



# Other City Policies

Date: October 31, 2019  
To: Honorable Mayor and City Council  
From: Brent Stockwell, Assistant City Manager; Susan Conklu, SR. Transportation Planner  
Subject: Other City Policies

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Maricopa Association of Governments developed a report on E-Scooter Policies and Practices in the MAG Region in April 2019 (attached). It includes a survey of cities in the region, key findings of the survey, literature review on scooter use around the nation, and summary of the National Association of City Transportation Officials Guide for the Regulation and Management of Shared Active Transportation.

The survey included 14 agencies in the MAG region, of which 10 submitted detailed responses about scooters in their community: Chandler, El Mirage, Gilbert, Goodyear, Mesa, Peoria, Phoenix, Scottsdale, Surprise, and Tempe. The survey topics included liability, regulations for riding and parking, community accommodations such as parking corrals and signage, financial structure and fees, public feedback, and data requirements from companies. The report findings confirmed that there is no established set of best practices for e-scooter regulations and accommodations regionally or nationally, but there are some emerging trends across municipalities.

Since April 2019, there have been some changes in scooter operations and regulations among cities in the MAG region. The current status for select cities follows.

## ***Chandler***

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Staff are developing a license agreement and modifying City Code to set the rules for operating a scooter. It is anticipated these changes will take effect in early 2020.

## ***Gilbert***

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Bird began deploying November 2019 and Lime in Spring 2019. The Town of Gilbert officially executed a pilot program license with both companies in June 2019. The pilot requirements include a one-time Pilot Program fee of \$2,500 per company, and a Monthly Operating Fee of \$0.10 per ride. There are relocation fees, and fees for failure to follow notification procedures. There are also fees for violation of license terms or data share agreement. Most fees start at \$50. They allow riding on streets with 25 mph speed limits. They allow riding on paths and sidewalks, except when prohibited with signage and except Class 3 Electric Bicycles. Devices are prohibited on bicycle lanes, streets with greater than 25 mph speed limits, and in the Heritage District. They have restricted speeds to 10 mph maximum in the San Tan Village vicinity and dense pedestrian areas, and 15 mph maximum everywhere else. Parked devices must not obstruct the right-of-way. No more than six total devices may be parked at bus stops, and no more than four per company every 150 feet in all other locations. Inoperable or unsafe devices must be removed within 24 hours. Devices must be rebalanced and inspected daily. Devices that obstruct the right-of-way or other prohibited areas must be removed within two hours from 7 a.m.-7pm and within

## **Scottsdale Device Sharing Report**

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four hours all other times. Companies must provide a 24/7 operations representative. There are vehicle stickers to identify them in Gilbert's program.

### ***Goodyear***

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There are no companies currently deploying devices, but some scooters have been brought by customers from neighboring cities to some destinations along the Estrella Parkway corridor. Staff presented a work session to City Council in September and received direction to draft an ordinance update with regulations. There is not yet a planned date to return to City Council.

### ***Mesa***

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On Sept. 19, 2019, Mesa City Council directed staff to change the proposed SATV License Fee from \$100 to \$400/year and approved ordinance change that regulate riding the devices. These changes will go into effect Dec. 2, 2019. Currently Bird, Lyft, Lime and Spin are operating in Mesa.

### ***Peoria***

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In October 2018, Bird began operating. Then the city developed an Emergency City Ordinance and Temporary Operating Agreement. The city could not come to an agreement with Bird, so this pilot program ended in January. No other companies have expressed interest in operating in Peoria.

### ***Phoenix***

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On Sept. 16, 2019, the six-month pilot program began which includes a geo-fenced operating area bordered by McDowell Road in the north, Buckeye Road to the south, Seventh Avenue to the west, and Seventh Street to the east. There are no-ride zones within the operating area. Each company is limited to 300 devices each. Sidewalk riding is prohibited. Parking is allowed in designated areas only. Three companies have obtained permits: Lime, Bird, and Spin. City Council will evaluate the program after the first three months and again after the six-month pilot program ends.

### ***Surprise***

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The city will begin a pilot program Nov. 1, 2019 for 180 days. Each SATV agreement lasts 90 days, with a possible extension until the pilot program ends. The program includes a four-mile operating area that is geo-fenced and includes the civic center, baseball stadium, and major commercial centers along Bell Road. The Temporary Operating Agreement Application Fee is \$2,500. The monthly operating fee is \$2.50 per device. The relocation fee is \$25 per device. The hours of operation are 5 a.m. to 10 p.m. A maximum of 100 devices are allowed and a maximum of 5 parked together. There are not designated parking areas, but devices are prohibited from blocking pedestrian walkways or doors, fire hydrants, utility boxes, or parking in landscaping or greenbelt areas. Violations must be removed within two hours or the city will confiscate the device. Riding on sidewalks is prohibited on 25 mph streets. E-bikes are limited to 20 mph, e-scooters are limited to 12 mph.

### ***Tempe***

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Bird launched in Tempe in April 2018, Lime launched in August 2017, and Razor in September 2018. City Council approved the Shared Active Transportation Vehicle License on Jan. 10, 2019 and provided a 30-day grace period for existing companies to acquire their license. Zapp, Bird, and Razor acquired a SATV License, however Lime pulled out of Tempe after the license was required. The city has amended the ordinance for bicycle and scooter use, including new regulations on minimum age limits and sidewalk riding. Spin acquired a license in late October 2019. The regulations state that no more than 10 devices can be parked within 150 feet, and fewer can be parked at bus stops. Restaging is required every 24

## **Scottsdale Device Sharing Report**

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hours. Violations must be removed within two hours or the city will relocate the device. The relocation fee is \$100 per device. The application fee is \$7,888 for each company, with a license enforcement fee of \$1.06 per device per day based on the maximum number of devices staged during any 24-hour period during the previous month.

### ***ATTACHMENT***

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Maricopa Association of Governments Report on E-Scooter Policies and Practices in the Region,  
April 2019

# E-Scooter Policies and Practices in the MAG Region

# Table of Contents

<b>TABLE OF CONTENTS</b>	<b>2</b>
<b>TABLE OF TABLES</b>	<b>3</b>
<b>TABLE OF FIGURES</b>	<b>3</b>
<b>STUDY SYNOPSIS</b>	<b>4</b>
INTRODUCTION	4
KEY LITERATURE REVIEW FINDINGS	4
KEY SURVEY FINDINGS	5
LESSONS LEARNED FROM OTHER CITIES' E-SCOOTER PILOTS	8
DISCUSSION AND NEXT STEPS	9
<b>APPENDIX A. LITERATURE REVIEW</b>	<b>11</b>
INTRODUCTION	11
OPINIONS OF E-SCOOTER RIDERS	11
BENEFITS AND CHALLENGES OF ACCOMMODATING E-SCOOTERS	14
DATA COMPARISON	20
EFFECTS ON OTHER MODES	21
DISCUSSION	21
REFERENCES	22
<b>APPENDIX B. NACTO GUIDE FOR THE REGULATION AND MANAGEMENT OF SHARED ACTIVE TRANSPORTATION: SUMMARY OF OPERATIONS AND SAFETY GUIDANCE</b>	<b>25</b>
<b>APPENDIX C. MAG REGION SURVEY</b>	<b>27</b>
SURVEY POPULATION	27
SURVEY TOPICS	27
SURVEY FINDINGS	27
E-SCOOTER ACCOMMODATION OUTSIDE OF THE MAG REGION	48
DISCUSSION AND CONCLUSIONS	52

# Table of Tables

TABLE 1. SUMMARY OF MAG COMMUNITY SURVEY FINDINGS	5
TABLE 2. AVAILABLE STATISTICS ON E-SCOOTER USAGE BY GENDER	12
TABLE 3. SUMMARY OF SURVEY FINDINGS RELATED TO OPERATIONS	28
TABLE 4. SURVEY RESULTS: PROGRESS TOWARD DEVELOPING REGULATIONS AND FEEDBACK IN MAG CITIES	31
TABLE 5. SURVEY RESULTS: OVERALL GOALS FOR ACCOMMODATION, CONTRACT DETAILS	32
TABLE 6. SURVEY RESULTS: AGENCY APPROACHES TO LIABILITY, PROTECTIONS, AND INSURANCE	33
TABLE 7. SURVEY RESULTS: REGULATIONS AND RULES FOR E-SCOOTER RIDERS	35
TABLE 8. SURVEY RESULTS: PERMITTED AND PROHIBITED RIDING LOCATIONS	36
TABLE 9. SURVEY RESULTS: ADDITIONAL INFO ON PROHIBITED AND PERMITTED RIDING LOCATIONS	37
TABLE 10. SURVEY RESULTS: PARKING REGULATIONS AND RESTAGING REQUIREMENTS, RECOURSE	38
TABLE 11. SURVEY RESULTS: SCOOTER CAPS, DISTRIBUTION REGULATIONS AND REQUIREMENTS	40
TABLE 12. SURVEY RESULTS: STRATEGIES FOR NON-COMPLIANT COMPANIES AND ERRANT SCOOTERS	41
TABLE 13. SURVEY PROGRESS: FINANCIAL STRUCTURE AND FEE USAGE	43
TABLE 14. SURVEY PROGRESS: DATA REQUIREMENTS AND ACCESS	44
TABLE 15. SURVEY RESULTS: FUTURE PUBLIC FEEDBACK AND RULE PROMOTION	45
TABLE 16. SURVEY RESULTS: COMMUNITY ACCOMMODATION	46

# Table of Figures

FIGURE 1. ANATOMY OF AN E-SCOOTER	11
FIGURE 2. E-SCOOTER MARKETING MATERIAL	16

# Study Synopsis

## Introduction

Electric scooters (“e-scooters”) have proven to be popular – and somewhat controversial – in the dozens of cities in which they currently operate. Several communities in the Maricopa Association of Governments (MAG) region currently allow e-scooters, while others are contemplating allowing them. While there are no established best practices regarding e-scooter accommodation, it can be helpful to learn from others in thinking through one’s own policies. This report uses a literature review and survey of the state of the practice in MAG communities to provide information about e-scooters that can help the MAG communities as they plan and create policy to accommodate e-scooters.

This summary outlines the key findings from the literature review and survey, and poses potential next steps for MAG member communities to ponder as they move forward with their policy and program development and monitoring. Additional information about the literature review can be found in Appendices A and B, while Appendix C contains additional information about the survey, including the survey responses for each city.

## Key Literature Review Findings

E-scooters have rapidly changed transportation patterns in the cities that allow them. They have been clearly popular with diverse groups of people, including people of color, younger adults, and those with lower incomes. In many cases, outreach to communities of color has been deliberate and is likely linked to high approval ratings in those communities. That so many people have used e-scooters in such a short time (millions of trips were taken in 2018 alone) suggests that the scooters fill a modal niche. Surveys reveal that the scooters are used for a variety of trip types, including to connect to transit, commute to work, run errands, and for fun/recreation.

In addition to increasing mobility options for residents and visitors, the literature suggests that e-scooters may positively contribute to the reduction of greenhouse gas emissions and congestion. These claims need additional data and further examination before they can be proven, however. E-scooter programs also support the micro-mobility industry by employing local contractors.

E-scooters are also associated with challenges within their host communities. Chief among these are safety concerns due to issues with e-scooter speed, equipment

design, equipment failure, and riders lacking proper use training and/or equipment. Additionally, the extent of safety issues is unknown and unable to be compared between different regions. Because e-scooter crashes often do not involve the police, they may go completely unreported, or may only be reported to the healthcare system, which protects the records for public access, even for research purposes. Furthermore, the lack of standard definitions between states and even cities within the same state leads to difficulty in standard regulation and thus resolution to identified problems.

More consistent regulation, definitions, and injury classification, as well as a collaborative system involving health care and the city officials, will lead to a deeper understanding of the type and extent of safety issues associated with e-scooters and potential solutions. This understanding can also further inform regulation regarding speed, design, permissions, etc. Cities can use tools like the NACTO guidelines to assist them in molding a regulation and management plan suitable for their unique circumstances.

Based on available data/information, e-scooters seem to be a net positive and popular addition to communities. The lack of safety information makes it difficult to ascertain if this mode of travel is truly a positive addition to the community. More detailed and uniform databases will allow communities to monitor progress toward goals and create consistent, research-based regulations and guidance. Such guidance will help mitigate associated challenges so that communities can reap the potential benefits from increased mobility.

## Key Survey Findings

MAG conducted a survey of 10 of the 32-member communities regarding e-scooters. The survey revealed that the member agencies are working to develop policies and programs to accommodate e-scooters. Some communities are further along in the process than others, but all recognize the value of knowing what each other is doing. Table 1 below summarizes the responses to the various survey questions, by category. For a detailed look at each city's responses, see Tables 4-16 in Appendix C.

**Table 1. Summary of MAG Community Survey Findings**

Category	Survey Findings
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<i>Public feedback</i>	
Positive feedback	While mixed in most cases, positive aspects of e-scooters include that they are “fun” and “innovative.”
Negative feedback	The main concerns about scooters involved their safety records and their propensity to create “blight” or “clutter.” One city has prohibited scooters based on public opposition, and others registered concerns based on observations from other cities. City council feedback has tended to that of the public.
<i>Overall goal for accommodating e-scooters</i>	
Most communities desire to capture e-scooters’ benefits for the public, but want to proceed in a way that will allow analysis of the scooters’ impacts and the ability to exercise some control of the process if the ratio of benefit to harm/nuisance grows imbalanced.	
<i>Restrictions related to age, speed, and riding area</i>	
User age	Minimum ages ranged from 14 to 18, with a couple of communities declining to require a minimum.
Helmet usage	Only one community currently requires a helmet while using an e-scooter, and that is only for those under age 18. One other community stated that they were “looking to follow bike regulations.” Currently, there is no state law requiring helmets for bicyclists in Arizona, although some local jurisdictions require them for bicyclists under age 18.
Maximum scooter speed	Maximum scooter speeds ranged from 10 mph to 25 mph*; in Scottsdale, the max speed is that which is “reasonable and prudent.”
Permitted vs. prohibited riding areas	Most communities prohibit riding on the sidewalks, although this is not uniform and may, as in Scottsdale, depend on the characteristics of the sidewalk. Similarly, bike lane riding is permitted in some cities and not others. For vehicle lanes, there is often a requirement for the road type (e.g., “residential road” or “speed limit ≤ 25 mph”), but this is also inconsistent.
Enforcement	Enforcement is not universally planned to enforce riding areas. For those that intend to enforce riding areas, some places propose to use geo-fencing, but more commonly police are expected to provide the enforcement.
<i>Parking-related regulations</i>	
Parking	Most communities propose to limit parking, ranging from 3 to 10 per location depending on the place.
Parking spacing	Few communities have decided to regulate spacing, but where regulated, 100 to 150 feet between groups will be required. In Scottsdale, scooters from the same company are also regulated with regard to how long they can be near each other.
Recourse for incorrect parking	Several communities have established a procedure for recourse that includes fees, scooter confiscation or relocation, and/or issue notices of violation or civil complaints.

<i>Expectations regarding scooter numbers and distribution</i>	
Scooter caps	Most communities either don't have a cap on the number of scooters or have not yet determined a cap. Phoenix has a cap of 300 scooters per company; Peoria's cap is 200.
Required distribution	The communities vary in terms of whether and where they will require some scooters to be distributed. For the few that will require distribution, this ranges from downtown to near transit stops to other specific streets.
Staging	Most communities will require the e-scooters to be restaged every day.
<i>Fee structure and recourse for violations</i>	
Fees	Approaches to a fee structure vary with regard to both fee type and amount. Common fees include a permit fee, per-trip fee, and usage fee. Most of these fees will go to cover the cost of administering the program.
Violating the terms of the agreement	If the companies violate the terms of the agreement, communities mentioned confiscating the scooters, citing the company, or revoking the business license.

<i>Adaptations to Accommodate E-scooters</i>	
Personnel	One community has hired new personnel to help with the transition to e-scooter accommodation. Others indicated that accommodation is to be determined.
Infrastructure	Three of the communities indicated that they are planning to build new parking infrastructure and/or provide signage and markings to accommodate e-scooters. Others indicated that these adaptations may occur in the future.
<i>Data</i>	
Required data from companies	Seven of the nine communities indicated that they will require the following data from the companies: <ul style="list-style-type: none"> <li>• Trip data</li> <li>• Injury data</li> <li>• Operability data</li> </ul>
Public injury data	To complement that data, most of the communities will work with the police and/or fire departments. Only Phoenix currently plans to work with the county hospital to analyze that data, as well.
Public feedback	Five of the communities plan to solicit public feedback about the scooter programs, most commonly through surveys, but also through community forums and public email addresses or websites.
<i>Legal Aspects of Accommodating E-scooters</i>	

Liability	Several agencies cited strong liability requirements in their survey responses (the most common amount was \$1 million in general liability); one respondent also mentioned that the liability constraints dissuaded the businesses from operating in the city. However, at least one community (Scottsdale) is allowing e-scooters in the city without contracts.
End user protections	Only three agencies have end-user protections in their contracts. One city that is still developing policies stated that they “need to ensure every party is covered.”

### Lessons Learned from Other Cities’ E-Scooter Pilots

This project also examined reports from e-scooter pilot programs in Denver, CO, and Portland, OR, to understand what lessons may be applicable to the MAG region. Key takeaways from those reports include the following.

1. **Require data on usage and injuries from the e-scooter companies.** Many in the MAG region are already planning to do this. This data will help the MAG communities understand where e-scooters are used within the cities, when the trips occurred, and how long the trips are. This can help with an understanding of the types of infrastructure that may be needed to safely accommodate e-scooter trips, as well as whether e-scooters are helping to meet equity and mobility goals. In addition, injury data can complement police-reported data which, unfortunately, will likely seriously underestimate e-scooter incidents given that most do not involve vehicles. Other sources of injury information are therefore critical to enabling an understanding of safety.
2. **Survey the e-scooter users** to understand who is using the scooters, their concerns and positive experiences related to e-scooter usage, and suggestions for improving the programs. This information can help the MAG communities better plan for e-scooter accommodation and identify potential issues that cannot be detected from the company data. It may also reveal additional safety data (e.g., through the exploration of near misses) and health outcomes (e.g., whether scooter trips are replacing car or walking trips) that could be important for future iterations of the program.
3. **Conduct focus groups with key populations** to gain insights into barriers or positive experiences related to e-scooter usage that will be difficult to access

from a survey. These may be particularly important to programs with equity components.

4. **Develop metrics that can be used to evaluate the programs' outcomes.** These metrics, especially if developed in coordination with nearby jurisdictions, will allow the MAG communities to measure progress consistently and quickly identify areas of concern or success.
5. **Evaluate the programs in an ongoing manner, and particularly mid-term or after an initial trial** to learn how to companies are complying with requirements and how to improve things going forward. Initial evaluations in both Denver and Portland will strengthen the programs going forward and likely lead to a greater chance of meeting city goals.

## Discussion and Next Steps

E-scooter accommodation promises to bring many benefits to the MAG region communities – as well as some challenges. While the field continues to evolve with regard to best practices, this report provides an overview of what is known about e-scooter accommodation in the hopes of helping the MAG communities establish policies and plans that can take advantage of the benefits and mitigate the challenges. Additionally, establishing a state of the practice will help the communities understand what each is doing and work together to determine better paths forward. In tandem with lessons learned from other US cities, the findings presented here will hopefully support the MAG communities as they move forward to plan and develop policies to accommodate e-scooters and other forms of micromobility.

This report also finds opportunities for the MAG communities to collaborate moving forward in several areas, as differing regulations and requirements between contiguous cities may create confusion and make enforcement more challenging. While the lack of established best practices in these areas precludes the ability to make specific recommendations, following are some general observations about how the communities can work more closely together to standardize rules and regulations and, in so doing, maximize the benefits and minimize the challenges associated with e-scooters and other forms of micromobility.

1. **Standardize definitions of micromobility options:** the San Francisco Department of Public Health (2019) published guidance on various micromobility types that can be used to ensure that all public safety, health, transportation, and

planning professionals are clear in their definitions, leading to standardization in data collection, analysis, and reporting. Published guidance in this area (as well as recently passed Arizona law) suggests that standardization should be feasible.

2. **Standardize rules for users:** the more standardized that rules and regulations about rider age, helmet usage, maximum speed, and permissible versus prohibited riding areas can be across the region, the less likely it is that people will be confused when riding in one place versus another. This will benefit users, law enforcement, and drivers who may travel regularly through various cities and share roadways with e-scooter users.

This area has less clear pathways to standardization, although research findings in some areas, such as the disproportionately high number of head injuries occurring with scooter crashes, may be used to guide regulations on helmets and speed. In other cases, trial and error may be necessary among the communities until a best practice is identified.

3. **Standardize requirements for micromobility companies:** the more that communities have the same liability conditions, end user protections, and operational and data requirements, the easier it will be on the companies overall to meet those requirements. The larger demand may also increase the likelihood that the companies comply, as they risk losing greater territory by declining to do so. In the same vein, standardized penalties and fees may be easier for the companies and work to the communities' benefit by creating a unified front for dealing with the inevitable challenges as they arise.

Best practices in this area are not defined, so some trial and error may be needed to identify the best practices over time in this area. These may also evolve as additional program evaluations become available from cities outside of the MAG region.

Ultimately, collaboration and the sharing of challenges and opportunities is likely even more important than standardization. It is hoped that this report – but one of the efforts within MAG to share knowledge and foster collaboration – can be part of a foundation that creates strong programs going forward, regardless of unique circumstances or aspects.

# Appendix A. Literature Review

## Introduction

### What is DESS?

Dockless electric scooter system (DESS) is a service that launched around 2017 in many cities around the U.S., allowing people to rent and ride battery-powered scooters (“e-scooters”, see Figure 1) for one-way trips. While most scooters require the rider to stand, some models do have seats. The scooters can travel up to 15 mph (in some cases, as high as 20 mph). After the trip has concluded, the consumer is able to leave the scooter at nearly any destination, as opposed to having to deliver the scooter to a predetermined docking station.

DESS is offered by a number of companies, including Bird, Lime, Uber, Skip, Spin, and Lyft. The companies generally promote the e-scooters as an inexpensive form of travel that can encourage people to reduce both their car trips and their carbon emissions.



**Figure 1. Anatomy of an E-Scooter**

(Bird, accessed via the San Francisco Chronicle)

## Opinions of E-Scooter Riders

E-scooters have been generally well-received in most cities, achieving an adoption rate nearly equal to that of ride-hailing – and much faster adoption than past forms of shared mobility (Populus, 2018). In their representative survey of ten cities with DESS, Populus found that 70% of their 7,000 survey respondents reported a positive view of e-scooters. Surveys from Portland, OR, and Denver, CO, found similar results:

- 62% of Portlanders (representative, citywide poll) viewed e-scooters positively (PBOT, 2019), and
- 55% of Denverites (non-representative, snowball poll) “loved” or “liked” them (DPW, 2019).

Although each city has different priorities for social equity, with the data collected usually reflecting immediate concerns of the municipality, the published reports tended to examine scooter usage according to income, race/ethnicity, age, gender, and trip purpose. The data suggest that e-scooters are well received by minority groups and those with average or lower household income (PBOT, 2019; Populus, 2018). For example, the Portland pilot program aimed to ensure wide access to e-scooters. Their effort seemed to have paid off, with the following groups reporting positive opinions of e-scooters:

- 66% of survey respondents with annual incomes under \$30,000
- 74% of survey respondents of color
- 71% of survey respondents age 35 and younger

The report noted that there are still barriers to e-scooter usage among people of color, such as a history of criminalization and a lack of training and equipment (e.g., helmets). Portland also found that e-scooters seemed to reach a new user group, with 74% of their respondents reporting never using the local bike share (Bike Town), and 42% reporting never biking at all. The published data on usage by gender varies, as seen in Table 2.

**Table 2. Available Statistics on E-scooter Usage by Gender**

<b>Region</b>	<b>Male (%)</b>	<b>Female (%)</b>	<b>Non-binary (%)</b>
Ten US cities <sup>a</sup>	50	50	n/a
Denver, CO <sup>b</sup>	69	31	n/a
Portland, OR <sup>c</sup>	64	34	2

<sup>a</sup> Populus (2018), gender split among reported riders

<sup>b</sup> Denver Public Works (2019), gender split among reported riders

<sup>c</sup> Dill (2019), gender split among riders who were residents<sup>1</sup>

<sup>1</sup> The survey received 4,532 responses, of which over 1,000 were from visitors. To investigate longer-term patterns, Dill’s analysis focused on residents, who have more potential of long-term use.

Despite its findings of greater gender equity among riders, the Populus (2018) report notes that women tend to be more sensitive to issues of personal safety, clothing, and distance, all of which may explain the differences in adoption rates between men and women for e-scooters (which also occur for bike share and biking more generally); more research is needed to investigate this aspect of e-scooter usage.

## E-Scooter Riders' Preferences

The city reports also examined how e-scooters are being used and where they are being ridden. In her analysis of the Portland survey data, Dill (2019) found that men ride e-scooters more frequently, and that they are more likely to use them for work-related trips (22% of men compared to 15% of women). In contrast, women were more likely to list their top trip type as "fun/recreation." Dill (2019) also found that, while the top choice for riding location among all riders was a bicycle lane, second choices among women were more likely to include the sidewalk, while men were more likely to choose a shared travel lane. Respondents also reported liking to ride on low-speed streets and other streets with bicycle-specific facilities; sidewalks were much less likely to be cited.

Both Lime and DPW also examined the types of trips people were taking while using e-scooters, with the following results (Lime, 2018; DPW, 2019):

- Lime (most recent trip types)
  - 39% of riders used scooters and bikes to travel to and from work, school, and/or appointments
  - 20% used scooters and bikes to travel to or from restaurants or shopping destinations
- Denver (top three trip types, respondents could select more than one)
  - 32% of respondents used scooters to get to/from work
  - 20% used scooters to get to/from entertainment

Only 3% of Denver respondents stated that getting to/from school trips was among their top three trip types using an e-scooter. The Denver survey also asked what the organizations could do to improve perceptions of e-scooters. Respondents requested to have wider access to e-scooters and to have more designated places for riders to use the scooters (e.g., bike lanes; DPW, 2019).

## Benefits and Challenges of Accommodating E-Scooters

There are many potential benefits to accommodating e-scooters in communities, such as greater mobility, fewer car trips, and enjoyability. Likewise, there are many challenges associated with e-scooter accommodation, such as safety issues, clutter, and regulation. This section examines these benefits and challenges from the perspective of the literature.

### Benefit: Reduced Greenhouse Gas Emissions and Congestion

E-scooters are promoted as a way to reduce greenhouse gas (“GHG”) emissions within a community, thereby potentially helping communities meet environmental goals. Emissions are reduced in two main ways: 1) electric vehicles are virtually emission-free, thus any e-scooter trip is carbon-neutral, and 2) when e-scooter trips replace car trips, they save all of the emissions from that trip. The evidence suggests that both of these pathways have real potential: according to Portland’s evaluation, 34% of Portlanders and 48% of visitors replaced driving and ride-hailing with e-scooters during the pilot, and 6% of Portlanders reported getting rid of their cars altogether to start regularly using e-scooters. Not only are these substituted trips saving GHG emissions, but they may also be reducing congestion and thereby reducing the idling of other gas-powered vehicles. Lime’s One-Year report calculates that e-scooter trips within six U.S. cities saved over 2.6 million lbs of CO<sub>2</sub> emissions (Lime, 2018).

However, the claims about air quality benefits may be exaggerated. Environmental costs associated with e-scooters include the fact that they are often picked up and redistributed by gas-powered vehicles, and the e-scooters themselves have a short lifespan (particularly if they are vandalized or destroyed). Thus, while there are clear benefits associated with GHG reduction, future research to more clearly measure the impact of e-scooter usage on congestion and to clarify the environmental lifecycle costs would help to further strengthen the case for e-scooters’ environmental benefits.

### Benefit: Greater Mobility

E-scooters also have the potential to increase mobility by increasing transportation options, especially for those who cannot afford or choose not to drive. Another major benefit of e-scooters is that they provide a “last mile solution” for those who want or need to take public transit, but cannot or do not want to walk or ride a bike to reach it.

Riding an e-scooter is faster than walking and easier than biking, seemingly filling a niche that has flummoxed practitioners for years. Indeed, Lime's One-Year Report stated that 27% of their riders used their e-scooters as a means of connecting to public transportation (Lime, 2018). And although the scooters are clearly enjoyed by many of the riders, their usage patterns seem to bear out their practicality: 71% of Portlanders reported that they most frequently used e-scooters for transportation, rather than recreation (PBOT, 2019).

## Challenge: Safety Concerns

While there are many advantages to embracing e-scooters, research has also indicated challenges. Due to their motors, e-scooters can travel much faster than pedestrians (contributing to sidewalk conflicts) and endanger the riders in ways that may be unexpected when the user waives liability to take a ride. Safety issues are associated with: 1) scooter speed, 2) scooter design, 3) equipment malfunction, and 4) untrained/unprotected users.

### Speed

Most e-scooters are capped at 15 mph, although the Portland pilot program found that scooters can go up to 18.6 mph depending on the weight of the user and whether they are traveling on a hill (PBOT, 2019). Research has clearly established a positive association between speed and injury (Tefft, 2013), such that the faster a person is going when they hit the ground or another object, the greater the likelihood of injury. There is no published information about how fast e-scooter users were going when they crashed; however, a lower capped speed would likely improve safety for both the e-scooter users themselves and the pedestrians and bicyclists (and potentially drivers) around them.

### Scooter Design

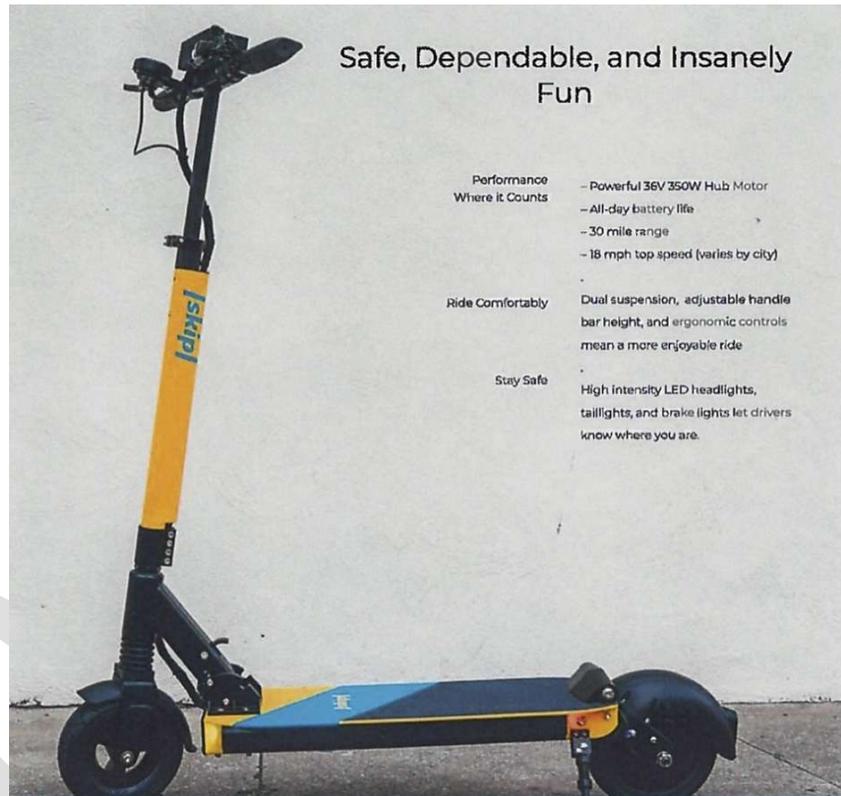
Little research exists on the relationship between the design of scooters and safety issues. However, there are some fundamentals of e-scooter design that are problematic. First, the small wheels do not allow much shock absorption in the event of a collision, resulting in a greater jarring to the user. Additionally, the small wheels are more likely to experience perturbation such as small rocks or pebbles, which may decrease stability.

Another key aspect of scooter design is the narrow standing pad for the rider. Upon acceleration, the rider leans slightly back as the scooter proceeds forward. In the

case of collision, the rider is launched forward, either into or over the handle bars, often resulting in injuries to upper body parts such as the head, face, arms, and abdominal region.

#### Equipment Malfunction

There have been several reports of e-scooters malfunctioning, although no comprehensive public database of these statistics currently exists. For example, there have been reports of jammed accelerators, causing the scooter to accelerate out of the control of the user and leading to some crashes; clipped brake cables or malfunctioning brakes; and equipment that has folded mid-ride or broken off, resulting in serious injuries. As



**Figure 2. E-Scooter Marketing Material**

(Skip, accessed via the San Francisco Chronicle)

companies indemnify both themselves and their contractors (who fix the equipment) when the user signs up to ride the scooter, most of the injured have no legal recourse. All the while, the companies maintain that their fleets are safe to use, as in the advertisement in Figure 2.

#### Untrained/Unprotected Users

Another safety concern is that e-scooter users are often untrained and/or lack protective gear. For example, only a few of the companies require someone to watch a training video regarding how to use the equipment, and this requirement can easily be subverted. Age requirements for using the scooters are also not uniform, and again can be subverted. Perhaps even more importantly, however, is the documented lack of helmet usage associated with e-scooters – particularly when considering the litany of

safety problems that have been reported. Researchers in Los Angeles observed that less than 10% of the population wore a helmet when using a scooter (Trivedi et al, 2019).<sup>2</sup> This neglect of the helmet almost certainly contributed to the large percentage of head injuries – over 40% – in the LA data (Trivedi et al, 2019). For reference, the other injuries were fractures (31%) and soft-tissue injuries (30%). In contrast, studies of bicycling injuries have found that head injuries comprise only about 22% (Rivara et al, 1997). The extent to which this difference reflects a lack of helmet usage or the nature of e-scooter injuries is unclear; both are likely at play and should be further investigated.

### Contributing Circumstances

It is also important to look at circumstances contributing to scooter incidents. The Portland pilot program reported that 83% of documented incidents were due to a fall, as were 80% of the incidents documented in the LA study. In contrast, a much smaller percentage of incidents involved crashing into another object (such as a car, a street lamp, rocks, etc.), although this varied by place. For example, 14% of incidents in Portland resulted from a collision with a car (PBOT, 2019), while 11% of the incidents examined in LA resulted from people crashing into another object(s) and 9% resulted from being hit by a moving vehicle or object (Trivedi et al, 2019). The Denver pilot program reported that few respondents hit or almost hit someone driving in a car.

Many of the complaints about e-scooters have come from pedestrians, although collisions involving pedestrians have tended to be rare (less than 5% in most cases; Trivedi et al, 2019; PBOT, 2019). The Denver Pilot Report is an exception, with 34% of respondents indicating that they were pedestrians who were hit or almost hit by a scooter (DPW, 2019); note, however, that this figure is likely much larger than the other cities' numbers because it includes near misses. Indeed, near misses can be scary and uncomfortable for pedestrians, particularly those who are less able to jump out of the way or who may be more likely to be injured if hit. Relatedly, e-scooters that are parked carelessly can impede pedestrian traffic, making it more difficult for the mobility-challenged and creating tripping hazards or contributing to injury due to needing to be moved. In LA, 2% of the injury reports resulted from a pedestrian tripping over a parked scooter, and another 2% resulted from pedestrians attempting to lift or carry a scooter out of their path (Trivedi et al, 2019).

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<sup>2</sup> Note that no good comparison of helmet usage exists for bicyclists at this time, although it is likely that helmet usage is higher among bicyclists who own their own bikes due to the greater emphasis of helmet usage within the bicycling culture, as well as the reality that the helmet can be stored with the bike. For bike share, however, helmet usage may be approximately the same as what has been observed for e-scooters.

Intoxication does not seem to be a major factor for e-scooter crashes. Pilot programs generally report low numbers of people riding scooters while under the influence, although Portland found that 16% of their reports involved intoxication while riding.

### Overall Safety Record

It is difficult to know how to judge e-scooter safety overall, given the lack of public data on injuries. In general, injuries are expected to increase as more people participate in an activity, given that exposure to the activity (and any related risk) increases during this time. However, without complete injury and ridership data, it is impossible to know the relative risk of e-scooters. For example, there were 175 e-scooter-related emergency room visits in Portland during the pilot period, compared to 429 bicycle-related emergency room visits (PBOT, 2019). However, it is unclear if this is a comprehensive number, given that current ICD-9 codes do not adequately provide for e-scooter incident identification (SFDPH, 2019). Furthermore, while we know the number of e-scooter trips during that time, we do not know the numbers of bicycle and pedestrian trips that would allow a comparison of relative risk; the high percentage of bicycling trips in Portland could mean that bicycling is less risky on a per-trip or per-mile basis.

In comparison, Los Angeles reported 249 e-scooter related emergency room visits over the course of a year, compared to 195 bicycle-related emergency room visits and 181 pedestrian-related visits for that same timeframe (Trivedi et al, 2019). Again, however, we lack exposure data to truly understand relative risk. Thus, available data indicates a mixed picture of e-scooter safety:

1. Millions of e-scooter trips have been taken safely.
2. Compared to bike share (two fatalities in seven years; Schmidt, 2018), DESS is experiencing a higher number of deaths (five fatalities in one year) and death rate.
3. Head injuries seem to be much more prevalent in e-scooter collisions than in bike collisions or pedestrian incidents, likely due to a combination of factors including, but not limited to, lack of helmet use (Rivara et al, 1997).

It will be in communities' best interest to work with the companies and local hospitals to have access to trip and injury data so that it can be monitored in as close to real-time as is possible, as well as to develop estimates of bicycle and pedestrian trips so that relative risk can be understood.

## Challenge: Regulation and Management

Electric scooters present challenges to communities with regard to regulations and facility management (Fang et al, 2018a). Lack of a standard definition of e-scooters has resulted in inconsistent operation and regulation policy between states – and even between cities within the same state. Most states regulate vehicles by defining them using a vehicle and type, and then assigning rules based on how that vehicle should be operated on the road. Electric scooters are still so new that many states do not yet recognize them as a vehicle type on their own; in fact, only six states currently regulate electric scooters: Virginia, California, Oregon, New Jersey, Utah, and Washington, (Fang et al, 2018a). Even between those states, the rules are not standard, such that some states have specific regulations, like where the vehicles are allowed to drive and how fast the vehicle can go, while other states simply identify a right-of-way rule to protect the rights of the pedestrian. If a vehicle is not independently identified, it is often classified as a different mode type. For example, 27 states define all motorized vehicles (even electric scooters) as vehicles like automobiles (Fang et al, 2018a), despite the clear, significant differences between autos and e-scooters.<sup>3</sup> Regulations can be broadly classified into three main categories: operations, safety, and parking. These are explored further below.

### Operations

Regulations pertaining to operations are inconsistent within and between states with regard to speed, where people are permitted to travel, helmet usage, and age and related requirements for operations. For example, the trend seems to be to prohibit e-scooters from riding on the sidewalk, given the myriad complaints by pedestrians (SFDPH, 2019; PBOT, 2019), but this is not always the case; Virginia, for example, allow riders the choice of riding location, as long as riders abide by regulations for said riding location (Fang et al, 2018a). Some cities and states require helmet usage, while others do not. Moreover, sometimes vehicles that are similar in nature are regulated differently. For example, an electric skateboard and motorized scooter have similar speed capabilities, yet, in California, riders can ride an electric skateboard without a driver's license, on the sidewalk, and are subject to a 15mph speed limit (Fang et al, 2018a), while e-scooter riders are required to have a driver's license, cannot ride on the sidewalk, and are not subject to the same 15 mph speed limit.

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<sup>3</sup> Arizona SB 1398, passed 4/16/19 defines “electric miniature scooters” and “electric standup scooters” for use in that and future legislation.

Another issue with regulation is enforcement. If riders are prohibited from doing various things but there is no one to enforce those rules, they lose meaning. Yet enforcing the rules throughout a city is resource-intensive and in many cases likely impractical. Because of this, the e-scooter companies have begun to aid in enforcement, e.g., through requiring a photo of a parked e-scooter to ensure it is not blocking the right-of-way, although some have called for the companies to do more. The National Association of City Transportation Officials (“NACTO”) has attempted to help cities regulate DESS programs via their “Guide for the Regulation and Management of Shared Active Transportation” (NACTO, 2018), summarized excerpts of which can be found in Appendix B.

### Parking

Another important aspect of regulation pertains to electric scooter parking. The public clearly identifies poor parking practices as one aspect of electric scooters that negatively impacts pedestrians (PBOT, 2019; Fang et al, 2018b; Populus, 2018). Most companies consider an e-scooter properly parked if it is (1) standing upright, (2) placed adjacent to pedestrian paths or in areas that already possess blocks or barriers, and (3) not blocking pedestrian access (Fang et al, 2018b). Observational research on e-scooter parking found that 72% of scooters are parked on sidewalks, with most of the remaining parked off the streetscape (about 23%) (Fang et al, 2018b). Of those parked on the sidewalk, 90% of them did not obstruct pedestrian flow of access. Additionally, more than half of the e-scooters that were parked off streetscape were on private property. (Fang et al, 2018b). However, parking clearly becomes an issue when not well regulated, so NACTO also provides suggestions for how to regulate e-scooter parking. First, they suggest that cities and local governments designate places where small vehicles can be parked, as is their right. The guidelines contain pros and cons for a variety of locking strategies (e.g., unrestricted, encouraged placement, lock-to), regulation for where the vehicles can be used (e.g., on the sidewalk, in the street), and cues about where how to encourage parking in certain spaces (e.g., street corrals, geo-fencing). For a thorough accounting of the pros and cons of these parking strategies, see NACTO’s “Guide for the Regulation and Management of Shared Active Transportation.”

### Data Comparison

It is important for cities to be able to compare the results of their e-scooter pilots in order to determine which regulations, policies, and techniques are the most effective for

both protecting the public and achieving larger municipal goals, like greenhouse gas reduction. Unfortunately, it has been difficult for cities to compare the results of their e-scooter experiences for several reasons. First, not all cities require the companies to provide them with current e-scooter data. Second, secondary data sources, such as injury data from hospitals and emergency rooms, is highly protected and therefore difficult to access. Third, even when that data can be accessed, it may not be consistently entered (e.g., via the use of ICD-9 or ICD-10-CM codes), making comparability across cities difficult (SFDPH, 2019). To facilitate such comparability, the San Francisco Department of Public Health (2019) recently published guidance about classifying e-scooter injuries. Additionally, NACTO's guidelines may help cities with regard to determining data standards (NACTO, 2018).

## Effects on Other Modes

There are many potential benefits from including e-scooters in a city's transportation system. However, there are also impacts on other modes, particularly healthy modes like walking and biking that share space with e-scooters. Understanding e-scooters' impact on pedestrian safety and space is critical to protecting pedestrians and walking in a community. Similarly, understanding how e-scooters and bicycles share space in bicycle-specific facilities, the preferred place for many e-scooter rides, will be critical to ensuring that both user types have the space they need to ride safely (PBOT, 2019). A potential win-win strategy is for cities to invest more consistently in bicycle facilities that will both attract new bicyclists and keep e-scooter riders off of the sidewalk, providing e-scooter riders with their choice of space while protecting pedestrians in their space.

In addition to understanding the safety impacts of e-scooter riding, it is important to understand the attendant health impacts. For example, research is needed to understand the amount of physical activity obtained while riding an e-scooter, as well the amount of pollution e-scooter riders are exposed to during their trips. This is particularly important given that e-scooter rides have been shown to replace more active trips by walking and bicycling (37% and 5% replaced, respectively, in the Portland pilot program; PBOT, 2019).

## Discussion

The rapid adoption of e-scooters has changed transportation options and patterns in cities around the United States. E-scooters have clearly been popular with diverse

groups of people. Although reports have concluded a high approval rate of low income and minority groups, programs continue to focus on making improvements to increase accessibility for these groups. E-scooters are being used for a variety of trip types, including for work, errands, and fun/recreation. More detailed and uniform databases would aid communities in ensuring that they are meeting their equity goals.

The literature suggests that widespread adoption of e-scooters increases mobility for residents and may positively contribute to the reduction of greenhouse gas emissions and congestion. The creation of e-scooters supports the micro-mobility industry (employing local contractors), and mitigates the “first and last mile” barrier to using transit.

E-scooters are also associated with challenges within their host communities. Chiefly, among these are safety concerns due to issues with e-scooter speed, equipment design, equipment failure, and riders lacking proper use training and/or equipment. Additionally, the extent of safety issues is unknown and unable to be compared between different regions. Because e-scooter crashes often do not involve the police, they may go completely unreported, or may only be reported to the healthcare system, which protects the records for public access, even for research purposes. Furthermore, the lack of standard definitions between states and even cities with the same state leads to difficulty in standard regulation and thus resolution to identified problems.

More consistent regulation, definitions, and injury classification, as well as a collaborative system involving health care and the city officials, will lead to a deeper understanding of the type and extent of safety issues associated with e-scooters and potential solutions. This understanding can also inform further regulation regarding speed, design, permissions, etc. Cities can use tools like the NACTO guidelines to assist them in molding a regulation and management plan suitable for their unique circumstances.

Overall, e-scooters seem to be a positive and popular addition to communities. Consistent, research-based regulations and guidance should help mitigate associated challenges so that communities can reap the potential benefits from increased mobility.

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# Appendix B. NACTO Guide for the Regulation and Management of Shared Active Transportation: Summary of Operations and Safety Guidance

## **Operations**

NACTO's policy guidelines delineate certain rights that they recommend cities reserve when regulating electric scooters. For example, NACTO notes that a city can and should reserve the right to require that electric scooters only operate in the public right-of-way in accordance with that city's zoning policies. Municipalities should carefully consider where they wish scooters to be ridden and where they should be prohibited, considering the pros and cons of allowing scooters to ride on the sidewalk, bike lanes, and/or bike paths in their local context. NACTO recommends that if companies do not respect the boundaries of their designated operating areas, they should be fined for any equipment found beyond those areas.

In addition to the riding location, the overall number of both electric scooter companies and electric scooters per company within a municipality can be regulated. The NACTO guidelines recommend that a city reserve the right to deny and revoke permits, licenses, or contracts of certain electric scooter companies according to the companies' conduct related to the public right-of-way. NACTO further recommends that cities reserve the right to limit the duration of any and all licenses they issue to ensure that all policies align with the current goals of the city as a whole, which are constantly evolving. Cities should also reserve the right to charge fees to cover the costs of regulating, overseeing, and managing any electric scooters operations, as well as to develop a system of penalties for companies who do not comply with their permit terms. Finally, NACTO recommends that cities also reserve the right to hold insurance and indemnify the city.

The NACTO guidelines also suggest regulations for the everyday operation of electric vehicles. Municipalities can reserve the right to require companies to remove their scooters within specific time frames (e.g., to reduce the disturbance caused by the removal teams and to prevent any negative impacts in traffic within a city). Cities can also reserve the right to require the electric scooter companies to work in cooperation with them regarding procedures in the cases of extreme weather, emergencies, special events, and maintenance. To better support such procedures, and any other issues that might arise, NACTO suggests that cities reserve the right to require all companies to provide contact information that allows the city to communicate with them at any time (24 hours and day, 7 days a week).

This correspondence might also include providing the city with staffing and operations plans upon request.

The NACTO guidelines also suggested strategies related to public communications for the electric scooter companies. Municipalities can reserve the right to guarantee that the public has access to terms of service, instructions for use, privacy policies, fees and costs, penalties, and unexpected charges related to the electric scooter company. This information can be provided by the means of a city-specific webpage or social media account. NACTO also suggests requiring each company to provide a service contact number to the public for 24/7 contact.

### **Safety**

The NACTO guidelines also make important suggestions related to e-scooter safety. To be able to actively monitor and understand the safety impacts of e-scooters, NACTO recommends that municipalities reserve the right to require all companies to provide accurate, complete, and timely data regarding how the electric scooters are being used and who is riding them. NACTO suggests that all cities meet a minimum level of regulations and requirements for all electric scooter operations, a consistency that would allow cross-city comparability and help the cities hold the e-scooter companies accountable if problems arose. Indeed, as discussed above, a lack of consistent regulation contributes to confusion among riders and difficulty monitoring the safety and success of various strategies. Specifically, NACTO recommends that all electric scooters abide by the Consumer Product Safety Commission (CPSC) established safety standards and other federal, state, and city requirements placed upon them. These include, but are not limited to, the following:

1. CPSC public law 107-309 for standards around weight bearing,
2. Subjecting all electric scooters to a 15 mph speed limit,
3. Requirements for front and back lights visible from at least 300 ft away,
4. Requirements for clearly displayed and permanent city identification numbers,
5. A city-approved inspection and maintenance schedule for the equipment, and
6. The ability to electronically lock down electric scooters upon request.

# Appendix C. MAG Region Survey

The literature review provided an overall picture of e-scooter usage, challenges, and benefits. To complement this understanding and establish the state of the practice in the Maricopa Association of Governments (MAG) region, we surveyed representatives of the various MAG communities regarding their experiences with and/or progress toward accommodating e-scooters. This section discusses the results of the MAG region survey as well as published reports by other agencies.

## Survey Population

Fourteen agencies were represented in the survey. However, several agencies indicated that they were too early in their process to provide feedback, or were uninterested in accommodating e-scooters at this time. Therefore, the responses discussed here represent the nine communities in which some policies and/or policy aspects relating to e-scooters have been established; note that not all of these cities currently allow e-scooters. The communities profiled here include:

- |           |           |         |             |
|-----------|-----------|---------|-------------|
| Chandler* | El Mirage | Gilbert | Goodyear*   |
| Mesa*     | Peoria*   | Phoenix | Scottsdale* |
| Surprise  | Tempe*    |         |             |

\* E-scooters allowed in the community as of 04/26/2019.

## Survey Topics

The survey covered multiple topics of interest to the various MAG jurisdictions, including liability, regulation of space (e.g., where e-scooter users are allowed to ride), community accommodations (e.g., the provision of parking corrals or signage), and community feedback, and data required for future analysis.

## Survey Findings

The survey findings are summarized in the following pages, followed by specifics of each community's policies for the various categories in Table 1 (pp. 18-26), where available.

## Public Feedback

Public feedback about the scooters has been mixed in most cities, with safety and “blight” or “clutter” being the top concerns registered. In contrast, those that favor the scooters deem them “fun” and “innovative.” One city has prohibited scooters based on public opposition, and others registered concerns based on observations from other cities. City council feedback has tended to mirror the public’s feedback.

## Overarching Goals for Accommodating E-Scooters

Many agency representatives stated that they want to accommodate e-scooters in order to capture their benefits for the public, but want to proceed in a way that would allow analysis of the scooters’ impacts and the ability to exercise some control of the process if it the ratio of benefit to harm/nuisance grew imbalanced.

## Legal Aspects of Accommodating E-scooters

The survey data suggest that the communities could use more information regarding the legal aspects of accommodating e-scooters. For example, many agencies cited strong liability requirements in their survey responses (with the most common amount being \$1 million in general liability), but one respondent also mentioned that the liability constraints dissuaded the businesses from operating in the city, and another is allowing e-scooter operators without contracts. Additionally, only three agencies have end-user protections in their contracts. One city that is still developing policies stated that they “need to ensure every party is covered.” There are no established best practices with regard to liability at this point, but this may change over time, as several court cases against the scooter companies are currently working their way through the judicial system.

## Programmatic Aspects of Accommodating E-scooters

There are many programmatic aspects to accommodating e-scooters, and many of the communities are trying different things. This is likely again related to the lack of established best practices at the national scale. The survey results related to programmatic and operational aspects of accommodating e-scooters are summarized in Table 3.

### **Table 3. Summary of Survey Findings Related to Operations**

Category	Survey Findings
<i>Restrictions related to age, speed, and riding area</i>	
User age	Minimum ages ranged from 14 to 18, with a couple of communities declining to require a minimum.
Helmet usage	Only one community currently requires a helmet while using an e-scooter, and that is only for those under age 18. One other community stated that they were "looking to follow bike regulations." Currently, there is no state law requiring helmets for bicyclists in Arizona, although some local jurisdictions require them for bicyclists under age 18.
Maximum scooter speed	Maximum scooter speeds ranged from 10 mph to 25 mph*; in Scottsdale, the max speed is that which is "reasonable and prudent."
Permitted vs. prohibited riding areas	Most communities prohibit riding on the sidewalks, although this is not uniform and may, as in Scottsdale, depend on the characteristics of the sidewalk. Similarly, bike lane riding is permitted in some cities and not others. For vehicle lanes, there is often a requirement for the road type (e.g., "residential road" or "speed limit ≤ 25 mph"), but this is also inconsistent.
Enforcement	Enforcement is not universally planned to enforce riding areas. For those that intend to enforce riding areas, some places propose to use geo-fencing, but more commonly police are expected to provide the enforcement.
<i>Parking-related regulations</i>	
Parking	Most communities propose to limit parking, ranging from 3 to 10 per location depending on the place.
Parking spacing	Few communities have decided to regulate spacing, but where regulated, 100 to 150 feet between groups will be required. In Scottsdale, scooters from the same company are also regulated with regard to how long they can be near each other.
Recourse for incorrect parking	Several communities have established a procedure for recourse that includes fees, scooter confiscation or relocation, and/or issue notices of violation or civil complaints.
<i>Expectations regarding scooter numbers and distribution</i>	
Scooter caps	Most communities either don't have a cap on the number of scooters or have not yet determined a cap. Phoenix has a cap of 300 scooters per company; Peoria's cap is 200.
Required distribution	The communities vary in terms of whether and where they will require some scooters to be distributed. For the few that will require distribution, this ranges from downtown to near transit stops to other specific streets.
Staging	Most communities will require the e-scooters to be restaged every day.
<i>Fee structure and recourse for violations</i>	

Fees	Approaches to a fee structure vary with regard to both fee type and amount. Common fees include a permit fee, per-trip fee, and usage fee. Most of these fees will go to cover the cost of administering the program.
Violating the terms of the agreement	If the companies violate the terms of the agreement, communities mentioned confiscating the scooters, citing the company, or revoking the business license.

\* 25 mph may be higher than the scooters can realistically travel. Additionally, the 25 mph limit is likely inadvisable given the risk of injury associated with speed (Tefft, 2013) and the seemingly disproportionately high rate of head injuries associated with e-scooters (Trivedi et al, 2019).

## Data

Seven of the nine communities indicated that they will require the following data from the companies:

- Trip data
- Injury data\*
- Operability data

\*Note that injury data from companies will only reflect injuries reported by users to the company, and may be biased toward injuries related to e-scooter malfunctions rather than incidents involving other roadway users. However, this data can be helpful to fill out the injury picture given that injuries, particularly if minor, often go unreported to other sources. To complement that data, most of the communities plan to work with the police and/or fire departments. Only Phoenix currently plans to work with the county hospital to analyze injury data, as well.

Five of the communities plan to solicit public feedback about the scooter programs, most commonly through surveys, but also through community forums and public email addresses or websites.

## Community Adaptations

Four of the communities indicated that they are planning to adapt to accommodate e-scooters, either by hiring new personnel, building new parking infrastructure, and providing signage and markings. Others indicated that these adaptations may occur in the future.

As mentioned above, Tables 4-16, starting on the following page, provide the details of e-scooter policies for each of the ten profiled cities, where available.

**Table 4. Survey Results: Progress Toward Developing Regulations and Feedback in MAG Cities**

<b>Community (e-scooters currently allowed: Y/N)</b>	<b>Progress toward developing e-scooter regulations</b>	<b>Public feedback about e-scooters</b>	<b>Feedback from community officials about e-scooters</b>
Chandler (N)	We are working on them.	Mixed. We have not received many complaints, but when we ask about them, it is pretty split whether people would like to have them in town or not.	N/A
El Mirage (N)	We have not started developing them.		That the scooter companies are placing the liability on the Cities.
Gilbert (Y)	A pilot program has been developed and approved by Council and will go into effect on April 6, 2019.	Mixed opinions, but concerns primarily focus on safety, with clutter and aesthetic concerns being a close 2nd.	We received a unanimous vote from Council to proceed with a micromobility pilot program.
Goodyear (Y)	Fact finding.	Council members have asked what regulations are in place and how other cities are handling this new technology.	None, this issue has not been addressed since an ordinance was passed 2-28-2005.
Mesa (Y)	We are working on them.	Complaints about devices impeding the walkway, ADA complaints, blocking private property, speed concerns and general concern about parking/staging in the ROW.	Similar to above. With varying viewpoints on this issue, some Councilmembers are supportive of the micro-mobility movement and do not want to regulate while others see value in developing a license.
Peoria (Y)	We have temporary regulations.	Feedback has been mixed. Those in favor find them innovative and fun, those against describe them as dangerous, blight, and interfering with higher priority uses for rights of way, such as handicapped accessible paths.	Our elected officials have offered mixed reviews that follow the same lines as the citizen feedback.
Phoenix (N)	We are working on them.	Sidewalk Regulations, Visual Blight, Safety requirements, Enforcement	Sidewalk Regulations, Visual Blight, Safety requirements, Fee Structure
Scottsdale (Y)	They have been developed.	We have received many complaints from residents and businesses.	City Council directed staff to develop an e-scooter ordinance.
Surprise (N)	We are working on them.		Hesitation to accept emerging technology do to the negative impacts from our neighboring communities.

Tempe (Y)	The license is implemented. Police Department and City Attorney's Office are working on traffic ordinance revisions	Travel speed, safety, end use parking and travel behavior, blocking sidewalks and ADA areas, "unsightly", needs regulations, supports concept	N/A
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**Table 5. Survey Results: Overall Goals for Accommodation, Contract Details**

<b>Community (e-scooters currently allowed: Y/N)</b>	<b>Overall goal for accommodating e-scooters in community</b>	<b>Can companies subcontract, sublicense, or sublease scooters?</b>
Chandler (N)	We still need to get direction from Council, but whichever direction we go, we will need to make sure they are not causing issues such as clutter, blocked sidewalks/ ADA access, etc.	Not sure
El Mirage (N)	We have no objections, but would like to share revenue.	Not sure
Gilbert (Y)	To analyze them for a temporary period of time in order to collect data and see how they are being used to serve our residents.	No
Goodyear (Y)	We have not discussed this, in detail, with Council. It appears the only concern at present is scooters being littered around town or in parking lots.	Not sure
Mesa (Y)	Council has given staff direction to draft regulations that license Vendors, collect a reasonable fee and regulate the ROW but do not place overly burdensome rules on the Vendors. At this point, the goal is balance.	No
Peoria (Y)	We are awaiting further guidance from elected officials. Nothing is pending at this time; it is a subject to be revisited in the next couple of months.	Not sure
Phoenix (N)	Safety, Data Sharing, Parking Compliance, Alternative Mode of Transportation	No
Scottsdale (Y)	Finding a balance for the use e-scooters that will satisfy the residents/businesses but allow for the continued operation of e-scooters.	Not sure
Surprise (N)	The City would like to ensure that they have their proper place in the transportation network without compromising ADA facilities and or other modes.	No
Tempe (Y)	Determining the best way to provide a new mobility solution while addressing community concerns.	No

**Table 6. Survey Results: Agency Approaches to Liability, Protections, and Insurance**

Community (e-scooters currently allowed: Y/N)	Agency's approach to liability	Are there contractual protections for the end-user?	Insurance \$ required of each company	Additional thoughts - licensing
Chandler (N)	Not yet determined.	Not sure	N/A	We are still exploring specifics about indemnification, insurance, etc.
El Mirage (N)	Not sure	Not sure	\$1 million	Not opposed to the scooters, need to ensure every party is covered.
Gilbert (Y)	We put a very strong indemnification section into the pilot program as well as high insurance requirements.	Yes	\$2 million commercial general and \$2 million commercial automobile	
Goodyear (Y)	We have not had a proliferation of rental scooters enter our community. Only one incident was observed, where a scooter was left in a Walmart parking lot. We are not sure how it got here.	Not sure	N/A	<a href="https://www.codepublishing.com/AZ/Goodyear/#!/Goodyear13/Goodyear135.html">https://www.codepublishing.com/AZ/Goodyear/#!/Goodyear13/Goodyear135.html</a> ARTICLE 13-5
Mesa (Y)	This is an on-going discussion point. We have heard concerns about the draft indemnification language similar cities are considering. At this point, we plan to require that the City be indemnified, but are not yet clear how that will read.	No	TBD	
Peoria (Y)	We put strict indemnification language in our operating agreement, so much so that it was cited as the main reason a vendor chose not to engage.	Yes	\$1 million in general liability per occurrence, \$100K workers' comp per occurrence.	
Phoenix (N)	Vendors will apply for a permit, which will include liability compliance.	Not sure	TBD	
Scottsdale (Y)	Not applicable - do not have contracts with any of the e-scooter companies.	Not sure	N/A	

Surprise (N)	If the City allows a commercial entity to operate within its agency boundaries it will look to have an indemnification clause releasing it from liability. We anticipate doing this through a business license requirement.	No	TBD	
Tempe (Y)	We have indemnification requirements for both the operator and the end user.	Yes	\$1 million commercial general; \$500K umbrella	All of our files associated with the Shared Active Transportation Vehicle ROW Use License can be found on this website. <a href="http://www.tempe.gov/satv">www.tempe.gov/satv</a>

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**Table 7. Survey Results: Regulations and Rules for E-scooter Riders**

<b>Community (e-scooters currently allowed: Y/N)</b>	<b>Minimum age for e-scooter riders</b>	<b>Helmet required?</b>	<b>Max e-scooter speed</b>	<b>Will rules be enforced?</b>
Chandler (N)	No	No	No	Not sure
El Mirage (N)	Not sure	Not sure	Not sure	Not sure
Gilbert (Y)	No	No	10 mph in "high pedestrian activity" areas; 15 mph everywhere else	Yes
Goodyear (Y)	14	Under age 18	25 mph	Not sure
Mesa (Y)	TBD	No	TBD, 15 mph proposed	Yes
Peoria (Y)	18	No	Required to be governed at 12mph	Yes
Phoenix (N)	18	No	15 mph	Yes
Scottsdale (Y)	No	No	"Reasonable and prudent"	Yes
Surprise (N)	Not sure	Looking to follow bike regulations	No more than 15 mph split on sidewalk with pedestrians	Yes
Tempe (Y)	Companies require a driver's license	No	Companies have set it at 15 mph	Not sure

**Table 8. Survey Results: Permitted and Prohibited Riding Locations**

		E-scooter users are prohibited from riding in/on...				E-scooter users are allowed to ride in/on...				How are you enforcing where they can and can't ride?		
Community (e-scooters currently allowed: Y/N)	Are you regulating where e-scooter users can ride?	the sidewalk	bike lanes	regular travel lanes	trails	the sidewalk	bike lanes	regular travel lanes	trails	Police	Geo-fencing	Other
Chandler (N)	Not sure	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD			
El Mirage (N)	Not sure											
Gilbert (Y)	Yes		x	*if speed limit > 25 mph		x		*if speed limit ≤ 25 mph		x	x	
Goodyear (Y)	Yes	x		x	x		x	*if speed limit ≤ 25 mph				
Mesa (Y)	No											
Peoria (Y)	Yes		x	x	x	x		*on residential streets		x		public education, on-board posting
Phoenix (N)	Yes	x					x	x		x	x	
Scottsdale (Y)	Yes	*where posted		*if speed limit > 35 mph		x	x	x	x	x		
Surprise (N)	No											
Tempe (Y)	Yes									p*	p*	

Legend: p\* indicates planned or proposed, but not finalized.

**Table 9. Survey Results: Additional info on Prohibited and Permitted Riding Locations**

Community (e-scooters currently allowed: Y/N)	How did you decide on these areas?	Additional thoughts - permissions, user regulations, and enforcement
Chandler (N)	N/A	
El Mirage (N)		
Gilbert (Y)	Team decision making effort and research based on safety concerns seen in other municipalities.	
Goodyear (Y)	Not sure	Ord. 05-936, passed 2-28-2005
Mesa (Y)		We are awaiting more direction from Council, but, at this point, we are not seeking to regulate.
Peoria (Y)	A cross functional team made the determination based on the characteristics of our community.	Enforcement would be more reactive (in the event of an incident/accident) than proactive. As for riding areas, we considered the valley's frequency of car vs bike/pedestrian accidents when prohibiting them on major arterial roadways.
Phoenix (N)	Research and Management	
Scottsdale (Y)	Restrictions on sidewalks areas are based on sidewalk width and heavy pedestrian use in historic downtown area.	Riders are also prohibited from areas posted for no scooter riding, including some sidewalks.
Surprise (N)		The current concern is how we regulate the perceived clutter and inappropriate placement of the commercial items.
Tempe (Y)	The City Council formed a Working Group to examine bicycle and scooter safety. That group will work with the Police Dept, City Attorney's Office, and Traffic Engineers to revise the ordinance and determine proper and improper riding locations for e-scooters.	

**Table 10. Survey Results: Parking Regulations and Restaging Requirements, Recourse**

Community (e-scooters currently allowed: Y/N)	Will e-scooter parking be regulated?	Is there a limit to the number of e-scooters that can be parked in one place?	Is there a spacing requirement for parking the e-scooters?	How often are the companies required to restage the e-scooters?	What recourse is there if someone parks an e-scooter incorrectly?
Chandler (N)	TBD	TBD	TBD	TBD	TBD
El Mirage (N)	Not sure	Not sure	Not sure	Not sure	Not sure
Gilbert (Y)	Yes	6 max. (total) at bus stops, 4 max. (per company) in all other areas	150 feet	Every 24 hours	Heavy penalty fees were put into place Relocation Penalties: 1st Failure: \$50 per device per day; 2nd Failure: \$250 per day 3rd and subsequent failures: \$500 per device per day; 3rd and subsequent failures that are within one month of 1st failure are \$1,000 per day.
Goodyear (Y)	No	Not sure	Not sure	N/A	N/A
Mesa (Y)	Yes	No	No	Every 24 hours	Impounding of the scooter if not relocated by the vendor within the time frame
Peoria (Y)	Yes	3 per location	No	Daily	None for users.
Phoenix (N)	Yes	4	100 ft from another vendor	Nightly	\$80 Relocation Fee to the vendor
Scottsdale (Y)	Yes	5 scooters per area	Scooters owned by the same company cannot be within 200 feet of each other for more than 2 hours	Every 72 hours	We can issue notices of violation or civil complaints for violations of the city's parking requirements.

Surprise (N)	Yes	Plan to limit to 5-10	Not sure	Within 24 hours of complaint	Looking to have the company to enforce if not enforced by them then the company will receive a fine.
Tempe (Y)	Yes	No more than 10; fewer allowed at transit stops	Groups must be separated by 150 feet; specific spacing requirements for bus stop areas	Every 24 hours	City communicates relocation need to operator and operator is given two hours to relocate. If no action taken, the City relocates and charges \$100 for each relocated vehicle.

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**Table 11. Survey Results: Scooter Caps, Distribution Regulations and Requirements**

<b>Community (e-scooters currently allowed: Y/N)</b>	<b>Is there a cap to the number of e-scooters any one company can distribute?</b>	<b>How are you regulating the number of e-scooters that any one company can distribute?</b>	<b>Are you requiring distribution in certain areas of your city, county, or community?</b>
Chandler (N)	TBD	TBD	TBD
El Mirage (N)	Not sure	Not sure	Not sure
Gilbert (Y)	No	N/A	No
Goodyear (Y)	Not sure	N/A	No
Mesa (Y)	No	At this point, we feel the proposed fee structure will help regulate the number of devices that each vendor will deploy.	TBD, we look to get more feedback from Council on the geographic staging area.
Peoria (Y)	200	Contractually and by monitoring data.	Only at transit stops on 3 specific routes, on private property with permission, and at corners of residential streets.
Phoenix (N)	300 scooters	Data sharing and investigations	Downtown vicinity
Scottsdale (Y)	No	To my knowledge we are not regulating the number of e-scooters.	No
Surprise (N)	TBD	TBD	No
Tempe (Y)	No	The ROW Use Fee is a per vehicle per day fee.	20% of fleet must be south of Broadway

**Table 12. Survey Results: Strategies for Non-compliant Companies and Errant Scooters**

<b>Community (e-scooters currently allowed: Y/N)</b>	<b>How is your agency handling companies that are not licensed to operate in your community?</b>	<b>How are you handling companies that are non-compliant?</b>	<b>How are you handling e-scooters that are damaged, littered, or unclaimed by the company?</b>
Chandler (Y)	TBD	TBD	TBD
El Mirage (N)	Cited for not having a City business license.	Cited for not having a City business license.	Not sure
Gilbert (N)	After April 6th, if they are not licensed through the pilot program (or working towards it with the Town).	We haven't yet, except for communicating with them to request relocation of devices that are causing obstructions. We will begin impounding and fining anyone who doesn't comply with the Pilot Program rules.	We haven't had to yet, however we do have relocation fees
Goodyear (Y)	N/A	N/A	N/A
Mesa (Y)	If a license process is established, we only plan to allow companies to operate in the City if they go through the process.	We would revoke their license.	We would impound.
Peoria (Y)	We would impound their scooters. We have not had any companies violate our ordinance.	We would impound their scooters. We have not had any companies violate our ordinance.	We would impound any that weren't picked up within the 2-hour time frame specified in the operating agreement.
Phoenix (N)	Relocation fees	Fines	Relocation fees
Scottsdale (Y)	We do not license or have contracts with any of the e-scooter companies.	Notice of violation	Calling the associated company
Surprise (N)	They are not allowed in without license	They will lose their license	They will be taken by code compliance and company informed and then fined if not claimed.
Tempe (Y)	City Engineer and City Attorney's Office have procedures for communicating with these companies	We have not had this yet. The idea with the ROW license is that it can be revoked if operators are non-compliant.	We have not encountered this yet.

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**Table 13. Survey Progress: Financial Structure and Fee Usage**

Community (e-scooters currently allowed: Y/N)	What financial structure has your city, county, or community set up for these e-scooter companies?	How will these fees be used?	Will you work with the e-scooter operator(s) to geofence zones?
Chandler (Y)	TBD	TBD	TBD
El Mirage (N)	Not sure	Not sure	Not sure
Gilbert (Y)	One-time \$2,500 pilot program fee and \$0.10 per ride fee, due monthly. The remaining fees are all penalties.	The program fee is used to cover staff time to process the application, manage the program, analyze the data, etc. Per ride fees will be used for maintenance, repairs, designating parking areas or parking racks, etc.	Yes
Goodyear (Y)	N/A	N/A	Not sure
Mesa (Y)	Fees are still being established, but we look to create a permit fee, per device per month fee and impound fee.	Oversight of this new process.	May require, but not clear at this point.
Peoria (Y)	The Company shall pay the City a Temporary Operating Agreement Application Fee of \$2,500, a monthly enforcement fee of \$2.50 per month per Stand-up electric scooter deployed in the City and a \$25.00 relocation fee for Stand-up electric scooters as provided for in Section 7(e) of this Agreement.	They would go to the general fund as a means of indirectly offsetting our increased costs associated with the program.	Not sure
Phoenix (N)	Permit Fees, and per trip surcharge fees	Cost recovery	Yes
Scottsdale (Y)	None	N/A	No
Surprise (N)	Not yet finalized	In the same manner as our other business license fees.	Yes
Tempe (Y)	The SATV ROW License includes: annual fee, relocation fee, and ROW use fee (a per vehicle per day fee).	Annual fee is due at the time of the application. Relocation fee and ROW fee is calculated each month and invoiced to the company.	Not sure

**Table 14. Survey Progress: Data Requirements and Access**

	For which areas are you requiring the e-scooter companies to provide data?				With whom are you working to access data on e-scooter injury numbers and severity?					How will you aggregate the data?
	Trips	Injuries	Operability	Other	City hospital(s)	County hospital(s)	Local clinics	Local police dept	Local fire dept	
Chandler (Y)								x		TBD
El Mirage (N)	x	x	x							N/A
Gilbert (Y)	x	x	x					x	x	In house for now
Goodyear (Y)										N/A
Mesa (Y)	x	x	x					x	x	TBD
Peoria (Y)	x	x	x	GIS data, staffing levels, crash/damage reports				x		In house
Phoenix (N)	x	x	x			x		x		Third party consultant
Scottsdale (Y)										N/A
Surprise (N)	x	x	x					x		Third Party
Tempe (Y)	x	x	x							In-house data aggregation used for ROW license monitoring and transportation planning

**Table 15. Survey Results: Future Public Feedback and Rule Promotion**

		How do you plan to solicit future public feedback?				
		Online surveys	Intercept (in-person) surveys	Community forums/public meetings	Publicized email address or website	
Community (e-scooters currently allowed: Y/N)	Will you solicit future public feedback about e-scooters?					Does your community plan to promote awareness of rules about e-scooter use?
Chandler (Y)	Not sure					Not sure
El Mirage (N)	Not sure					Not sure
Gilbert (Y)	Yes	x				We have 175,000 social media followers, so we have been promoting through these channels. We have also included a link on our website for rider rules:
Goodyear (Y)	Not sure					Not sure
Mesa (Y)	Not sure					Not sure
Peoria (Y)	Yes					We would require and work in conjunction with a company to promote the rules.
Phoenix (N)	Yes	x	x	x	x	Website, community outreach meetings
Scottsdale (Y)	Not sure				x	
Surprise (N)	Yes	x		x	x	As part of our active transportation plan
Tempe (Y)	Not sure					Not sure

**Table 16. Survey Results: Community Accommodation**

		Are you providing any of the following as part of accommodating e-scooters?			
Community (e-scooters currently allowed: Y/N)	How is your community changing to accommodate e-scooters (and other forms of mobility)?	Parking corrals	Signage	Pavement markings	Additional thoughts - data, fees, feedback
Chandler (Y)	Considering adding infrastructure for scooter parking near bus stops.				
El Mirage (N)	No action at this time.				
Gilbert (Y)	We will embark on a micromobility master planning process in the upcoming year, mostly likely coinciding with the Transportation Master Plan update.	May provide in future	x	May provide in future	
Goodyear (Y)	We have not discussed this yet. We are waiting on the state to pass legislation first, which is pending.				
Mesa (Y)					
Peoria (Y)	No current/recent changes. We are studying a variety of non-traditional modes of transportation to allow us to plan accordingly.				
Phoenix (N)	Assigned new personnel	x		x	
Scottsdale (Y)	Future planning may include the recognition of new transportation technologies.				We also have a webpage where citizens/business can file a complaint regarding e-scooters, e-bikes, bike shares.
Surprise (N)	We are looking to provide signage and markings to help designate them in locations that we feel are appropriate.		x	x	

Tempe (Y)	No plans yet.				We are in the early stages of the ROW license and the traffic ordinance revisions are not finalized. Following this, we may be asked to conduct public education campaigns or create new infrastructure.
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## E-Scooter Accommodation Outside of the MAG Region

It is clear that the field of e-scooter accommodation is rapidly evolving, with no comprehensive set of guidelines or best practices. A forthcoming report from the Mineta Transportation Institute found that cities were inconsistent in how they regulated personal transportation devices (PTDs), including e-scooters. For example, a sample of 100 cities found that many don't regulate the devices specifically. Of those that do (21 cities), about half prohibited riding in certain places or areas, but this was clearly inconsistent.

In this realm, therefore, it can be instructive to look more in-depth at case studies. While many cities are currently experimenting with and evaluation e-scooters, only two have released program evaluations specific to e-scooters: Denver and Portland. Summaries of these two pilots follow, with suggestions for key takeaways for the MAG region.

### Denver

The pilot program for Denver, Colorado was launched in June of 2018 and will continue until July 31, 2019. Eight e-scooter permits were approved for the pilot; however, only five companies are covered in the pilot report (Bird, Lime, Lyft, Razor, and Spin). The Bird and Lime permits was launched in August, and the Lyft permit launched in September, allowing 350 total of scooters to be deployed per permit. The Razor and Spin launched in October, allowing for 100 total scooters to be deployed under the Razor permit, and 115 total scooters to be deployed under the Spin permit. To incentivize a "more equitable distribution", operators who wanted to maximize the number of scooters were required to deploy at least 100 of them in "opportunity areas" outside of the city core.

The city of Denver permits required all the pilot programs to meet a few regulations before upon permit approval. Every day, the companies are required to rebalance the scooters to areas near transit stops (in order to better integrate them with the transit system). The scooters are allowed to be ridden in bike lanes or roads with speed limits that were 30 mph or less. If other cases (i.e., when no bike lanes are present and the road has a speed of higher than 30 mph), users are allowed to ride on the sidewalk, but the speed of the scooter is not to exceed 6 mph. In addition, all companies are required to provide the city with real time application interface data such as which days people are riding, what time of day they are riding, distance traveled, number of trips taken, etc.

Denver's pilot program is ongoing but, as discussed in the Literature Review, the interim evaluation suggests positive results, with 55% of respondents reporting that they "like" or "love" them. The e-scooters seem to be consistently used for transportation

purposes, with 43% of respondents reporting a top trip type of work or work-related meetings or appointments. Only 7% of respondents reported a top trip type of "fun/recreation".

In terms of how e-scooter usage impacts other modes, 33% of trips would have been taken by car (rideshare, taxi, or personal/rented car) if not by the dockless vehicle (e-scooters and bikes are combined in the report). However, 43% would have occurred by walking, suggesting a need to further investigate the health impacts associated with e-scooter usage.

Results regarding scooter safety suggest room for improvement. The largest concern pertains to the 34% of survey respondents who reported being hit or almost hit by a scooter while walking. To address this concern, Denver quickly passed an ordinance that allowed e-scooters to ride in bicycle lanes and that should improve safety for pedestrians as a result.

Finally, when asked what changes would encourage more frequent scooter usage, 46% of respondents selected "more scooters available where you need them", and 28% selected "more designated places to ride (e.g., bike lanes)." Only 4% of respondents indicated that none of the proposed changes would encourage more usage, suggesting the potential for greater e-scooter usage in the Denver area if the city decides to continue its path.

## Portland

The pilot program for Portland, Oregon was launched on July 23, 2018 and ended November 20, 2018. Three e-scooter permits were approved (Bird, Lime, and Skip Transport Inc.). All of the permits were launched in August with a total number of scooters of 683 allowed to be deployed per permit.

The City of Portland regulations were mostly related to traffic and safety control, as well as to meet the equity goals set forth by the city. The latter related to a goal that everyone have access to the e-scooters due to their lower price point and the potential for a new mobility option. For this reason, one daily deployment regulation was that every company provide at least 100 scooters in (traditionally lower-income) East Portland. In terms of safety regulations, PBOT required the following of all companies:

1. Enforce a 15-mph speed limit,
2. Require helmet use,
3. Expressly prohibit riding on the sidewalk,

4. Require that scooters be parked on sidewalks close to the curb without disturbing pedestrian access flow, and
5. Educate all riders on safe riding and proper parking procedures.

As discussed in the Literature Review above, PBOT considered the pilot a success, finding high use among various segments of Portland's population, including lower-income residents and residents in East Portland, and a generally positive reaction to the scooters. While there were some identified safety challenges, these challenges did not dominate the program and may have been less prevalent than similar challenges in other cities. It is unclear the extent to which this related to Portland's developed bicycle network, although sidewalk riding was clearly higher on streets without bicycle lanes than those with bicycle lanes – especially when associated with higher speed limits. This should be further investigated to understand how other cities might learn from Portland's experience.

As in Denver, there was significant trip substitution associated with e-scooter usage, with 34% of Portlanders and 48% of Portland visitors indicating that they would have used a car for their trip had they not used an e-scooter. These findings should lead to both a reduction in GHG emissions and potential safety improvements, given that additional vehicle trips and miles traveled increase the likelihood of crashes. That said, 42% of Portlanders would have biked or walked had an e-scooter not been available, again suggesting the need to further investigate the health impacts associated with e-scooters. As in Denver, e-scooters seem to be primarily used for transportation rather than recreation or exercise.

Also similar to Denver, pedestrian comfort is an ongoing concern related to e-scooter accommodation, particularly for the mobility-challenged. Nearly 27% of e-scooter complaints to the City related to sidewalk riding. Further improvement and expansion of the bicycle network should alleviate some of this concern.

A unique aspect of the Portland evaluation was focus groups with members of Portland's Black community and East Portland neighborhoods. These groups revealed insights into aspects of e-scooter usage that would not have been captured by the survey alone, such as the hesitation among Black community members to use the equipment and potentially subject themselves to racial profiling or criminalization. The groups also discussed barriers to e-scooter usage such as a lack of training or specialized equipment. These insights can help PBOT better plan for expanded usage throughout the City.

## Lessons Learned

The pilot reports from Denver and Portland suggest some key takeaways for the MAG region.

1. **Require data on usage and injuries from the e-scooter companies.** Many in the MAG region are already planning to do this. The data will help the MAG communities understand where e-scooters are used within the cities, when the trips occurred, and how long the trips are. This can help with an understanding of the types of infrastructure that may be needed to safely accommodate e-scooter trips, as well as whether e-scooters are helping to meet equity and mobility goals. In addition, injury data can complement police-reported data which, unfortunately, will likely seriously underestimate e-scooter incidents given that most do not involve vehicles. Other sources of injury information are therefore critical to enabling an understanding of safety.
2. **Survey the e-scooter users** to understand who is using the scooters, their concerns and positive experiences related to e-scooter usage, and suggestions for improving the programs. This information can help the MAG communities better plan for e-scooter accommodation and identify potential issues that cannot be detected from the company data. It may also reveal additional safety data (e.g., through the exploration of near misses) and health outcomes (e.g., whether scooter trips are replacing car or walking trips) that could be important for future iterations of the program.
3. **Conduct focus groups with key populations** to gain insights into barriers or positive experiences related to e-scooter usage that will be difficult to access from a survey. These may be particularly important to programs with equity components.
4. **Develop metrics that can be used to evaluate the programs' outcomes.** These metrics, especially if developed in coordination with nearby jurisdictions, will allow the MAG communities to measure progress consistently and quickly identify areas of concern or success.
5. **Evaluate the programs in an ongoing manner, and particularly mid-term or after an initial trial** to learn how to companies are complying with requirements and how to improve things going forward. Initial evaluations in both Denver and Portland will strengthen the programs going forward and likely lead to a greater chance of meeting city goals.

## Discussion and Conclusions

The literature review and subsequent survey of MAG communities confirmed that there is no established set of best practices regarding e-scooter accommodation. However, some commonalities seem to be emerging, such as the need to analyze trip data and solicit user and public feedback to understand how the programs are meeting their goals.

Additionally, establishing a state of the practice in the MAG region will help the communities work together going forward. All communities can also benefit from those who have already evaluated e-scooter pilots and published their findings, such as Denver and Portland. Future pilot reports from additional cities should help further clarify best practices; ideally, some of those reports will be from within the MAG region, and it is hoped that this report can help facilitate that work.

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