for transportation options including the West and East Side of Saint Paul, Frogtown, and the North End. In these areas there are currently topographic constraints, such as hills, and limited infrastructure such as sidewalks. Due to these constraints, people in these areas are less likely to utilize more common transportation modes because, for example, people may not want to walk up a steep hill to the nearest bus stops. Therefore, dockless bicycles and scooters may be more suitable to meet their needs in those areas.

Additionally, in the interviews with many of our stakeholders, there was a recurring emphasis on ensuring equity in payment methods and access. Some residents may not have access to payment options commonly accepted by vendors such as a credit card or the technology needed to access a ride such as a smartphone which unlocks the bicycle or scooters. Currently, the Lime bike and scooter vendor has a ‘Lime Access’ program in partnership with PayNearMe which allows users who participate in a local, state, or federal assistance program to access and pay for a bike or scooter using cash and a standard text message. For those who qualify for the Lime Access program, there is a 50% discount on scooters and a 95% discount on bicycle rides. The following recommendations address stakeholder concerns and provide a starting point for the City of Saint Paul to ensure that equity is part of dockless technology integration.

Goal Statement:

The City of Saint Paul defines equity through a lens of ownership, inclusion, and justice and inclusion as the act of leveraging unique differences as strengths to increase engagement, contributions, and opportunities for all in the community³⁷. To ensure that all residents and visitors throughout the city regardless of race, gender, age, identity, ability, language, zip code or other factors have access to dockless bicycles and scooters as a reliable form of public transportation, these options must be adequately dispersed by vendors throughout the city and all users must be able to easily pay for and utilize these modes of transportation.

Equity Recommendations:

1.1. Develop an Equity Plan to Address Barriers to Equitable Distribution

The City of St. Paul, henceforth “the City” should develop and propose an equity plan that features the following considerations to ensure that dockless mobility is distributed throughout the city, rather than solely in heavily concentrated areas. The equity plan should be shared with mobility vendors to ensure that they comply accordingly.

1.1.1 Establish an Equity Clause for Vendors: The City should maintain an active dialogue with the mobility vendors and demonstrate why distribution in these target areas is critical and why vendors should comply with the equity priorities for the proposed zip codes. In order to ensure that vendors comply with the City’s equity goals, the City should consider incentivizing mobility vendors financially through reduced fees or require certain geographic distributions in formalized agreements between the City and vendors. There should be one uniform equity clause for all vendors.

- *Timeline for Implementation:* Medium Term (1-2 Years)
- *Financial Commitment:* [\$], Staff are currently working the mobility vendors, so it is important to continue to have equity conversations with vendors. When formal agreements are up for renewal, city staff should consider adding an addendum to the agreements/ RFP requiring specific distribution or consider reducing fees paid by vendors to the City per scooter/bike and per ride. However, while the second course of action may result in reduced revenue, the City must consider whether revenue generation or equitable access is a key priority and if the City has the ability to hire dedicated staff using fees collected from vendors.

1.1.2 Designate Equity & Inclusion Target Neighborhoods: The City should designate zip codes and geographic areas to be prioritized by vendors for deployment of dockless bicycles and scooters. These areas should mirror the Metropolitan Council’s Areas of Concentrated Poverty where 50% or more of the residents are people of color (ACP50)²⁵. Utilize trip data as needed for justification for certain areas and prepare to communicate these equity goals with vendors. According to the NACTO²⁰, the standard distribution for comparable cities is approximately 20% of bikes and scooters to be located in these target neighborhoods which the City should use as a general benchmark.

- *Timeline for Implementation:* Short Term (Present-1 Year)
- *Financial Commitment:* [\$], City staff should designate meeting times to discuss equity plans for the City. Current salaries and benefits would be maintained, however additional staff time is required outside typical day-to-day responsibilities.

1.1.3. Require Vendors to Rebalance Bicycles and Scooters as Appropriate: Rebalancing or relocating bicycles and scooters from more dense to less dense areas, is necessary for increasing opportunities for those living in target neighborhoods. As users move the bicycles and scooters throughout the city, there may be decreased availability in the areas in which the bicycles and scooters originated. Vendors should be required to monitor the fleet and ensure that the technology is redistributed across the city as needed to meet equity goals. The City may request vendors to rebalance the distribution and the vendor should comply within 24 hours, a standard in comparable cities. Moreover, vendors should demonstrate to the City of Saint Paul that they are taking proactive steps to ensure that there is equal distribution in accordance to the equity clause.

- *Timeline for Implementation:* Medium Term (1-2 Years)
- *Financial Commitment:* [\$\$]- Vendors must designate staff to rebalance the bicycles and scooters as needed. The City may have to consider reducing certain fees for bicycles and scooters that are redistributed. However, if the vendors comply with equity goals it is likely that rebalancing may not be necessary on a frequent basis.

Equity Recommendations:

1.2 Develop and Utilize a Community Engagement Action Plan For Target Areas

The City of Saint Paul should not work alone in developing a plan for the community, specifically those living in underrepresented, low-income, and less dense areas. The Principles of Equitable Engagement, as outlined by the City of Saint Paul describe engagement as relevant, equitable, accountable, and listening oriented²⁴. An action plan should be developed which outline how to best engage those in equity and inclusion target neighborhoods and educate them on bicycle and scooter safety, access, and discuss other transportation needs such as infrastructure improvements.

1.2.1 Promote Existing Lime Access and One Bird Program: The Lime and Bird vendors currently maintain programs that addresses many of the concerns by users on financial assistance in regard to credit card usage and smartphone access. The City should utilize social media and work with local media outlets to publish more information about Lime Access and One Bird and designate a webpage on the City of Saint Paul website to inform users about this program.

- *Timeline to implementation:* Short-Medium Term (Current- 2 Years)
- *Financial Commitment:* [\$]- The City should set standards requiring outreach to be performed by vendors in contracts. The City should work in partnership with the vendors to continue to promote and publish more information about these programs.

1.2.2 Conduct Community Meetings to Solicit Feedback: Utilize existing scooter survey data collected from users to better understand the needs and trends. The City should hold community listening sessions throughout the City specifically geared toward understanding concerns about access, payment, distribution, and general safety. Use the information gathered to revise community engagement strategy accordingly. The City can consider including mobility vendors at these meetings, however these sessions are more geared for the City to receive feedback from its constituents and use that information to make program improvements.

- *Timeline to Implementation:* Medium Term (1-2 Years)
- *Financial Commitment:* [\$], Considerable staff time and planning is needed to host community listening sessions. However, if resources are limited it may be possible to conduct strategic sessions in priority areas (i.e. Frogtown & East Side)

1.2.3 Develop Relationships with Local Nonprofits and Other Agencies to Understand and Address Community Barriers: Local nonprofits that serve the communities at a grassroots level know how best to create change in the City of Saint Paul. Nonprofits, specifically those engaged with transportation currently, are informed about the barriers that different communities face and know how to tailor solutions to meet those needs. The City should work to develop partnerships with nonprofits in underrepresented areas throughout the city. Nonprofits should be responsible for continuing to engage and mobilize the community to explore new transportation modes.

- *Timeline to Implementation:* Medium-Long Term (1-4 Years)
- *Financial Commitment:* [\$], Transportation focused nonprofits would be responsible for the majority of the on the ground costs and working with the community. Stakeholders in the nonprofit arena have estimated the cost to be between \$25,000- \$50,000 for door knocking, hosting community focused events, providing incentives, and spreading information. City cost would be reflected in staff time and commitment needed to foster these relationships.

Equity Recommendations:

1.3 Utilize the City of Minneapolis and other cities across the nation as models for updates to the Equity Plan in the Future

Dockless bicycle and scooter technology is rapidly evolving and different cities are taking new approaches to addressing barriers to equity. The City should monitor these approaches and continue to learn from other cities successes and challenges.

- *Timeline to Implementation:* Ongoing
- *Financial Commitment:* [\$]: Staff time is needed to conduct research and track trends overtime. A spreadsheet or other monitoring document should be used to track and analyze trends. At a minimum, the City should review results from the City of Minneapolis pilot equity plan.

2. Effectively Managing the Right-of-Way for Dockless Technology:

Goal Statement:

The Right-of-Way Management of dockless bicycles and scooters will include focus primarily on: public education, ROW strategy development, peer-to-peer learning, and long-term infrastructure improvements.

The public right-of-way (ROW) under the jurisdiction of the City of Saint Paul includes streets, sidewalks, alleys, and other rights of way dedicated to public use, whereas private property starts behind the public sidewalk²⁶.

Dockless bicycles and scooters have created new challenges to the existing ROW system, such that there are new concerns about where to park the new technology, how to educate users about where to ride the bikes and scooters (i.e. in existing bike lanes), managing concerns by private businesses and residents, and ensuring that there is a safety focus and compliance to existing ROW ordinances. The City of Saint Paul will need to consider improving existing infrastructure and developing new infrastructure to accommodate the new technology, specifically dockless bikes and scooters. Additionally, a strategic and clear ROW management plan will be critical to addressing the changes in demands for modern transportation modes ensuring that safety, compliance, education, and strategy are at the forefront of the ROW management plan. The ROW plan geared toward these new modes will be used to establish safety and systematic order in the intersections of scooters, bike users, pedestrians and property owners.

Justification & Stakeholder Support:

According to the stakeholder interviews, ensuring compliance to state laws and city ordinances are key elements needed to facilitate effective right of way management. For example, state and local ordinances prohibit users from riding electric scooters and bicycles from riding on the sidewalks and requires users to utilize existing bike lanes. Often, electric scooters are much faster than a walking pedestrian's speed which leads to safety concerns by riders and walkers. Additionally, many stakeholders cited gaps in public education about where to park the scooters in particular and in some instances they abandoned the scooter in public park lawns, sidewalks, and on private property in front of businesses. This leads to additional concerns about safety for those walking and for those with disabilities, such as those with wheelchairs who may have a hard time navigating around the scooters or bicycles improperly parked. Lastly, ROW management for dockless technologies is being piloted across the United States, it will be critical for the City of Saint Paul to build partnerships with other Cities who may be further ahead in piloting stages or who may have developed new data-based tools to effectively manage the ROW.

Right-of-Way Management Recommendations:

2.1 Utilize Existing Internal Right-of-Way Management Operational Procedures to Address Concerns about Illegal or Abandoned Scooters and Bicycles

Per interviews with Public Works Department Staff, there are currently existing internal operational procedures for addressing abandoned scooters and bicycles. City staff should continue to comply with these procedures when receiving citizen complaints or concerns.

2.1.1: Revisions to Document: Revisions should be made to the internal operational procedures document which currently require the caller to first contact the vendor regarding concerns about misplaced scooters or bicycles. Currently, only if the caller indicates that they first reported to the vendor then does the City of Saint Paul gather information about the location and nature of the complaint. If the City receives a call about a concern/complaint related to scooter or dockless bicycles, all necessary information should be gathered and logged first. The City can still continue to require callers to first call the vendor to address concerns, but the data should be logged in order to ensure more adequate data collection and transparency about problem areas and determine areas of concern to address in the future. Additionally, the City should add a “Scooter/Bicycle Complaints” category to the City’s online 311 Information Service.

- *Timeline to implementation:* Short-term (Current-1 Year); continue to use policies until additionally piloting of dockless bicycles and scooters has been completed.
- *Financial Commitment:* [\$]; low additional cost; may increase staff time at first but will lead to more accurate data collection and long-term understanding of problem areas.

2.2. Develop a Public Education Plan to better Inform Users

Currently, a gap exists between user understanding and the City of Saint Paul rules and regulations regarding proper bicycles and scooter usage including: where the transportation should and should not be used, where to park and store scooters and bicycles, and a general understanding of the existing ordinances. The City needs to develop a plan to ensure that users comply with ordinances. This plan should be developed in coordination those staff on the informal Dockless Mobility Working Group.

- **2.2.1: Coordinate with Vendors:** In the short-term, vendors should be required to demonstrate considerable effort to educate and inform users. Based on the terms and agreements outlined in a vendor contract, vendors should have a responsibility to provide public education via messages in the application (*app*) or other forms of communication such as on their corporate website. The City of Saint Paul should link to these existing webpages on their own website.
- **2.2.2: Utilize Public Messaging:** The City should work with news outlets and other media as well as update the City of Saint Paul website to include more detailed information about where scooters and bicycles should be ridden. For example, video links or “how-to” videos could be provided on the website that engage and inform users with ease.
- **2.2.3: Engage Businesses:** Continue to engage with private property owners, such as businesses to address their concerns. Inform private property owners about the benefits of dockless bicycles and scooters in the city to ensure their buy-in for ROW management concerns.
 - *Timeline to Implementation:* Short-Medium Term (Current-2 Years); Decisions should be made soon regarding how to best inform users
 - *Financial Commitment:* [\$-\$\$]; Depending on the extent of the public engagement, the financial cost could include posted signage, website development costs, staff time, or tangible fees to vendors.

2.3. Establish Right-of-Way Management Strategies Based on Policy Goals and Transportation Industry Emerging Practices:

After the City of Saint Paul establishes its policy goals, it will be able to determine what right-of-way management strategy will be most appropriate for its streets. The City should utilize existing transportation resources such as the NACTO guidelines for dockless technology, Transportation for America Shared Micromobility playbook, and review comparable case study city piloting results. The City of Saint Paul should pilot various recommended right-of-way management strategies such as designating parking areas via geofencing or requiring users to park bicycles and scooters in designated areas i.e. existing bicycles racks, or in the furniture zone. The City will know that it is successful when users are compliant with rules and regulations and tracked parking complaints are reduced.

- **Timeline to Implementation:** Short-Medium Term (Current-2 Years)
- **Financial Commitment:** [\$-\$\$] Cost depends on which options are selected. City staff time will be needed to dedicate time to making a final decision and collecting piloting results.

2.4: Integrate Long-term Infrastructure Improvements into Transportation Plan

Many stakeholders mentioned one problem with right-of-way management is that due to limited bike lanes available, users felt more safe riding scooters, in particular, on the sidewalk. City administrators should integrate dockless technology additions and considerations into the long-term transportation improvement plan. The infrastructure improvements should include constructing new and improving existing bike lanes and sidewalks, in order to provide space and improve in order to provide space and improve connectivity for all transportation modes. Also, the City should cooperate with vendors and local communities to provide parking options for dockless mobility modes. To provide a more safe and delightful environment for all transportation modes, the City should also further improve the street lighting systems.

- *Timeline for Implementation: Long-term (5-20 years);* Infrastructure improvement is a long-term process, including new street design, negotiation with stakeholders, and construction.
- *Financial Commitment: [\$\$\$]*The City should apply for Federal funds for infrastructure improvement, or other grant programs in order to fund the infrastructure construction.

3. Improve City Processes to Effectively Manage Dockless Mobility

Goal Statement:

The City should improve its internal processes for document and data management and evaluation. If the City is able to reflect on its successes and learn from its challenges regarding dockless mobility, and is able to rely on the strength of its internal processes, the City will be better prepared to manage dockless mobility both now and in the future as new technologies emerge and existing technologies continue to evolve.

Justification and Stakeholder Support:

The City has established internal processes to manage dockless mobility such as city ordinances and contracts with mobility vendors, an informal dockless mobility Working Group, documents to manage complaints or concerns from citizens, and has provided information to the public via its website. Stakeholders frequently mentioned the importance of the city of being prepared to address new challenges that arise and for the city to be flexible. Flexibility will be necessary in order to address the challenges, specifically revising ordinances or vendor contracts. Mobility vendors indicated that they were willing to cooperate and comply with the priorities and needs of the City as long as the City was clear about communicating those with the vendor. Soon, the City will start its second year of piloting scooters in the city, so it is critical that the City has tools and internal processes in place now in order to be more effective in the future at understanding strengths and weaknesses of shared mobility in Saint Paul.



Image 4: City of Saint Paul via Minnesota Council of Nonprofits 2018

Internal Process Recommendations:

3.1 Develop a Data Dashboard for Internal and External Learning

The City needs to more effectively manage and analyze the data collected from mobility vendors in order to identify areas for improvement as well as increase opportunities for collaboration of data sharing with other cities. The City should develop a data dashboard that analyzes data collected by mobility vendors. This analysis should look at trip start and end points and work to identify trends. The dashboard should illustrate the data in charts, graphs, and maps. This dashboard is primarily geared toward improving internal processes, however it should also be made public to allow an opportunity for those in academics or for other cities to view and understand trends. This dashboard is the foundation for monitoring, analysis, and quantitative evaluation for dockless mobility.

- *Timeline for Implementation:* Short-Long Term; This is a part of the city's long-term planning process for managing the Dockless mobility, however the process should begin as soon as possible.
- *Financial Commitment:* [\$-\$\$] The City should dedicate specific IT or data professionals to develop the dashboard and manage and publish the data. Additionally, the City could collaborate with the University of Minnesota to further develop the data tools and analysis methods.

3.2 Continue to Conduct Surveys to Gather Resident Feedback

The City should continue to conduct annual public information surveys from residents to gather their perceptions and perspectives about dockless mobility. The purpose of this survey is to understand how dockless mobility is aligning with the transportation needs of the City's residents and visitors. These surveys can be used to identify trends such as: purpose for usage, and where and how often people use the dockless mobility. These surveys can be used by the City to make improvements and enhance their evaluation of the performance of dockless mobility modes.

- *Timeline for Implementation:* Short-term; Survey Development should begin now and implemented in the next year.
- *Financial Commitment:* [\$-\$\$]; The City should cooperate with the vendors or a non-profit organization to produce the survey. The survey should be conducted in-person and should be available via online. The survey requirement could be identified as a requirement in future vendor contracts.

3.3 Conduct Yearly Program Evaluations of Dockless Mobility

The City should conduct yearly comprehensive evaluations about the performance of dockless mobility in Saint Paul. The evaluation should include a quantitative data analysis from the data dashboard, resident surveys, and internal monitoring of complaints by residents. The evaluation should also evaluate the success of the selected mobility vendor and if the vendor met city goals. Summaries of the evaluation should also be available for review by the public and can include additional metrics such as ridership, safety concerns, and equitable promotion throughout the City. The City should use this tool to make program improvements and revise documents as needed such as: further revise vendor contracts, ordinances, or regulations.

- *Timeline for Implementation:* Ongoing; This report should start being prepared in the following year with fundamental information like riderships in different period, spatial distribution and reported accidents. In the long-term, the City can provide further evaluation of equity, right-of-way management, economic and environmental impacts and so on.
- *Financial Commitment:* [\$]; This recommendation will require some staff time, but can be done by city staff with limited extra cost. The time required to produce the evaluation will pay off due to long-term program improvements that positively benefit residents and the City.

Internal Process Recommendations

3.4 Foster Relationships with Other Cities and Transportation Organizations to Increase Information Sharing & Program Learning for Dockless Technologies

Developing relationships with other cities, nonprofits, and local and national transportation organizations will be critical to the success of the City of Saint. Paul in managing dockless mobility in the long-term. Learning should not be done in a silo, rather the City should build upon the work of other cities and understand the approaches other cities and organizations are using to address concerns about: vendor contracts, safety, equity, right-of-way management, ordinances and legal language, and data utilization.

- **3.4.1 Discuss Dockless Mobility Successes and Challenges with Neighboring Cities and Local Organizations:** The City should continue to talk with the City of Minneapolis to learn more about their dockless mobility management and to review the results of their piloting. The City should continue to foster relationships with local transportation organizations and nonprofits who can provide a wealth of on the ground information and have fostered relationships with residents in various communities.
- **3.4.2 Develop Partnerships with Other Cities Outside of Minnesota for Information Sharing:** The City should develop partnerships with other cities and discuss emerging practices for dockless mobility management. Dockless mobility has been present in other cities across the United States for a longer duration than in Saint Paul. The City should utilize their resources to make internal improvements as appropriate. Consider partnerships with cities with similar climate such as Chicago or Boston as well as agencies such as Los Angeles DOT which is piloting a mobility data specification (MDS) tool for managing ROW and tracking dockless mobility throughout their city²⁷. Utilize relationships with existing stakeholders to aid in making connections with other cities as well as continue to connect with Shared Mobility transportation groups such as the Twin Cities Shared Mobility Collaborative.
 - *Timeline for Implementation:* Short-Medium term
 - *Financial Commitment: [\$];* The City should assign staff responsible for fostering relationships with neighboring cities and organizations. The City should review online resources published by other cities to learn more information about equity, right-of-way management, and identify future partnerships.

Summary of Recommendations:

Recommendations	Timeline (Short-Long)	Financial Commitment [\$: \$0-99,999] [\$\$: \$100,000-499,999] [\$\$\$: \$500,000+]
Recommendations for Addressing Equity		
1.1. Develop an Equity Plan to Address Barriers to Equitable Distribution: <ul style="list-style-type: none"> • 1.1.1: Establish an Equity Clause for Vendors • 1.1.2: Designate Equity & Inclusion Target Neighborhoods • 1.1.3: Require Vendors to Rebalance Bicycles and Scooters as Appropriate 	1.1.1 Short Term 1.1.2 Medium Term 1.1.3 Medium Term	1.1.1 [\$] 1.1.2 [\$-\$] 1.1.3 [\$]
1.2 Develop a Community Engagement Action Plan For Target Areas: <ul style="list-style-type: none"> • 1.2.1 Promote Existing Lime Access Program • 1.2.2 Conduct Community Meetings to Solicit Feedback • 1.2.3 Develop Relationships with Local Nonprofits and Other Agencies to Understand and Address Community Barriers 	1.2.1 Short Term 1.2.2 Medium Term 1.2.3 Medium to Long Term	1.2.1 [\$] 1.2.2 [\$] 1.2.3 [\$]
1.3 Utilize the City of Minneapolis and other cities across the nation as models for updates to the Equity Plan in the Future	Ongoing	[\$]
Recommendations for Right-of-Way Management		
2.1 Utilize Existing Internal Right-of-Way Management Operational Procedures to Address Concerns about Illegal or Abandoned Scooters and Bicycles <ul style="list-style-type: none"> • 2.1.1: Revisions to Document 	2.1.1 Short Term	[\$]

2.2. Develop a Public Education Plan to better Inform Users <ul style="list-style-type: none"> • 2.2.1: Coordinate with Vendors • 2.2.2: Utilize Public Messaging • 2.2.3: Engage Businesses 	2.2.1-2.2.3: Short- Medium Term	[\$-\$\$]
2.3 Establish right-of-way management strategies based on policy goals and transportation industry emerging practices.	Short- Medium Term	[\$-\$\$]
2.4: Integrate Long-term Infrastructure Improvements into Transportation Plan:	Long Term	[\$\$\$]
Recommendation for Internal Processes		
3.1 Develop a Data Dashboard for Internal and External Learning:	Short-Long Term	[\$-\$\$]
3.2 Continue to Conduct Surveys to Gather Resident Feedback:	Short-Long Term	[\$]
3.3 Conduct Yearly Program Evaluations of Dockless Mobility:	Ongoing	[\$]
3.4 Foster Relationships with Other Cities and Transportation Organizations to Increase Information Sharing & Program Learning for Dockless Technologies: <ul style="list-style-type: none"> • 3.4.1 Discuss Dockless Mobility Successes and Challenges with Neighboring Cities and Local Organizations: • 3.4.2 Develop Partnerships with Other Cities Outside of Minnesota for Information Sharing: 	Short- Medium Term	[\$]

Conclusion

Shared mobility technology is rapidly developing and has presented cities with the unique opportunity to reflect on their existing transportation plans. Cities, especially Saint Paul, must focus on strengthening its internal processes, dedicate staff who are responsible for managing aspects of shared mobility such as safety and equity, utilization and land-use, and determine how the shared mobility technology will integrate with the existing right-of-way and continue to connect users to other modes of transportation.

This report will enable the City of Saint Paul to learn from its shared mobility existing conditions, the current academic literature, and reflect upon stakeholder insights. The City of Saint Paul will be more prepared to address barriers to equity and right-of-way management as well as work to improve its internal processes for evaluation, data monitoring, and communication with the public. By establishing its policy goals, the City will have a clearer view for the future of shared mobility and will be better prepared to address challenges that may arise.

The action plan presented is a workable framework which will enable the City of Saint Paul to make changes as appropriate and identify next steps for managing shared mobility in the city. Furthermore, the City can continue to have conversations with other comparable cities and learn from the pilot results of other cities. The City of Saint Paul cannot work in isolation, rather it must collaborate and communicate with other leading cities, including the neighboring City of Minneapolis.

Now is the time for the City of Saint Paul to take chances in exploring and adapting emerging shared mobility practices. The transportation industry is constantly evolving, and the City of Saint Paul must be flexible, transparent in its processes, and unafraid to implement and learn from its piloting of shared mobility practices. The future is bright for the City of Saint Paul and all its residents and visitors can look forward to a transportation future which enables all people to reach new destinations throughout the City and beyond.

Appendices:

Appendix A: Data analysis

1. General Statistics

Table A-1 represents the total origins and destinations share by neighborhood. This provides a support for further equity program. It shows that 53% of total trips began at the Downtown area, following by West 7th/Fort Road neighborhood. Neighborhoods on the east and north of Saint Paul, like Eastview-Conway-Battle Creek-Highwood Hills, Greater East Side and North End have less than 1% of total origins. The neighborhoods with low Dockless mobility usage can be the potential focus of the city's equity plans in the future.

Table A-1: Total Origins and Destination Share by Neighborhood

Neighborhood Name	Share of Origins (%)	Share of Destinations (%)
West Side	8.148	9.35
Macalaster-Groveland	3.885	3.70
Union Park	3.651	4.08
St. Anthony Park	0.855	0.70
Downtown	53.033	46.48
Como	4.575	4.58
Payne-Phalen	1.295	1.97
Highland	1.323	1.55
Eastview - Conway - Battle Creek - Highwood Hills	0.144	0.26
Greater East Side	0.183	0.35
Hamline-Midway	1.128	1.36
Dayton's Bluff	2.403	3.29
Summit Hill	1.828	1.99
West 7th/Fort Road	12.133	13.23
Thomas-Dale/Frogtown	1.316	1.82
Summit-University	3.320	4.08
North End	0.780	1.20

2. Dockless Mobility Trips by Month

In this part, trips are divided by different months, August, September, October and November to show the seasonal changes of usages of Dockless mobility in the City of Saint Paul.

2.1 Origins by Month

The four maps below show the origins counts at census tracts level in four different months. The darker red means the greater number of trips began in this area. From the maps, the Downtown area and surrounding areas are the main origins of the Dockless mobility trips. Also, Como Park is a hotspot for Dockless mobility usages in the summer months, August and September, and is an indicator of the recreational usage of Dockless mobility. From September, the origins distribution along Summit Avenue began to grow, and the spatial distribution was less concentrated in the Downtown area.

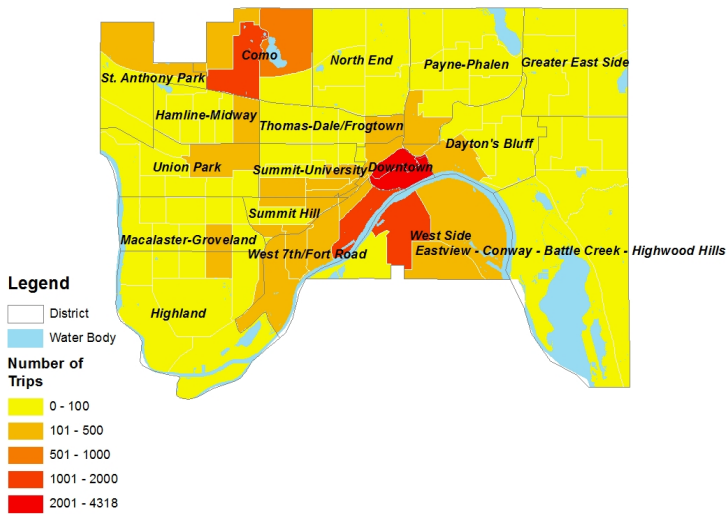


Figure A-1: Origins, August

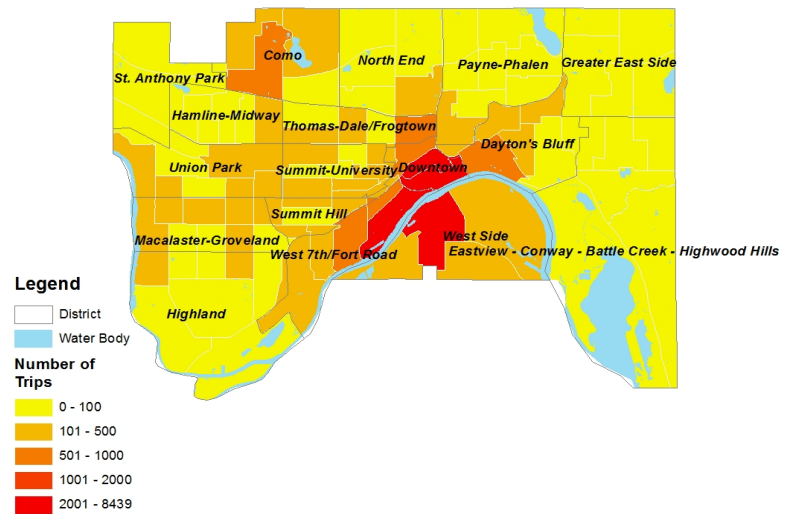


Figure A-2: Origins, September

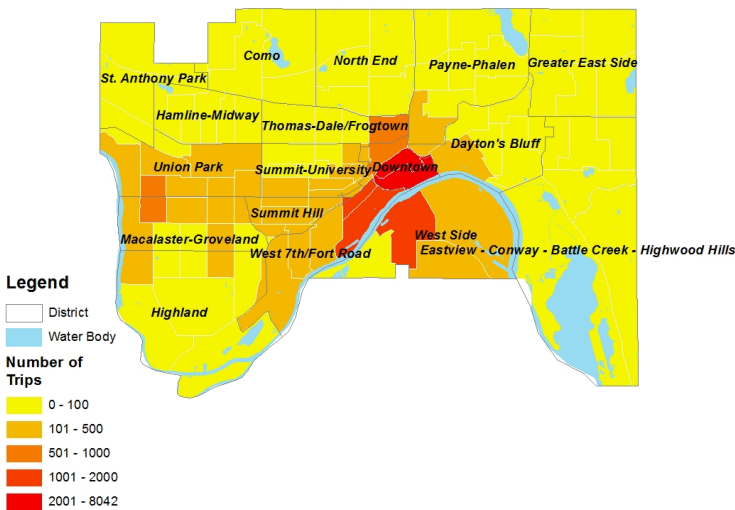


Figure A-3: Origins, October

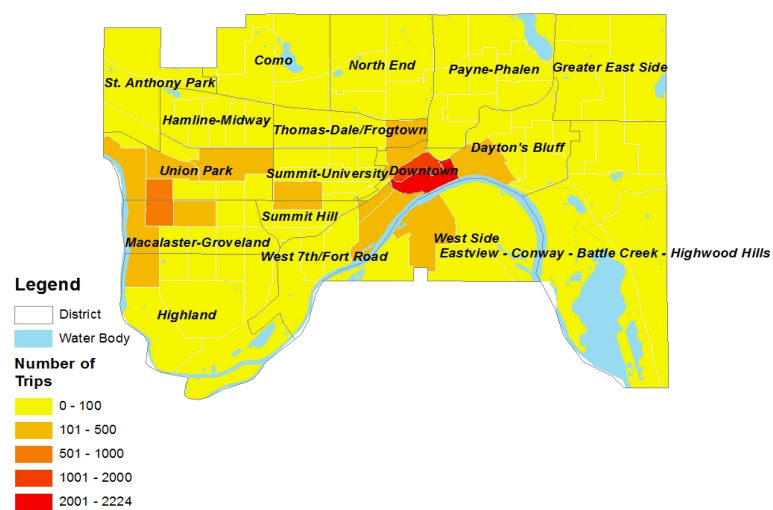


Figure A-4: Origins, November

2.2 Destinations by Month

Maps below represent the destinations counts at census tracts levels in four months. The darker the green color indicates the greater number of trips ending in this area. From the maps below, the overall trends of destinations correspond with the trends of origins and the Downtown and surrounding area are still the main destinations of Dockless Mobility trips. The Como Park destinations declined from September and increased along the Summit Avenue.

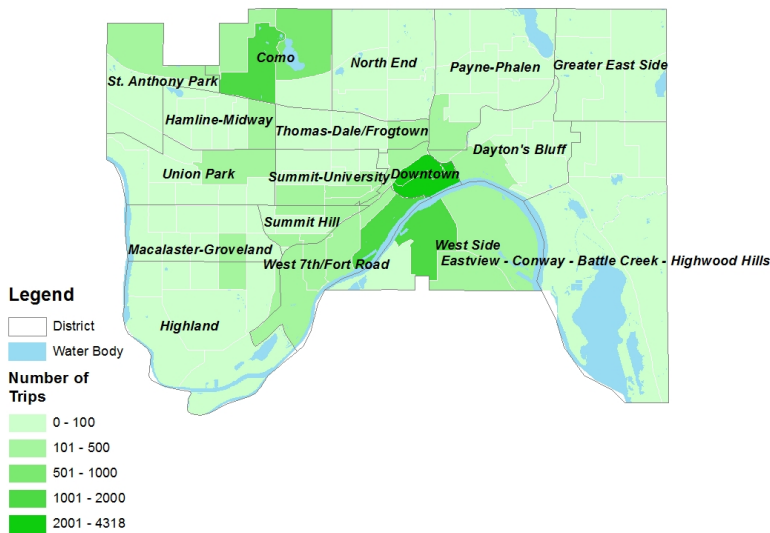


Figure A-5: Destination, August

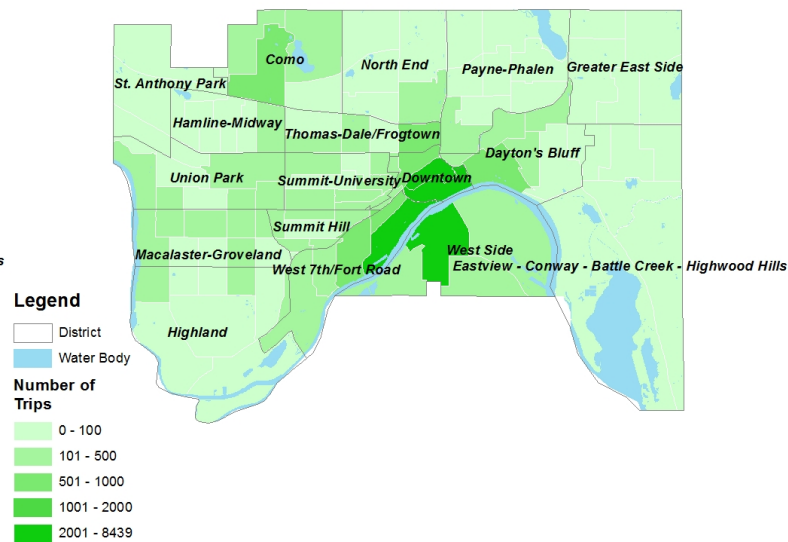


Figure A-6: Destination, September

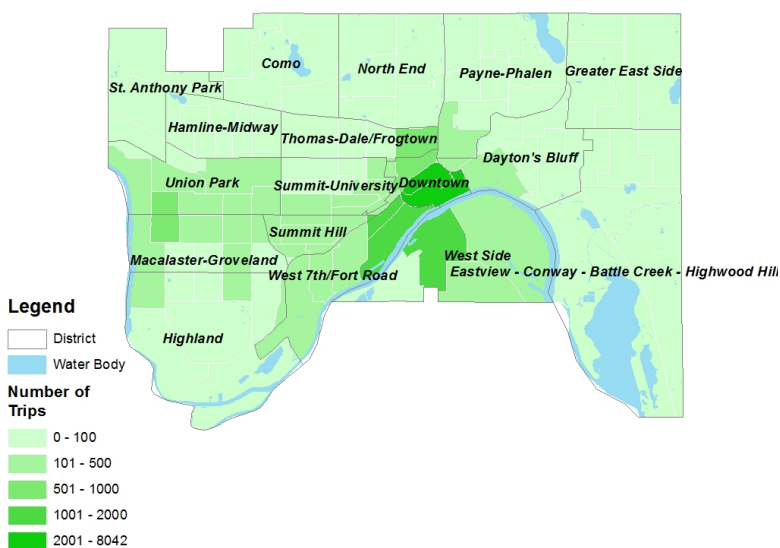


Figure A-7: Destination, October

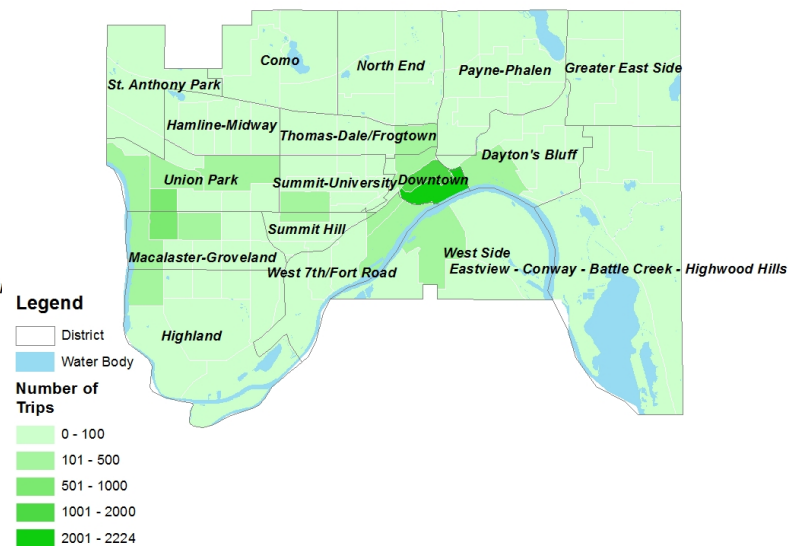


Figure A-8: Destination, November

2.3 Trip Flow by Month

To further analyze the trip flow in the City of Saint Paul, the four maps below represents the differences between the number of origins and the number of destinations at census tract level in different months. The red area in those maps denotes more departure trips were generated than the arriving ones whereas green represents otherwise. The darker the color means the bigger the difference. The Downtown area is the major departure area in the City while the surrounding areas became the destinations. Also, before the month of October, Como Park is one of the major origins for Dockless mobility users.

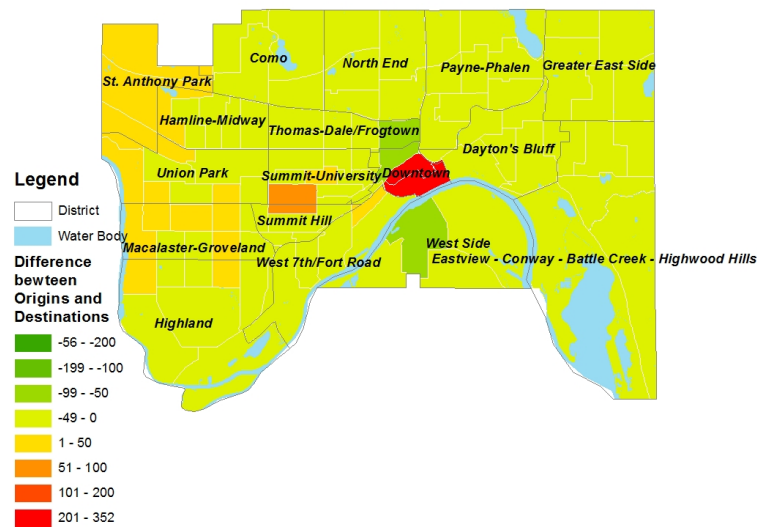
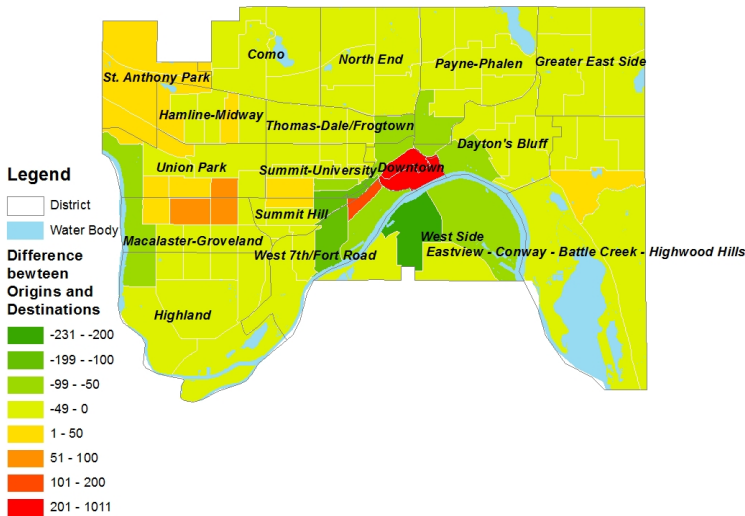
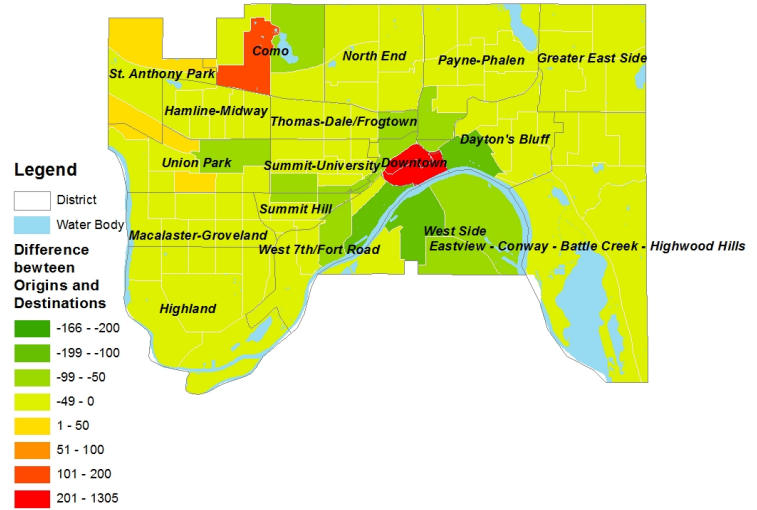
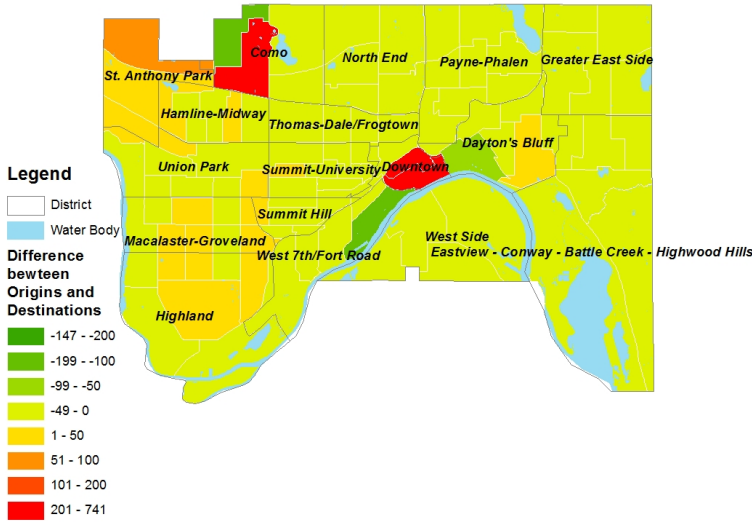


Figure A-11: Trip Flow, October

Figure A-12: Trip Flow, November

3. Dockless Mobility Trips by Time

In this section, trips are divided by different departure time, morning (before 10 am), afternoon (10 am to 4 pm), evening (after 4 pm). This shows the usage spatial pattern at different times of the day in the City of Saint Paul.

3.1 Origins by Time

Three maps on the right show the origins counts at census tracts level in different time of the day, morning, afternoon and evening, throughout the four months. The darker red means the greater number of trips beginning in this area.

The Downtown area is the major origin of Dockless mobility trips, with over 5000 origins in each census tracks, in different time of day. However, there is a clear increase of trips in the afternoon on the west and north side of the City. The spatial distribution is less concentrated in Downtown in the afternoon. The activities at Como Park in the afternoon reached a peak, which may because of the recreational usages of Dockless mobility modes. On the other hand, the north and east side of the City barely have any Dockless Mobility activities in the day.

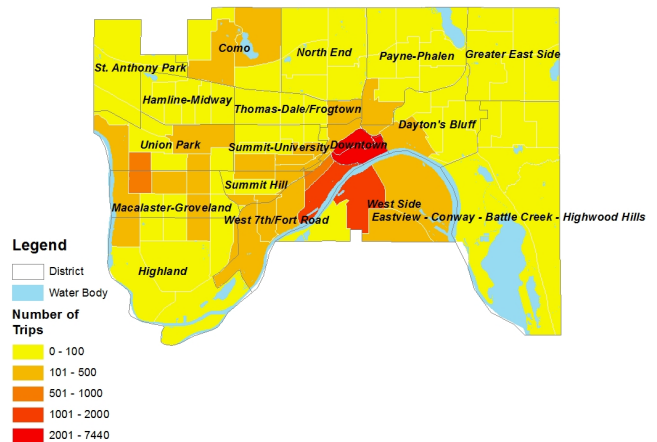


Figure A-13: Origins, Morning

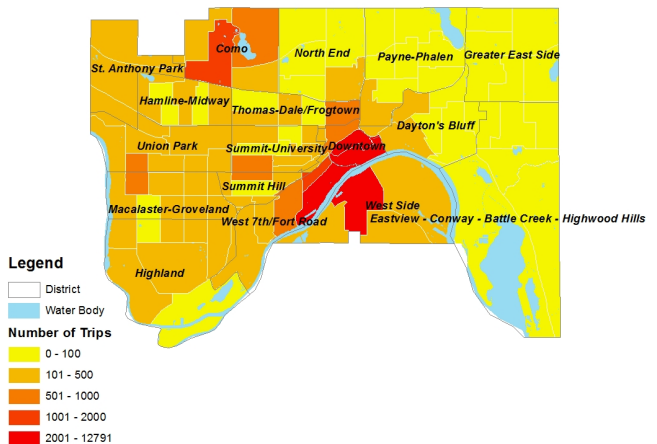


Figure A-14: Origins, Afternoon

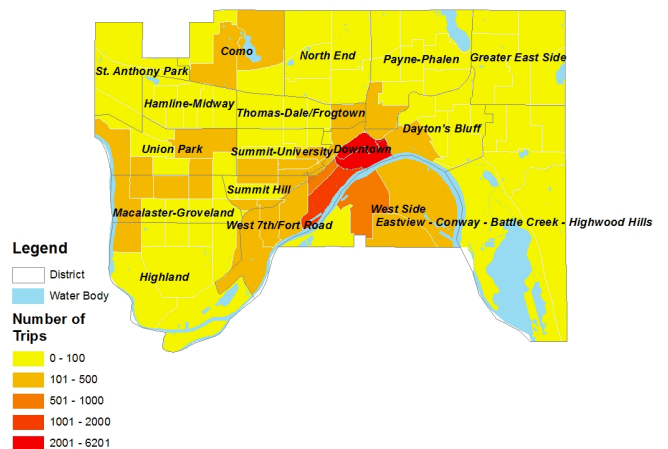


Figure A-15: Origins, Evening

3.2 Destinations by Time

Three maps on the right represent the destinations counts at census tracts levels in different time of the day, morning, afternoon and evening throughout the four months. The darker the green color means the greater number of trips ending in this area. From the maps on the right, the overall trends of destination are corresponding with the trends of origins in different time of the day, and the Downtown and surrounding area are still the main destinations of Dockless Mobility trips, almost half the trips ends in the Downtown area. The destinations in the afternoon began to spread out in the evening to the north and the east of the City.

Overall, the Downtown area is still the major place for Dockless mobility usages, but more people choose to ride Dockless mobility modes to other places on the west and south side of the City of Saint Paul in the afternoon. It may because of the recreational usage are mostly in the afternoon, while further analysis is needed to determine the purpose of Dockless mobility usages.

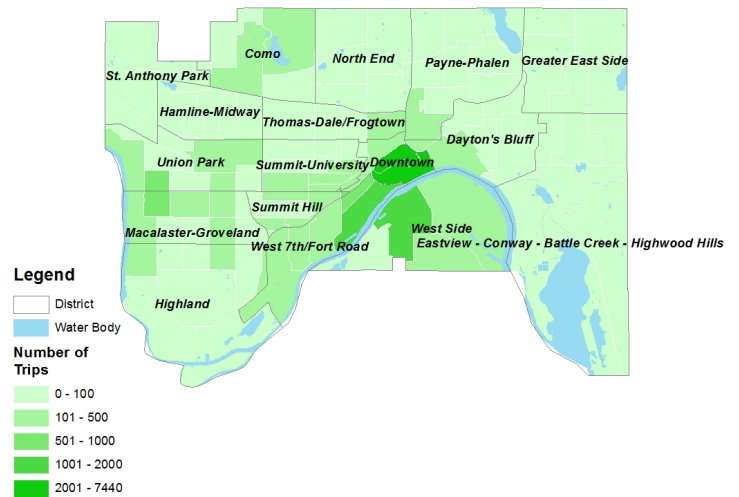


Figure A-16: Destinations, Morning

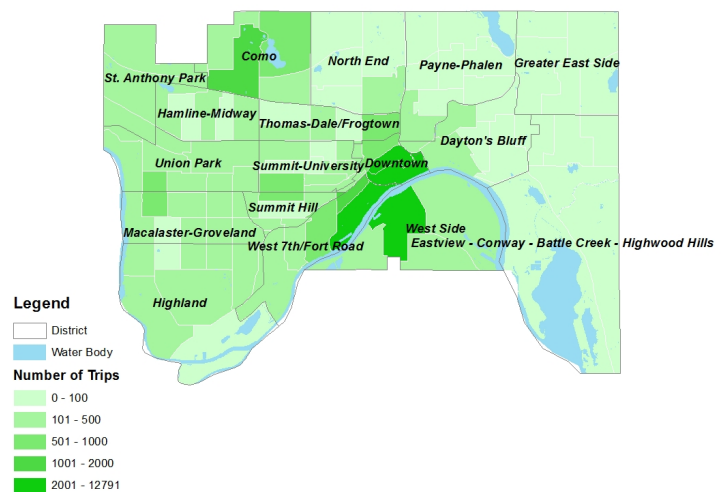


Figure A-17: Destinations, Afternoon

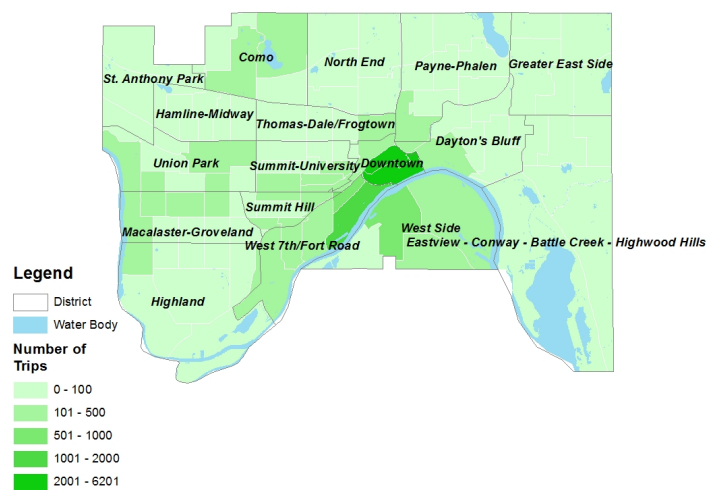


Figure A-18: Destinations, Evening

3.3 Trip Flow by Time

To further analyze the trip flow in the City of Saint Paul at different times of the day, three maps on the right represent the differences between the number of origins and the number of destinations at census tract level in different time of the day. The red area in those maps denotes more departure trips were generated than the arriving ones whereas green represents otherwise. The darker the color means the bigger the difference.

The Downtown area is the major departure area in the City in all time of the day. Also, there are more trips began from the east and south side of Downtown in the morning and become a destination in the afternoon and evening. Como Park is the one of the major origins in the morning and afternoon but become a destination for Dockless mobility trips in the evening. Also, there are slightly more trips beginning along Summit Avenue in the morning, but not in the afternoon and evening. However, the differences between origins and destination are relatively small along Summit Avenue in the afternoon and evening. Overall, the pattern shows most trips are from Downtown area to surrounding neighborhoods, while other places have more internally focused trips.

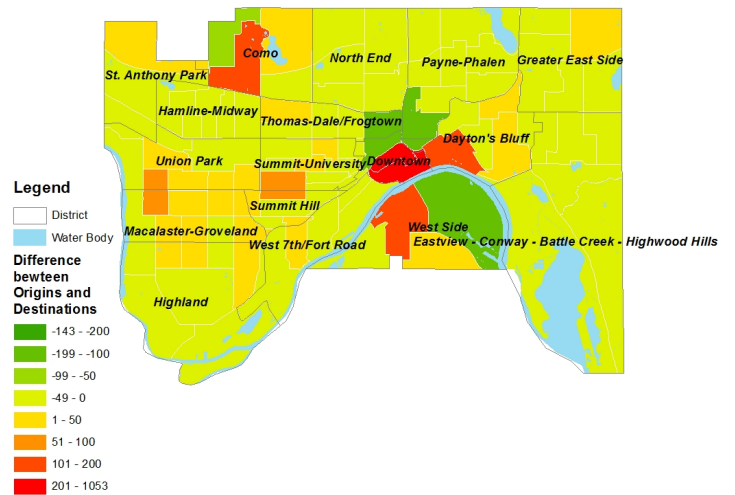


Figure A-19: Flow, Morning

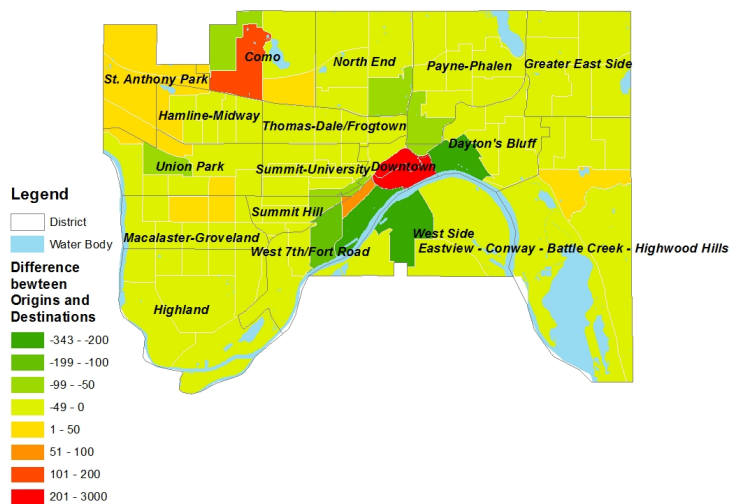


Figure A-20: Flow, Afternoon

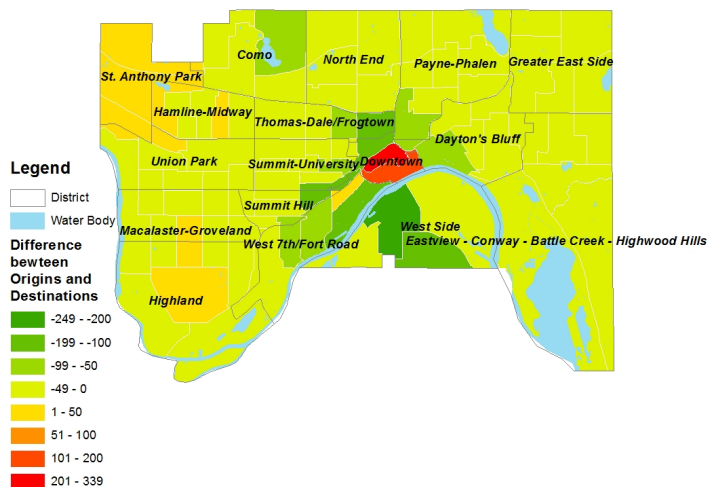


Figure A-21: Flow, Evening

Appendix B: Stakeholders Interviewed & Interview Guide

Table B-1: Stakeholders Interviewed

Name	Stakeholder Title
Frank Douma	Director of the State & Local Policy Program at the University of Minnesota Humphrey School of Public Affairs; Research Scholar Center for Transportation Studies
Bill Dermody	City Planner; Planning & Economic Development, City of St. Paul
Bill Dossett	Executive Director, Nice Ride Minnesota
Wes Denning	Commander, Investigative & FORCE, City of St. Paul Police Department
Austin Hauf	Graduate Student/Researcher; Master of Urban & Regional Planning, Humphrey School of Public Affairs
Lisa Hiebert	Public Works Communication Lead, City of St. Paul
Joshua Johnson	Mobility Manager; City of Minneapolis
Kathy Lantry	Director, Public Works, City of St. Paul
Ginger Palmer	Attorney, Attorney's Office- Parks & Recreation Department, City of St. Paul
Nico Probst	Midwest Government Relations, Lime
Steve Sanders	Alternative Transportation Manager, University of Minnesota Twin Cities
Paul Sawyer	Management Assistant, Parks and Recreation, City of St. Paul
Russ Stark	City of St. Paul: Chief Resilience Officer
Melissa Summers	General Manager at Nice Ride Minnesota/Motivate LLC
Jessica Treat	Director, Move Minnesota

Table B-2: Sample Interview Guideline

<p><i>Content Area: Grand Tour</i></p> <p>1. What opportunities or challenges, if any, have arisen in the past few years following the integration of dockless mobility in St. Paul?</p> <ul style="list-style-type: none">• Can you give me any examples?• In your opinion, does dockless mobility support city transportation policy goals?
<p><i>Content Area: Existing Conditions</i></p> <p>2. To what extent do you think dockless mobility has encouraged safe and accessible ways for people to travel around St. Paul?</p> <ul style="list-style-type: none">• How safe and accessible do you think dockless mobility has been for users and non-users?• In the past there have been complaints about scooters and bikes blocking sidewalks. How should the city best address this type of problem? <p>3. To what extent do you think that dockless mobility is equitable for all residents of St. Paul?</p> <ul style="list-style-type: none">• Do you think any residents are left out? <p>4. How have you seen people using dockless mobility, i.e. scooters/bikes?</p> <ul style="list-style-type: none">• Do they ride on sidewalks or in the right-of way? <p>5. To what extent has dockless mobility addressed the “last mile” problem for transit users?</p> <ul style="list-style-type: none">• Do you believe users of dockless mobility use it for novelty or to connect with other forms of transportation (i.e. light rail or buses)?
<p><i>Content Area: Emerging Practices</i></p> <p>6. Dockless mobility can sometimes operate in a regulatory “grey area” where rules and regulations are inconsistent from city to city across the U.S. What policy or regulations, if any, do you think should be implemented or changed to increase policy compliance by users?</p> <ul style="list-style-type: none">• Can you provide any examples?• Any success or challenges with current regulations?• How does the seasonal usage of dockless mobility in Minnesota affect its long-term management or regulation? <p>7. To what extent do you believe Minneapolis and St. Paul should coordinate to manage and regulate dockless mobility in the Twin Cities?</p> <p>What dockless mobility management challenges do you see being unique to St. Paul, say in comparison to Minneapolis? Even in the greater metropolitan area?</p> <p>What do you believe the City of St. Paul should do in the future to continue to integrate dockless mobility into the city’s transportation landscape?</p>
<p>[Specialized Questions For Dockless Mobility Companies Only]</p> <p>A. What regulations or policies might enhance or limit your operation of dockless mobility in the Twin Cities?</p> <ul style="list-style-type: none">• For example: limit the number of vehicles, limited parking areas, infrastructure support <p>B. What steps or actions, if any, could be taken to enhance your relationship with city government? What is your vision of cooperation? How do you sustain your relationship with the city government?</p>

- C. What lessons have you learned in other cities that might be helpful for St. Paul going forward?**
- Do you see any different regulation or policy in different cities, in your experience, and how do you look at it?
- D. How are you ensuring that dockless mobility is safe and equitable for all residents of St. Paul?**
- For example: spatial mismatch, speed control, user fee adjustment, public/users education.

Table B-3: Aggregated Stakeholder Themes and Information Shared

Questions:	Common Themes:
To what extent do you think dockless mobility has encouraged safe and accessible ways for people to travel around St. Paul?	<ul style="list-style-type: none"> • Generally, the technology seems relatively safe; there have been only a few reported incidents considering the high number of ridership • Minneapolis and the U of M have only received a few complaints for scooters. • St. Paul is concerned about the speed of the scooters near pedestrians. • Could have increased health benefits; reduced biking stigma
To what extent do you think that dockless mobility is equitable ?	<ul style="list-style-type: none"> • Leveraging mobility companies to be more equitable might be a good next step. • There have been some steps taken to address equity concerns, but daily rebalancing of the bikes/scooters is key. Vendors are hesitant to put their products in low-dense areas • Equity focus should be on low-utilization, low-income areas, not just isolated to low-income and high-utilization. • Key focus should be on payment options and access to low-income areas.
<p>Utilization and Land-Use: How and where are people using dockless mobility?</p> <ul style="list-style-type: none"> • <i>How to Address Right of Way Concerns</i> 	<ul style="list-style-type: none"> • In some parts of the city, such as Uptown, they have allocated good parking and street space to the bikes • There is a shift from only bikes in the bike lane; the challenge will be how to ensure the bike lanes are sufficient. • Redistribution challenges with bikes and scooters not moving back up hilly areas. • Right-of way issues should be negotiated between those who have right-of-way ownership; and some responsibility should be on the vendors to communicate with users.

<p>To what extent has dockless mobility addressed the “last mile” problem for transit users?</p>	<ul style="list-style-type: none"> • Due to the division in regulations in St. Paul and Minneapolis it may be hard for users to utilize certain dockless bikes to use in that last mile; certain augmented boundaries exist. • Uncertain that this technology is really addressing this problem; we need to wait in see in 5 years if it is really serving this purpose. • Challenge is in connecting the technology to the existing transit infrastructure (i.e. light rail)
<p>What policy or regulations, if any, do you think should be implemented or changed to increase policy compliance users?</p>	<ul style="list-style-type: none"> • Draft regulation that addresses the problem of where you do and do not want scooters. • Need to have flexible, evolving regulations and frameworks • Right-of-way owners should consider the public good • Develop a franchise agreement that outlines clearly what each city wants from the vendors and the costs in mind. • Amend wheel-stop regulations for bike companies
<p>To what extent do you believe Minneapolis & St. Paul should coordinate to manage and regulate dockless mobility in Twin Cities?</p>	<ul style="list-style-type: none"> • Maintain strong coordinated efforts with Minneapolis; develop a Joint Powers Agreement • Agree to maintain the same vendors and data requirements from these companies. • May need to designate a regional body to address barriers to coordination.
<p>What do you believe the City of St. Paul should do in the future to continue to integrate dockless mobility into the city’s transportation landscape?</p>	<ul style="list-style-type: none"> • Determine city goals and decide how (or if) St. Paul wants to continue to have dockless services in the city; if so determine what that vision looks like and start there first. • Consider how much city staff time is currently being spent and will need to be spent to address issues in the future. • Need to consider how to weave dockless mobility into the transportation fabric. • Continue to educate policymakers, planners, citizens, and city attorneys

Appendix C: Case Studies

1. Austin, Texas

Austin, the capital of the State of Texas, with nearly one million residents, after a hard time involving Dockless bike and scooter in the city, including initial exclusion of scooters, is the first city where Centers for Disease Control and Prevention (CDC) is conducting a related safety study. There are, according to the report from the city's Mobility Committee, 7 licensed operators with 11,001 authorized scooters and 850 authorized bikes on the ground, by the end of 2018. There were a total 292,900 trips in October 2018, including 275,300 scooter trips and 17,600 bike trips. Lime issued a year-end report of 2018, in global level, over half of riders have an annual income of less than 75 thousand dollars, and 34% less than 50 thousand. In Austin, according to Lime, there are 275,000 riders used Lime in 2018, 40% of them reported replacing a trip by automobile during their most recent trip. 38% reported commuting to/from work or school during their most recent trip. Those data provided another perspective to looking at dockless mobility in replacing automobile and commuting. The city quickly responded to the dockless wave, with some licensing and regulations in places by April 2018, and allowing bikes and scooters on some hike-and-bike trails by November 2018. The city also released a series of related regulation for Dockless mobility regarding safety, parking, privacy and insurance issues.

There were 14 reported crashes by scooter from September 29th to October 31st, according to Austin Emergency Medical Services, in 2018. For safety concerns, the government required the licensee to equip the capability of remotely disabling the use of a unit, and to report if a unit have safety, maintenance or other hazardous condition. Also, licensees should respond to complaints and obstruction within certain timeframes. Moreover, Austin Transportation Department (ATD) have started to analyze data to develop a location-specific ordinance including safe and reasonable riding speeds and locations for all users. As for parking, the city required licensees to instruct users to park in designated parking zone, like "hard surface within the landscape/furniture zone of a sidewalk so long as there is at least 3-foot pedestrian clear-zone". The city also asked licensee to pay the City for "the costs associated with the installation and maintenance of Parking Boxes at a ratio of 5% of the total fleet size". Moreover, the City of Austin has a "Dockless Mobility Code of Ethics" including pedestrian first, parking responsibly, stay on right-of-way, right and report, for users and licensees. Licensees have the obligation to inform their users of ethic code with "visible language".

The City of Austin provides many ways to control and regulate the dockless mobility, including public education, parking regulations, and safety guidelines. However, there are still issues needed to be discussed like equity, and interaction with other transportation modes.

2. Beijing, China

Beijing, the capital of China, with more than 20 million inhabitants, is one of the most crowded cities in the world. The city also suffers from the problems of air pollution and traffic congestion. In 2005, the first for profit bike-sharing program in China was established by a private bicycle enterprise, the Fangzhou Bicycle, in Beijing. However, the program developed slowly and didn't attract much public attention. The program finally ended in 2011 due to enterprise bankruptcy. In 2012, with the development of electronic payment technology, the new era of shared bicycle began. By September 2017, there were 15 Shared bike bicycle enterprises, which comprised a total of 2.35 million shared bikes in Beijing. The bike sharing provides a solution to the first mile and last mile problem. In Beijing, 81% of the Mobike trips start at the bus station and 44% of trips start near a metro station.

The government didn't respond to the bike sharing program until several years ago. The bike sharing companies merged to the free market without proper business model and put millions of bikes in to the city. The unregulated Dockless bikes left many problems in the city, specifically parking and sustainability. The first and the greatest problem is parking. Bike sharing companies put numerous bikes into the city without maintaining and recycling. There are too many bikes and "zombie bikes" parking in private property, blocking sidewalks and bicycle lanes and abandoning in the streets. Second, because of lacking appropriate business model, many private bike-sharing company ended up in bankruptcy. The industry boosted almost 60 bike-related start-ups over the last 18 months; nevertheless, by the end of November 2017, at least six well-known bike-sharing start-ups had shut down, and more than RMB 1 billion (USD 150 million) in deposits could not be refunded to users. The government and bike sharing companies are still seeking adequate solution to sustain the bike sharing program in a long-term.

Besides those problems, China is going ahead in regulating and advocating bike sharing in many ways. To begin with, with the development of new technology, we can believe there will be more travel modes for residents. However, in this case, the government should consider how to integrate those modes, and provide residents a platform with multiple transportation choices. In China, the rise of mobile payment method provides a way. Users can pay Dockless bike, bus, subway and ride-hailing with the same application, which can integrate multiple transportation modes. Also, in some cities, like Shenzhen, the government provide "city card" which can pay franchise fees and transportation fees. Second, regarding the parking problem, the government in Beijing is implementing multiple hub designs around transit center, including mechanical parking systems for bikes in order to save space in high-density area. The city also presented a series of regulations regarding parking, including parking within lines, self-report systems.

Appendix D: Vision for the Future

1. In 2039, Shared Mobility will Reduce Equity Barriers

In the Eastside of Saint Paul lives a hardworking mother, Shakina, and her three children who depend solely on public transportation to access school and work and other services throughout the Twin Cities. Shakina enjoys using public transportation because it allows her to spend extra quality time with her children and helps her save her wages for other important necessities. The family's home is about 1.5 miles away from the nearest bus route and 3 miles away from a Metro Green Line Light Rail station. In the past, families like Shakina's would have to walk a good distance to catch the bus or connect to the Light Rail train. Twenty years ago, shared mobility options, such as dockless bikes and scooters would have been available to connect residents like Shakina to existing transportation modes, such as the light rail, however these shared mobility options often neglected low density and low-income neighborhoods. The City of Saint Paul noticed this gap in shared mobility services and were strong advocates for people in these areas.

The City worked hard to reduce systematic equity barriers throughout the city and implemented an equity plan which required mobility vendors to match their equity goals and to provide services first to less dense and underserved areas. Shared mobility providers, too, saw the value in distributing their products throughout these neighborhoods. People like Shakina were more connected to the City, invested their money in City services and businesses, and were able to have more job opportunities. Now, Shakina and her children have access to a range of new shared mobility options, including dockless scooters and bikes which easily connect her to the bus and light-rail stations. Moreover, local neighborhood nonprofits have worked in tandem with City officials and mobility vendors to disseminate information about options available to all residents who may not have access to a smartphone or credit cards in which to pay for the shared mobility technology. City residents who qualify as low-income now have a range of opportunities in which to pay for and access these transportation services.

Shakina feels supported by the City of Saint Paul and has seen the impact of their transportation equity work. It has transformed the lives of the residents and met the transportation needs of Shakina and her family as well as other residents within the East Side neighborhood. People ride down the street on scooters and bikes, waving as they pass. The vision has become a reality, people like Shakina have a range of diverse transportation options at their fingertips and they have strong supporters in the City and through shared mobility vendors and local nonprofits.

2. In 2039, Right-of-Way Management will be Effective and Efficient:

On this warm day in May, the sun is shining particularly bright as there are no clouds in the sky to block its luminescence. Off in the distance, a lion can be heard roaring but closer yet is the happy sound of children laughing. The main attraction is the Como Park Zoo and Conservatory which offers free admission to its visitors. Today, the Swanson family has decided to come from their home in South Saint Paul to learn more about the animals that call the zoo home.

The Swanson children, Mark and Ruby aged 10 and 6 were ecstatic to learn that they would be spending the day at the zoo. However, Mark and Ruby wanted to make the day more special by including their grandma Doris who lived in West Saint Paul in a senior living facility. Mark and Ruby decided to call their grandma and ask if she would be able to join them. On the other hand, Mr. Swanson was worried about how his mother would be able to navigate from her home and throughout the park because Grandma Doris had difficulty walking long distances and needed a wheelchair accommodation. On the phone, the children pleaded with their grandma to attend the zoo with them. Doris reassured her son and grandchildren that it would be no trouble at all to join the family at the park, because she would be able to take the local bus from the living facility to the zoo. She was also eligible for a reduced bus fare and the bus had wheelchair accommodations.

At the zoo entrance, the Swanson family and their children Mark and Ruby waited excitedly for their grandma. After arriving at the bus stop, Doris navigated her wheelchair down the paved sidewalk. She began to reminisce about the world twenty years ago when adults of all ages were seen riding dockless bikes and electric scooters down the pathway. Doris remembers marveling at the new technology but remembered how it often made it challenging for her to navigate the right-of-way area in her wheelchair because scooters and bikes would often be blocking sidewalk entrances and thrown about the park lawn. As she approached the Zoo entrance and her grandkids smiling faces slowly came into view, Doris was happy. If only her grandkids could have seen how the world was before they would be amazed at the progress. Shared mobility technology no longer only includes dockless bikes and scooters but so many other options as well. The City of Saint Paul and the Saint Paul Parks Department has transformed the right-of-way and manages these new technologies efficiently and effectively. Doris is able to navigate down the park trail in her wheelchair without concern that the sidewalk might have barriers. Grandma Doris soon embraces her grandkids and little Ruby squeezes her hand and says, “Grandma, I am so happy that you could come with us to the zoo today. I can’t wait to tell you about all the fun facts I know about the animals”. Doris smiled and squeezed her granddaughters’ hand, she was happy that she was able to access and navigate the transportation and park system with ease and would not have to miss a day making new memories.

3. In 2039, Shared Mobility Options will Improve Connectivity throughout the City

Mary, an undergraduate student at the University of St. Thomas, is commuting from the University to downtown Saint Paul for a meeting. Mary looked at her watch, there was only about thirty minutes until the meeting started. She opens her transit application on her phone and checks the route to get to downtown. The application compares transit options, including driving a car, but the application shows that if she chooses the shared mobility option and decides to take the Metro Green Line light rail to the destination it will only take her about 20 minutes and cost less than 5 dollars. As a student it is important for Mary to save money and to be conscious about her environmental footprint. In the application, she also chooses to reserve a scooter to connect her from the University building to the light-rail station, which is about a mile away. Mary could have chosen another option, such as a shared bike but she is wearing a dress today. She can enjoy the wind running through her hair when riding on the scooter, even if the weather is still chilly in May. As she rides down the road, she notices the sunshine peeking through the canopy of the trees and remembers her mother saying that down this road there were no such trees when she was born. Back then, there were not many bike lanes and far too many private automobiles. Today, there are only a few private automobiles driving down the streets, instead, the new way of transportation is the utilization of the numerous shared mobility options.

After five minutes, she neatly parks her scooter next to other scooters in a designated parking area in front of a local coffee shop and buys herself a cup of coffee. Because the City integrates the technology so effectively, business owners see the value of shared mobility in bringing in new customers and growing their businesses. With her warm cappuccino in hand, Mary waits at the crosswalk near the light rail station. Thanks to the signal transmitting between the shared mobility technology integrated in scooters and bikes, she doesn't have to wait too long for the traffic light. Bikes, scooters, pedestrian crosswalks, and the cars are well organized by the central control system. According to Mary's mother, the light rail also runs much more efficiently and faster now, because the infrastructure system is deeply integrated with the shared mobility options. It won't take her more than 15 minutes to get to downtown St Paul now. Soon, Mary arrives at her stop and swipes her phone at the blue phone/card reader. She opens her transit application again and clicks "End Trip". After ending the trip, the application provides her with a detailed trip summary which includes trip duration, total steps taken, calories burned, and total carbon footprint generated from the trip. Mary walks up to the building steps to her meeting; she has an interview for a business internship. Diverse transportation options and heightened connections between the University and downtown St. Paul has provided Mary with new opportunities to be successful now and in the future.

Appendix E: References

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