APPENDIX E.
EMERGING MOBILITY PLAYBOOK

CONNECTING PEOPLE AND PLACES

Gilbert Transportation Master Plan

CONNECTING PEOPLE AND PLACES

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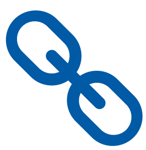
THE CHANGING MOBILITY LANDSCAPE

Over the past decade, a wave of technology innovations and changes in consumer preferences and behavior have combined to significantly reshape the mobility landscape in cities and towns across the U.S. These shifts have resulted in new ways for people to get around–from ride-hailing services like Uber and Lyft to fleets of shared electric scooters–and changed the way people plan and pay for trips. Five key trends underly many of the changes occurring in transportation.

SHARED. Shared mobility refers to a model where transportation services and resources are shared between users, encompassing everything from traditional transit service to bike- and scooter-share. Shared mobility provides users with flexibility and on-demand access, providing access to a range of choices and enabling customers to choose the most convenient mode for that trip, at that specific time. By providing a suite of mobility choices, shared mobility can help reduce reliance on private vehicles and single-occupant trips.



INTEGRATED. While the increase in new transportation modes and services provides people with more choices, handling multiple smartphone apps, comparing travel times and costs between different options, and paying for trips across platforms can become overwhelmingly complicated. Mobility as a Service (MaaS) seeks to integrate different forms of transportation in a single application where users can compare, book, and pay for trips.

ELECTRIC. Electric vehicle (EV) technologies have been developing rapidly in recent years amid growing urgency for strategies to combat climate change. The federal government and many states are setting aggressive targets to increase the share of personal EVs on the road and build out a comprehensive network of vehicle charging infrastructure to lower transportation emissions. Likewise, many cities are transitioning their municipal fleets to EVs, and a number of transit agencies are shifting towards electric buses.

CONNECTED. Connected vehicles (CVs) use communication technology to ‘talk’ to other vehicles, infrastructure, and connected devices, enabling vehicles to recognize other nearby vehicles and send signals or alerts to drivers when dangerous situations arise. Harnessing the benefits of CV technology requires infrastructure upgrades and a standard implementation of communications technology across all vehicles, traffic control infrastructure, and roadside equipment.

AUTOMATED. Autonomous vehicles (AVs) are vehicles in which at least some aspect of a safety-critical control function (e.g., steering, throttle, or braking) occurs without direct driver input. Technology and automotive companies are testing AV technology in Arizona and across the U.S., but there are many significant safety challenges and edge cases, unanticipated situations AVs struggle to interpret and respond to, that remain before AVs can become a significant element of the transportation system.

Many of the changes resulting from these trends have been positive, providing people with more transportation choices, equipping them with better information for making individual mobility decisions, and enabling alternatives to private cars or lower emissions options. However, technological disruption is rarely without a downside. Many emerging mobility technologies require users to have access to, and be fluent using, a smartphone, meaning many groups that already struggle to obtain reliable transportation, like older adults and those with limited means, can be left out. While many new technologies hold promise for lowering emissions and improving transportation safety, these outcomes are not a forgone conclusion, and some technologies may lead to more cars on our roads–worsening congestion and endangering people walking and biking.

Emerging mobility technologies can greatly benefit Gilbert but achieving positive outcomes for our Town will require a consistent, thoughtful approach to determine what's right for Gilbert.

What's Right for Gilbert?

Emerging mobility strategies provide the highest benefits when they're implemented not for their own sake, but in pursuit of a town's goals. This means identifying both the right strategies and the right ways to implement those strategies. Gilbert's General Plan and this Transportation Master Plan establish four main transportation goals:

1. Effectively manage congestion
2. Improve mobility choices
3. Enhance travel safety
4. Plan for technology

Additionally, Gilbert has important stated environmental goals. Because transportation accounts for roughly 1/3 of all greenhouse gas emissions, environmental goals need to have transportation solutions as an important tool for meeting the Town's environmental goals. To better understand what emerging mobility strategies can best help Gilbert reach its goals and which to prioritize, a scorecard matrix was developed to assess emerging mobility technologies and services based on the Town's goals. The scorecard also incorporates two additional metrics: the maturity horizon of the technology (will this technology be ready in the near future or is it many years off?) and the risk of negative externalities, such as increased emissions, congestion, or negative safety impacts. Gilbert's goal to "plan for technology" was not part of the assessment because this process is largely, in and of itself, planning for technology.

How to Use the Scorecard

Each emerging technology is scored across six metrics, with each metric being assigned a score of 0-4 based on the scoring table below. The scores across each metric are then added together, and the strategies with the highest scores represent the strategies best positioned to help Gilbert reach its goals.

Figure 1. Emerging Mobility Scorecard Guidance

	4	3	2	1	0
Impact on Congestion Management	Substantial	Major	Moderate	Minimal	None
Impact on Improving Mobility Choices	Substantial	Major	Moderate	Minimal	None
Impact on Enhancing Travel Safety	Substantial	Major	Moderate	Minimal	None
Impact on Environmental Health	Substantial	Major	Moderate	Minimal	None
Technology Maturity Horizon	Now	0-2 yrs	2-5 yrs	5-10 yrs	10+ yrs
Negative Externalities Risk	None	Minimal	Moderate	Major	Substantial

Scorecard Outcomes

Combining Gilbert's opportunities and constraints with research on the latest emerging mobility best practices, five strategies emerge as best positioned to help the Town reach its goals:

1. Shared Micromobility,
2. Mobility Hubs,
3. Microtransit,
4. Adaptive Signals, and
5. Dynamic Curb Management

These five key emerging mobility strategies are explored in further detail in the following section.

Figure 2. Emerging Mobility Scorecard

Emerging Mobility Scorecard	Impact on Congestion Management	Impact on Improving Mobility Choices	Impact on Enhancing Travel Safety	Impact on Environmental Health	Negative Externalities Risk	Technology Maturity Horizon	Total Score
Shared Micromobility	1	4	2	2	3	4	**16**
Demand Responsive Microtransit	2	4	1	2	3	4	**16**
Adaptive Traffic Signals	4	0	3	2	3	4	**16**
Mobility Hubs	2	4	0	2	4	4	**16**
Dynamic Curb Management	2	2	2	1	3	4	**14**
Mobility as a Service	2	3	0	2	4	2	**13**
Alternative Delivery Modes	2	0	2	3	3	2	**12**
Connected/Autonomous Vehicles	2	0	4	2	2	1	**11**
Widescale Vehicle Electrification	0	0	0	4	3	3	**10**
Ride Hail Services	0	4	0	0	0	4	**8**

SHARED MICROMOBILITY

What is it?

Micromobility is a broad term used to describe a class of vehicles that are typically small, lightweight, operate at low speeds (e.g., under 20 miles per hour), and do not have internal combustion engines. Shared micromobility refers to networks of these vehicles shared between multiple users and usually available for short-term rental via docking station or smartphone app. While shared micromobility can describe an array of vehicles, the majority of systems use bicycles, e-bikes, or e-scooters. In the US, docked bikeshare systems have existed for at least a decade; however, smartphone-based dockless e-bikes and e-scooters are much newer, with most systems coming online after 2017. Due to the newness of this portion of the industry, dockless e-bike and e-scooter companies do carry more uncertainty than a city-run docked bikeshare system.

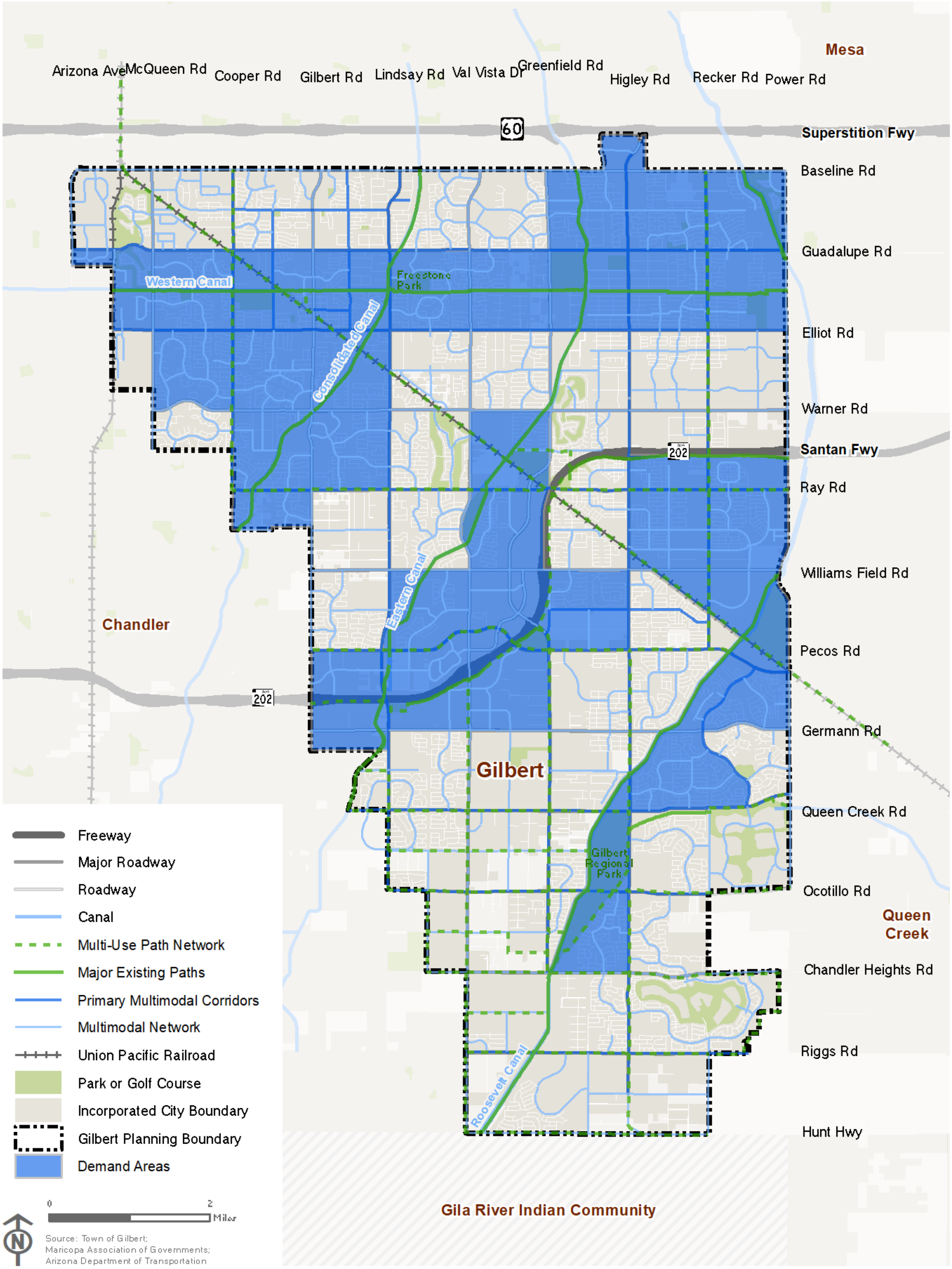
Shared micromobility is not entirely new to Gilbert, however. In 2019, Lime operated shared e-scooters for five months, generating nearly 10,000 trips throughout the pilot. In 2020, Bird began operating a shared e-scooter pilot. Bird paused operations in the spring of 2020 due to COVID-19 but resumed operations in July 2020 and has seen increasingly strong ridership numbers since–regularly averaging around 2,000 trips each month.

How would it benefit Gilbert?

Shared micromobility has the potential to sustainably expand mobility choices for Gilbert residents. If planned and implemented carefully, shared micromobility could offer residents a convenient and affordable alternative to driving or using a ride-hailing service – especially for shorter trips. However, since shared micromobility is a relatively new form of transportation, the unfamiliarity among users can create additional risks. For example, dockless micromobility systems allow users to park their vehicles flexibly, which makes for a more convenient system, but can also lead to challenges in managing the public realm if vehicles are improperly parked. Considering these challenges ahead of time can enable municipalities to proactively plan for a system that is safe, orderly, and useful to residents. Shared micromobility programs should be coupled with marketing and outreach to educate the public about how to safely use these vehicles and raise awareness among all street users.

To help maximize these potential benefits, a micromobility demand model was developed to identify areas of Gilbert with the highest potential demand for micromobility. This model incorporated known predictive factors, such as population density, employment density, land use, parks, and transit, into a framework tailored to fit Gilbert's unique characteristics. The model highlighted distinct areas with high potential for micromobility demand including the Heritage District, Baseline corridor, the 202 corridor, and the Gateway Village area. Targeting shared micromobility deployments in these areas would maximize potential benefits and serve as an indicator for whether these systems are scalable and sustainable throughout other parts of the Town.

Figure 3. Micromobility Demand Areas



Recommended Actions

If planned effectively, shared micromobility has the potential to support a more robust and equitable transportation system in Gilbert by providing additional transportation choices to residents, workers, and visitors. Gilbert's micromobility pilot program has demonstrated an interest and demand for these services.

Transition to a Permanent Program

Transitioning from a pilot to permanent program would give operators more long-term certainty about operations in Gilbert and enable additional investment by operators, including increasing the number of devices available and installing supportive parking and charging infrastructure.

Additional recommendation: Consider expanding the program to allow for shared e-bikes as well and develop policies and rules that encourage and/or incentivize both scooters and e-bikes.

Steps for developing a permanent micromobility program:

Step 1: Establish and document program goals. Specific goals and objectives lead to better rules and improves the process of evaluating outcomes. Consider that just because a private company is offering to sell shared micromobility service does not automatically mean there is a public or mobility benefit to allowing that service.

Step 2: Consider a wholistic, multi-device micromobility network. Different devices have different benefits and constraints and not every device type offers the same mobility benefits across different municipalities. A successful program is built by completing a process that determines which devices are appropriate for the specific context.

Step 3: Streamline access and reduce barriers. A key path to improving mobility is streamlining user access to multiple modes. Too many separate apps, accounts and payment points required to access mobility services can lower the overall benefit to residents.

Step 4: Determine the appropriate program mechanism.

- **Option 1. Develop a business license:** Under this model, the municipality has more limited control over service and outcomes and accepts the possibility that no company will be interested in securing a license to operate.
- **Option 2. Public/private partnership:** Under this model, the municipality typically has decided it is important that shared micromobility service is offered to residents and may bear administrative or financial costs to help ensure desired level of service and outcomes.

Recommended program rules:

Operating regulations

- **Device speeds:** Maintain current speed limits (15 mph), including slow zones (10 mph) in dense pedestrian areas.
- **Device parking:** Replace large no-parking zones with specific zones and/or corrals where devices must be parked; consider parking zones and/or corrals in high-demand areas, including Downtown, Freestone Park, Civic Center/Town Square, and Santan Village Area. Related costs may be covered by the Town, by operators or shared. *(See examples in next section.)*
- **User regulations:** Consider age restrictions. Many municipalities require riders be at least 16 or 18 years old.

Permitted areas of operation:

- Allow devices within bike lanes.
- More closely align shared micromobility regulations with existing bicycle regulations to help reduce confusion.
- Work with companies to ensure devices are displaying correct information. Many municipalities ban sidewalk riding, and so many companies may bring in devices that have default no-sidewalk-riding information, which could be confusing for riders in Gilbert.
- Maintain town-wide operations.
- Work with SRP, RWCD, and other similar agencies to develop new rules that allow low-speed electric motorized devices to operate on canal trails. For reference, a new 2020 Bureau of Land Management rule now allows e-bikes on trails if a BLM Manager has issued a written decision authorizing e-bike use in accordance with applicable laws and regulations.
- Consider updating rules to better clarify operational requirements that some riders might find impractical such as: "To cross any prohibited location, bicycle lane, intersection, crosswalk, railroad track or other prohibited location the operator of a micromobility device shall dismount the micromobility device and walk the micromobility device across said areas."

Program size (number of devices):

- Permit each company to deploy a small initial number of devices (100-200) and create a process by which companies can request to deploy more devices if they show compliance with Town rules and demand for the devices. Current daily device deployments are low, and the Town should be able to comfortably accommodate more parked devices if managed properly.
- Consider whether it is necessary to cap the total number of devices in certain areas, such as downtown.
- Consider whether to set a minimum number of devices that must be deployed to help ensure a basic level of service is being offered. Chandler requires vendors maintain a minimum fleet size of 75 devices and Tucson requires a minimum fleet of 100 devices. This rule should be set carefully so as to avoid too many devices sitting unused. Setting a minimum device rule should be considered a potential additional cost for operators and may impact operator interest and ability to bear other costs (financial or otherwise)–as a result, operators may expect greater public partnership and cost sharing.
- Consider identifying specific geographies in the Town where devices must be available and set a minimum number of devices that should be available in these areas. These could be areas where people have a greater need for additional transportation choices, areas with potential for higher demand (see Figure 3), or both. Setting device distribution rules should be considered a potential additional cost for operators and may impact operator interest and ability to bear other costs (financial or otherwise)–as a result, operators may expect greater public partnership and cost sharing.
- Reconsider rule limiting maximum 2 devices at bus stops. As long as companies adhere to rules keeping devices from blocking bus access, bus stops are locations where higher demand for complimentary mobility services might be expected to be higher, and therefore, opportunities to meet this higher demand should not be strictly limited.

Vendor regulations

- Consider capping the number of companies allowed to operate in the Town. Fewer companies operating larger fleets can lead to operational and service efficiencies, can reduce oversaturation of devices, and can lead to reduced administrative costs. At least one major shared scooter provider has recently transitioned to a policy of not operating in municipalities that allow an unlimited number of providers.

- Consider specifying how often devices are inspected (instead of “regular device inspection”). For instance, the Town may consider that each device be tested and inspected at least once every 7 days.
- Add requirement that companies make available real-time and archival data through MDS and GBFS feeds. Securing access to vendors’ MDS feeds would enable Gilbert to engage with a third-party monitoring service in the future if needed.

Establish Program Fees

Municipalities typically collect four types of fees (collecting either one type or multiple types), and each fee type has distinct advantages and outcomes:

One-Time Application Fee: Can be set to cover the municipality’s administrative costs of setting up and processing applications. Limiting the cost of this fee can help attract more potential operators.

Annual Permit Fee: Can be set to cover administrative costs of oversight of a program for one year. This fee can also be set to help fund related infrastructure upgrades. Limiting the level of this fee can help attract more potential operators. Setting a higher fee can help raise more money for infrastructure improvements or cover more administrative costs.

Per-Ride Fee: Can be set to cover administrative costs and/or infrastructure upgrades. This fee may be more attractive to potential operators because it spreads costs out over a longer period of time and scales up as they sell more rides. The risk of this fee structure comes from an outcome where ridership is low, but administrative effort is still needed to regulate deployed and parked (but unused) devices. The benefit of this fee structure is that the municipality enjoys a financial benefit as the service sees higher ridership. Setting this fee too high may result in higher rider costs, depressing ridership.

Per-Device Fee: Can be set to cover administrative costs and/or infrastructure upgrades. This fee can be set as a one-time up-front payment, an annual payment, a quarterly payment, or a monthly payment. Increasing the frequency the fee is calculated may increase administrative costs, but it also allows the process to be more flexible to better meet changing device demand throughout the year. The benefit of this fee structure is that it is aligned with the administrative costs that come with overseeing deployed and parked devices.

Steps for defining fees:

- Define the specific costs the Town is seeking to cover through fees and define the specific outcomes the Town is seeking. A typical fee structure combines an upfront fee to cover basic expected administrative costs along with either a per-ride or per-device fee that raises more revenue as the program grows and/or sees higher ridership.
- Consider that lowering or waving fees may incentivize more operators to offer their service and can be used to negotiate certain offerings or levels of service from operators.
- Consider whether operator subsidies are worth mobility, congestion, and/or environmental benefits that may come from strong shared micromobility service and use. Subsidies also provide a municipality with a stronger position to negotiate with operators on certain offerings or levels of service.

Update Program Requirements

Recommendation: Maintain current speed limits, including slow zones in dense pedestrian areas

Recommendation: Consider removing large no-parking zones in downtown and replacing with specific zones and/or corrals where devices must be parked.

Recommendation: Consider parking zones and/or corrals in high-demand areas, including Downtown, Freestone Park, Civic Center/Town Square, and Santan Village Area. Related costs may be covered by the Town, by operators or shared. *(See examples in next section.)*

Recommendation: Consider capping the number of companies allowed to operate in the Town. Fewer companies operating larger fleets can lead to operational and service efficiencies, can reduce oversaturation of devices, and can lead to reduced administrative costs. At least one major shared scooter provider has recently transitioned to a policy of not operating in municipalities that allow an unlimited number of providers.

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Recommendation: Consider updating rules to better clarify operational requirements that some riders might find impractical such as: "To cross any prohibited location, bicycle lane, intersection, crosswalk, railroad track or other prohibited location the operator of a micromobility device shall dismount the micromobility device and walk the micromobility device across said areas."

Recommendation: Add requirement that companies make available real-time and archival data through MDS and GBFS feeds. Securing access to vendors' MDS feeds would enable Gilbert to engage with a third-party monitoring service in the future if needed.

Recommendation: Consider age restrictions. Many municipalities require riders be at least 16 or 18 years old. Eight out of twelve peer communities examined include a minimum age for users, typically either 16 or 18.

Shared Micromobility Parking Plan

Clear, orderly parking for shared micromobility vehicles is critical for a successful program. Without sufficient parking, vehicles can end up blocking sidewalks and causing hazards for other streets users. There are two key components to encourage good parking behavior for shared micromobility users:

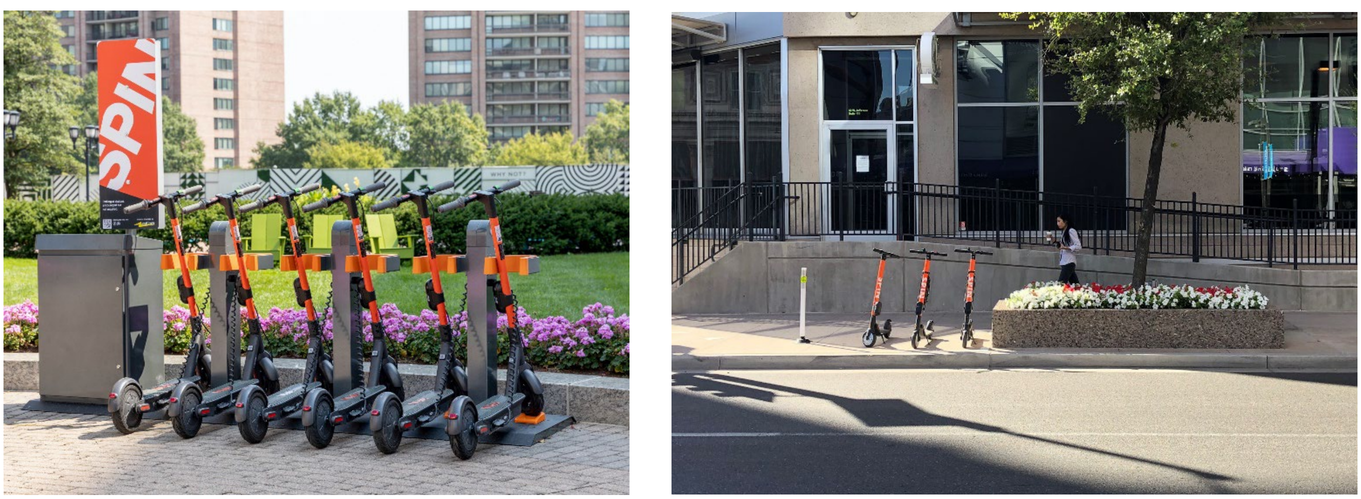
1. Working with vendors and structuring program requirements so that parking is easy and clear for users and does not negatively impact other street users.
2. Provide sufficient high-quality public bike parking for people biking and shared micromobility users.

Vendor Coordination and Program Requirements for Parking

Gilbert should work with shared micromobility vendors to install designated shared micromobility parking zones in the Heritage District and future high-density micromobility locations. Parking zones can take the form of formal stations or charging hubs or relatively inexpensive, simple-to-install painted parking zones. Implementing designated parking zones will require altering the program's current requirements, which state that no more than four devices be parked together. Gilbert should work with vendors to implement the following standards.

- 1.2 designated parking spaces should be available for every 1 vehicle expected to be in service.
- Painted parking zones should be marked with paint, flexible delineators (particularly if located at street-level), and signage. Parking zones can be located within the furniture zone of sidewalks, park areas, surface parking lots, and/or on-street parking spaces.
- Encourage vendors to install charging hubs in high-usage areas to minimize need for vendors to pick up scooters for charging, which creates additional emissions and vehicle traffic.

Figure 4. Shared Micromobility Parking Examples



Formal scooter parking hub (right: Spin), informal scooter parking in Phoenix (right: Sam Schwartz Consulting)

Figure 5. Conceptual Shared Micromobility Parking Zone in Gilbert's Heritage District

In addition to working with vendors to install more designated parking for shared micromobility, Gilbert should also require shared micromobility vendors to encourage proper parking from users by implementing various technology solutions, such as:

- Requiring users to submit a photo of the parked vehicle to end their trip (and vendor verifying proper parking),
- Requiring users to lock the vehicle to a fixed object to end a trip,
- Implementing geofencing to require (or incentivize) users to park vehicles in designated locations, or
- Sending warnings and/or issuing small fines to users for improper parking.

Public Bike and Micromobility Parking

Plentiful, easy-to-find public bike parking can also help make parking easier for users of shared micromobility vehicles and is an important amenity for people biking as well. Convenient parking will help cyclists and users of micromobility have a better end-to-end trip experience and encourage increased use. Gilbert should take the following actions and update the Town's bike parking regulations to reflect the follow best practice standards[i].

- Distinguish between short-term and long-term parking for residential, civic, and commercial land uses. Short-term parking should be located within 50 feet of a main entrance of the building and be easily visible from the street. Long-term parking can be within 50 ft of any functional entrances.
- Bicycle racks should be able to support bicycles in two places to avoid falling over and allow for the frame and at least one wheel to be locked with a U-lock.
- Remove the maximum bicycle parking requirement for new developments (currently 100 spaces).
- Assess public bicycle parking availability in parks, along trails, parking garages and other public spaces to determine if adequate and convenient parking options are provided. Install additional parking where needed.
- Emphasize compliance with bicycle parking requirements during development review.
- Recommended minimum parking requirements for both short and long-term parking are detailed below.

Table 1 Recommended Minimum Bike Parking Requirements

Land Use	Long-term parking requirement	Short-term parking requirement
Multifamily residential	.05 spaces for each bedroom	.05 spaces for each bedroom
Retail	1 space for every 12,000 sqft	1 space for every 5,000 sqft
Office	1 space for every 10,000 sqft	1 space for every 20,000 sqft
Civic/Cultural/Health	1 space for every 20 employees	1 space for every 15,000 sqft
Educational	1 space for every 10 employees	1 space for every 20 students of planned capacity (10 students for colleges)
Industrial	1 space for every 15,000 sqft	N/A
	Minimum for any land use is 2 spaces	

MOBILITY HUBS

What is it?

Mobility hubs are places where multiple modes of transportation are co-located to enable seamless connections from one mode of transportation to another. While mobility hubs often center around transit, providing a variety of convenient and accessible modes of transportation is critical to success. Walking is a feature of nearly all multimodal trips, so prioritizing pedestrians and designing a vibrant public space is imperative for a successful mobility hub. Additionally, mobility hubs can play a key role in communicating information across a transportation network. Real-time transit information, network maps and even information kiosks can help people navigate the system and improve user experience. In addition to information, providing services like bicycle repair stations, electric vehicle charging, and package lockers can further support an array of transportation modes and use cases.

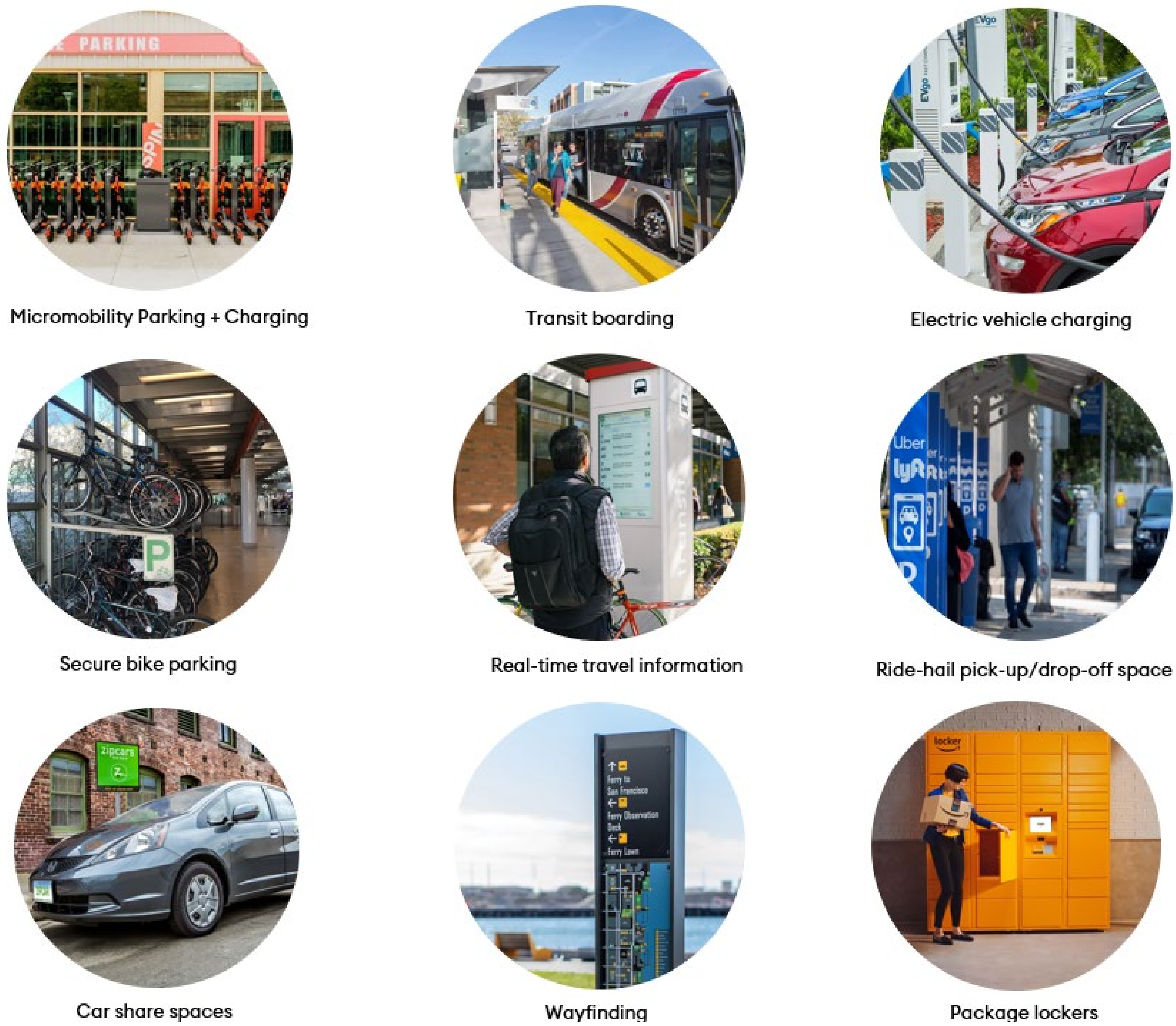
Figure 6. Mobility Hub in Long Beach, CA[ii]

Mobility hubs operate best when designed as a system, as each node strengthens the entire network. And while mobility hubs can and should vary in their size and function to match a particular context, maintaining consistent design principles and branding across a system is key to overall success. Ultimately, a well-designed system of mobility hubs can serve as the backbone of a multimodal transportation network and improve mobility choice and quality of life for all residents.[iii]

How would it benefit Gilbert?

Building a robust multimodal transportation network in Gilbert will depend heavily on connecting current and future transit stations to Gilbert's existing network of paths and trails and making a range of mobility options conveniently available at key destinations. Mobility hubs offer a framework for well-designed places that can enable easier transportation connections. Thoughtfully designed mobility hubs could help Gilbert build upon its existing active transportation infrastructure by supporting these trips and encouraging new modes of travel. Secure bicycle parking, repair stations and tire pumps all support active transportation; however, locating hubs near transit, providing transit information, and maintaining branding consistent with transit would also promote linked trips across multiple modes. Additionally, incorporating infrastructure for shared micromobility, personal electric bikes and scooters, reserved parking spots for car share vehicles, electric vehicle charging, and pick-up/drop-off zones for ride-hailing would further encourage trips across modes.

Figure 7. Example Mobility Hub Elements and Amenities



Case Studies

MovePGH is a partnership between several organizations in Pittsburgh, PA, known as the Pittsburgh Mobility Collective, that aims to provide Pittsburghers a wider variety of convenient and affordable transportation options. Central to MovePGH is a series of consistently branded mobility hubs that integrate with a mobile platform where users can plan and book trips across different services. These mobility hubs provide real-time information and are strategically located near transit and other forms of shared mobility to help users connect between modes. While MovePGH incorporates cutting edge technology into its mobile platform, the mobility hubs operate as the backbone of the system. With each mobility hub branded with a recognizable MovePGH logo, users can quickly identify where hubs are located and confidently expect a menu of mobility options at each hub. MovePGH plans to grow to 50 mobility hubs spread across the city in the coming years. Figure 8 showcases a smaller scale MovePGH mobility hub.

Figure 8. MovePGH Mobility Hub[iv]

Recommended Actions

In order to maximize the potential benefit of mobility hubs, Gilbert should:

- Develop a mobility hub program and implementation plan (including a mobility hub typology, siting criteria, inventory of potential locations, priority locations and phasing, and financing strategy). Engage with the community, landowners, and developers to identify key amenities and opportunities to leverage mobility hubs as community assets.
- Evaluate opportunities to incorporate or incentivize mobility hub concepts into zoning requirements in appropriate areas.
- Develop partnerships with private mobility providers (e.g., shared micromobility providers, micromobility parking and charging solutions, car share companies, vehicle charging infrastructure, transportation information companies, and others) to integrate amenities and services into mobility hubs and explore financing opportunities.
- Coordinate with Valley Metro and MAG to identify opportunities for collaboration and funding. Begin early planning to incorporate mobility hubs into future transit projects.

MICROTRANSIT

What is it?

Microtransit is a type of public transportation which includes demand responsive scheduling, flexible routes, and a variety of vehicle sizes. When effectively implemented, microtransit allows agencies to provide a high level of service in areas where fixed-route transit is difficult to operate. Because of this, microtransit can enable cities to expand their traditional transit network to serve new areas and demographics with limited transportation options.

In recent years, microtransit has become increasingly prevalent as new technology has enabled more cost-effective and reliable operations. Mobile platforms, often rolled out through private partnerships, can include features like on-demand booking, real-time dynamic routing, and transit fare payment integration. The result is a nimble and adaptable extension of a transit system that can strengthen existing networks and reach entirely new riders. Additionally, the opportunity for on-demand routes and accessible vehicles makes microtransit an excellent option in supporting transportation accessibility for all.

While many communities and transit agencies are piloting microtransit services, challenges to scaling these programs still exist–particularly deploying enough vehicles to ensure acceptable user wait times without increasing the cost per rider beyond acceptable levels.

Figure 9. Accessible van in LA's Metro Micro on-demand transit fleet[v]

How would it benefit Gilbert?

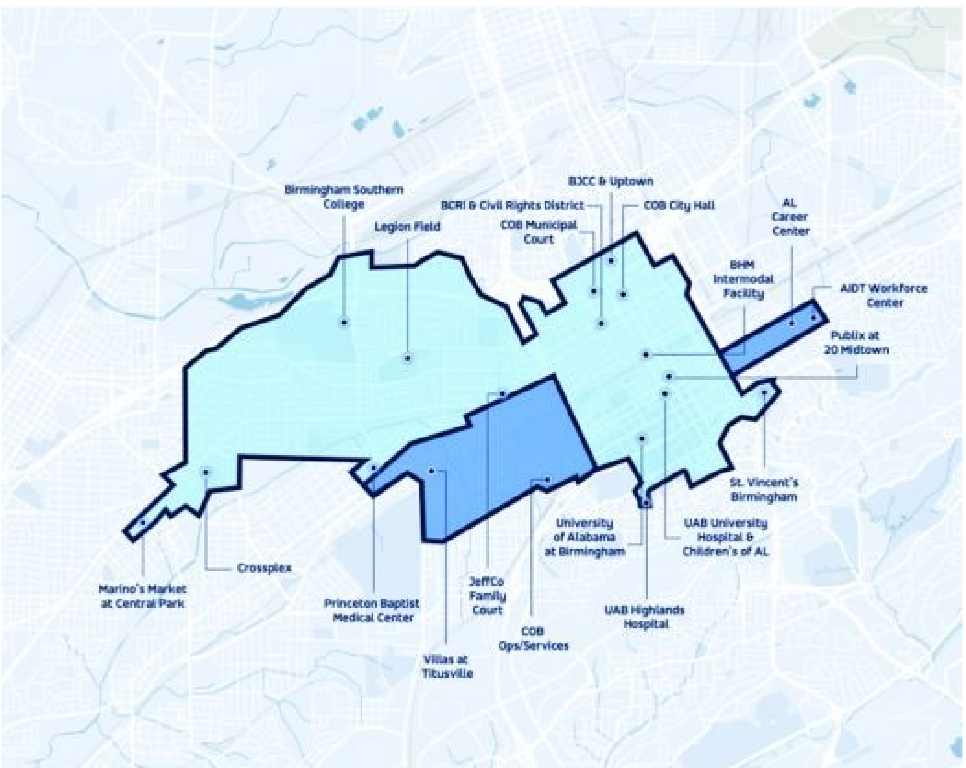
Microtransit can serve a variety of needs but is most effective when used as a complimentary tool to existing fixed-route transit, extending transit's reach into new areas, serving lower density areas, and/or providing first/last mile connections. Microtransit could enable Gilbert to reach a much wider variety of transit riders efficiently, while supporting the fixed route transit infrastructure already in place.

Areas identified in the micromobility demand analysis (see Figure 3) are excellent candidates to incorporate microtransit, as they have existing transit networks and characteristics which support multimodal transportation, including denser concentrations of people, jobs, and other key destinations. Additionally, a fleet of accessible microtransit vehicles would further benefit areas with a high proportion of riders with accessibility needs, such as hospitals. Strategically incorporating microtransit into defined areas in the city would immediately expand mobility choice to a wide variety of people, while supporting existing transit infrastructure through efficient first/last mile connections.

Case Studies

Via is a mobility company that specializes in using technology to enhance transit systems. The company has partnered with several cities to pilot a variety of on-demand transit services all aimed at building a more effective and inclusive transit system. This has been the case in Birmingham, AL, where Via partnered with the city to launch a pilot microtransit service in December 2019. The pilot launched as a 6.7 square miles service zone designed to connect residents between key destinations like the University of Alabama Birmingham, intermodal transportation hubs and large grocery stores with several city neighborhoods.

Figure 10. Birmingham Via Pilot Service Area[vi]



Within the service area, riders can book rides on-demand Monday-Saturday for a flat fee of $1.50. The Brookings institute estimates that Birmingham residents without a vehicle have access to 50 times less jobs within a 40-minute commute than those with a vehicle. As such, this service has become essential in supporting mobility for those without reliable access to a car, with over 40% of riders earning less than $25,000 annually and nearly 20% of riders having a long-term mental or physical impairment. Critical to this success was recognizing who the system would best serve and tailoring it to better fit their needs. For example, deploying wheelchair accessible vehicles ensured that those with physical impairments could still access service. Additionally, non-smartphone registration options are available to those without smartphone access and multiple forms of payment are accepted to include those without a bank account. This pilot demonstrates that thoughtfully planned microtransit programs have the power to expand mobility options to many, especially those with limited mobility options.[vii,viii]

Recommended Actions

In order to maximize the potential benefit of microtransit, Gilbert should:

- Perform a microtransit needs assessment to determine where within Gilbert microtransit could deliver the most value to residents, workers, and visitors and enhance Valley Metro service. This assessment should also evaluate which type of microtransit service would best meet Gilbert's needs–such as an on-demand service in a defined coverage area or flexible-route transit with "virtual stops"–potential fare structures, and operating hours. Gilbert should engage key stakeholders, such as large employers, and the community to determine parameters and priorities for a potential microtransit service.
- Develop partnerships with private microtransit providers to begin co-creating the framework for a microtransit pilot.
- Coordinate with Valley Metro, MAG, and potential private partners to identify funding opportunities for a microtransit pilot.

DYNAMIC CURB MANAGEMENT

What is it?

Dynamic curb management is an emerging trend to utilize technology to improve the way municipalities allocate, operate, and manage curbspace. The COVID-19 pandemic highlighted the value and flexibility of a space traditionally just used to park cars, as many cities adapted curbspace for a variety of new uses, such as patios, parklets, and pickup space for restaurants and businesses. Additionally, the COVID-induced boom in food delivery and online retail demonstrated the importance of managing this space efficiently to create a safe operating environment for all street users. New technology, such as app-based bookings and payment and dynamic signage, combined with flexible policy, can help create curbs which change uses to respond to demand in real time.

How would it benefit Gilbert?

Dynamic curb management would provide Gilbert with the tools to inventory, price and allocate curbspace in a flexible manner that aligns with local needs. This approach could result in fewer trucks on the road searching for loading zones, fewer cars circling for parking, and fewer ride-hailing vehicles double parked to pick up or drop off passengers, all while creating more public space for Gilbert residents to enjoy. Reductions in circling vehicles and double parking can also improve traffic safety for both vehicles and people walking and biking. Implementing dynamic curb management practices and tools would be especially valuable in an area like the Heritage District, where there is significant competition for curb space between deliveries, passenger loading and unloading, cars looking for parking, and the Town's goals to create a walkable, vibrant district.

Dynamic curb management would help to more efficiently utilize this space, improving functionality for businesses and visitors while also supporting a safe and aesthetically pleasing public realm. Additionally, dynamically managed curbs allow for the ability to flexibly change uses in real-time, ideal for managing deliveries and parking for events. Overall, leveraging technology to proactively manage curb space could help Gilbert improve traffic flow and safety, while improving delivery reliability and enhancing the public realm.

Case Studies

In 2020, Aspen, CO partnered with Coord to launch a smart zone pilot program aimed at more efficiently managing downtown curbspace for commercial loading. Launched in late 2020, the city converted 7 curbside spaces and 4 alleyways into Smart Zones. These Smart Zones are available for $2/hour and integrate with the Coord Driver mobile app, allowing commercial delivery drivers to seamlessly, locate, book, and pay for loading space. The pilot program was widely adopted by local delivery fleets and saw impressive results, particularly during peak hours. In part due to the hourly rate for smart zones, passenger pick up and drop off vehicles spent 80-90% less time in smart zones than in standard loading zones. Further, having clear messaging and rules about where loading vehicle can and cannot park reduced the instances of illegally parked and double-parked vehicles. Smart zone sites were also found to have a reduction in conflicts between vehicles and pedestrians/cyclists. Aspen has since extended the pilot and expanded Smart Zones by 45%. Additionally, the City of Aspen and Coord developed a few best practices for other cities looking to implement smart zones:

1. Outreach and enforcement are key
2. Use existing loading space
3. Create a critical mass of Smart Zones

Ultimately, the biggest challenge was ensuring enough outreach was done to bring delivery drivers on board and using the system. They also found launching enough Smart Zones in existing popular loading spaces to develop a "critical mass" of zones was helpful in encouraging drivers to adopt the system. After signing up, drivers tended to use the system and gave generally positive feedback about the reliability and clarity that the system provided.

Figure 11. Smart loading zone sign from Aspen pilot[ix]

Recommended Actions

In order to maximize the potential benefit of dynamic curbs, Gilbert should:

- Evaluate the impact of ride-hailing passenger loading zones installed in the Heritage District and, depending on results, identify additional areas with high level of ride-hailing activity for potential passenger loading zones.
- Digitize curb regulations and uses within the Heritage District.
- Engage local business leaders to identify current and future areas with high demand for commercial loading zones and curb management challenges.
- Align curb management policies and processes with guidance regarding flex zones in Gilbert's Street Typologies.
- Work with the community and businesses to develop an overall approach for allocating curbspace within the Heritage District.
- Develop partnerships with curb management technology providers to explore a potential pilot program for a technology-driven curb management solution.

ADAPTIVE TRAFFIC SIGNALS

What is it?

Adaptive signals include a variety of traffic signal technologies designed to make intersections safer and more efficient. In general, adaptive signals use various types of sensors to gather traffic data and optimize signals in real time. Examples of adaptive signals extend across modes and can improve safety and travel time for private vehicles, bicycles, and buses. For motor vehicles, Adaptive Signal Control Technology (ASCT), which uses sensors to continuously adjust signal timing to optimize for changing traffic conditions, is commonly used. This technology is shown to improve traffic flow, travel time reliability and safety across road networks. Additionally, it has been shown to reduce wear and tear on roadways and vehicle emissions as more efficient intersections decrease idling vehicles.

Adaptive signal technologies can also include more deliberate safety features for both motor vehicles and active modes. For example, Rest-in-Red Operations is an adaptive signal technology specifically designed to curb motor vehicle speeds.[x] As the name indicates, these signals rest on red lights when no traffic is detected, and only give vehicles green lights when traveling below a set speed threshold. Further, adaptive signal technology can be designed specifically for bicycle safety as well. Bike Detection Technology can differentiate between bicycles and motor vehicles to enable intersection safety features tailored specifically for bicycles.[xi] This can vary from a green light indicating bikes are in the intersection to signal timing adapted for bicycle safety. Overall, adaptive signal technologies offer a suite of tools to improve intersection function and safety across a variety of road and intersection types.[xii]

Gilbert is already working to incorporate adaptive traffic signals at key intersections in the San Tan Village Mall area and to install the necessary infrastructure to enable this technology.

How would it benefit Gilbert?

Implementing a variety of adaptive signal technologies could be beneficial for Gilbert. Along highly trafficked arterial roads, ASCT has the potential to reduce travel times while also improving safety along key corridors. In particular, this technology has the power to dramatically improve conditions for roads with highly variable traffic.

Implementing adaptive traffic controls with specific safety goals could also improve travel time and safety along target corridors. Namely, adding bike detection technology at intersections with high bicycle-vehicle interactions would improve safety conditions for cyclists, as well as pedestrians and motor vehicles. Adopting this technology at key intersections within the identified micromobility demand areas would both improve safety for existing users and help to further support new micromobility users.

Case Studies

Bell Road is a long, heavily trafficked arterial corridor north of Phoenix that extends across several municipalities in the Phoenix metropolitan area. The corridor is operated by seven separate agencies, compounding the challenges of managing a high-volume arterial road. To address this, the cities of Surprise, Peoria, Glendale, Phoenix and Scottsdale have been working alongside the Maricopa County Department of Transportation (MCDOT) and the Arizona Department of Transportation (ADOT) through the AZTech Regional Partnership to develop potential solutions to reduce congestion and improve safety and travel time along the corridor. Due to the highly variable traffic conditions, induced by rapid growth of the Phoenix metropolitan area and seasonal differences, the partnership chose to explore adaptive signal control technology to actively maintain optimal signal timing along the corridor. In 2018, a pilot program testing the technology was implemented along three separate stretches of the corridor.

Preliminary analysis showed an average reduction in travel time of 16%, with some pilot areas showing travel time reductions as high as 51%. While the pilot achieved the primary goal of improving travel time along the corridor, it was not without lessons. In developing an RFP for these systems, they recommend procuring detection hardware and software in tandem, working with the software vendor to determine the best detection configuration. Additionally, strong regional leadership and collaboration was critical to success. If Gilbert were to implement adaptive signals along an entire corridor, involving all relevant municipalities and agencies would be critical to success. [xiii]

Recommended Actions

In order to maximize the potential benefits of adaptive signal technology, Gilbert should:

- Install adaptive signal technology at key intersections, corridors, and areas such as the San Tan Village Mall area.
- Implement advanced detection safety improvements at intersections with significant crash history.
- Continue building out the Town's fiber optic network along arterial roads.
- Upgrade existing traffic signal cameras to enable video detection capabilities.
- Measure and evaluate the impact of newly installed adaptive traffic signals to inform future investments.
- Identify additional high-priority corridors and intersections for adaptive signal control technology through a combination based on traffic operations and safety.
- Collaborate with neighboring municipalities (e.g., Chandler, Mesa), regional agencies (e.g., ADOT and MCDOT), and the AZTech Regional Partnership to identify adaptive signal projects that could be of regional significance.

ADDITIONAL STRATEGIES

While vehicle electrification and connected and autonomous vehicles did not score highly on the assessment using Gilbert's emerging mobility scorecard, both these trends have a high potential to impact Gilbert even without direct action from the Town. Gilbert must plan and prepare for this future to ensure these emerging technologies provide the highest benefits possible while mitigating negative externalities.

Vehicle Electrification

Broadly speaking, vehicle electrification is the transition from fuel-powered internal combustion vehicles to those powered by electricity. This trend has a tremendous number of benefits, including the reduction in carbon dioxide emissions, a near elimination of localized vehicle pollutants and a significant reduction to vehicle noise pollution. Preparing for the transition to electric vehicles involves a combination of developing infrastructure to support private electric vehicles (EVs), such as charging stations and grid upgrades, prioritizing the electrification of public vehicles, and updating policies and regulations to encourage the provision of electric vehicle charging and uptake of electric vehicles.

In order to maximize the potential benefit of vehicle electrification, Gilbert should:

- Update Gilbert's Land Development Code to require and/or incentivize installation of electric vehicle charging stations in new developments, aside from in single family residential districts. Require parking facilities for new developments to be wired for future installation of electric vehicle charging stations.
- Inventory town-owned parking garages and lots for opportunities to install electric vehicle charging stations.
- Work with electric utility companies to identify priority locations for electric vehicle charging stations.
- Assess opportunities to procure electric vehicles for the Town's vehicle fleet.
- Collaborate with Valley Metro to transition to battery electric buses.

Connected and Autonomous Vehicles

Connected and autonomous vehicles describe two separate emerging technologies which are anticipated to have a complimentary effect when implemented together. Autonomous vehicles are broadly defined as vehicles capable of sensing their environments and making real-time operational decisions without human support. Currently, the Society of Automotive Engineers has defined 6 levels of automation, ranging from 0 (no automation) to 5 (full automation), with a variety of partially automated features in between. It should be noted only the highest level of vehicle automation can operate entirely without human interaction. While autonomous vehicles can use sensors to make decisions about their environment, connected vehicles are able to communicate with other vehicles, traffic signals or external sources to receive real-time information. When combined with automation, vehicles could receive external information and make automated operational decisions in real-time to improve overall traffic safety and efficiency.

Connected and autonomous vehicles could lead to a variety of potential impacts, depending on the level of vehicle autonomy and the structure of vehicle rollout. Increased autonomy in vehicles, combined with vehicle-to-vehicle communication between connected vehicles, could lead to safety improvements, as the vast majority of fatalities in vehicles are due to human error; however, there are still many unknown questions regarding the safety of autonomous vehicles in unpredictable environments and interactions with people walking and biking.

Beyond safety, autonomous vehicles could provide a path towards reduced vehicle ownership and subsequent decreased demand for parking. Since cars can spend well over 90% of their useful life parked, many speculate that fully connected and autonomous vehicles could spur a world where fewer cars can more efficiently serve our transportation needs. This scenario would entail a decrease in private vehicle ownership and a growth in fleets of autonomous vehicles, resulting in far less space required for parking. Alternatively, if autonomous vehicle ownership follows the current ownership model where people purchase and operate their own private vehicles, this technology has the potential to increase vehicle miles traveled (VMT) and congestion by significantly reducing the cost of driving. Connected and autonomous vehicles offer a range of benefits and risks to consider. However, there are still many unknowns about the technology, and it should be monitored accordingly.

In order to maximize the potential benefit of connected and autonomous vehicles, Gilbert should:

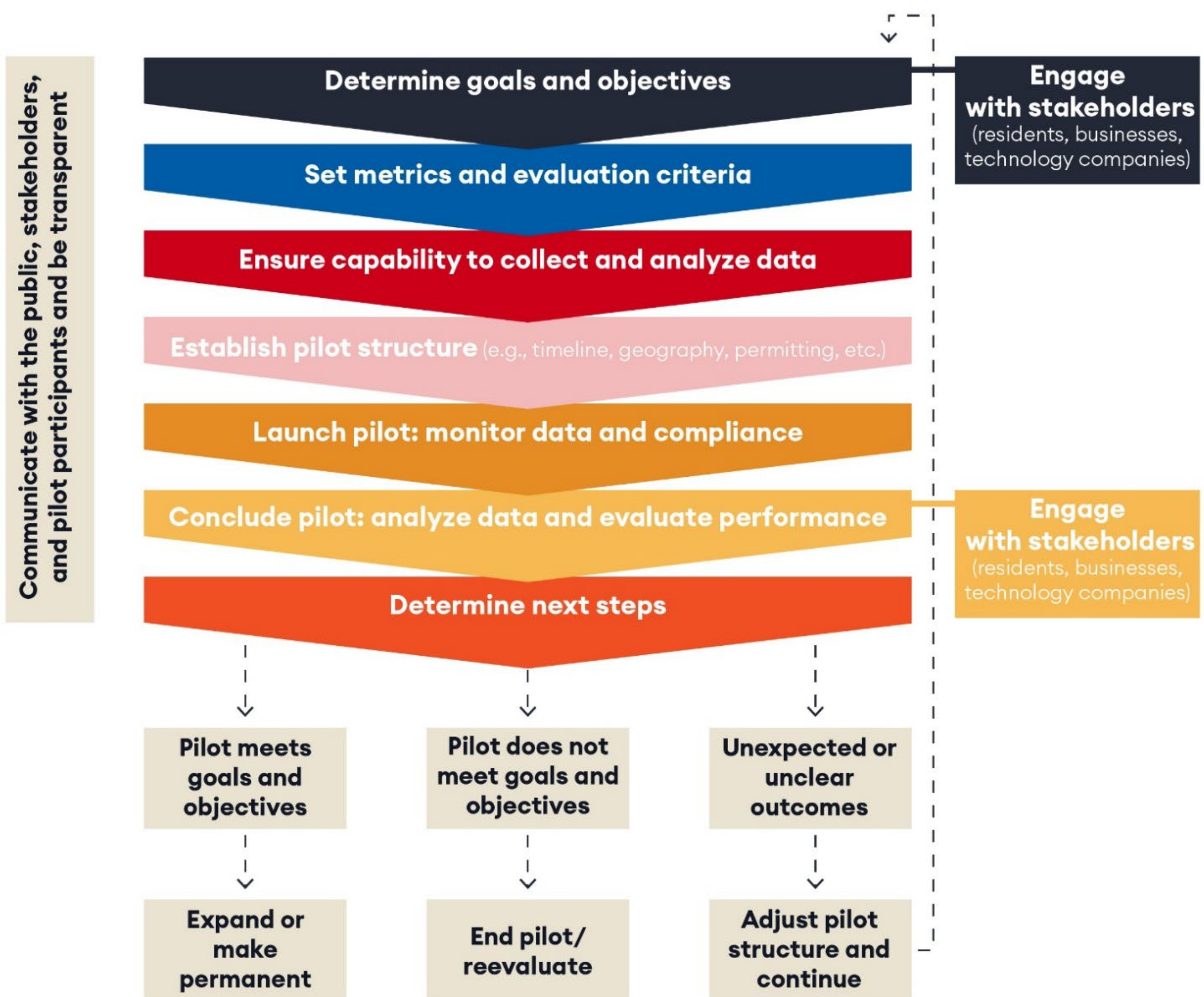
- Establish a staff working group focused on monitoring developments in connected and autonomous vehicles. Develop scenario-based plans, infrastructure, and policy responses, for various levels of vehicle automation, different ownership models, and varying uptake scenarios.
- Coordinate with MAG, MCDOT and ADOT to explore opportunities for collaborative planning for the potential regional impact of connected and autonomous vehicles.
- Continue building out the Town's fiber optic network along arterial roads and deploying necessary communication infrastructure to enable connected vehicles and connected infrastructure.

WHERE TO GO NEXT?

Emerging mobility technology is constantly evolving, along new business models and changing user preferences and behaviors. Amidst this constant evolution, Gilbert must consistently refer back to the Town's broader goals when evaluating next steps for emerging mobility strategies. Innovation is necessary, but innovation for innovation's sake presents risks. The new technology with the most attention and hype may not be the strategy that best helps Gilbert reach its goals, and it's essential to carefully and constantly evaluate new opportunities against the framework of the Town's goals (embedded in the emerging mobility scorecard). There is always an opportunity cost to perusing innovation, and it's important to weigh the tradeoffs of sacrificing resources dedicated to strategies known to work for strategies with many unknowns.

Of course, it is not always clear how an emerging mobility strategy may help the Town meet its goals. In this situation, pilot programs may be recommended to test the technology or strategy within the context of the Town. Doing so can allow policymakers to measure impacts from the new technology and gauge public reaction. Pilots should always be grounded by concrete questions and hypotheses that can be answered with data and feedback, and it's critical to ensure pilot partners are required to share useful data with the Town.[xiv]

Figure 12. Pilot execution and evaluation process



Positioning Gilbert to Leverage Emerging Mobility

For Gilbert to fully leverage the potential benefits of emerging mobility technologies, the Town will need to develop new skills and capabilities amongst its staff and update processes to enable greater flexibility, experimentation, and fast decision making.

Capabilities

- Develop capabilities and invest in systems to collect and analyze data from emerging mobility technologies to inform decision making.
- Build staff capacity around developing and managing public-private partnerships and technology pilot programs.
- Invest in robust marketing and outreach initiatives to accompany the deployment or pilot testing of any emerging mobility technologies.

Partnerships

- Work with surrounding municipalities and regional entities to establish an emerging mobility working group to monitor technology developments, track relevant changes to state and federal legislation, and develop regional policy frameworks.
- Conduct stakeholder mapping exercise to inventory additional partners across the region, including technology companies, private mobility providers, community groups, universities, and non-profits.
- Actively build relationships with local technology companies and private mobility providers to explore opportunities for integrating new technologies in Gilbert.
- Cultivate relationships with universities and non-profits to supplement the Town's capacity to track, monitor, and analyze data and for potential funding opportunities.
- Work with local community groups to deliver information on emerging mobility technologies being piloted or deployed to hard-to-reach groups, such as older adults and non-native English speakers.

Regulations and Processes

- Adopt an emerging technology demonstration policy to enable rapid testing and deployment of new technologies.
- Examine the Town's procurement processes to identify barriers to public-private partnerships and implementing emerging technologies.
- Evaluate data privacy standards and ensure all data collected by companies and shared with Gilbert protects residents' privacy.

Sources:

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[x] City of Albuquerque. 2021. Rest-in-Red Feasibility Study.

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[xii] US Department of Transportation. Adaptive Signal Control Technologies.

[xiii] National Operations Center of Excellence. 2020. Bell Road Adaptive Signal Control Technology Pilot Deployment Program.

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