

2023



PATIENT PARKING AT THE PENN MEDICINE PAVILION BUILDING
CREDIT: PENN MEDICINE

University City, Philadelphia

PARKING INVENTORY



Introduction

In 2023, the Philadelphia City Planning Commission (PCPC) completed an update of the University City Parking Inventory, a comprehensive review of off-street public parking spaces in the vicinity of University City. The inventory was conducted to better understand changing parking supply and demand associated with increased institutional, commercial, and residential development west of the Schuylkill River. This report follows up on the original 2017 baseline inventory to continue the assessment of patterns and trends in the characteristics of the University City parking supply, focusing on capacity, occupancy rates, and prices. This inventory focuses only on public parking facilities in an area bounded by Spring Garden Street/Haverford Avenue (north), 45th Street (west), and the Schuylkill River (south and east). (The boundaries were slightly adjusted to align with 2020 US Census tracts.) The University City Parking Inventory can serve as a companion to the Center City Parking Inventory, which is completed every five years.

This report can equip policy makers, community members, developers, and parking facility operators with information about an issue that is often the source of debate: costs and congestion related to parking within University City. The information offered in this report can help guide decisions to ensure that parking is provided and priced at rates that meet the needs of commuters, visitors, businesses, and residents, while also advancing the City's broader goals of economic development and sustainability.

Parking supply has many implications for the accessibility and built form of the University City area and has direct impact on neighboring residential areas. Parking remains a necessary facet of university and hospital operations, and neighborhoods feel burdened when demand for parking spills over into residential streets. However, an over-supply of low-priced parking can serve as an incentive to drive personal vehicles into the district, which increases traffic congestion, and decreases demand and support for a robust public transit network. A further consequence is the rise in development of auto-oriented buildings, resulting in higher development costs and reduced walkability due to increased conflicts between pedestrians, bicyclists, and automobiles, along with negative impacts on the public realm.

A well-managed parking supply in University City is one that achieves a balanced response to the competing demands associated with ease and equitability of accessibility, support for alternative modes of transportation, and the advancement of neighborhood vitality. It is one that is priced and available such that it encourages walking, biking, and the use of public transit without overly burdening users who need to quickly access destinations by car. When on-street parking is priced competitively with garages or is dedicated for residential permit parking, there is less incentive to "circle" in search of free or cheap parking. Further, when public parking is managed in a way that promotes higher density development and

Credits

Authors:

David Kanthor, Transportation Planner
Nathan Grace, Transportation Planner
Mason Austin, Transportation Planner
Daniel Farrell, Transportation Planner
Olivia Jiang, Transportation Intern
Leah Krasner, Transportation Intern

Contributors:

Office of Transportation and Infrastructure Systems
University City District
Philadelphia Parking Authority
Delaware Valley Regional Planning Commission

alternative modes of transportation, associated social, economic, environmental, and health benefits can be achieved. Recognizing that the automobile continues to play an essential role for many residents and businesses, University City's parking inventory must continue to provide for a total supply and distribution of parking that accommodates future market demand, yet is compatible with other public objectives. Industry experts suggest that overall occupancy rates of 85% to 95% are an indication of conditions where parking is supplied and priced properly.¹

Shift work patterns in University City hospitals and universities can lead to congested roads and parking facilities at specific times of day when shifts begin and end. Businesses are interested in ensuring that customers have convenient access to their establishments, neighboring residents often complain that parking demand spills out into the neighborhoods. The City continues to support non-vehicular modes of transportation to reduce carbon emissions, promote equity and safety, and support the dense and growing urban environment which should also reduce the demand for parking.

These data were assessed relative to University City as a whole, as well as in the context of its various component neighborhoods. Following the analysis, the report provides conclusions and best practices for the future of University City's parking supply.

1. Shoup (2005) *The High Cost of Free Parking*



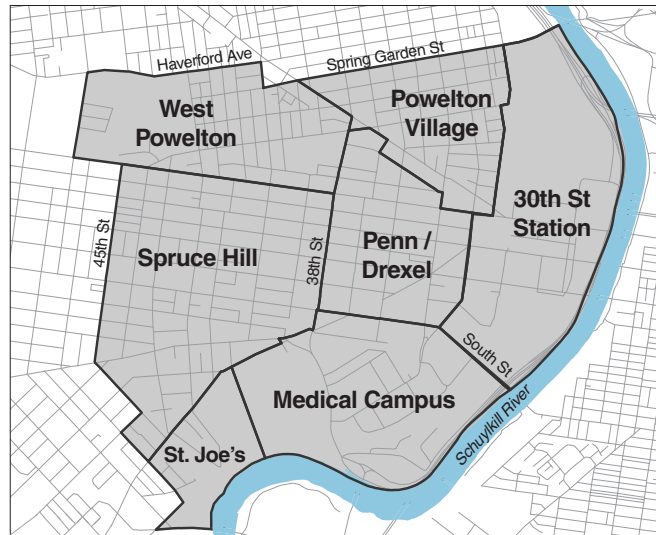
Context

Over the past decade, University City has seen significant growth, hosting some of the city's largest academic, research, and commercial institutions. The district employs nearly 77,000 workers in the 30th Street Station, Penn/Drexel, Medical Campus, and Saint Joseph's University areas, and is flanked by commercial corridors and diverse residential neighborhoods, which include Powelton Village, West Powelton, and Spruce Hill (see map to the right). There are over 40,000 students enrolled across four colleges and universities and office occupancy is high at 95.5%. Over the past decade, the area has witnessed significant development, with more than 10 million square feet of new construction or major renovations. This includes the construction of nearly 4,000 multi-family housing units.

In just 7 years since the 2017 University City Parking Report was published, the area has witnessed substantial development, with more than 10 million square feet of new construction or major renovations worth over \$45 million in real estate value. Among the noteworthy projects are the 1.5 million square foot HUP Pavilion in the Medical Campus, the mixed-use Living & Learning Commons (LLC) at St. Joe's University featuring 426 dorm rooms, and 30 University Place, the world's first commercial office building certified LEED V4 Platinum, spanning 170,000 square feet. This development trend is poised to continue with tens of millions square feet of new development projects planned, in addition to substantial investment expected in Schuylkill Yards and the expanding campus of CHOP.

University City is host to a variety of transportation options, including one of the busiest Amtrak stations in the country at 30th Street Station, SEPTA's Market Frankford El, trolley, and bus network, and the LUCY shuttle that circulates within the University City area. The University City District created a Transportation Management Association, which serves as an organization dedicated to solving transportation demand management in University City. Parking issues in the University City area mainly involve striking a balance between the parking that is needed for employees, visitors, and residents, and managing the impacts that over-abundance of parking can have on real estate values, walkability, safety, and congestion of the road network. Shift in work patterns in University City hospitals and universities can lead to congested roads and parking facilities at specific times of day when shifts begin and end. Businesses are interested in ensuring that customers have convenient access to their establishments and neighboring residents often complain that parking demand spills out into the neighborhoods.

Study Area



Impact of COVID-19

Due to the COVID-19 pandemic, PCPC assessed that it was necessary to postpone the 2022 parking inventory until 2023. Parking patterns similar to pre-COVID returned in mid-2022, but to ensure that the capacity, occupancy and cost data would remain relevant, PCPC waited until 2023 to invest its time and resources into surveying parking facilities. While parking needs in University City have resumed at pre-COVID levels, SEPTA ridership has not. Work from home has greatly increased as has additional reliance on Indego bikeshare, and overall, the city has experienced a reduction in reliance on rideshare.

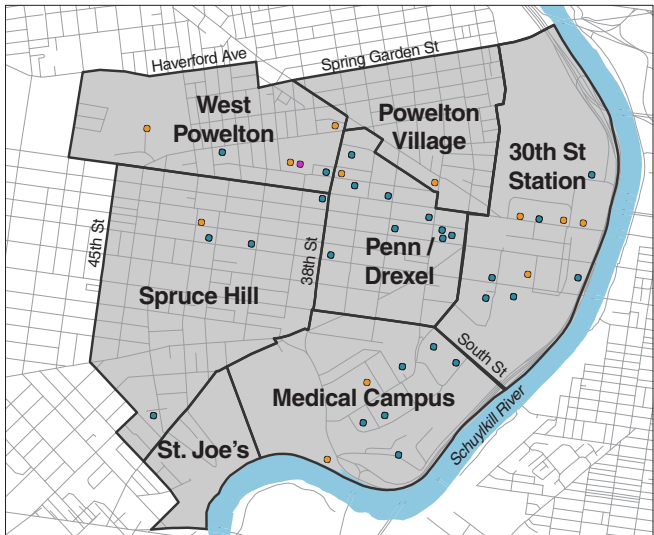


Parking Facility Capacity

The 2023 University City Parking Inventory included 30 public facilities, totaling 11,576 publicly available parking spaces. Due to development patterns and the transfer of public facilities to private operations, there are approximately 2,900 fewer publicly available parking spaces compared to those in 2017. For instance, the Wood Center Garage on CHOP's campus, now closed, contained 767 public parking spaces in 2017. Additionally, the combined parking lot at 3001 and 3025 John F Kennedy Blvd in the 30th Street district, which had 363 parking spaces in 2017, is now closed due to ongoing construction developments at those sites. Penn/Drexel is the only neighborhood that witnessed an increase in its public parking capacity from 2017 to 2023. Among these neighborhoods, the ones with the highest public parking capacity are the Medical Campus (3,986) and Penn/Drexel (3,420), while St Joseph's and Powelton Village have no parking facilities with 30 or more spaces. The Medical Campus (3,986) boasts the highest percentage of public parking spaces, representing 35 percent of the total available in University City.

Parking Facilities By Status

- Public Parking Facilities
- Parking Facilities, closed or no longer public
- Parking Facility, under construction



Source: Philadelphia City Planning Commission, 2023

Parking Facilities By Capacity

Area	2017 Public Capacity	2023 Public Capacity	% Change
30th St Station	4,343	2,591	-40.3%
Penn/Drexel	2,617 ²	3,420	30.7%
Medical Campus	4,738 ²	3,986	-15.8%
West Powelton	1,538	576	-62.5%
Spruce Hill	1,527	1,003	-34.3%
St. Joseph's	0	0	0.0%
Powelton Village	86	0	-100%

² These 2023 numbers were revised from those shown in the 2017 report by removing parking garages/spaces that were incorrectly included in 2017 because they were designated only for patients and employees, not available to visitors. This updated methodology ensures that the data from the two years are comparable.

Source: Philadelphia City Planning Commission, 2023

The 2023 University City Parking Data

The survey conducted as part of the 2023 University City Parking Inventory included public facilities that contained 30 or more spaces. A facility is considered public if it is accessible to anyone interested in parking at the location and includes posted rates for the cost to park. Some facilities include both private and public parking, such as a garage with certain levels gated off and reserved for specific clients, and only the spaces available for public parking were surveyed. All parking facilities were surveyed in Spring 2023 on weekdays during daytime hours.

In 2020, the US Census made a change to a census tract in University City. Therefore, in 2023, PCPC adjusted the western edge of the study area of the University City Parking inventory along 45th Street to align with the new census tract boundaries.



Penn Presbyterian Medical Center Garage

Left: Rendering, 2021.
Right: Garage under construction, 2023.

Source:
Philadelphia City Planning Commission

Parking Facility Occupancy

During daytime hours in Spring 2023, PCPC surveyed each of the public facilities in University City containing 30 or more parking spaces (30 sites total). The occupancy rate for the 30 sites surveyed was 74%, equaling 8,518 spaces out of 11,576 publicly available parking spaces. This is an approximately 3.5% increase from 2017, primarily due to the decrease in occupied parking spaces. West Powelton had the lowest public occupancy rate at 58.3%. Excluding Powelton Village which had the only public garage removed from 2017, all the other neighborhoods had capacity changes within 10% of the 2017 rate, indicating that there weren't significant capacity changes.

Occupancy Rate By Area

Area	Public Capacity #	Public Occupancy #	Public Occupancy %
30th St Station	2,591	1,562	60.29%
Penn/Drexel	3,420	2,751	80.44%
Medical Campus	3,986	3,142	78.83%
West Powelton	576	336	58.33%
Spruce Hill	1,003	727	72.48%
St. Joseph's	N/A	N/A	N/A
Powelton Village	N/A	N/A	N/A
ALL University City	11,576	8,518	73.6%

Area	2017 Public Occupancy %	2023 Public Occupancy %
30th St Station	61.3%	60.29%
Penn/Drexel	79%	80.44%
Medical Campus	73%	78.83%
West Powelton	64.8%	58.33%
Spruce Hill	63.4%	72.48%
St. Joseph's	N/A	N/A
Powelton Village	91.9%	N/A
ALL University City	70.1%	73.6%

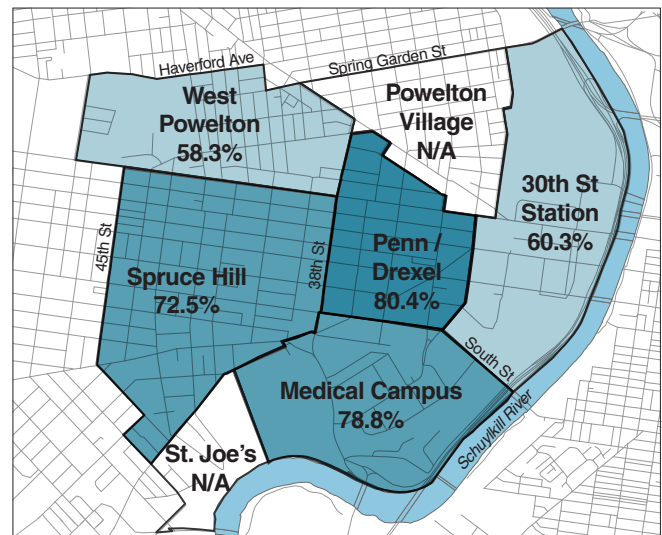
Source: Philadelphia City Planning Commission, 2023

Penn/Drexel (80.44%) and the Medical Campus (78.83%) had the highest occupancy rates in University City, but they still had 544 and 844 parking spaces available during the daytime, respectively. Every neighborhood's parking capacity was below the optimized rate of 85%-95% for efficient parking facility operations indicating that the public parking facilities in University City may still be underutilized. In 2023, we surveyed 15 fewer public parking facilities than in 2017 due to facilities being closed, under construction, transferred from public to private use, or otherwise inaccessible.

Over the past six years, University City has witnessed a significant amount of development that has resulted in more residents and employees in the neighborhood, which could impact the demand for parking. This trend is expected to persist with the long-term developments planned for the neighborhood, which include uCity Square, Schuylkill Yards, CHOP's expanding campus, and Amtrak's 30th Street Station District Plan.³

³ See Page 4

Public Daytime Occupancy



Source: Philadelphia City Planning Commission, 2023

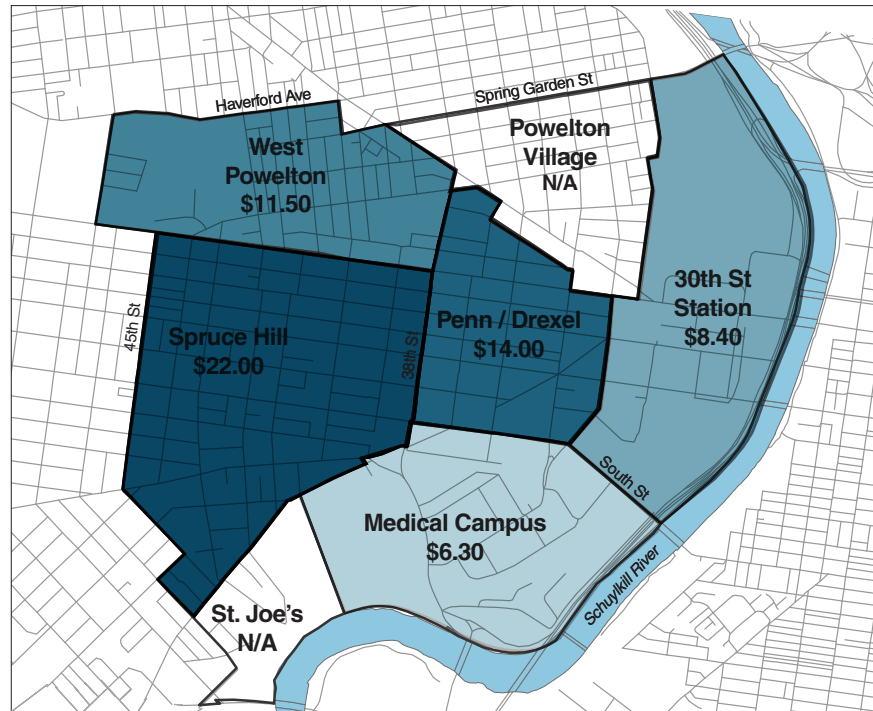
Parking Facility Rates

The map on the right displays one-hour parking rates for public facilities in each of the University City neighborhoods. Hourly parking costs range from \$6.30 to \$22, with an overall average of \$9.03. The Medical Campus institutions provide subsidies for parking, resulting in the neighborhood having the lowest average hourly rate of \$6.30. Conversely, Spruce Hill has the highest one-hour rate at \$22.00. Cheaper or similarly priced on-street parking may incentivize visitors to choose it over more expensive public garages or lots.

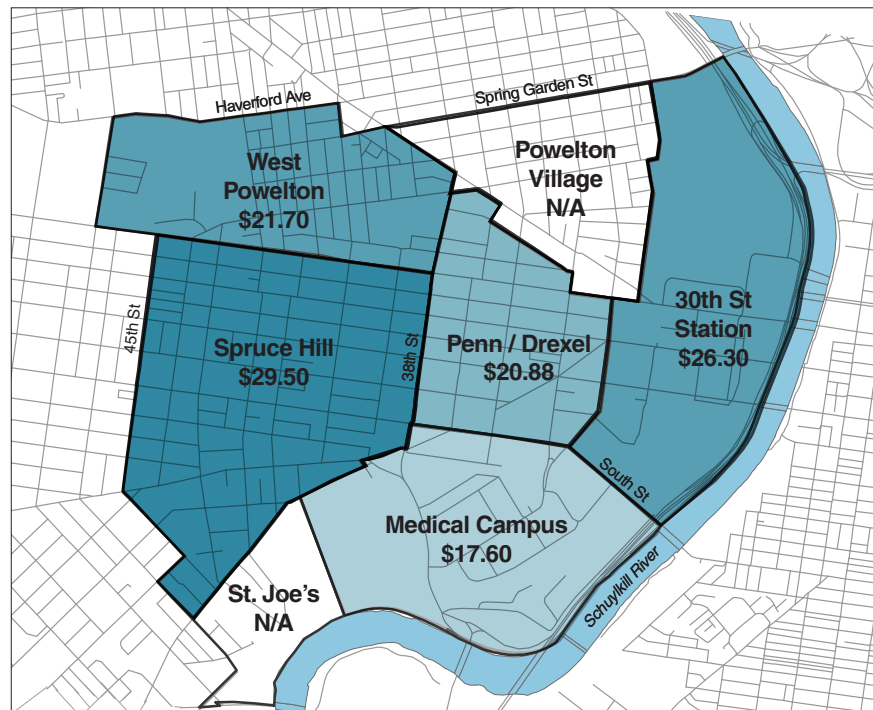
For all-day parking, rates in University City's public facilities vary from \$17.60 to \$30 per day, with an average cost of \$22.38. Spruce Hill has the highest all-day rate, while the Medical Campus offers the lowest average rate, typically subsidized for patients and visitors.

St. Joseph's University does not contain any public lots that meet the criteria of this study. Instead, the university offers parking permits to students and employees on a first-come, first-served basis. Full-time faculty and students pay \$250 for a parking permit, while part-time faculty and students pay \$75.

Average 1 hour rates for public parking facilities



Average all day rates for public parking facilities



Parking Rates

Public Parking Rates

Includes Parking Tax Rate of 22.5%

Neighborhood	Hourly Rate Range	Hourly Rate Average	Daily Rate Range	Daily Rate Average
30th St Station	\$2.50 - \$16	\$8.30	\$15 - \$35	\$26.30
Penn/Drexel	\$4 - \$25	\$15.00	\$15 - \$31	\$20.88
Medical Campus	\$4 - \$13	\$6.30	\$15 - \$20	\$17.60
West Powelton	\$10 - \$13	\$11.50	\$20 - \$24	\$21.70
Spruce Hill	\$17 - \$25	\$22	\$17 - \$42	\$29.50
St. Joseph's	N/A	N/A	N/A	N/A
Powelton Village	N/A	N/A	N/A	N/A
All University City	\$2.50-\$25	\$11.78	\$15-\$42	\$22.38

Source: Philadelphia City Planning Commission, 2023

Comparison to Center City*

When compared to the 2022 Center City Parking Inventory, University City has fewer public facilities (30 vs 183), lower capacity (11,576 vs 45,898) and functionally the same daytime public parking occupancy rate (73.6% vs 74%). On average, University City facilities charge \$4.41 less per hour than Center City facilities and \$8.71 less per day. University City differs from Center City in that it has more "free" parking options, including abundant accessory lot parking at stores, such as Rite Aid, and unmetered, unpermitted on-street parking options, both of which are rarely found in Center City.

*Center City parking rates were collected in February 2020 prior to COVID-19 whereas the parking capacity was updated when the Central Philadelphia Parking Inventory was released in 2022.

Comparison with Center City

Capacity, Occupancy & Rates

Neighborhood	Number of Public Facilities	Public Facility Capacity	Public Daytime Occupancy	Average rates	
				One-Hour	All Day
University City	30	11,576	73.6%	\$9.03	\$17.90
Center City	183	45,898	74%	\$13.44	\$26.61

Source: Philadelphia City Planning Commission, 2023



Parking Permits and Vehicle Registration

While the 2023 University City parking inventory focused only on public parking facilities, it is important to understand the wider parking landscape. Given that drivers often have no inherent preference between on-street and garage parking, the pricing and availability of on-street spaces plays a very significant role in determining the usage of garage parking spaces (and vice-versa). The Philadelphia Parking Authority (PPA) manages the Residential Parking Permit (RPP) program, through which residents in eligible areas can purchase parking permits that exempt vehicles from meter and time limit restrictions on posted blocks. These permits attempt to assist residents in finding parking spaces near their home. Vehicles with residential parking permits may only park in the specific zone where they are registered. University City includes both District 2 and 3. Between 2016 and 2022, District 2 experienced a 46.7% increase in parking permits issued and District 3 experienced a 17.1% increase. Between 2020 and 2022, the number of residential parking permits issued for districts 2 and 3 within the 19104 zip code boundary, which is similar to the study area, increased from 1,931 to 2,221. Based on the 2017 analysis of on-street parking spaces, the number of parking permits issued was 115% of the number of permit parking spaces available.

The number of cars registered to addresses within the study area serves as a key measure of parking demand in residential neighborhoods. As of 2022, the study area encompassed 5,153 light-duty vehicles registered in Pennsylvania. Nearly half of these registered vehicles are located in the Spruce Hill neighborhood, while only a small number of cars were registered in the Medical Campus area.

During COVID, two major influences on parking occurred: the increase in reliance on personal vehicles and the increase in virtual work, both of which had an associated decrease in transit use. Although the PennDOT vehicle registration data shows 5,153 cars registered in Pennsylvania, many additional cars are parked in the area with out of state license plates, many of whom are students whose cars may be registered at their parents' addresses. The prevalence of working from home has also affected vehicle volumes and the overall demand on parking; while medical institutions have returned to normal staffing for in-person appointments, many administrative and other professional services are able to be performed remotely.

Cars, Vans, and Small Trucks Registered in PA

Area	2022
30th St Station	319
Penn/Drexel	353
Medical Campus	25
West Powelton	1,291
Spruce Hill	2,336
St. Joseph's	165
Powelton Village	664
Total	5,153

Source: DVRPC, PennDOT



Residential Parking Permit

To be eligible for a Residential Permit Parking sticker, a vehicle must have Pennsylvania license plates and be registered and insured to a home address within the area's permit parking district. Applicants must provide the PPA with proof of vehicle registration and insurance; along with proof of residency in the form of the following: driver's license, lease or recent utility bill in applicant's name. The vehicle registration requirement can be waived for a company car (including a leased company car), or an applicant is in the military service.

The annual fee for a permit is per household:

- 1st vehicle: \$35
- 2nd vehicle: \$50
- 3rd vehicle: \$75
- 4+ vehicle: \$100.00 each

Residential Permits Issued

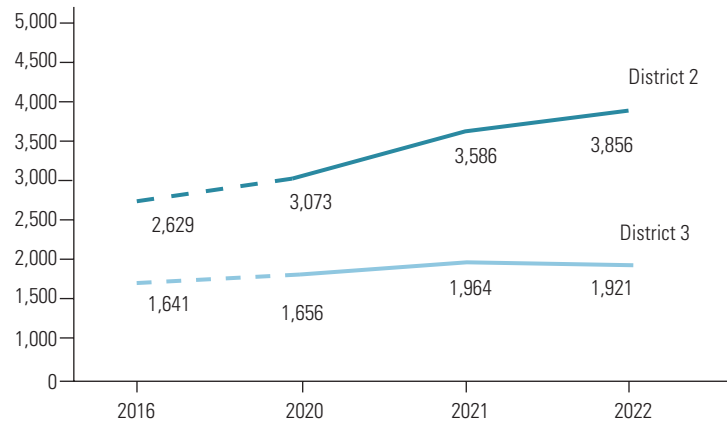
RPP Districts 2 & 3 within 19104

Year	District 2	District 3
2020	919	1,012
2021	956	1,168
2022	1,022	1,199

Source: Philadelphia Parking Authority

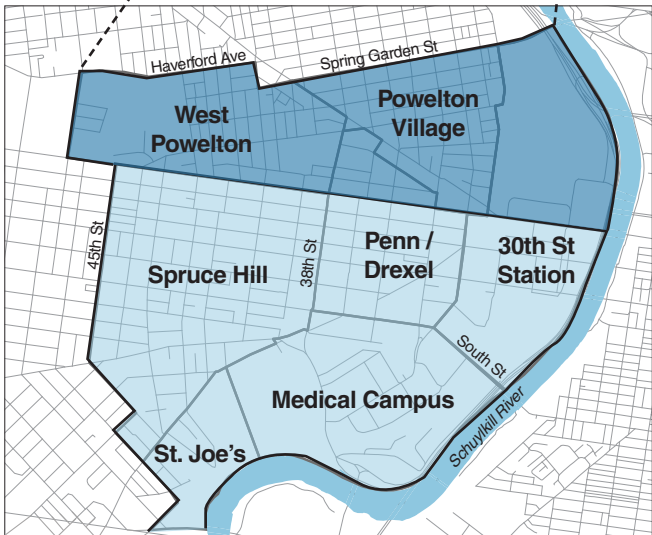
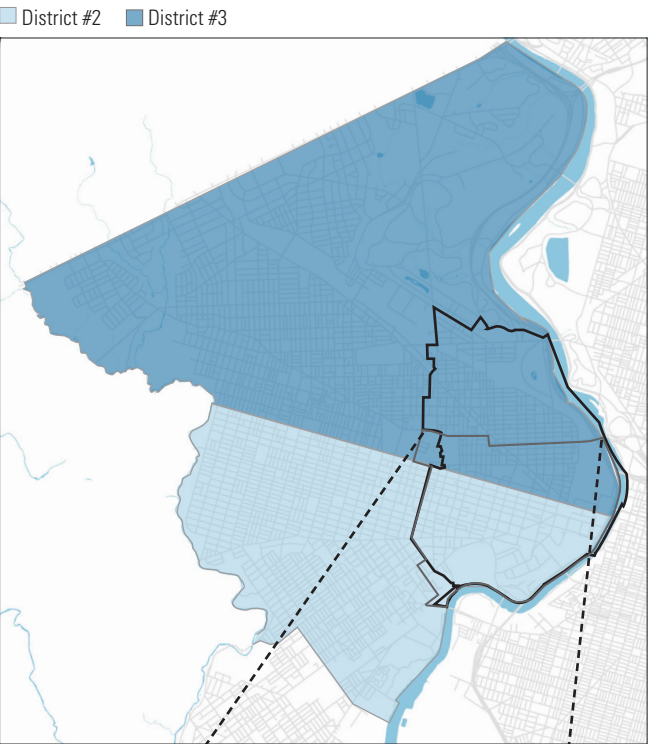
Residential Permits Issued

Entire RPP Districts 2 & 3



Source: Philadelphia Parking Authority

PPA Parking Districts within 19104



Source: Philadelphia City Planning Commission, 2023

Transportation Alternatives

University City is well-served by transportation infrastructure, including alternatives to driving and parking cars. Public transportation, train connections, bicycle lanes, and car and bicycle sharing are all readily available in the study area.

At 30th Street Station, 50,000 travelers a day use AMTRAK, SEPTA Regional Rail service, and New Jersey Transit trains to get to and from University City. Additional service by the SEPTA Market-Frankford El, buses, and trolleys creates a well-connected transit network to the hub for employment, education, medical services, and commercial activity. Recently, New Jersey Transit added bus service to 30th Street Station to connect commuters from South Jersey to this employment center. In addition, the Loop through University City, known as the LUCY Shuttle, has provided door-to-door service to University City institutions since 1999, with daily ridership at just under 15,000 passengers per day. While the loop has suffered due to low ridership and infrequency of buses during COVID, the shuttle ridership has rebounded to nearly 50% of its pre-pandemic levels.

The plurality (46%) of University City employees reside in Philadelphia. Census data suggests that a significant majority of these Philadelphia resident employees commute to work using alternative modes of transportation, such as walking, biking, or taking transit, rather than driving. Only 16% of University City residents commute by private automobile, a much smaller share than that of the region as a whole. It highlights a preference and a need for continued investment in alternative modes of transportation in University City for these residents, as well as for University City workers that live in locations conducive to walking, biking, or transit.

Indego Annual Ridership University City Study Area Trips

Year	Annual Ridership
2019	89,241
2020	87,334
2021	117,910
2022	127,008

Source: Indego

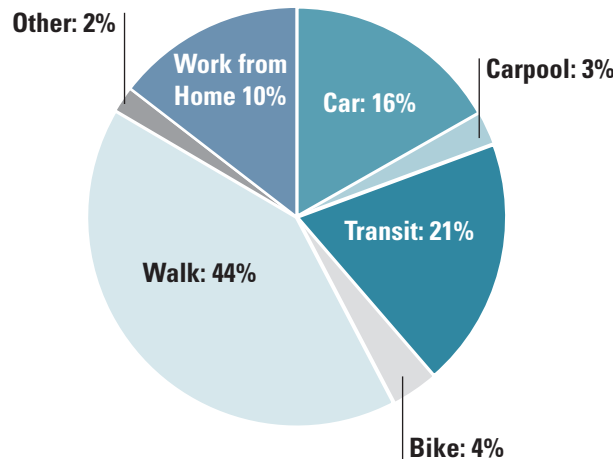
LUCY Annual Ridership

Year	Annual Ridership
2019	32,908
2020	8,575
2021	10,074
2022	14,710

Source: SEPTA, 2022

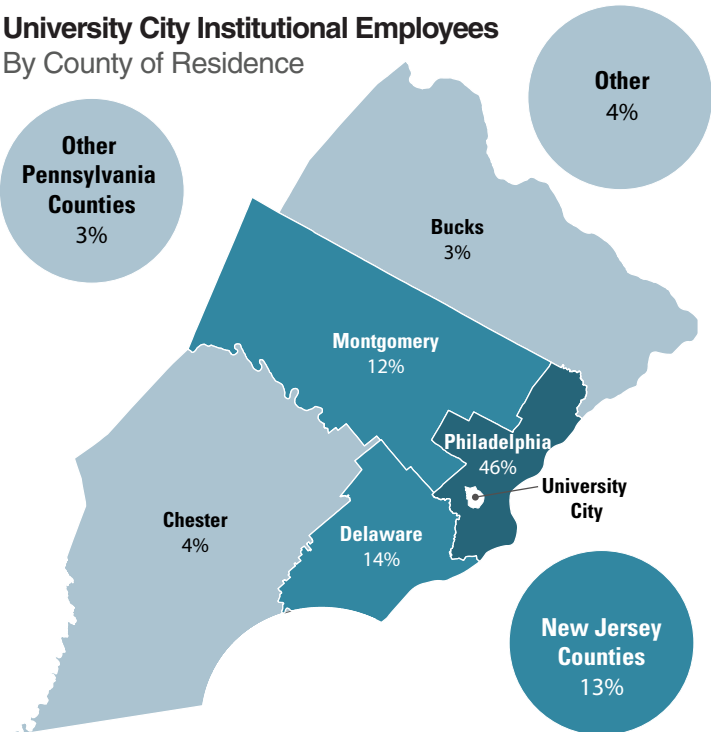
The bicycle network in the University City study area spans over 11 miles of bike lanes, including the Walnut Street protected bike lane which was installed in 2023. Indego bike share has seen consistent expansion, with 28 stations now available within the study area. Additionally, there are 24 ZipCar locations (stations) accessible to ZipCar members and a total of 54 ZipCar parking spaces.

Means of Transportation to Work Residents of University City Study Area



Source: US Census, American Community Survey 5-Year Estimates 2020

University City Institutional Employees By County of Residence



Source: University City District, 2023

Conclusions

PCPC conducted a parking facility inventory in University City in response to the potential increase in parking demand driven by ongoing institutional, commercial, and residential development. The 2023 study showed just over 11,500 off-street parking spaces, with a current occupancy rate of 74%, below the optimal 85% for efficient parking facility operations.

Areas closer to the universities and the medical centers primarily rely on off-street parking facilities due to limited on-street parking options. Parking facility occupancy in these neighborhoods range from 60.3% to 82.8%, suggesting underutilized parking in the garages, likely influenced by high parking pricing as compared to cheaper on-street options. The relatively high cost of parking in garages and lots may encourage travelers to seek alternative modes of transportation but may also be leading drivers to cruise for cheaper on-street parking, contributing to congestion. Conversely, while lowering off-street parking rates or raising on-street rates could shift drivers to a better utilization of off-street facilities and reduce cruising of on-street spaces, it could also induce additional car trips to these areas contributing to congestion.

Adjacent residential areas with fewer off-street parking facilities may experience tighter on-street parking constraints; to address this, many blocks have adopted residential parking permit (RPP) restrictions to ensure that there is available parking for residents. The demand for on-street parking in these neighborhoods seems to be exceeding or nearly reaching the supply of curbside spots, especially overnight. This could result in spill-over effects, as University City residents start parking in adjacent neighborhoods. This phenomenon is made possible by the expansive geography of RPP Districts, which extend well beyond neighborhood boundaries. Parking on most of the blocks within these districts does not require a RPP, which also may encourage some West Philadelphia residents living further away to drive into University City and park on the street. As with the areas closest to University City's institutions and employment centers, building additional off-street parking capacity would not necessarily relieve the pressure on on-street parking, as it would likely induce additional demand. That is, the easier it is to find a spot, the more it would encourage more driving and auto ownership; simultaneously, the driveways for parking lots and garages often reduce the supply of on-street spaces.

Improved on-street parking management in residential neighborhoods (which could include making more blocks subject to RPP restrictions, amending the boundaries of RPP districts, changing the prices of permits, and implementing dynamic pricing for parking meters), could discourage long-term parking by residents of neighboring streets and by cars that are not registered locally. This strategy aims to make finding on-street parking easier for residents and promote higher turnover of customers for local businesses. University City District (UCD), parking operators, institutions, City agencies, and PPA could collaborate to effectively manage existing on-street and off-street parking while promoting alternative transportation options to, from, and within the neighborhood. This collaboration should establish efficient and effective parking policies that meet the needs of residents, visitors, and businesses in University City.

PCPC is monitoring the development and deployment of electric and autonomous vehicles, which will likely be the focus of subsequent parking studies and could influence the demand for parking spaces. In addition, on-street loading demands have increased dramatically in recent years, resulting in a need to study and implement potential interventions for improved curbside management. Changes in technology and driving behavior will result in changes in parking behavior, so any investments in parking facilities must align with the evolving technology and shifting driving habits to effectively meet the future parking needs of the neighborhood. Some of the best practices and opportunities for adapting to these changes can be found on the following page.



Best Practices

Shared Parking & EV Charging

The parking facilities in University City support the commercial, residential, office, educational, research, and medical institutional land uses. These land uses have different peak hours of demand presenting an opportunity to consider shared parking as a solution to current and future parking needs. While each parking facility is managed by one of several discrete entities, implementing shared parking would enable different users to utilize the facilities at different times, optimizing space usage. This approach would minimize wasted parking spaces during off-peak hours and reduce the need for construction of new parking facilities. Other cities, such as Madison, Wisconsin and Seattle, Washington have established a shared parking program that allows two (2) or more uses to share parking provided they meet certain criteria, which reduces their minimum off-street parking requirements. Participation in programs like these create a significant opportunity for electric vehicle charging stations, allowing them to be utilized multiple times throughout the day. Creation of shared parking in University City would likely require participation by a number of stakeholders including the University City District (UCD), parking operators, institutions, and City agencies.

Transportation Demand Management

Transportation Demand Management (TDM) involves strategies aimed at reducing traffic congestion, enhancing transportation efficiency, and advocating for sustainable travel choices. TDM acknowledges that solely building more infrastructure won't solve the congestion issues faced by communities; rather, it emphasizes the efficient use of existing infrastructure. Examples of effective TDM strategies include promoting public transit, encouraging carpooling, advocating for biking and walking, implementing improved parking management, and urging employers to offer telecommuting and flexible hours to reduce commuting during peak hours.

Reducing the amount of traffic congestion, improving air quality, and creating a better commuting experience for employees, patients, students, residents, and others is important to the vitality of University City. The provision of adequate parking is important, yet University City has a wealth of infrastructure for alternative modes of transportation and every effort should be made to encourage commuters to use SEPTA, AMTRAK, New Jersey Transit or commuting by walking or bicycle. SEPTA Key Advantage, an employee benefit that provides free monthly transit access to organizations with over 50 employees, has already been implemented at various University City institutions and would benefit the multimodal transportation network. Additional work on operation improvements for shift changes could help with parking and congestion challenges.

Technology

A live count of free available spaces and their respective floor locations within each facility should be displayed in order to minimize cruising for spaces. There are several smartphone apps available to assist drivers to locate and purchase their parking before reaching their destination and the Philadelphia Parking Authority recently relaunched the on-street parking app, MeterUP. While parking demands may increase in the short-term, the introduction of technology has the potential to improve parking operations and reduce congestion.



Sources

City of Madison, Wisconsin

<https://www.cityofmadison.com/bikeMadison/documents/zoningBicyclePkg20140822.pdf>

City of Seattle, Washington

https://library.municode.com/wa/seattle/codes/municipal_code/304661?nodeId=TIT23LAUSCO_SUBTITLE_IIILAUSRE_CH23.54QUDESTACOREPASOWAST_23.54.030PASPST

Dynamic Parking Pricing

<https://www.phila.gov/media/20211119112925/OTIS-dynamic-parking-pricing-one-pager.pdf>

Future of Parking in Boston.

http://www.abettercity.org/docs-new/Future_of_Parking_in_Boston.pdf

How 'shared parking' can improve city life.

<https://medium.com/sidewalk-talk/how-shared-parking-can-improve-city-life-3f4ce1c83dd9>

How to park for cheap and free in Philadelphia

<https://www.inquirer.com/philly-tips/free-cheap-parking-philadelphia-20211012.html>

More than 1 million have downloaded mobile pay-parking app, PPA says

<https://www.inquirer.com/transportation/philadelphia-mobile-phone-metered-parking-ppa-20220406.html>

Pay-by-phone parking returns to Philly

<http://www.philly.com/philly/business/transportation/pay-by-phone-app-parking-returns-to-philly-ppa-smartphone-20171211.html>

Penn adds more perks to reducing commuter costs

<https://penntoday.upenn.edu/news/penn-adds-more-perks-reducing-commuter-costs#:~:text=The%20new%20commuter%20discount%20is,additional%20cost%20savings%20for%20participants>

Philadelphia Parking Authority.

<http://www.philapark.org/residential-parking-permit/>

SEPTA

<https://data.septa.org>

The State of University City, 2023.

https://issuu.com/universitycity/docs/the_state_of_university_city_2023_web?fr=sOWE3MzU5OTQ4Mjl

University City Multimodal Study.

<https://www.dvrpc.org/products/tr21050>

US Census

www.census.gov

Why Center City parking garages are disappearing

http://www.philly.com/philly/columnists/inga_saffron/why-center-city-parking-garages-are-disappearing-20170830.html

Why Downtown Parking Garages May Be Headed for Extinction.

<http://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2017/12/12/why-downtown-parking-garages-may-be-headed-for-extinction>

ZipCar

Corujo, P. (2023, March 9). ZipCar Contact.

