CHANGE FOR THE METER

Exploring the Equity Implications of Market-Priced Parking

A comprehensive project
submitted in partial satisfaction
of the requirements for the degree
Master of Urban and Regional Planning

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16. Abstract

As California aims to curb its transportation-related greenhouse gas emissions, policymakers and planners are implementing strategies to disincentivize single occupancy vehicle (SOV) use. Kounkuey Design Initiative (KDI) is a global non-profit organization specializing in community development and design. KDI was interested in understanding the most gender and racially-equitable approaches to disincentivize driving, given Los Angeles' dispersed development pattern and decentralized job centers.

This capstone research project aims to better understand whether one proposed method of reducing SOV use—pricing parking—disproportionately affects people of color and female and gender minority drivers. The project uses a mixed-methods approach, beginning with a review of relevant academic literature to understand travel behavior, the theory behind pricing parking, and the equity implications of raising transportation costs. The research design also includes an analysis of the USC Understanding America Study (UAS) Survey 379, field observations, and an in-person survey in Hollywood. The small sample size limits the generalizability of the Hollywood findings. However, the survey is helpful in better understanding the variety of people's parking preferences and responsiveness to potential parking-related policies. Finally, the project uses case studies to identify other cities' strategies to price parking to meet their community needs.

Each methodological approach used in this report works together to build a more comprehensive understanding of parking behavior and preferences in Los Angeles. The findings reveal that parking preferences and experiences vary by race and gender. This report includes seven policy and planning recommendations that could redistribute the benefits of market-priced parking.

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Disclaimers

This report was prepared in partial fulfillment of the requirements for the Master in Urban and Regional Planning degree in the Department of Urban Planning at the University of California, Los Angeles. It was prepared at the direction of the Department and of Kounkuey Design Initiative as a planning client. The views expressed herein are those of the authors and not necessarily those of the Department, the UCLA Luskin School of Public Affairs, UCLA as a whole, or the client.

The project described in this paper relies on data from a survey administered by the Understanding America Study, which is maintained by the Center for Economic and Social Research (CESR) at the University of Southern California. The content of this paper is solely the responsibility of the author and does not necessarily represent the official views of USC or UAS.

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

FIGURES

TABLES

1 Vehicular Travel Downtown, *Source: Pexels*

EXECUTIVE SUMMARY

As the United States aims to curb its transportation-related greenhouse gas (GHG) emissions, policymakers and planners are implementing strategies to disincentivize the overuse of private vehicles. Most of these strategies involve adjusting the price of vehicular use to capture the actual environmental costs. Fewer strategies focus on other amenities incentivizing vehicular use, such as abundant free parking. This research study explores the equity implications of market-priced parking in Los Angeles and offers recommendations to address potential disparities through adjustments to parking policies and the planning process.

To do so, I use a mixed-methods approach, beginning with a review of relevant academic literature to understand travel behavior, the theory behind pricing parking, and the equity implications of raising transportation costs. My research design includes an analysis of the USC *Understanding America Study* (UAS) Survey 379, which focuses on the mobility and transportation behavior of Los Angeles (LA) County residents. Next, I focus my research on Hollywood, a neighborhood that implemented variable parking prices in 2018. My research in Hollywood includes observations and an in-person survey. Finally, I use case studies to identify other cities' strategies to price parking to meet their community needs.

Key Findings

- Most Angelenos spend, on average, $0 per month on parking and find private vehicle use relatively inexpensive.
- Women find it more difficult to find parking in their neighborhood than men, with approximately 23% of female UAS 379 respondents stating the process was "difficult" compared to 15% of males.
- The importance of parking-related factors such as proximity to destination changes based on the time of day for women and men.
- More UAS 379 survey respondents who identified as white indicated that it was "easy" to find parking in their neighborhood compared with respondents of color.
- Approximately 44% of observed drivers did not pay for parking.
- Community members are open to the flexible use of parking-generated revenue, and other cities have set a precedent for using funds to redistribute the benefits and burdens of transportation.

While the findings help paint a clearer picture of parking preferences and behavior in Los Angeles, it is essential to note that communities have unique histories and diverse needs. Unfortunately, historically, transportation planning has taken a one-size-fits-all approach and prioritized the needs of higher-income white communities at the expense of lower-income communities of color. Therefore, I make the following recommendations with the intention and acknowledgment that they will adjust based on direct community engagement and input from community members to avoid continuing this harmful planning approach.

Recommendations

1. Develop a plan for consistent community outreach
2. Implement discounts at parking meters
3. Improve street design and public transportation systems
4. Reconfigure parking policies to accomodate different travel behaviors
5. Establish community task groups in LA Express Park neighborhoods
6. Remove barriers to establish parking benefit districts
7. Further research

2 Aerial View of Hollywood, Source: Pexels

INTRODUCTION

As of 2020, the transportation sector—primarily on-road travel—accounted for 38% of California's total GHG emissions and over half of Los Angeles (LA) County's (*Draft 2045 Climate Action Plan*, 2022). State law requires emissions reductions of at least 40% by 2030 and 85% by 2045. Experts from across sectors have researched and piloted ways to reduce transportation-related emissions. Yet, driving alone remains the primary mode of travel statewide (*Scoping Plan*, 2022). Given the lack of widespread success, jurisdictions need to explore other ways of reducing single occupancy vehicle (SOV) use to meet state climate goals. However, reducing SOV use is more than an urgent climate issue. Pollutants from vehicle emissions have been linked with adverse health afflictions that often disproportionately affect communities of color and low-income communities (August et al., 2022). Despite the urgency of these issues and the significant potential benefits of reducing SOV use, convincing drivers to give up their cars in favor of more sustainable modes of transportation is challenging.

Furthermore, efforts to transition car users to other modes of transportation may exacerbate mobility injustices (Sheller, 2020). For example, pricing driving can disproportionately affect low-income drivers of color who already spend more on transportation than white and middle-class drivers (Deka, 2004, as cited in Wellman, 2014). Therefore, the potential regressive effects that policies aimed at reducing SOV use may have on low-income, historically disenfranchised communities should be examined before widespread implementation.

Kounkuey Design Initiative (KDI) is a global non-profit organization specializing in community development and design. KDI was interested in understanding the most gender and racially-equitable approaches to disincentivize driving, given Los Angeles' dispersed development pattern and decentralized job centers. This capstone research project aims to better understand whether one proposed method of reducing SOV use—pricing parking—disproportionately affects people of color and female and gender minority drivers. Using primary and secondary data, I explore the travel preferences of Los Angeles County residents, investigate potential gender and racial disparities in parking behavior and pricing schemes, and evaluate approaches other cities have implemented.

Project Objectives

- To identify the benefits and limitations of market-priced parking
- To understand driving and parking behavior in LA by gender and race
- To consider how adjusting price, proximity, and parking duration could make market-priced parking strategies more effective and equitable

3 Source: Pexels

There are an estimated **3.6 million** on-street parking spaces in LA County[1]

In the City of Los Angeles, there are

38,011 parking meters[2]

155 preferential parking districts[3]

and **4** neighborhoods with market-priced parking[4]

1 (Fraser et al., 2016)
2 (*Mobility 2035*, 2016)
3 (LADOT PPD, n.d.)
4 (La Express ParkTM, 2023)

Background

Federal and state transportation policies have historically prioritized building highways between higher-income, predominantly white communities and job centers (Higashide et al., 2020). As a result, regional and local transportation planners and policymakers prioritized vehicular travel at the expense of other modes. As a result, people who did not, and do not, have access to cars have faced enormous barriers to accessing recreational spaces, healthcare, employment, and educational opportunities, despite often having the most access to highway infrastructure (Wellman, 2014).

During the 20th century, transportation engineers and planners in LA County developed numerous plans for highway construction. Powerful companies influenced freeway design. They identified suitable land throughout the County (in both higher- and lower-income communities) that they needed to take over to construct the highway (Estrada, 2005). However, freeways that would have passed through predominantly white communities were never built partly because of community uproar (Estrada, 2005). Instead, city officials and developers focused on specific geographic areas in the County that they perceived to have less political power, most notably East LA. Despite widespread backlash similar to that in predominantly white communities, freeway construction went through in East LA, separating friends and families and destroying entire communities (Estrada, 2005). Many community members were forced to sell or give up their homes and land to make way for freeways they would never use (Estrada, 2005). As a result of transportation planning decisions such as the one briefly described above, private vehicles are the most convenient mode of transportation throughout LA County.

KEY TERMS

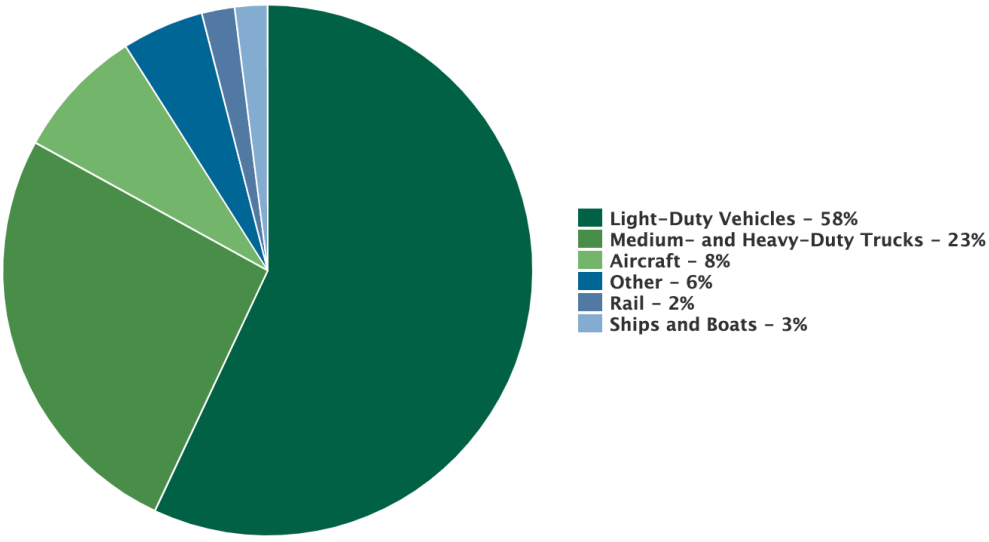
Gender	"Gender refers to social, behavioral, and cultural attributes, expectations, and norms associated with being male or female" (Odbert et al., 2020)
Market-Priced Parking	Parking priced based on the demand
Sex	"The biological categories of male, female, and intersex to which humans belong, based on sex characteristics and chromosomes" (Odbert et al., 2020)
Time Poverty	"Time poverty refers to a lack of adequate discretionary time outside of sleep and paid and unpaid work to engage in activities that build social and human capital and is a useful metric for overall well-being" (*Changing Lanes*, 2021)
Trip Chaining	"A description of a series of short trips linked together between anchor destinations, such as a trip that leaves home, stops to drop a passenger, and continues to work" (*Changing Lanes*, 2021)

LITERATURE REVIEW

Introduction

In 2021, the United States transportation sector accounted for 29% of the country's total greenhouse gas (GHG) emissions. As shown in Figure 1, 58% of the 2021 transportation sector emissions were from light-duty (passenger) vehicles. Pollutants from vehicle emissions have been linked with low birth weights, reduced lung function, and cardiovascular and respiratory hospitalizations (August et al., 2022). These adverse health conditions often disproportionately affect people of color and low-income communities (Higashide et al., 2020). Many state and local agencies have attempted to reduce driving levels by regulating car standards and implementing pricing policies such as high-occupancy toll (HOT) lanes, cordon pricing, and highway-lane expansion. While most policies have offered temporary congestion relief, they ultimately have not decreased single occupancy vehicle (SOV) use. This is likely because they are subject to triple convergence, a process in which travelers converge on the increased capacity from other routes, times, or modes of travel when traffic conditions improve (Downs, 2004; Sorenson, 2009).

Figure 1: 2021 United States Transportation Sector Emissions



Source: EPA Fast Facts on Transportation Greenhouse Gas Emissions

Although historically more attention and resources have been allocated to addressing vehicular travel, given the ineffective reduction of vehicle miles traveled, there is increased research on vehicles when they are stationary (Inci, 2015). Specifically, more research and pilot programs are devoted to evaluating parking and how the price of parking could reduce driving. This literature review explores research related to pricing parking and travel behavior, paying particular attention to factors related to income and gender.

Approaches to Modifying Travel Behavior

Many researchers have studied the most effective methods to influence travel behavior and manage demand. Methods fall into one of two categories: "carrots" or "sticks." Piatkowski et al. (2017) define "carrots" as methods designed to entice desired travel behaviors, while "sticks" discourage undesirable travel behaviors. Travel behavior interventions can be further categorized as structural or psychological. Garling and Schuitema (2007) define structural interventions as those that involve modifying the physical or legislative structures that regulate travel behavior to decrease the attractiveness of automobile travel and incentivize the use of other modes of transportation. Rowe et al. (2011) define psychological interventions as those that are designed to motivate a change in travel behavior by changing a person's perceptions, attitudes, and beliefs.

Rowe et al. (2011) reviewed existing research studies that aimed to reduce car use through behavioral interventions. Out of the 77 reviewed studies, only 12 were deemed methodologically strong, and six demonstrated an effective intervention (Rowe et al., 2011). Overall, "carrots"—specifically financial incentives and other rewards—reduced driving during the studies, but once the incentives were removed, participants either resumed or increased their normal driving levels (Rowe et al., 2011).

Similarly, Kristal and Whillans (2019) suggest that "nudges" (non-coercive, cheap, and easy approaches to behavior change) may not be the most effective approach to changing habitual behaviors such as commuting and other travel behaviors.

Penalties or "sticks" to deter driving are likely the most effective approach to reducing driving, but they are often politically unpopular and perceived by the public as inequitable or punitive (Sorensen et al., 2008; Piatkowski et al., 2017). Meyer (1999) evaluated the Maryland Department of Transportation's approach to congestion reduction in which different transportation actions were applied to different corridors. They found that road pricing, a strategy that directly added to the cost of a driver's trip, was the most effective approach, whereas voluntary actions had little effect (Meyer, 1999). Despite its effectiveness, the direct added costs were not supported by the state's planning task force (Meyer, 1999), demonstrating that the political environment will likely dictate the successful enactment of any pricing policy.

Despite public resistance, increasing the costs of vehicular travel through a variety of more assertive pricing strategies (Kristal & Whillans, 2019) is argued to be the most effective method to change travel behavior

throughout much of the reviewed literature (Meyer, 1999; Taylor, 2002). This is due to their exemption from triple convergence, as the charges would deter any new drivers that may have otherwise utilized the additional capacity (Sorenson, 2009). While "sticks" may be the most effective approach to curbing vehicle use, gaining political support for such policies will likely require interventions that use both "carrots" and "sticks" (Piatkowski et al., 2017) and work in conjunction with one another.

Cars spend **95%** of their time **stationary**

Pricing On-Street Parking

Cars spend 95% of their time stationary (Evans, 2021), and 99% of vehicle trips end in a free parking space (*U.S. Parking Policies*, 2010). Abundant free parking incentivizes vehicular travel. In order to address the domino effect that free parking initiates, many cities are piloting programs that price parking based on demand or duration. The terminology for a variable parking price based on demand varies across the literature. It includes "market-priced parking" (Chatman & Manville, 2016), "performance-based pricing" (Millard-Ball et al., 2014), and "dynamic pricing" (Glasnapp et al., 2014). Throughout this research, I will refer to policies that price parking based on demand as variable market-priced parking. While the terminology varies, the goal of each policy is to price parking to leave several parking spaces open per block. Adjusting parking prices based on occupancy can provide many benefits, including reducing cruising time, reducing congestion, encouraging mode shift, and other adjustments to travel behavior (Sorensen et al., 2008; Pierce & Shoup, 2013). To achieve the desired result—most often a few open spaces on a block—cities can set the price of on-street parking, usually with higher prices near popular destinations and lower prices farther away (Shoup, 2021). Most cities aim to set prices so that drivers are not enitrely deterred from parking in an area but that one or two spaces are vacant (Shoup, 2011). While aiming for the "Goldilocks" price (Shoup, 2011) is a worthy goal, Russo et al. (2019) argue that parking prices should account for the opportunity costs of alternative land uses and adverse environmental effects. While other researchers agree that automobile users have not paid for the full cost of their travel and its effect on the environment (Meyer, 1999; Shoup, 2021), given the political aversion to increased pricing policies, promoting less congestion may make the policy more palatable.

Reducing Cruising for Parking

Limited research is available about the effects of market-priced parking as it has only been implemented recently and in a limited number of cities. However, cruising for parking—a result of inadequately priced parking—is highly studied in the field of transportation economics (Inci, 2014). The reviewed literature can be divided into two categories: research examining levels of cruising before and after market-priced parking implementation and studies that used modeling to predict the potential effects of pricing parking (Shiftan & Golani, 2005).

Cruising for parking instead of driving directly to an off-street lot demonstrates that a driver's willingness to pay in wait time exceeds the price of parking (Inci, 2014). Shoup (2006) developed a model that used six variables to determine how a driver chooses whether to pay for off-street parking or cruise for curbside parking. The six variables are: 1) curb parking price, 2) off-street parking price, 3) parking duration, 4) fuel cost of cruising, 5) number of people in the vehicle, and 6) the value of time (Shoup, 2006). While the model calculates the time and fuel cost of cruising with the monetary cost of paying for off-street parking, Shoup (2006) acknowledges that parking behavior is complex and that a driver's values and priorities often vary from trip to trip. Pierce and Shoup (2013) studied the market-priced parking program in San Francisco (SFpark) and found that occupancy on under-occupied blocks rose after approximately 75% of price decreases, while occupancy on over-crowded blocks fell after the same percentage of price increases. Other studies found that SFpark has been successful in driving occupancy into its target ranges but argue that it takes time for parkers to adjust their behavior to rate changes (Chatman & Manville, 2018; Millard-Ball et al., 2014).

Encouraging Mode Shift by Increasing the Cost of Parking

Shiftan and Golani (2005) studied the effect of congestion pricing and parking pricing on travel behavior in Tel Aviv, Israel. The researchers used a response model based on stated preference data collected at the city center and found that most drivers who respond to the policy will do so by changing their mode and time of travel (Shiftan & Golani, 2005). Simicevic et al. (2013) also used a model based on results from a stated preference survey conducted in Belgrade, Serbia. They produced similar findings, specifically that a slight majority of drivers would shift travel modes under strict parking measures (Simicevic et al., 2013). While it may take time to achieve desired outcomes, the reviewed studies demonstrate that pricing parking could decrease automobile use and help cities achieve their emissions reduction goals.

4 SFPark **Meters,** *Source: Pexels*

Differences in Travel Behavior

Given the established and anticipated success of market-priced parking policies and the potential for future widespread implementation, there is a need to evaluate how income, race, and gender affect parking behavior. Doing so will enable the creation of parking policies that are gender-inclusive and do not further exacerbate barriers to driving already experienced by low-income Black, Indigenous, People of Color (BIPOC) women (Blumenberg, 2016).

Because of their societal gender role as caregivers, women's travel behavior is complex and often includes tradeoffs between employment and domestic responsibilities (Rosenbloom & Burns, 1993). Findings about women's travel behavior have been consistent across decades. Women tend to travel shorter distances and for shorter amounts of time than men (McGuckin & Nakamoto, 2005; Understanding How Women Travel, 2019; Maffii et al., 2020). Women also tend to make more stops, or trip-chain, during their trips (McGuckin & Murakami, 1999; Taylor & Mauch, 1996; McGuckin & Nakamoto, 2005; McGuckin et al., 2005). McGuckin and Murakami (1999) find that women are more likely to perform household-sustaining activities than men and are liklier to trip-chain to and from work to accomplish these tasks.

Similarly, Taylor and Mauch (1996) find that for women, "6% of all work commutes included a child-serving stop, compared to only 2.7% for men'' (p. 389). According to a 2019 study conducted by LA Metro, women's trips are more likely to serve someone else (*Understanding How Women Travel*, 2019). Several earlier studies produced similar results, finding that women conduct a much higher proportion of child-serving trips than men (Taylor & Mauch, 1996; Schwanen, 2007; Fan, 2017; Chakrabarti & Joh, 2019). Given that women are often tasked with transporting others, they often opt for private vehicle travel as it is the most flexible, convenient, and safe (McGuckin & Murakami, 1999; Loukaitou-Sideris, 2014; Blumenberg, 2016; *Understanding How Women Travel*, 2019). For example, cars allow women to change their travel plans in the event of an emergency situation regarding their children (Rosenbloom & Burns, 1993).

> Private vehicle travel is often the most **flexible, convenient,** and **safe** mode of transportation for women

However, it is essential to acknowledge that women are not a monolith and that there are differences in travel behavior between different groups of women. For

example, Chakrabarti and Joh (2019) used the 2017 California Household Travel Survey to study the effect of parenthood on travel behavior and found that having one or more young children was associated with 4.55 more miles of auto travel relative to comparable households with no children. Rosenbloom and Burns (1993) found that more than 80% of married women made trips solely for children compared to 50% of all married men. Taylor and Mauch (1997) find that white, Hispanic, and low-income women, on average, are especially burdened with household maintenance responsibilities. Low-income BIPOC women are also more dependent on transit and consistently have less access to driving (*Changing Lanes*, 2021). Despite these differences, Taylor and Mauch (1997) argue that gender is more important in determining child-serving trips than any other socioeconomic factor. Several theories were put forth to explain gender differences in travel behavior, such as labor market segmentation (Fan, 2017), but empirical evidence was inconsistent.

Beyond traveling differently, women also experience the environment differently (*Understanding How Women Travel*, 2019; Loukaitou-Sideris, 2004), and the design of an environment can affect the ease or difficulty of a trip (Goddard et al., 2006). Fear often drives women's decision making behavior and studies have shown that different design features, such as cleanliness (Loukaitou-Sideris, 2014) and good street lighting, can reduce fear (Loukaitou-Sideris, 2014).

Equity and Pricing Parking

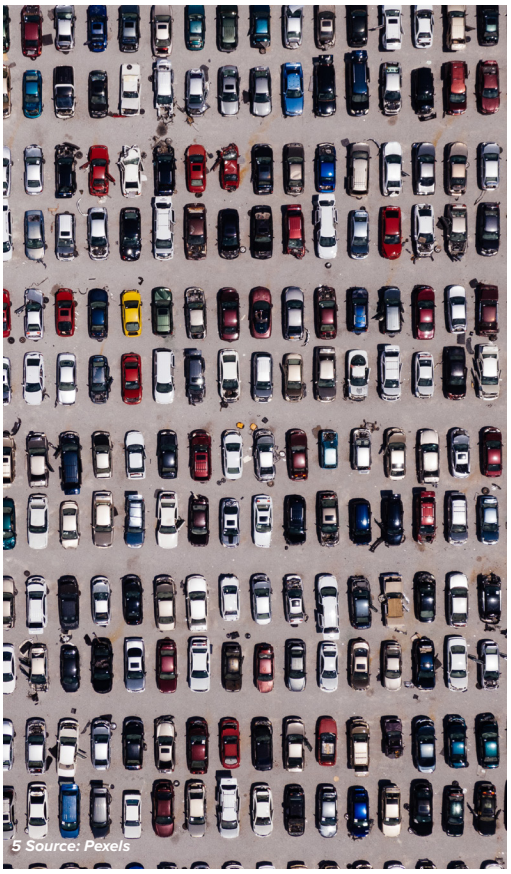
Defining Equitable Outcomes

Implementing additional costs to any transportation mode requires exploration into its potential equity effects. Evaluating equity is a challenging endeavor as the term is defined differently by different people at different times (Hamer et al., 2012; Blumenberg, 2017). A policy viewed as equitable using one definition could be considered inequitable by someone using a different definition (Litman, 2022; Blumenberg, 2017). The differences in the definition of transportation equity is seen across the literature. For example, Bills et al. (2012) argue that transportation equity refers to the just distribution of costs and benefits among current and future generations. Litman (2022) defines equity as the fairness with which costs and benefits are distributed. Carter et al. (2013) include shared distribution of benefits and burdens but also emphasize partnership in the planning process, resulting in shared decision-making. In an equity resource guide, the Toole Design group suggests that equity means "giving everyone what they need today while considering how resources have been distributed in the past" (Butler, n.d., 2). In this project, I use the definitions put forth by Carter et al. (2013) and Toole Design Group to guide my research.

Free Parking

Increased prices will likely place a more burdensome cost on lower-income, car-dependent communities (Sheller, 2020). However, before examining how pricing parking may affect different types of drivers, it is important to establish the equity effects of free or underpriced parking. Meyer (1999) argues that drivers have yet to pay for the full cost of their travel or their negative impact on the environment. When the price of curbside parking is uniform across a city, all drivers who park pay the same price. Yanocha et al. (2021) argue that parking spaces, in general, are inequitable allocations of public space, reserved for those who are wealthy enough to own cars.

In the United States, most adults have access to a household vehicle. As of 2017, approximately 80% of low-income adults lived in households with a vehicle (Blumenberg, 2017). However, vehicle ownership does not imply consistent vehicle use. For example, low-income households often share one vehicle, which renders it an inconsistent mode of transportation that is only sometimes available when needed (Blumenberg, 2017). Furthermore, lower-income people tend to take fewer trips, travel shorter distances, invest in older vehicles, and rely on social networks for car access in order to limit their transportation expenditures (Blumenberg, 2017). Generally, free parking subsidizes higher-income drivers who are more likely to drive cars and benefit from abundant parking (Russo et al., 2019).



5 Source: Pexels

99%,
of vehicle trips end in a **free** parking for space

6 Source: Pexels

Low-income Drivers

Pierce and Shoup (2013) suggest that because all spaces are the same price, lower-income drivers cannot choose to save money by opting for another spot with a lower price. However, in a study of SFpark, Chatman and Manville (2018) found that higher-priced parking did not seem to displace lower-income drivers. The researchers hypothesized that this could be due to the fact that lower-income drivers use curbside parking in less discretionary ways (Chatman & Manville, 2018). Similar ideas have been put forth in earlier research explaining that low-income working women often accept the expense of driving in exchange for time gains (Rosenbloom & Burns, 1993). For example, while an alternate mode of transit might be cheaper, if it takes longer to reach their destination, they are losing time and paying mounting costs such as childcare (Rosenbloom & Burns, 1993). However, the choice to take a more convenient mode of transportation, such as a private vehicle, is more feasible for higher-income people who can pay for better transportation or live in neighborhoods with more mobility options (*Changing Lanes*, 2021). Lower-income women who lack this choice often have more complex trips, which contribute directly to time poverty (*Changing Lanes*, 2021).

With market-priced parking, paying a higher price for a parking space is an option for those who want it (Sorensen et al., 2008). Yet another factor at play, many market-priced parking programs encourage drivers to use technology to pay for their parking spaces. However, this could prove challenging for low-income drivers who are less likely to have access to smartphones, unlimited data, or bank accounts (Brown, 2019; Brown & Williams, 2021).

Women and Gender Minorities

Another benefit of market-priced parking that advocates tout is that it would reduce cruising by forcing many drivers to park in off-street parking (Evans, 2021). However, parking garages—which are often dimly lit, desolate, and poorly monitored—may cause women stress and make them feel unsafe (Loukaitou-Sideris, 2004 and 2014). Safety concerns could make certain parking spaces, such as on-street parking, highly valued by women and gender minorities, especially at night. As such, if women and gender minorities perceive an environment as unsafe, they might feel

as though they have no other option but to pay a higher price for a space closer to their destination. Given that desired outcomes of market-priced parking policies may not be desirable for women and gender minorities, it is critical to further explore gender disparities in parking behavior.

Conclusion

Across cities, implementing market-priced parking policies has proven effective at reducing congestion. Additionally, research simulating travel behavior responses to market-priced policies has demonstrated that it could result in mode shift and reduced driving. However, more research is needed to understand how market-priced parking would affect different drivers. This exploratory research study will help fill a gap in the literature by examining differences in parking behavior and preference and will recommend ways in which market-priced parking can be implemented for the most equitable outcomes.

7 Downtown LA, *Source: Pexels*

RESEARCH DESIGN

This exploratory field study uses a mixed-methods approach to evaluate how communities can implement variable market-priced parking for the most gender and racially-equitable outcomes. Specifically, I use primary and secondary data to:

1. Identify where parking meters currently exist in the City of Los Angeles
2. Examine driving behaviors and perceptions of parking in Los Angeles County
3. Evaluate the association between driver demographics and parking price
4. Understand drivers' parking preferences

Because this capstone research project focuses on implementing market-priced parking for the most equitable outcomes, I aimed to collect data in a diverse community with high destination density and a high percentage of residents who do not drive. Although there are four communities with market-priced parking in the City of Los Angeles, given the limited timeframe and resources for research, I focus my research on Hollywood.

Examining Driving Behavior in Los Angeles

I rely on secondary survey data from the *Understanding America Study* (UAS) Survey 379 to understand current driving and parking behaviors in Los Angeles County. The UAS survey is maintained by the Center for Economic and Social Research (CESR) at the University of Southern California. Other datasets, such as the American Community Survey, include information about transportation modes and preferences. However, I opted to use the UAS Survey 379 as it collected data not included in other datasets, such as attitudes towards driving, perception of parking availability, and parking expenses.

The UAS 379 survey was fielded from March 2, 2021, to April 30, 2021. There was a 78% response rate, and 1337 respondents completed the survey (*UAS 379*, 2021). The provided dataset does not include any personally identifiable information. One limitation of this dataset is that there is no geospatial component and thus no way to identify where in Los Angeles County the respondents are located.

LITERATURE REVIEW

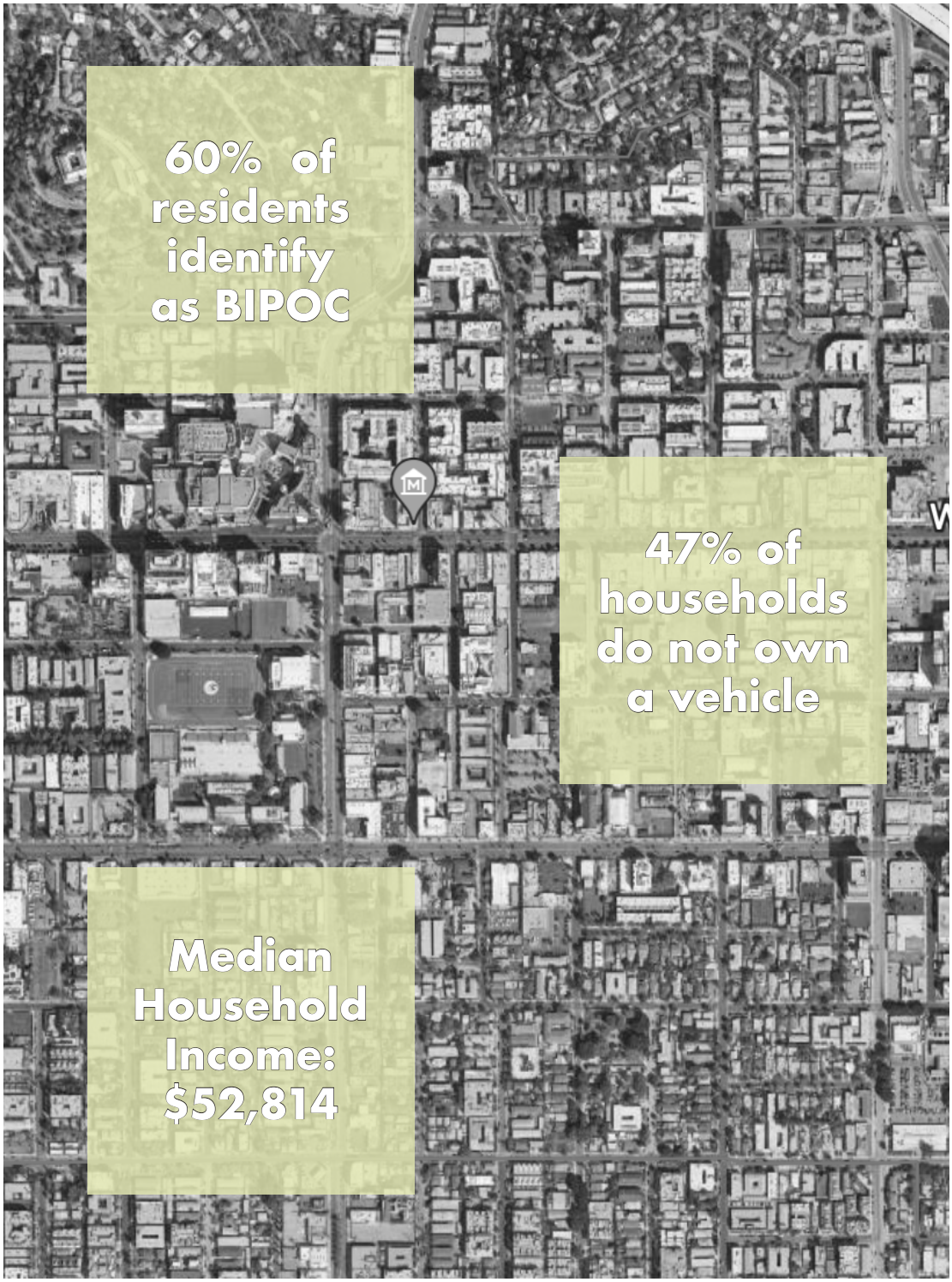
OBSERVATIONS

IN-PERSON SURVEY

ONLINE SURVEY

CASE STUDIES

Hollywood as a Study Site



Source: US Census, 2020

I first queried the data to include only respondents that were based in Los Angeles at the time of the survey. I then analyzed the survey data to understand differences in driving behavior, perceptions of parking and driving, and parking expenditures. Next, I organized and summarized the dataset, then used the chi-square test to explore associations between gender and race and six variables of interest.

Understanding Parking Behavior and Preferences

8 Source: Pexels

Field Observations

I conducted field observations to better understand potential gender and racial disparities in parking behavior in areas with market-priced parking. To select the observation blocks, I used spatial analysis to identify which blocks had many market-priced parking meters overall and compared to nearby blocks. Then, using the results from the spatial analysis, I manually selected two blocks in Hollywood with market-priced parking to ensure each block had consistent differences in parking prices over different days and times.

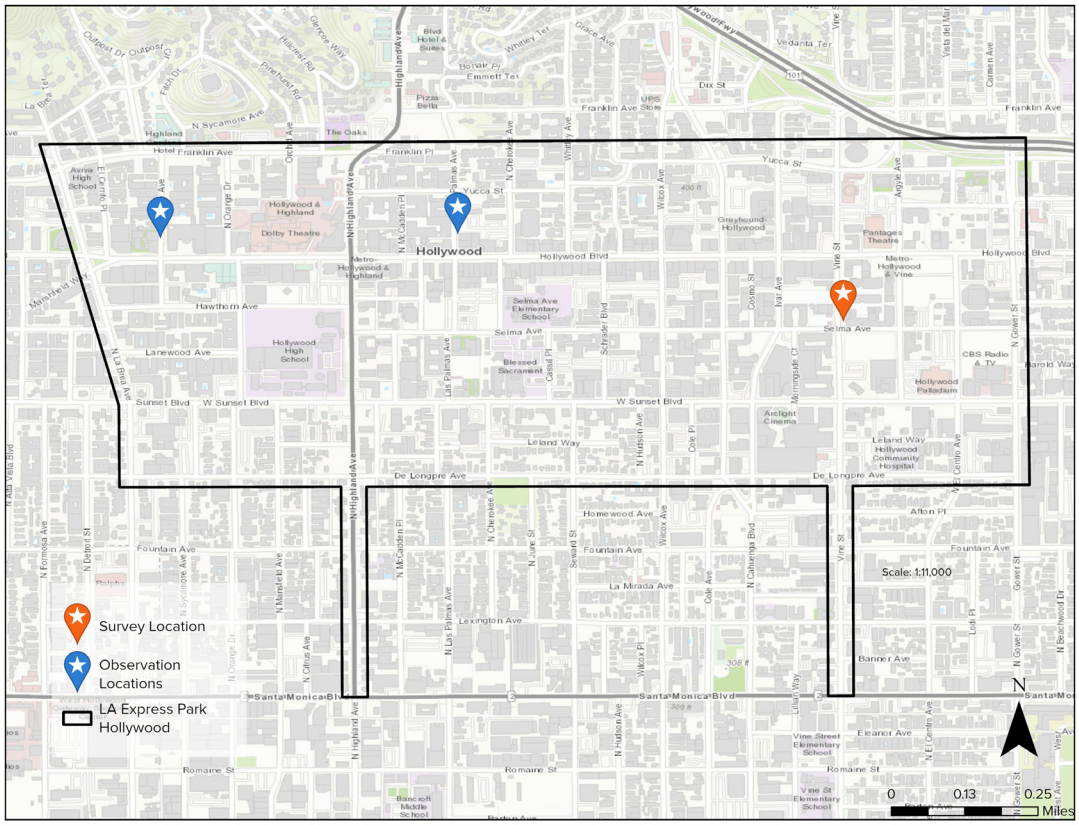
Figure 2 shows the two blocks where I conducted my observations. I visited each block site four times on weekdays and weekends in the mornings and afternoons. The first site visit involved a walking audit of street conditions and parking availability. I elected to conduct a walk audit as previous literature identified a relationship between street conditions and travel mode preference (Loukaitou-Sideris, 2004). Appendix B includes a copy of the worksheet I used for the walking street audit.

The other three site visits occurred on varying days and times, but I observed parking behavior for two hours during each visit. The observational study was

designed to collect data on parking selection, duration, and payment, as well as driver gender and race.

Appendix C includes the observation worksheet I designed and used during the site visits. The primary limitation of this method is that I had to determine the driver's gender and race based on appearance. Another limitation of this observational research approach is that my presence may have influenced drivers' behavior. For example, a driver asked me if I was the "parking meter lady" before they paid for parking during one visit. Additionally, the observational data likely does not represent parking behavior in Hollywood or the City of Los Angeles because of the small sample size. I first generated descriptive statistics about my observational data and then ran chi-square tests to explore associations between driver demographics and parking choice, payment, and duration.

Figure 2: Observation and Survey Site Locations in Hollywood



Source: City of Los Angeles GeoHub

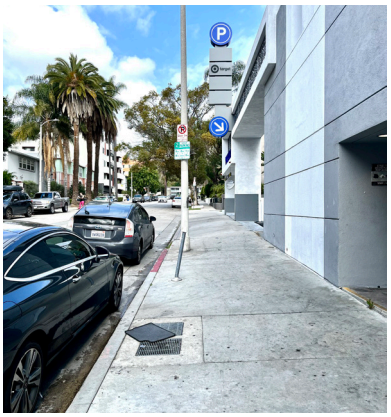
Field Survey

In addition to my field observations, I conducted an in-person survey to better understand driving behavior and parking preferences in Hollywood. Specifically, the questionnaire was intended to generate information that could inform policy recommendations. Figure 2 shows the randomly selected Hollywood block face where I conducted my survey. I made six total visits to the block face. All individuals walking on the street were asked to participate in the anonymous survey. Appendix D includes the questionnaire.

The questionnaire included questions related to market-priced parking approaches I encountered in my literature review. The first part of the survey asked respondents about how frequently they drive. If a respondent indicated that they never drive, they were asked to elaborate on their reasons for not driving, and then information about their zip code, gender, and race was collected. Respondents who did not drive were not asked any of the additional survey questions, as the remaining questions related to driving and parking behavior. The primary limitation of this method is the small sample size.

Additionally, although the questionnaire took approximately two minutes to complete, respondents were those who had the time and bandwidth to stop and talk. I analyzed responses to the questionnaire in Python. After generating descriptive statistics, I conducted chi-square tests to examine any correlation between participant demographics and question responses and used Cramer's V test to explore the strength of any statistically significant relationship.

Parking on North Sycamore



Parking Restrictions on Las Palmas

FINDINGS

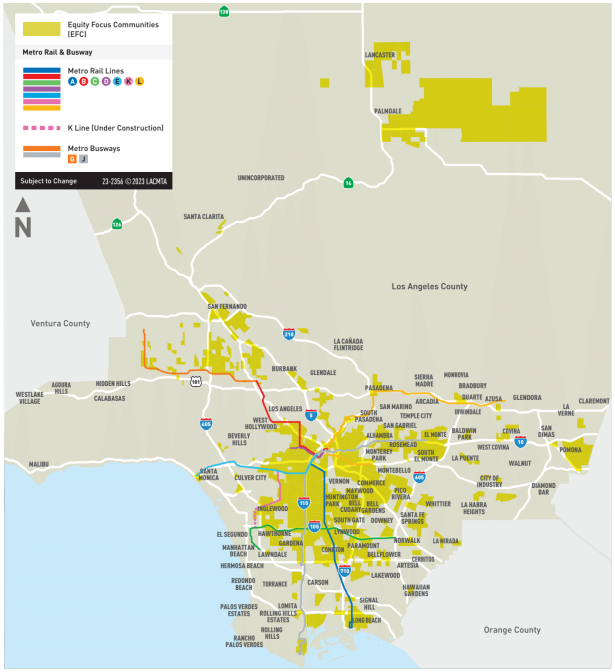
Where are parking meters in Los Angeles?

Fraser et al. (2016) estimated that as of 2010, LA County boasted "18.6 million parking spaces, including 5.5 million residential off-street, 9.6 million non-residential off-street, and 3.6 million on-street spaces" (4). The City of LA's parking network includes over 38,000 parking meters, numerous preferential parking districts (PPDs), and four neighborhoods with market-priced parking (see Figure 3). To further understand how parking has been distributed in the past, I examined and mapped geospatial data of the City's parking meters.

As illustrated in Figure 4, parking meters are located across the City of Los Angeles. The map shows the distribution of parking meters across the City by neighborhood. Most parking meters are clustered in the central part of the City, particularly Downtown, Westwood, and Hollywood, and are largely absent from suburban Los Angeles.

Figure 5 shows the percentage of households who do not own vehicles and the number of parking meters by City census tract. The map illustrates that the areas with the most parking meters often have the highest percentage of households who do not own vehicles. These areas also have a high number of Equity Focus Communities (EFC) as defined by LA Metro (*Data and Maps*, n.d.). EFCs are communities with low-income households, Black, Indigenous, or People of Color (BIPOC) populations, and households with no vehicles (*Data and Maps,* n.d.) Like highways, those with the most access to parking appear to be those who will not use it. Instead, valuable public space is inequitably allocated to visitors who drive into the community.

LA Metro Equity Focus Communities (EFC)



In 2022, Metro updated the agency's EFC Map using the same three sociodemographic criteria (income, race/ethnicity, and vehicle ownership) from the map first adopted in 2019. For an interactive web version of this map, visit *metro.net/2022efcmap*.

Source: LA Metro

Additionally, as detailed in the literature review, scholars have found that women tend to travel shorter distances for shorter amounts of time and are more likely to trip-chain (McGuckin & Murakami, 1999; Taylor & Mauch, 1996; McGuckin & Nakamoto, 2005; McGuckin et al., 2005). Because of this particular travel behavior, short-term parking could be a valuable amenity. Therefore, I mapped the number of parking meters reserved for short-term parking (15 minutes or less). Figure 6 shows the location of 147 15-minute parking meters and the number of meters within each cluster. Unfortunately, despite the abundance of parking meters throughout the City, short-term parking meters are less frequent and often unavailable in specific areas such as Mid-City.

Market-Priced Parking Meters

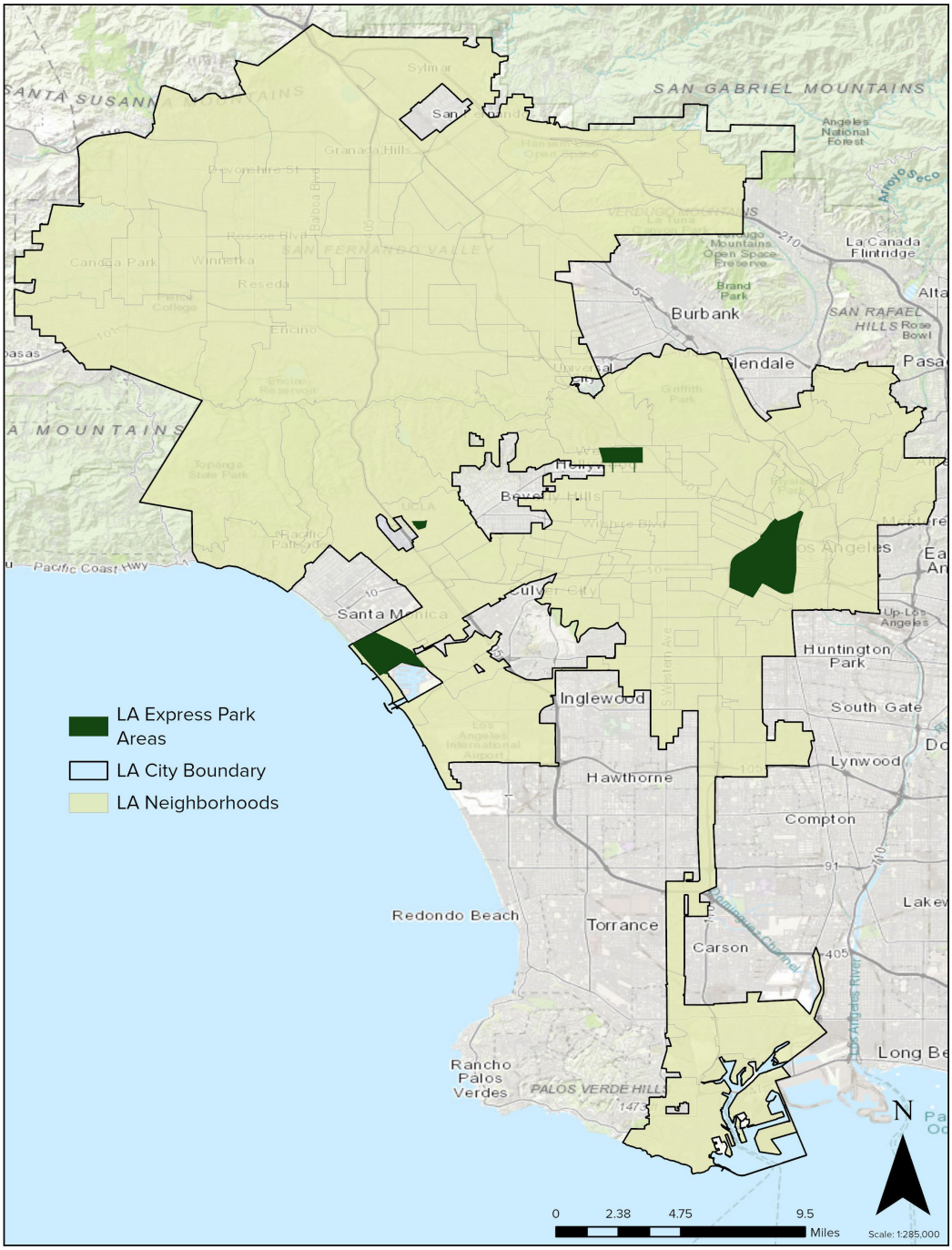
There are four neighborhoods with market-priced parking, as illustrated in Figure 3. Table 1 shows more information about the prices of parking and price increase schedules in each neighborhood.

Table 1: Los Angeles Express Park Neighborhood Profiles

	Downtown	Hollywood	Venice	Westood
Number of On-Street Spaces	6100	1500	300	450
Rate Ranges	$0.50-$6 per hour	$0.50-$4 per hour	$0.50-$6 per hour	$0.50-$2 per hour
Schedule of Price Changes	Weekdays at 8 AM, 11AM, and 4 PM	Weekdays at 8AM and 11 AM, Saturdays at 8AM, 10 AM, and Sundays at 8AM	Monday-Thursday at 8 AM, 10 AM, 3 PM and 8 PM, Friday at 3 PM	Monday-Thursday at 8 AM, 10 AM, and 3 PM, Friday at 3 PM

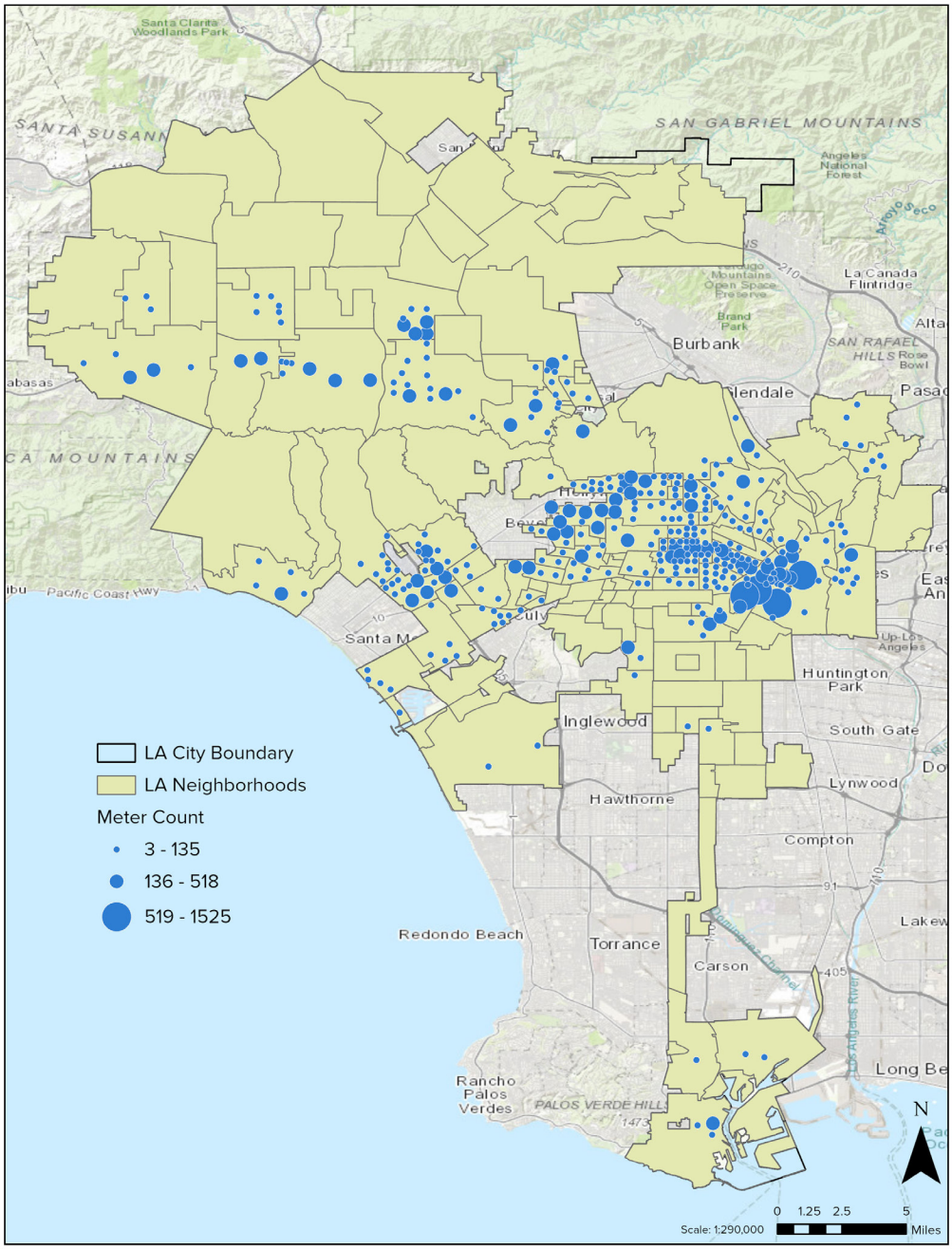
Source: LA Express Park

Figure 3: Los Angeles Express Park Areas



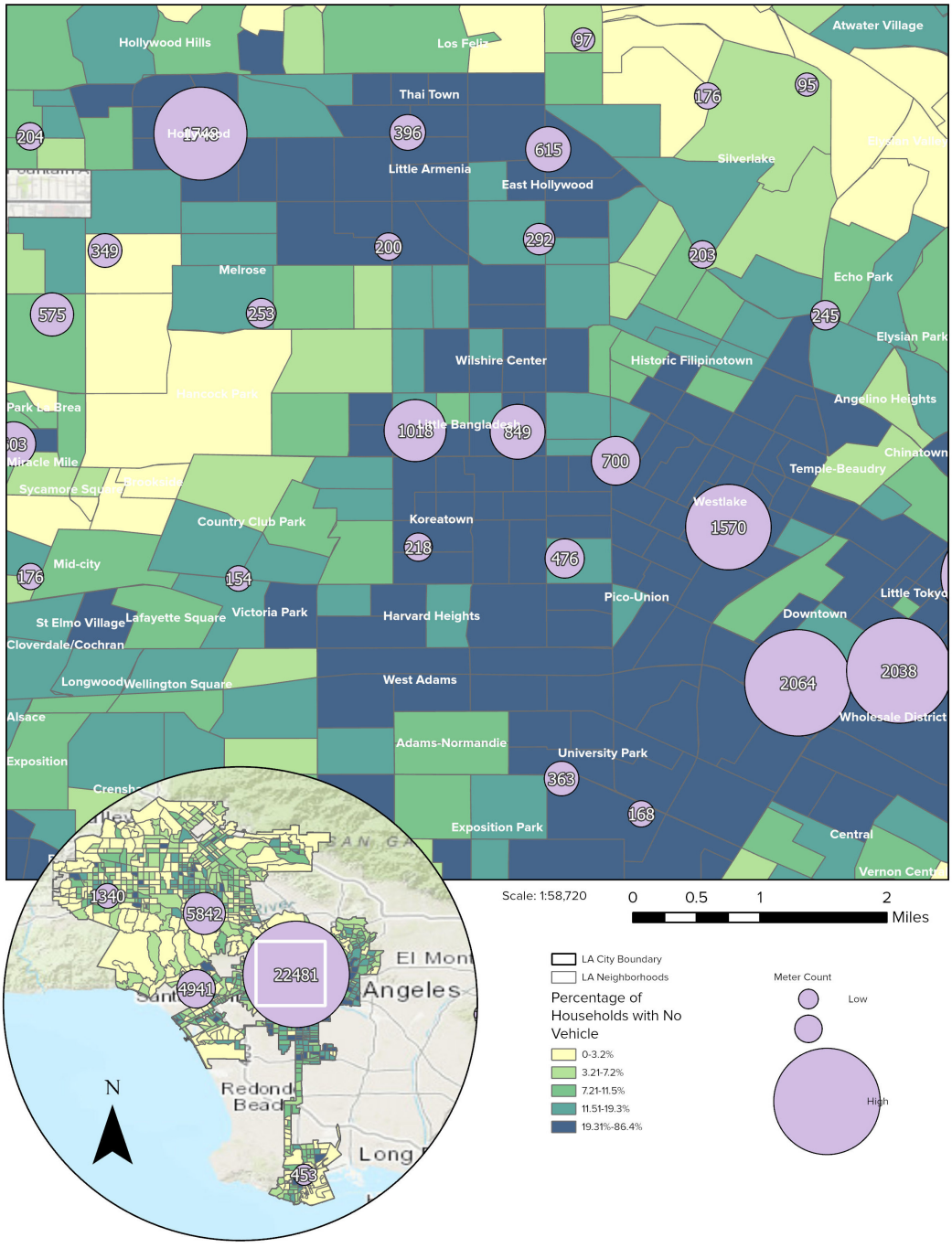
Source: LA Express Park

Figure 4: Parking Meters in the City of Los Angles (by Census Tract)



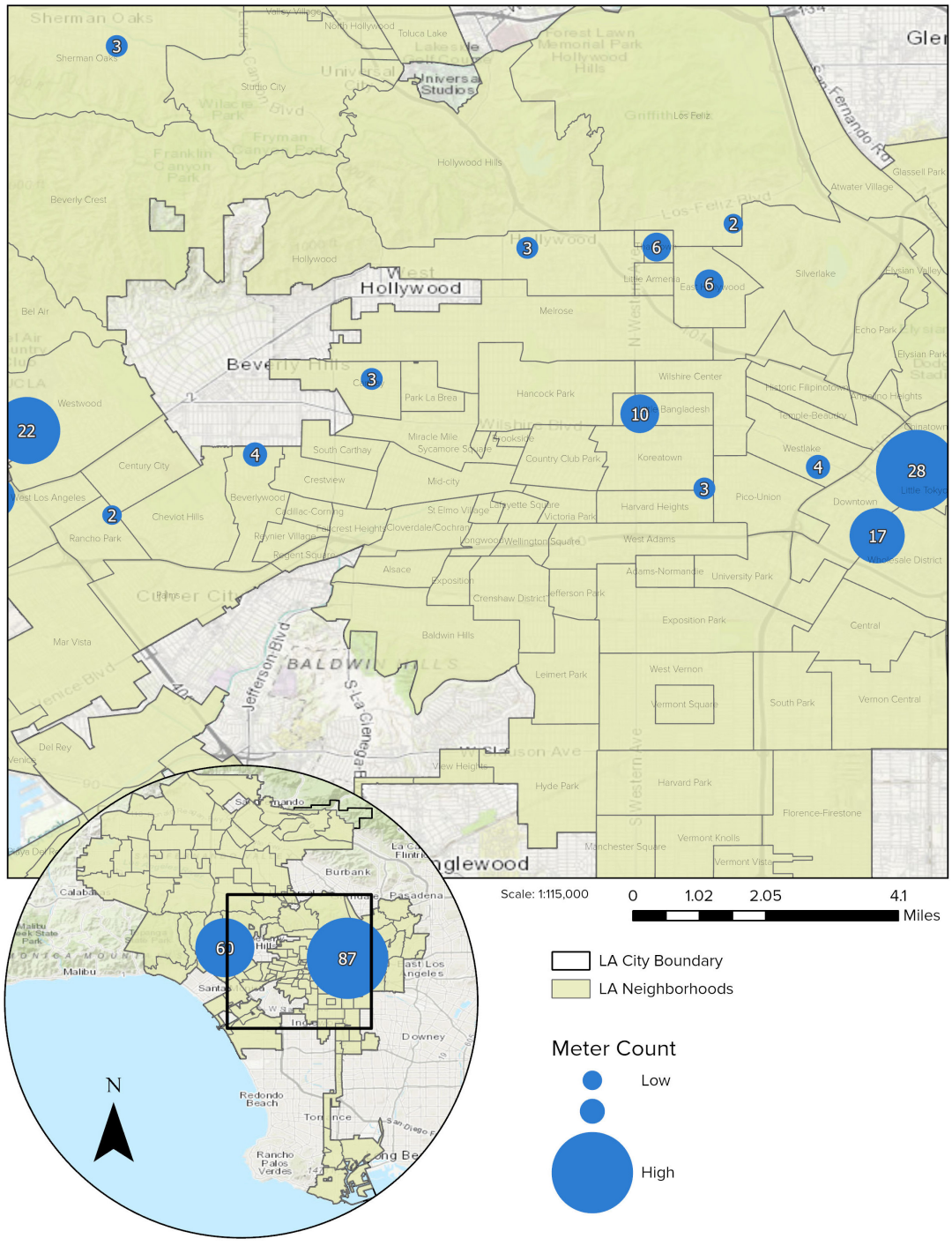
Source: LA Express Park

Figure 5: No. of Parking Meters and Percentage of Households with Zero Vehicles (by Census Tract)



Source: City of LA Geohub

Figure 6: Number of 15-Minute Parking Meters in the City of Los Angeles (by Census Tract)



Source: City of LA Geohub

Los Angeles County Survey

Of the 1337 respondents that completed the UAS 379 survey, 1280 resided in Los Angeles County at the time of survey completion. Appendix A shows survey participant demographics for the 1280 respondents who resided in the County.

Findings by Gender

Approximately 14% of all respondents did not use a private vehicle as a mode of transportation, while 23% indicated that they drive daily. 5.4% of female respondents did not own or lease a vehicle compared to 4.6% of male respondents. 56% of male and 51% of female respondents indicated using a private vehicle for school or work trips, and 86% of male and 85% of female respondents indicated using a private vehicle for personal or caretaking trips. Most female (71%) and male (67%) respondents indicated that they spend, on average, $0 per month on parking. On average, 29% of male respondents spend between $1-$50 per month on parking compared to 23% of female respondents.

Respondents indicated their views on several aspects of driving and parking using a scale from one to seven. One signified the most negative response (e.g., “very expensive” or “very unenjoyable”), and seven signified the most positive response (e.g., “very inexpensive” or “very enjoyable”). Table 3 shows the average response to three statements by gender.

Table 2: Average responses to statements on perceptions of vehicles and parking by gender

Survey Question	Average Response Male	Average Response Female
How safe are you from harassment or crime in a private vehicle?	5.52	5.41
How expensive is it to use a private vehicle?	3.07	3.06
How enjoyable is it to use a private vehicle?	5.23	5.47
Please rate how difficult or easy it usually is to find street parking in your neighborhood:	3.41	3.21

A higher number indicates a more positive response
Source: UAS 379 Survey

There was no statistically significant relationship between gender and safety or gender and expense of private vehicle use. However, there is a statistically significant relationship between gender and enjoyment of driving a private vehicle, with an alpha of .05, a p-value of .018, and a Cramer's V value of 0.057, which indicates a weak relationship between the two variables. Figure 7 shows the reported enjoyment of using a private vehicle by gender. 5.7% of male respondents responded that driving was "somewhat enjoyable" compared to 2.6% of female respondents. Relatedly, more female respondents indicated that driving was "very enjoyable" (30.5%) compared to male respondents (24.1%). Despite the gender differences in reported enjoyment of private vehicle use, 59.4% of all respondents consider it "enjoyable" or "very enjoyable."

There is also a statistically significant relationship between gender and ease of finding parking in the neighborhood, with an alpha of .05 and p-value of .005. However, the calculated Cramer's V value is .095, which indicates a weak relationship between the two variables. Figure 7 shows the reported enjoyment of using a private vehicle by gender. Approximately 23% of females reported finding parking in their neighborhood "difficult" compared to 15% of males. This difference could be due to the need for women to find a parking space near their destination or the time of day they travel. Studies have found that safety is a primary concern for women when traveling, especially for low-income women of color who are more likely to live in neighborhoods with higher crime or to return home late in the evening (Understanding How Women Travel, 2019).

Figure 7: Reported Enjoyment of Private Vehicle Use by Gender

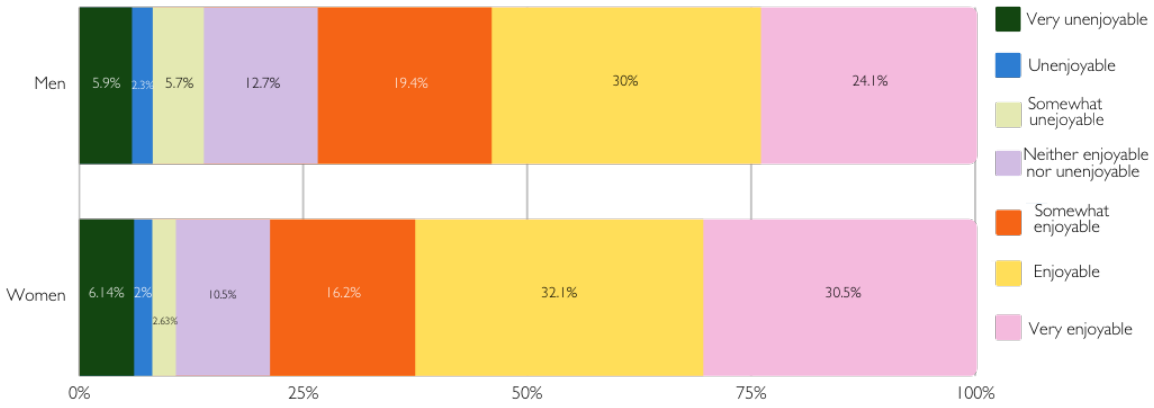
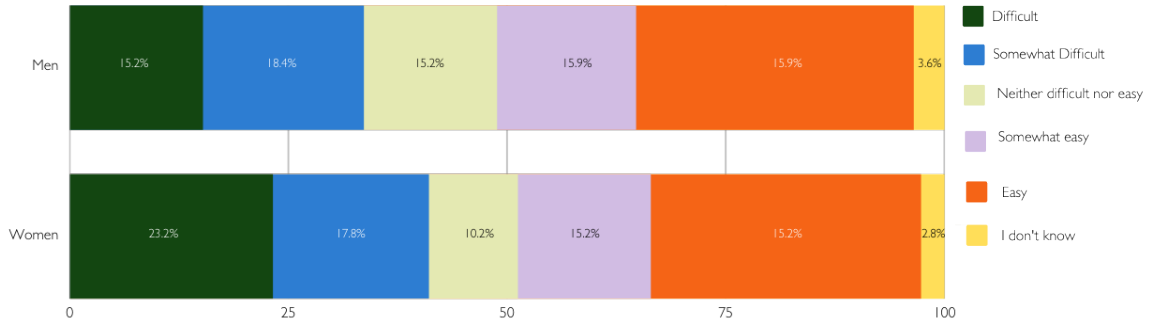


Figure 8: Ease of Finding Neighborhood Parking by Gender

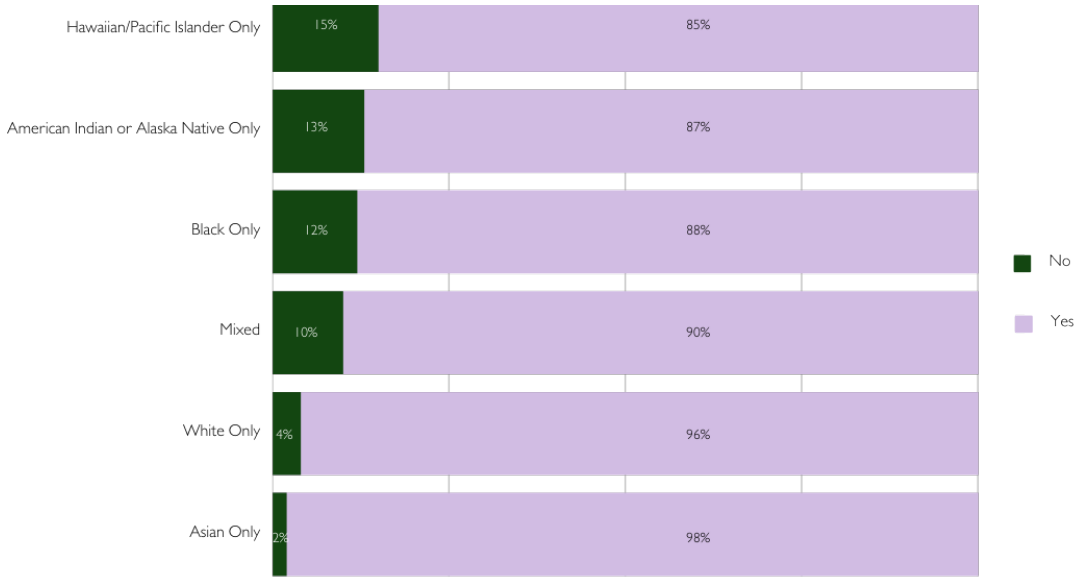


Source: UAS 379 Survey

Findings by Race

The relationship between race and private vehicle use was statistically significant, with an alpha of .05 and a p-value of 3.72e-6. However, the Cramer's V value was 0.149, which indicates a weak relationship between the two variables. Figure 9 shows the respondent's race and reported vehicle use. 15% of respondents who identify as Hawaiian/Pacific Islander (HPI), 13% of American Indian or Alaska Native (AIAN) respondents, and 12% of Black respondents indicated that they do not use private vehicles to go places compared to just 4% of White respondents. This finding aligns with the 2020 National Equity Report that found households headed by people of color are less likely than white households to have private vehicle access nationwide (*Car Access*, 2020).

Figure 9: Use of a Private Vehicle as a Means of Transportation by Race



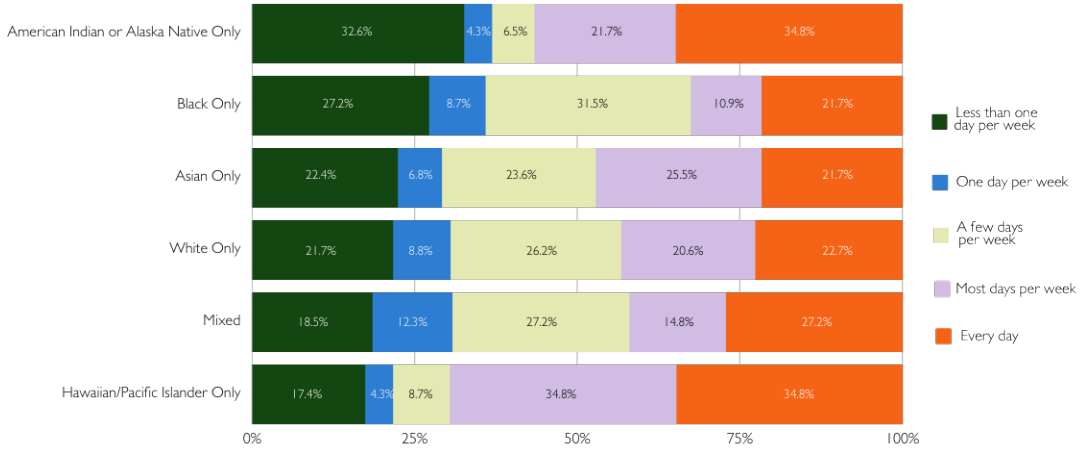
Source: UAS 379 Survey

There was also a statistically significant difference in levels of private vehicle use amongst respondents who indicated they use private vehicles, with an alpha of .05 and a p-value of .037. Figure 10 shows the respondent's race and reported levels of vehicle use. Approximately 35% of respondents who identify as AIAN drive every day, compared to approximately 22% of respondents who identify as Asian or Black. This finding aligns with reviewed literature that indicates vehicle ownership does not imply consistent levels of use (Blumenberg, 2017).

The relationship between race and ease of finding parking was also statistically significant, with an alpha of .05 and a p-value of 7.16e-7. However, the value of Cramer's V was .082, indicating a weak association between the two variables.

Figure 11 shows the respondent's race and reported ease of finding parking in their neighborhood. Notably, most of the respondents who identify as AIAN, HPI, and Black indicated that it was difficult to find parking in their neighborhood. Conversely, most respondents who identify as white or mixed race indicated that it was easy to find parking in their neighborhood. There was no statistically significant relationship between race and perception of safety in a private vehicle, enjoyment of driving a private vehicle, or convenience of a private vehicle for school/work trips or personal/caretaking trips.

Figure 10: Frequency of Private Vehicle Use by Race



Source: UAS 379 Survey

Other Notable Findings

As illustrated in Figure 12, the ease of finding neighborhood parking varies by income level. For example, over 56% of respondents with an income of $150K or more indicated that finding neighborhood parking was "easy," compared to 18.6% with an income of $24,999 or less and 17.6% with an income between $25K and $49,999. This finding could be related to the type of housing in which respondents live. For example, those living in suburban areas likely have access to free parking, whether a garage or off-street parking. In contrast, respondents living in urban areas might not have a designated off-street parking space and, instead, have to compete with other drivers to find on-street parking.

Figure 11: Reported Ease of Finding Neighborhood Parking by Race

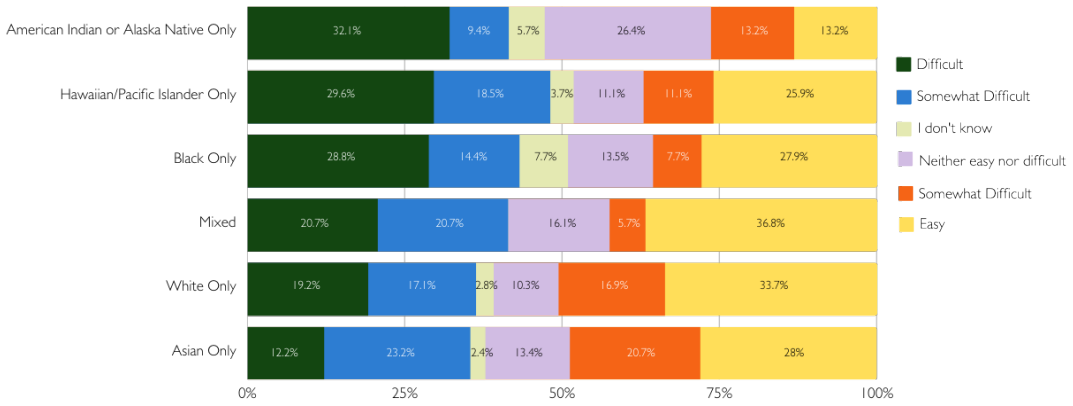
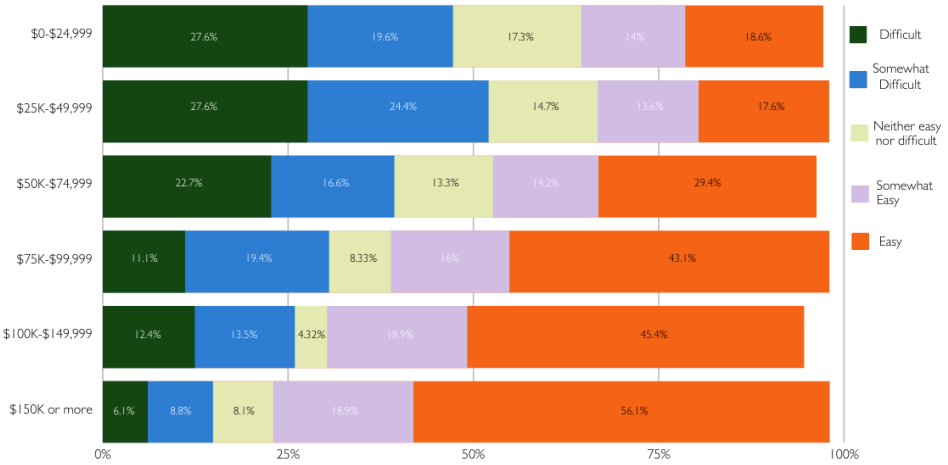


Figure 12: Reported Ease of Finding Neighborhood Parking by Income Bracket



Source: UAS 379 Survey

Hollywood In-Person Survey

Forty-five pedestrians in Hollywood participated in the survey, and participant demographics can be seen in Table 3. The small sample size limits the generalizability of the findings, and responses are not representative of all Angelenos. However, the survey allowed me to better understand the variety of people's parking preferences and responsiveness to potential parking-related policies.

Table 3: Hollywood Survey Participant Demographics

	Demographic Characteristics	N	%
Total		45	100%
Gender	Female	22	49%
	Male	20	44%
	Prefer to Self-Describe	3	7%
Race/Ethnicity	White	22	49%
	Black or African American	8	18%
	Hispanic/Latino	5	11%
	Asian	3	7%
	Other	2	4%
	Mixed	2	4%
	Prefer not to state	3	7%
Home Zip Code	90028	21	47%
	90068	5	11%
	90027	2	4%
	90038	2	4%
	Other	15	33%

To further examine the gender differences in ease of parking identified during the analysis of the UAS 379 survey, I included two questions related to parking preferences in the Hollywood survey I created (see Appendix D). Figure 13 shows the average importance of three parking-related factors by gender. On average, women considered the price and duration of parking to be slightly more important than men. When asked if their parking preferences change at night, approximately 66% of women and 25% of men said yes. “Proximity to destination” became more important for 50% of men and 67% of women, while the importance of “price of parking” decreased for both groups. Several respondents who lived in the area (the 90028 or 90038 zip codes) shared that they feel unsafe in the neighborhood after dark and value proximity over price. Therefore, the need to feel safe could be a factor in the rising importance of proximity to one’s destination at night.

Figure 14 shows the average responses to hypothetical statements regarding parking by gender. The average response to the first question from the women surveyed was 1.5, indicating that closer proximity to their destination would not be worth an increase in price despite its previously stated importance. On the other hand, both men and women agreed with the notion of paying a higher price in exchange for a longer parking duration, despite its relative unimportance in the previous question. Finally, both men and women, on average, agreed with the hypothetical possibility of adding more parking meters if it translated into more parking availability.

In addition to the hypothetical statements, respondents were asked to select one hypothetical allocation of revenue from parking meters. Twenty-five percent of respondents who drove opted to allocate all revenue from parking meters to the community in which the meters were located (the

66% of women and **25%** of men said their parking preferences change at night

Proximity to destination became more important for **50%** of men and **67%** of women

For most women surveyed, closer proximity to their destination would **not** be worth an increase in price

community). Approximately 19% of surveyed respondents elected to allocate all parking meter revenue to a city-wide general fund (city fund), and 50% chose to allocate half of the meter revenue to the community and half to the city fund. The range of responses demonstrates support for the flexible use of meter-generated revenue.

Figure 13: Average Importance of Parking Factors by Gender

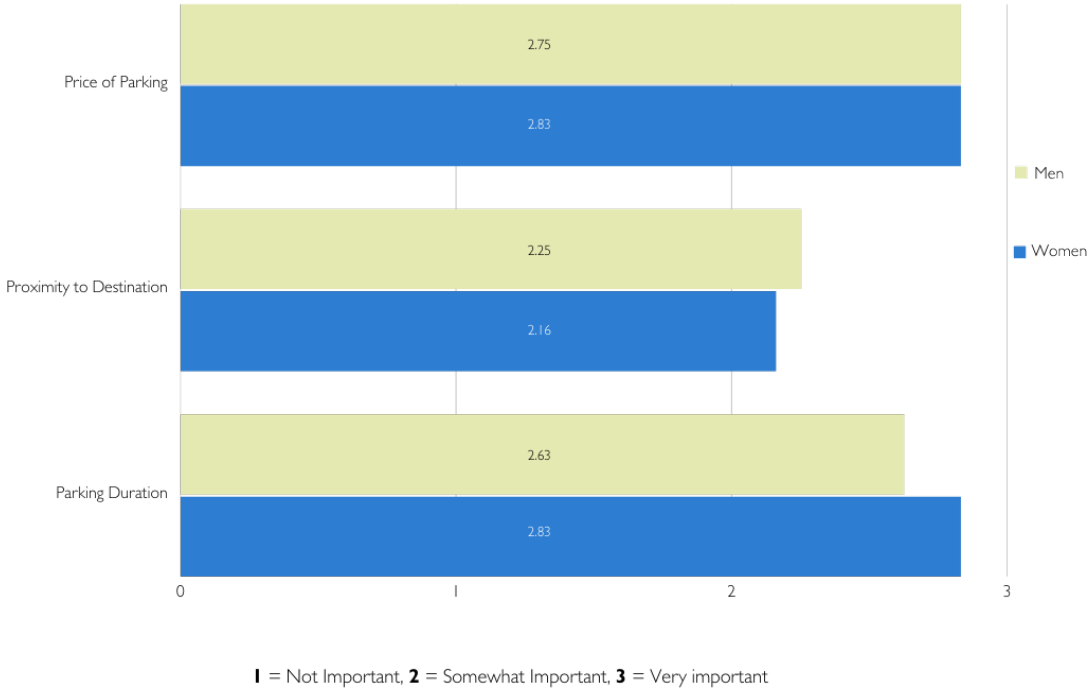
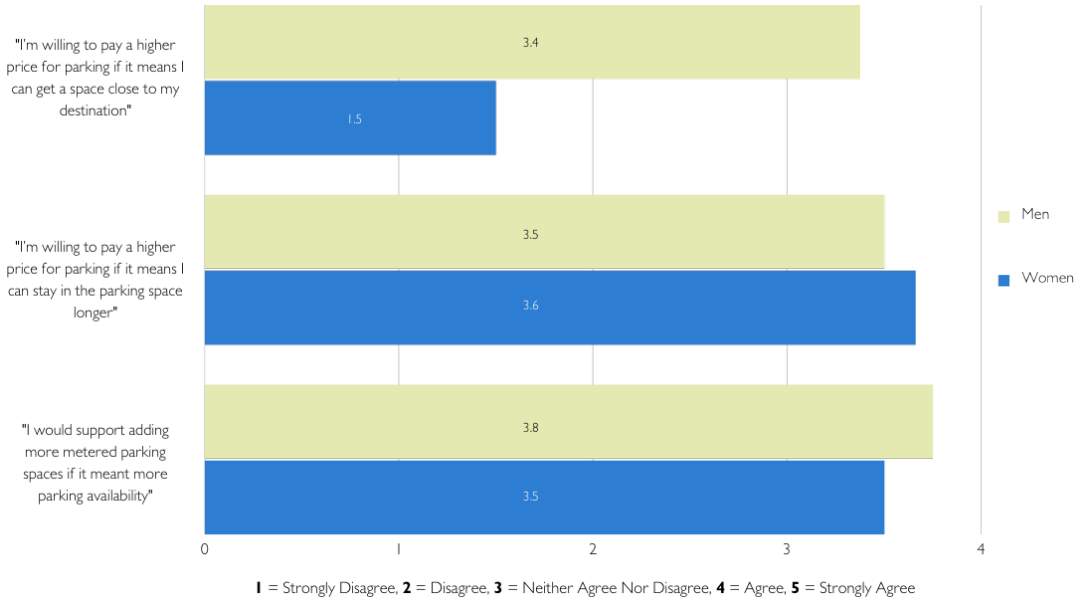
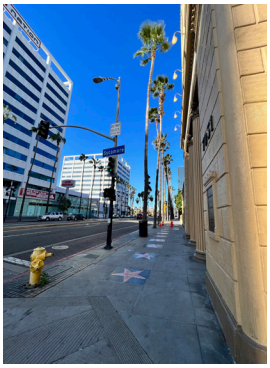


Figure 14: Average Responses to Hypothetical Statements about Parking Behavior



Observations

I used a walk audit worksheet created by AARP (see Appendix B) to assess the street design of each observation location. First, there were no public places to sit on any block faces. Some segments of each block had trees though most appeared for aesthetics, as the trees did not shade the blocks at peak hours. Finally, the lack of pedestrian-scale street lighting could make the streets feel less safe at night.



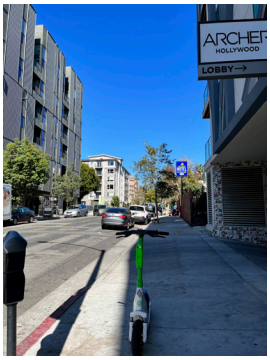
Hollywood Boulevard and N. Sycamore

Parking Behavior

The worksheet I created and used to observe parking behavior is in Appendix C. There were several notable observations. First, free parking was available either next to or near the market-priced parking on the blocks I observed.

Southwest corner of North Las Palmas Avenue

Second, consistent with the literature, there was no significant difference between observed driver gender and race and the use of market-priced parking (Chatman & Manville, 2018). Drivers of all races and genders consistently avoided meter payment: less than half (47.1%) of drivers paid their parking meter, approximately 44% did not pay, and almost 9% had a placard that exempted them from paying for parking. Additionally, many cars parked longer than allowed, despite posted two-hour parking limitations. Third, there were two instances in which the parking meter was not working, and despite the drivers' best efforts, they gave up and left the meter unpaid. During my site visits, I observed multiple drivers cruising for a free parking space and one driver u-turning to park in a free space despite several open meter spaces.



Scooter blocking path on North Las Palmas Avenue

Southeast corner of North Las Palmas Avenue

Case Studies

After data analysis, I reviewed how other U.S. cities are planning for and implementing various types of parking policies. The following three case studies highlight existing approaches to parking price, parking revenue allocation, and community collaboration. However, none of the case studies explicitly consider gender or racial equity.

Hoboken, New Jersey

Hoboken is a 1.3 square mile city approximately four miles west of New York City. The area was home to the Lenni Lenape indigenous peoples until 1658. Over the centuries, the City leveraged its riverfront location and proximity to New York City to establish itself as a transportation hub ("Explore Hoboken," n.d.). In the 1970s, a series of allegedly intentional arson fires displaced predominantly Latino residents in rent-controlled units, and more expensive housing was constructed in their place ("Hoboken Is Burning," 2019). Over the decades, Hoboken has struggled with gentrification. It is now home to a diverse array of businesses and approximately 60,000 residents with a median household income of $160,890.

In recent years, local business owners contacted the Hoboken Business Alliance (HBA) to ask how parking could be easier for patrons (City of Hoboken, 2023). Eventually, a request for meter price increases went before the City Council's Transportation and Parking Subcommittee. In December 2022, the Hoboken City Council adopted new meter rates ($3/hour) to increase on-street parking turnover in business districts. The new policy aims for 85% occupancy and is framed as a means to offer more flexibility to drivers and make it easier for them to visit local businesses (City of Hoboken, 2023). The City implemented higher prices on February 27, 2023. Hoboken is a notable case study as it successfully implemented an often controversial policy with the majority support of politicians, business owners, and residents.

The City established a partnership with ParkMobile in 2016 and is leveraging the company's technology to offer discounted parking rates for certain drivers in Business Districts. Residents will receive a 50% discount ($1.50/hour) on metered parking, and local businesses will receive a promotional code to share with customers. Residents will first input their license plate number into the ParkMobile app to receive the discount. The app will then evaluate if the driver has a valid permit and, if so, automatically reduce the parking price. In addition, businesses' promotional codes will give customers a 50% discount on metered parking for up to 25 transactions.

Although Hoboken's parking discounts will likely benefit higher-income drivers, given the City's demographics, the case study demonstrates how technology can be leveraged to offer discounts for different drivers. This approach could be used in LA to discount on-street parking for lower-income residents of color who often pay a higher proportion of their income on transportation expenses.

Portland, Oregon

The City of Portland has put community collaboration and expertise at the forefront of its transportation planning work. Given their negative effects on the environment and resident health, Portland recognized that addressing traffic and increased vehicle miles traveled was a top priority. City leaders wanted to explore how pricing strategies could be equitably designed and implemented across communities (Stampe, 2021). They called for volunteers to join a transportation task force that would bring together city staff, community leaders, and consultants. The task force had a 25-member limit, and all applicants had to live, work, worship, or attend school in Portland (*Moving to Our Future,* 2020). After a two-month open recruitment process, 19 community members were selected to participate. They first drafted an Equitable Mobility Framework, which was inspired by a similar document from the Greenlining Institute. Their work was also guided by the following three questions (*Moving to Our Future*, 2020):

1. What does equitable mobility look like in Portland?
2. What opportunities exist to advance equitable mobility?
3. Can we use pricing more intentionally to help advance equitable mobility and address the climate crisis?

The task force met monthly from January 2020 to Spring 2021, developing guidelines and near-term and longer-term recommendations for pricing vehicular travel in Portland (*POEM Final Report,* n.d.). Key recommendations included:

- Acknowledging that despite its importance, revenue generation should not be the top priority when implementing pricing strategies
- Policies should include exemptions for low-income households
- Pricing revenue should be reinvested to continuously expand and improve mobility options
- Pricing options that leverage technology should be designed to reduce barriers for community members with limited access to such services

The task force consistently emphasized that more in-depth community engagement is foundational for any future policies. In October 2021, the Portland City Council accepted the task force's final report. Portland is an example of how a city can leverage its power and resources to cultivate community knowledge. Their approach does not simply accept status quo approaches to community engagement but instead creates space for a diverse team to exchange ideas and develop local knowledge.

San Diego, California

Most cities funnel meter-generated revenue into a general fund (Shoup, 2016). However, in cities with Parking Benefit Districts (PBDs), a certain percentage of parking-generated revenue is spent on public services in the communities in which the meters are located (Shoup, 2016). Though the term PBD has appeared across academic literature (Shoup, 2016), the City of San Diego uses the term Community Parking District (CPD). San Diego established their first CPD—the Uptown Community Parking District—in 1997 and has since added three more (*CPD*, n.d.). The City first considered this policy approach as a means to alleviate long-term parking issues in densely populated neighborhoods (*Council Policy*, 2015).

While there are different ways to allocate revenue in a PBD, San Diego established a 55:45 ratio in which 55% of the generated revenue is allotted to the City, and 45% is allocated to the CPD (*Council Policy*, 2015). Each neighborhood that is part of the CPD will receive a revenue sum proportional to the revenue generated in that neighborhood. Revenue can be generated from valet parking fees, residential parking permits, meters, and "any other authorized fees obtained to regulate parking in a Community Parking District" (*Council Policy*, 2015). Although there are four CPDs across San Diego, specific parties can submit a request to form a new CPD, but they must use data to demonstrate how parking demand negatively impacts the community (*Council Policy*, 2015).

Each neighborhood in a San Diego CPD has its own subcommittee that develops proposals and budgets for local projects. Subcommittee members then present their proposals to the Planning Board. All residents and business owners within the proposed project area are notified of streetscape changes. In order to move forward, each project must go through a community review process and receive at least a majority approval (51%) from the community. The CPDs in San Diego demonstrate how localized approaches to a general policy can be implemented successfully and with community support.

Discussion of Findings

Each methodological approach used in this report works together to build a more comprehensive understanding of parking behavior and preferences in Los Angeles. Both surveys show that women and men express different parking preferences and experiences. For example, women have more difficulty finding parking in their neighborhood than men and place a higher importance on a parking space close to their destination at night. Nevertheless, this increased importance does not translate into a willingness to pay more for proximity. On average, both men and women agreed with the possibility of paying a higher price in exchange for a longer parking duration. Though one goal of market-priced parking is to keep a certain number of spaces open, drivers might be receptive to tiered pricing, through which they can stay longer at an increased hourly rate. Drivers were also open to the flexible allocation of meter-generated revenue and additional metered parking if it translated into more parking availability. However, it is likely that expressed preferences do not fully align with behavior. Most observed drivers did not pay for parking, and many surveyed drivers were not aware that the price of parking varied throughout Hollywood. The lack of awareness of varied parking prices could lead to drivers neglecting to pay for parking instead of seeking cheaper parking nearby.

Though the price of parking did not deter drivers of different genders and races, some improvements could be made to market-priced parking in Los Angeles to better meet the needs of women and low-income drivers of color. Before proposing policy recommendations, I return to the definitions of equity presented in the literature review and pose the following questions: Are the benefits and burdens of free and market-priced parking distributed equitably? Do people have what they need today? In the following section, I build upon my findings and present several policy and planning recommendations that address these questions.

9 Downtown LA, *Source: Pexels*

RECOMMENDATIONS

I draw on my findings to present seven recommendations that could redistribute the benefits of market-priced parking. The first three recommendations are based on my empirical work and relate specifically to gender and racial equity. The final four recommendations are based partly on my findings and established literature and could improve parking-related policies and planning approaches.

Recommendation 1: Develop a Plan for Consistent Community Outreach

Although the small sample size prevents generalizing the findings, it is worth noting that over 67% of surveyed respondents in Hollywood were unaware that the price of parking varied by block, despite the program's existence since 2018. Drivers cannot choose to park in a less expensive area if they do not know that it exists (Pierce & Shoup, 2013). As such, more community-based outreach and promotional efforts are needed to ensure community members and visitors are aware of variable parking prices. However, moving beyond "traditional" outreach methods of notifying community members about policies without soliciting feedback is vital. A plan for meaningful community outreach must include an avenue for community members to share ideas and submit feedback.

Recommendation 2: Implement Discounts at Parking Meters

All on-street parking meters should be equipped to offer drivers a reduced parking rate. While the Hoboken, New Jersey case study applied discounts to all drivers visiting a specific business district, the City of LA could utilize technology to offer discounts to particular groups. Offering specific drivers, such as lower-income drivers, households with one car, and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) participants, would reduce the financial burden of driving that disproportionately falls on lower-income drivers of color while not entirely exempting them from paying for the costs of their driving. In addition, eligible drivers could be enrolled automatically when signing up for WIC or registration renewal so as to avoid creating a logistic barrier to entry.

In this study, women surveyed in Hollywood acknowledged that proximity is important when parking, especially at night, but it is not necessarily worth a price increase. Discounts could allow drivers to park in spaces close to their destination that might otherwise have been avoided due to their price (e.g., lower-income drivers of color or women and gender minorities). An LA Express Park team representative explained that the technology is available to offer such discounts but currently only through pay-by-phone apps. Market-priced parking could become more equitable by moving beyond the exploration phase and leveraging technological capabilities to provide such discounts.

Recommendation 3: Improve Street Design and Public Transportation Systems

All recommendations should be implemented alongside improvements to street design and public transportation systems. During the in-person survey, several participants expressed their hesitation to park far away or even travel at night due to safety concerns. By improving the street design (e.g., adding pedestrian scale lighting), parking further away from critical destinations could be more appealing for drivers who want to pay a lower price for parking but are concerned about their safety, such as people of color, women, and gender minorities. In addition, improvements should be prioritized in lower-income communities that have historically borne the brunt of transportation-related emissions and often face the most challenges in moving around conveniently and safely (*Changing Lanes*, 2021).

Recommendation 4: Reconfigure Parking Policies to Accommodate Different Travel Behaviors

This research project has reaffirmed that men and women travel differently and have different parking-related needs. As uncovered in the survey analysis, some drivers value proximity to their destination over the price of parking, while others are most concerned with the price they pay for parking. Modifying the one-size-fits-all parking price approach could give drivers more flexibility in choosing where and how they park.

- Converting free long-term spaces to short-term parking spaces near destinations women frequent could accommodate the trip-chaining behavior established throughout the literature and make these trips more convenient for women.
- The City of Los Angeles published a 2035 Mobility Plan in which Program PK.5 Meter Pricing states to "establish demand based meter pricing to maximize efficient use of on-street meters" (*Mobility 2035*, 2016). The City should require a percentage increase in market-priced parking spaces and a percentage reduction in free on-street parking spaces annually (Alternatives, n.d.). Doing so would reduce the abundance of free parking and may deter drivers from avoiding paying for parking by seeking out adjacent free parking spaces.
- The average parking meter in LA makes about $1,000 annually (Gardetta, 2011). This research project found that many drivers are willing to pay a higher price for parking if it means they can stay in their parking spaces longer. Parking meters that allow drivers to pay a higher hourly rate the longer one stays in the space offer more flexibility while still capturing parking costs.

Recommendation 5: Establish Community Task Groups in LA Express Park Neighborhoods

In order to develop more equitable parking policies, the lived experience and expertise of community members must be incorporated into the planning process. First, adequate funding should be allocated to participatory planning efforts to ensure that community members are financially compensated for their efforts and that staff have adequate time for meaningful discussions (*Blue Line*, 2018). Next, the City should form committees to determine how to implement parking pricing equitably to suit the unique needs of each neighborhood. Much like the approach undertaken by the City of Portland, the City should call for community members who work, live, worship, or attend school in the neighborhood (*Moving to Our Future*, 2020). Though task groups should define their mission and objectives, their work could include defining what equitable pricing strategies mean in the context of their community. The long-term goal should be to implement participatory transportation planning processes across the City. However, the four neighborhoods with market-priced parking should be prioritized in developing pricing strategies and parking-related programs and policies.

Recommendation 6: Remove Barriers to Establishing Parking Benefit Districts

Figure 5 shows that parking meters are highest in lower-income areas with the lowest car ownership rates and a large percentage of BIPOC populations. As a result, people of color without cars are still surrounded by car-related pollution but not reaping any benefit from hosting metered spaces. In order to help redistribute the benefits and burdens of on-street parking spaces, the City should expedite the establishment of Parking Benefit Districts (PBDs). Program PK.6 in the 2035 Mobility Plan states that the City should "explore modifying some Neighborhood Parking Districts to permit the utilization of residential streets for metered commercial parking and direct revenue to specific neighborhood improvements" (*Mobility 2035,* 2016). Thus, establishing PBDs in communities with high percentages of zero-car households and high counts of parking meters would align with published City goals. Furthermore, as this research project and previous literature show, there will likely be support for such an initiative if a percentage of meter-generated revenue is funneled back into the community (Shoup, 2016). In any approach to PBDs, community members should lead the development of goals and revenue allocation alongside City officials.

Recommendation 7: Further Research

Although the Hollywood survey and observational data helped frame parking behavior and preferences, further research is needed to understand these two phenomena. Specifically, the parking preferences of lower-income drivers of color and women and nonbinary drivers must be studied more thoroughly. A limitation of this research project is that I did not conduct in-depth surveying of non-drivers. Their voices need to be incorporated into any participatory planning processes as often they bear the disproportionate impact of transportation-related projects. Finally, more research is needed to explore the potential impacts of adding more short-term parking, reducing the number of free on-street parking spaces, tiered pricing, and adding additional paid parking spaces recommended above.

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APPENDIX A

UAS Survey 379 LA County Resident Participant Demographics

	Demographic Characteristics	N	%
Total		1280	100%
Age	35-44	301	24%
	25-34	298	23%
	45-54	218	17%
	55-64	184	14%
	65 or older	184	14%
	18-23	93	7%
	No Response	2	0.1%
Education	Bachelor's Degree	342	27%
	Some College	304	24%
	High School Graduate or GED	173	14%
	Master's Degree	169	13%
	Associate's Degree	162	13%
	Less than High School	74	6%
	Professional or Doctorate Degree	56	4%
Income Level	0 to 24,999	305	24%
	25,000 to 49,999	284	22%
	50,000 to 74,999	211	16%
	100,000 to 149,999	186	15%

	150,000 or more	148	12%
	75,000 to 99,999	144	11%
	No Response	2	0.1%
Race	White Only	813	64%
	Asian Only	164	13%
	Black Only	105	8%
	Mixed	91	7%
	American Indian or Alaska Native Only	53	4%
	Hawaiian/Pacific Islander Only	27	2%
	No Response	27	2%
Sex*	Male	804	63%
	Female	476	37%
Household Vehicles	2 Vehicles	476	37%
	1 Vehicle	407	32%
	3 or More Vehicles	317	25%
	No Vehicles	65	5%
	No Response	8	1%
	Question not Asked	7	1%

Source: UAS 379 Survey
*Survey participants could select “Male” or “Female”

APPENDIX B

AARP Walk Audit Tool Kit Worksheet

AARP

AARP Walk Audit Tool Kit Worksheet

Sidewalks, Streets and Crossings

SINGLE-LOCATION AUDIT

Community Name: _____

Location/Street Name(s): _____

Audit date: _____ **Start time:** _____ **AM | PM** **End time:** _____ **AM | PM**

Posted speed limit(s): _____ **Do the motorists appear to be obeying the speed limit(s)?** _____

Total number of vehicle lanes: _____ **The street is:** ☐ one-way | ☐ two-way

If more than one lane: Does the roadway have ☐ a median and/or ☐ a pedestrian island?

The street has: ☐ no sidewalk ☐ no sidewalk but needs one ☐ no sidewalk but needs two
☐ partial sidewalks ☐ a sidewalk on one side of the street ☐ sidewalks on both sides of the street

YES | NO | OTHER Skip any statements that don't apply

THE SIDEWALK:

☐ ☐ ☐ 1. Is separated from the street by a barrier or buffer (a curb, grass, landscaping)
☐ ☐ ☐ 2. Is surfaced with a material that is smooth and consistent (e.g., or asphalt rather than bricks)
☐ ☐ ☐ 3. Is in good condition, without cracks or raised sections
☐ ☐ ☐ 4. Is free of obstacles (hydrants, utility poles, overgrown landscaping, trash receptacles)
☐ ☐ ☐ 5. Is free of interruptions from driveways (such as to/from homes, parking lots, etc.)
☐ ☐ ☐ 6. Is continuous (no segments are missing) and complete (it doesn't randomly end)
☐ ☐ ☐ 7. Is wide enough (at least 5 feet) for two people to walk side by side or pass one another
☐ ☐ ☐ 8. Has tactile ground surface indicators so pedestrians with vision impairment will know when the path is ending
☐ ☐ ☐ 9. Has a curb cut ramp (for use by wheelchairs, baby strollers, etc.) wherever it is interrupted by a street

THE STREET:

☐ ☐ ☐ 1. Has traffic lights and/or stop signs at intersections and crossings
☐ ☐ ☐ 2. The traffic lights and/or stop signs are clearly visible to drivers and pedestrians
☐ ☐ ☐ 3. Has crosswalks
☐ ☐ ☐ 4. The crosswalks are well marked and clearly visible to drivers and pedestrians
☐ ☐ ☐ 5. Has signage alerting drivers to the presence of pedestrians
☐ ☐ ☐ 6. Has a designated bicycle lane
☐ ☐ ☐ 7. Has a pedestrian crossing signal, also called a beacon (if yes, complete the next section)

THE PEDESTRIAN CROSSING SIGNALS:

☐ ☐ ☐ 1. Are working
☐ ☐ ☐ 2. Have a "push-to-walk" mechanism, meaning pedestrians can stop vehicle traffic
☐ ☐ ☐ 3. Have audible prompts for people with vision impairment
☐ ☐ ☐ 4. Are placed in appropriate locations (if not, make note of where more are needed)
☐ ☐ ☐ 5. Provide enough time to cross (indicate the amount of time: _____ minutes _____ seconds)
☐ ☐ ☐ 6. Provide suitable opportunities to cross (indicate the amount of time pedestrians must wait for a traffic light change in order to cross: _____ minutes _____ seconds)

Consider using the "Build a Better Block" worksheet as well.

Walkability of the area, based on the findings above: ☐ **Great** ☐ **Acceptable** ☐ **Mixed** ☐ **Poor**

Visit *AARP.org/WalkAudit* to download, print, copy and/or share additional worksheets.

Source:AARP

APPENDIX C

Observation Worksheet

Study Area: _____ Weather/Temp: _____ Date: _____
Street Name(s): _____ No. of Meters: _____
Start Time: _____ Cars Parked at Start: _____ No. of Unpaid Meters: _____
End Time: _____ Cars Parked at End: _____ No. of Unpaid Meters: _____

Street	Arrival Time	Gender*	Race*	Car Occup.	Children (Y/N)	Paid (Y/N/P) **	Make	Model	Depart Time	Add. Notes

*Gender and race are assumed
** P = Permit / Placard and implies exemption from payment

APPENDIX D

Hollywood Travel Behavior Survey

1. **How many days a week do you drive a car?**

- ☐ I do not drive
- ☐ Once or twice a week
- ☐ Several times a week
- ☐ Every day
- ☐ Unsure [**DO NOT READ**]

1a. Why do you not drive?

- ☐ Too expensive
- ☐ Environmental Concerns
- ☐ Lack of parking
- ☐ Prefer to use other modes of transportation
- ☐ Don't have a driver's license
- ☐ Other: _____

[Continue to Question 7]

2. **Before this interview, were you aware that the price of metered parking varies by block in this neighborhood?**

- ☐ Yes
- ☐ No

3. **How important are each of the following to you when choosing a place to park?**

Ranking Scale	1 = Not Important	2 = Important	3 = Very Important
Price of parking			
Proximity to your destination			
How long you are able to park for			

4. **Do any of your previous answers change if you are parking at night?**

- ☐ Yes [**Ask 4a below**]
- ☐ No

4a. How important are each of the following to you when choosing a place to park at night?

Ranking Scale	1 = Not Important	2 = Important	3 = Very Important
Price of parking			
Proximity to your destination			
How long you are able to park for			

5. Imagine you could decide where the revenue from parking meters goes. Which of the following would you prefer?

- ☐ Invest the revenue into the community in which the meters are located
- ☐ Invest the revenue into a city-wide general fund
- ☐ Invest half into a city-wide general fund and half into the community
- ☐ Don't know, no preference [**DO NOT READ**]

6. How would you respond to the following hypothetical statements?

Ranking Scale	1 = Strongly Disagree	2 = Disagree	3 = Neither Agree Nor Disagree	4 = Agree	5 = Strongly Agree

____ "I'm willing to pay a higher price for parking if it means I can get a space closer to my destination"

____ "I'm willing to pay a higher price for parking if it means I can stay in the sapce longer"

____ "I would support adding more metered parking spaces if it meant more parking availability"

The final three questions are for statistical purposes only

7. What is your home zip code? _____

8. What is your gender identity?

- ☐ Male
- ☐ Female
- ☐ Prefer to self-describe (please specify): _____

9. What is your race/ethnicity? (Please select all that apply):

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Hispanic / Latino
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White
- ☐ Other (Please specify):_____
- ☐ Prefer not to state