
DOWNTOWN MADISON BICYCLE & MOPED PARKING STUDY

Adopted September 5, 2017



ACKNOWLEDGEMENTS

This project was developed by Toole Design under the guidance of the City of Madison Department of Traffic Engineering.

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Information contained in this document is for planning purposes and should not be used for final design of any project. All results, recommendations, concept drawings, cost opinions, and commentary contained herein are based on limited data and information, and on existing conditions that are subject to change. Further analysis and engineering design may be necessary prior to implementing the recommendations contained herein.

Moped Parking Ordinance Adoption

On August 1, 2017, the Madison Common Council adopted the following update to the City's moped parking ordinance which incorporates the moped parking recommendations made in this study.

The Common Council of the City of Madison do hereby ordain as follows:

1. Subdivision (f) of Subsection (4) entitled "Parking" of Section 12.76 entitled "Special Rules Applicable to Bicycles" of the Madison General Ordinances is hereby repealed.
2. Subdivision (g) of Subsection (4) entitled "Parking" of Section 12.76 entitled "Special Rules Applicable to Bicycles" of the Madison General Ordinances is hereby renumbered to Subdivision (f).
3. Section 12.793 entitled "Moped Parking" of the Madison General Ordinances is created to read as follows:

"12.793 MOPED PARKING.

- (1) Definition. For the purposes of this section:

"Moped Parking Area" means an area within the sidewalk and terrace area approved for moped parking under this ordinance.

"Sidewalk and terrace area" means the entire area of the highway from the curb line of the roadway to the adjacent property line. This area often includes, but is not limited to, both a paved sidewalk and a grassy or paved area commonly referred to as the terrace.

- (2) Mopeds shall be considered Type 1 motorcycles for parking purposes. No person shall park a moped on the sidewalk and terrace area except in an approved Moped Parking Area. A list of Moped Parking Areas shall be on file with the City of Madison Traffic Engineering Division and the Parking Utility and listed on the City of Madison website. Mopeds parked in Moped Parking Areas must comply with applicable Madison General Ordinances and Wisconsin State Statutes in addition to the following requirements:
- (a) Mopeds must not be locked to or leaned against any object.
 - (b) Mopeds must be parked in a marked stall.
 - (c) Mopeds must be registered to the current owner and display a valid moped license plate. Mopeds not displaying a current and valid moped license plate may be cited and towed.
 - (d) Mopeds may not be driven upon any sidewalk and terrace area, pedestrian walkway, pedestrian mall, or wheelchair ramp except at a permanent or temporarily established driveway or unless permitted to do so by signs or pavement markings.
- (3) Moped Parking Area Requirements. A Moped Parking Area may be established and maintained as follows:
- (a) Unless established directly by the City, the area, and all encroachments contained therein, shall lie within a valid privilege in street granted under Sec. 10.31, MGO.
 - (b) A Moped Parking Area may only be approved on a paved sidewalk and terrace area located in the following zoning districts: UMX, DC, TSS, NMX, and TE.
 - (c) No Moped Parking Area will be approved if it abuts a local, state, or national historic building, place, or landmark or if it is located in a local, state, or national historic district.
 - (d) No Moped Parking Area will be approved on State Street or any area designated as part of the State Street pedestrian mall established by Sec. 12.167, MGO.
 - (e) No Moped Parking Area will be approved if the sidewalk and terrace area was paved after the effective date of this ordinance. Removing grass or other landscaping in the sidewalk and terrace area for the purpose of creating a Moped Parking Area will not be permitted.

- (f) Moped stall design shall be in accordance with Sec. 28.141(12), MGO titled Moped Parking Design.
 - (g) In areas with on-street parking, Moped Parking Areas shall not obstruct space for parking meter access or the opening of vehicle doors.
 - (h) The area shall be marked by official City of Madison traffic signs designating the area as a Moped Parking Area.
 - (i) The holder of the privilege in street containing the Moped Parking Area shall be responsible for funding and maintaining the area, including any official signs, pavement markings required to define the boundaries of the Moped Parking Area, and signs or markings to identify where mopeds may park.
 - (j) The holder of the privilege in street containing the Moped Parking Area shall be responsible for the routine maintenance, including, but not limited to, snow and ice removal.
 - (k) Moped Parking Areas shall not be reserved for private use and no person shall be charged a fee or be otherwise restricted from using the Moped Parking Area.
 - (l) No Moped Parking Area will be approved when, in the opinion of the City Traffic Engineer, the location will create a vision obstruction to on-street traffic, interfere with access to vehicles parking on the street, interfere with bus stops or loading zones, interfere with pedestrian travel, or reduce the effective width of the pedestrian circulation area of the sidewalk.
- (4) The failure to comply with the terms of the privilege in street or of this ordinance shall result in the termination of the Moped Parking Area.
- (5) Any person violating sub. (2) shall be subject to a forfeiture of not less than five dollars (\$5) nor more than one hundred dollars (\$100). The registered owner of the vehicle shall be liable for violations of this section.”
4. Subsection (14) entitled “Parking on Terrace Prohibited” of Section 12.128 entitled “Miscellaneous Restrictions on Parking” of the Madison General Ordinances is amended to read as follows:
- “(14) Parking on Terrace Prohibited. No person shall stop or leave standing any vehicle, upon any portion of a street between the curb line thereof and the ~~element~~ paved or traveled portion of the sidewalk, said space being commonly known as the terrace, except temporarily and for the purpose of and while actually engaged in loading or unloading or in receiving or discharging passengers and while the vehicle is attended by a licensed operator so that it may be promptly moved in case of an emergency; or unless specifically allowed for bicycle parking under Section 12.76(4) or moped parking under Section 12.793 of these ordinances. Any person violating this subsection shall be subject to a forfeiture of not less than five dollars (\$5) nor more than one hundred dollars (\$100).”
5. Subsection (1) of Section 12.141 entitled “Penalties for Violating Sections 12.122 Through 12.140” of the Madison General Ordinances is amended to read as follows:
- “(1) Any person violating any provision of Sections 12.128 (1), (3), ~~(14)~~, and (16), 12.130, 12.1334 except 12.1334(99), 12.134 to 12.136 inclusive, 12.138(9), or 12.140, shall be subject to a forfeiture of not less than ten dollars (\$10) nor more than fifty dollars (\$50) for the first offense and not less than twenty dollars (\$20) nor more than one hundred dollars (\$100) for the second or subsequent conviction within a year.”
6. Subdivision (c) of Subsection (3) entitled “Rates” of Section 12.145 entitled “Parking at Parking Meters and Multi-Space Meters; Meter Rates” of the Madison General Ordinances is amended to read as follows:
- “(c) The hourly rate for all on-street metered parking designated for motorcycles and mopeds shall be one dollar (\$1).”

7. Subdivision (a) of Subsection (3) entitled “Schedule of Deposits” of Section 1.08 entitled “Issuance of Citations for Violations of Certain Ordinances and Providing a Schedule of Cash Deposits” of the Madison General Ordinances is amended by creating and amending therein the following:

<u>Offense Ord.</u>	<u>No./Adopted Statute No.</u>	<u>Deposit</u>
Illegal moped/bicycle parking (w/in 15' of crosswalk/secured to tree, etc.).	12.76(4)	\$20
Moped parking on Sidewalk and Terrace area.	12.793(2)	\$60
No parking on terrace.	12.128(14)	\$4560”

8. This ordinance shall be effective January 1, 2018.

EDITOR’S NOTES:

1. New bail deposits must be approved by the Municipal Judge prior to adoption. These deposits have been so approved.
2. Section 12.76(4)(f) currently reads as follows:
“(f) Mopeds shall comply with this subsection, pursuant to Wis. Stat. § 346.54(1)(e).”
3. Wisconsin Statutes Legal References for Convenience. Wis. Stats. § 340.01 provides the following definitions:

340.01(22) "Highway" means all public ways and thoroughfares and bridges on the same. It includes the entire width between the boundary lines of every way open to the use of the public as a matter of right for the purposes of vehicular travel. It includes those roads or driveways in the state, county or municipal parks and in state forests which have been opened to the use of the public for the purpose of vehicular travel and roads or driveways upon the grounds of public schools, as defined in s. 115.01 (1), and institutions under the jurisdiction of the county board of supervisors, but does not include private roads or driveways as defined in sub. (46).

340.01 (29m) (am) "Moped" means any of the following motor vehicles capable of speeds of not more than 30 miles per hour with a 150-pound rider on a dry, level, hard surface with no wind, excluding a tractor, a power source as an integral part of the vehicle and a seat for the operator:

1. A bicycle-type vehicle with fully operative pedals for propulsion by human power and an engine certified by the manufacturer at not more than 130 cubic centimeters or an equivalent power unit.
2. A Type 1 motorcycle with an automatic transmission and an engine certified by the manufacturer at not more than 50 cubic centimeters or an equivalent power unit.

(bm) “Moped” does not include a motor bicycle.

340.01(54) "Roadway" means that portion of a highway between the regularly established curb lines or that portion which is improved, designed or ordinarily used for vehicular travel, excluding the berm or shoulder. In a divided highway the term "roadway" refers to each roadway separately but not to all such roadways collectively.

340.01(58) “Sidewalk” means that portion of a highway between the curb lines, or the lateral lines of a roadway, and the adjacent property lines, constructed for use of pedestrians.

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1 | Introduction

Downtown Madison is a lively and popular location with tens of thousands of students, residents, employees, and other visitors making use of countless businesses, restaurants, schools, and attractions in the area. Many of these people utilize bicycles and mopeds for transportation to and within Downtown. Bicycles and mopeds present a more economical, environmentally-friendly, and space-efficient alternative to travel by car in the Downtown area, and their use is supported by the City. At the same time, providing adequate parking for bicycles and mopeds Downtown is challenging with many uses competing for limited space. The City provides thousands of bicycle parking spaces Downtown, while thousands more are provided by the University of Wisconsin and private property owners, but these spaces often do not meet demand. Bicycles are often locked to inappropriate objects including trees, fences, benches, and other street furniture, and mopeds often crowd the public right of way.

This study presents an assessment of existing bicycle and moped parking conditions in the Downtown area, including information about the availability and utilization of parking spaces. Existing City ordinances and zoning relating to bicycle and moped parking are also assessed. The study then presents recommendations for improving bicycle and moped parking in the Downtown area, including policy recommendations and recommendations for where to install new bicycle and moped parking.

The study recommendations address concerns about bicycle and moped parking within the project area; however, many of the recommendations will also impact bicycle and moped parking throughout Madison through policies designed to make bicycle and moped parking convenient and consistent throughout Madison.

1.1 | The Study Area

The study area for this project was determined by City staff prior to the beginning of the project and is displayed in Map 1. The study area roughly covers the area two blocks out in each direction from the Capitol Square as well as a corridor two blocks wide along State Street from the Capitol Square to the University of Wisconsin.

1.2 | Types of Bicycle Parking

Bicycle parking can generally be divided into two categories: short-term and long-term. This section provides a brief overview of these categories. Table 1 displays criteria for the two different types of bicycle parking.

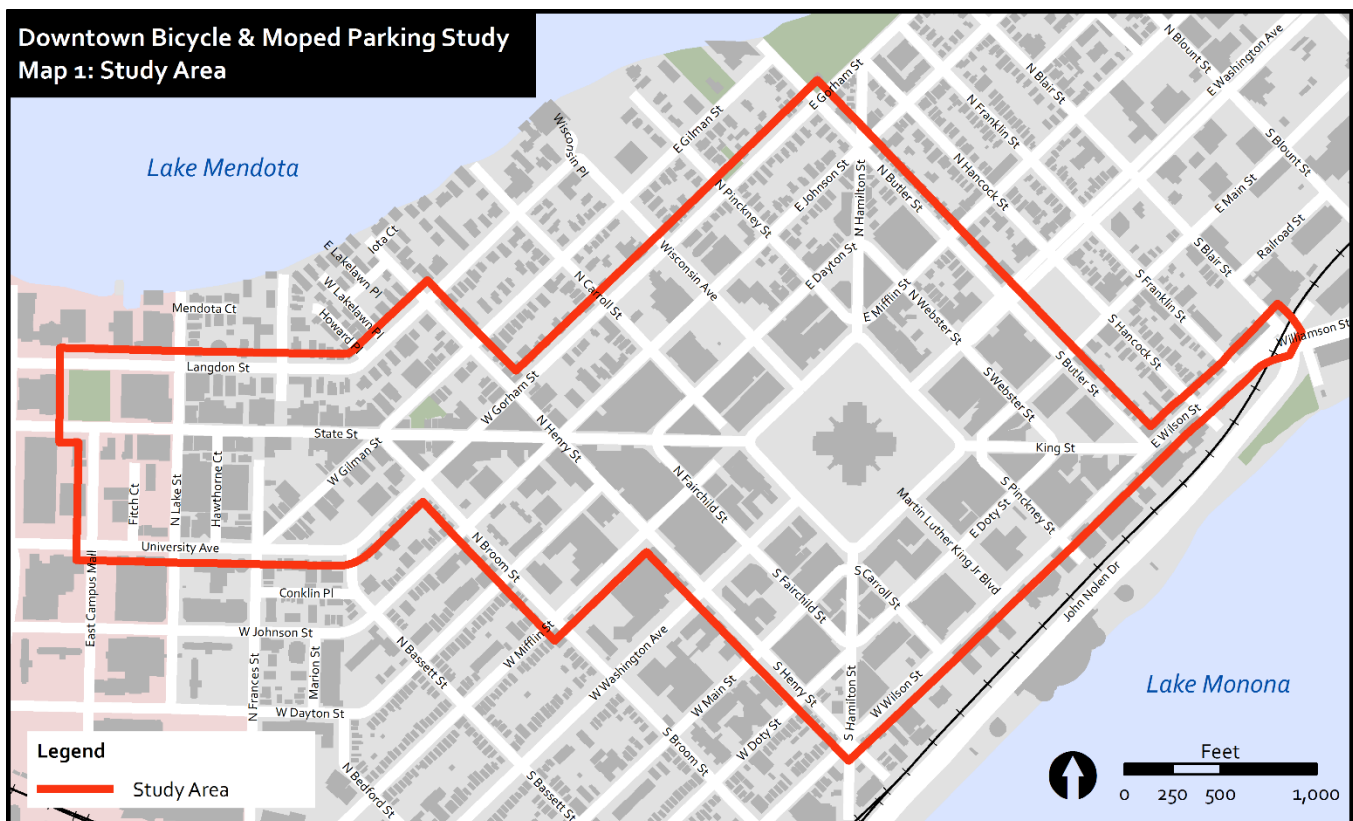
Short-Term Bicycle Parking

Short-term bicycle parking is intended to be used for a short period of time, typically less than four hours. Short-term bicycle parking is useful for users visiting restaurants or retail establishments, attending entertainment events, attending classes or brief meetings, or any other activity that is not more than a few hours in length. Short-term bicycle parking uses bicycle racks, typically in unsheltered locations. Short-term parking should be placed as close to the entry of the primary building it is intended to serve as possible. Mixed use buildings should have short term bicycle parking close to the entries for each use. Short-term bicycle parking is free for users on a first-come, first-served basis.



Short-term bicycle parking on State Street

Map 1: Downtown Madison Bicycle & Moped Parking Study study area



Long-Term Bicycle Parking

Long-term bicycle parking is intended to be used for a longer duration of time, typically from four hours to days or even weeks in the case of residential bicycle parking. Long-term bicycle parking is useful at residences, places of employment, and transit stations – anywhere where a person may want to lock and leave a bicycle for an extended period of time. Long-term bicycle parking should provide both protection from the elements as well as increased security from theft over short-term bicycle parking. Long-term parking typically takes the form of individual bicycle lockers; secure bicycle cages or rooms in parking garages, private buildings; or bicycle centers. A fee is often charged for long-term bicycle parking, although it is often provided free for residents or employees in specific buildings.



Long-term bicycle parking in a private residential building

Table 1: Typical criteria for short-term and long-term bicycle parking (Adapted from Association of Pedestrian and Bicycle Professionals (APBP) Bicycle Parking Guidelines)

Criteria	Short-Term	Long-Term
Parking duration	Less than four hours	More than four hours
Fixture types	Bicycle racks	Lockers; bicycle racks in secured areas
Weather protection	Unsheltered	Sheltered or enclosed
Security	Unsecured, passive surveillance (eyes on the street)	Secured, active surveillance <u>Unsupervised</u> <ul style="list-style-type: none"> • “Individual-secure” such as bicycle lockers • “Shared-secure” such as bicycle cages or rooms <u>Supervised</u> <ul style="list-style-type: none"> • Valet bicycle parking • Paid area of transit station
Typical land uses	Commercial or retail, medical/healthcare, parks and recreation areas, community centers	Residential, workplace, transit

1.3 | Public Input

Public input for the Bicycle & Moped Parking Study was conducted through two forums: a public open house and an online survey about bicycle and moped parking.

Open House

An open house was held in November 2014 to present information about bicycle and moped parking in the downtown study area and solicit feedback about bicycle and moped parking issues and concerns. Participants highlighted the need for more bicycle parking in specific parts of the study area, and a desire for a variety of bicycle rack types that better serve a wide variety of bicycle types and user preferences. Additional comments were provided indicating a desire for secure bicycle parking such as bicycle lockers or cages throughout the downtown. The open house was lightly attended.

Online Survey

An online survey was available from April 22 through May 15, 2015. During this time 1,382 people completed the survey with an additional 491 people partially completing the survey. Key findings from the survey include the following:

- 28% of respondents stated that difficulty finding bicycle parking near destinations prevents them from bicycling downtown more often.
- Over 70% of respondents stated that the bicycle racks closest to their destination are regularly full.
- 44% of respondents noted that abandoned bicycles at bicycle racks are an issue.
- 20% of respondents stated that existing racks do not easily accommodate bicycles such as those with front baskets, cargo bikes, recumbents, and other non-traditional bicycle styles, while 25% of respondents stated that they did not like the types of racks available in the study area.
- There is interest in paying for secure bicycle parking from a small portion of the bicycling public; overall willingness to pay is difficult to assess.
- Moped parking is problematic in that it often blocks bicycle racks and terrace areas.

Survey responses are not reported here due to the length of the survey but are included as an appendix to this study.

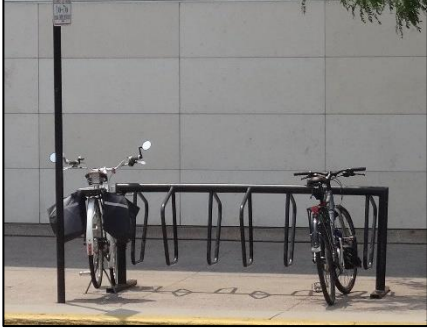








2 | Existing Conditions

This chapter presents an overview of existing bicycle and moped parking conditions in the study area, including an assessment of City zoning and other ordinances that impact bicycle and moped parking.

2.1 | Bicycle Rack Types

Table 2 provides a photograph of the most common types of bicycle racks used in the study area, as well as a notation if the rack style meets current City and Association of Pedestrian and Bicycle Professionals (APBP) guidance for bicycle parking. The City’s bicycle parking requirements are included in Appendix A.

Table 2: Common types of bicycle racks in the study area

Hanging Loop	Post & Ring	Meter Ring
 <p>Meets City Standard: If spaced properly Meets APBP Guidance: No</p>	 <p>Meets City Standard: If spaced properly Meets APBP Guidance: Yes</p>	 <p>Meets City Standard: Yes Meets APBP Guidance: Yes</p>
Inverted U	Locker	UW High Capacity Rack
 <p>Meets City Standard: If spaced properly Meets APBP Guidance: Yes</p>	 <p>Meets City Standard: Yes Meets APBP Guidance: Yes</p>	 <p>Meets City Standard: No Meets APBP Guidance: Sometimes</p>
Vertical Rack	Fence Rack	Wave
 <p>Meets City Standard: No Meets APBP Guidance: No</p>	 <p>Meets City Standard: No Meets APBP Guidance: No</p>	 <p>Meets City Standard: No Meets APBP Guidance: No</p>

2.2 | Existing Bicycle Parking and Utilization

A full inventory of bicycle racks in the study area was completed during the week of July 7, 2014; there were subsequent updates to the initial inventory as a variety of construction projects were completed and obstructed sidewalks were reopened. Racks included in the inventory include all racks within the public right-of-way, racks in public parking garages, and racks on private property that are visible from the public right of way and are often used by the general public. Table 3 displays the number of different rack types that were inventoried and the total number of bicycle parking spaces provided by those racks. The locations and approximate capacity of the racks in Table 3 are displayed on Map 2. Points on the map may represent multiple racks at a single location, and some rack points may obscure other points on the map.

Table 3: Inventory of existing bicycle racks within the study area

Rack Type	# of Racks	# of Spaces	Meets City Standard	Meets APBP Guidance
Decorative	3	14	Yes (generally, if spacing and other design specifications are met)	Sometimes
Fence	43	244	No	No
Hanging Loop	129	636	Yes, for models with loops at least 24" apart	No
Vertical Racks	9	72	No	Sometimes*
Inverted U	167	348	Yes, if spaced properly	Yes
Locker	2	16	Yes	Yes
Meter Ring	66	66	Yes	Yes
Post & Ring	52	104	Yes, if spaced properly	Yes
Rail Mounted	89	555	Yes, if spaced properly	Varies
UW Campus Rack	43	323	No	Sometimes*
Variety	23	55	Yes (generally, if spacing and other design specifications are met)	Varies
Wave	20	77	No	No
Total	646	2,510	N/A	N/A

* Vertical racks and racks with tight spacing, meet APBP guidance for bicycle parking in high capacity locations such as bicycle cages or rooms.

Note: To determine the number of spaces for fence and wave racks, it was assumed that one bike can be accommodated every 24" regardless of the number of wheel slots available for bicycles. Inverted U racks were assumed to accommodate two bikes per rack unless a rack was placed in such a way that one side was obstructed. Meter rings were assumed to accommodate one bike per rack. Post and ring racks were assumed to accommodate two bikes per rack.

Bicycle Rack Utilization

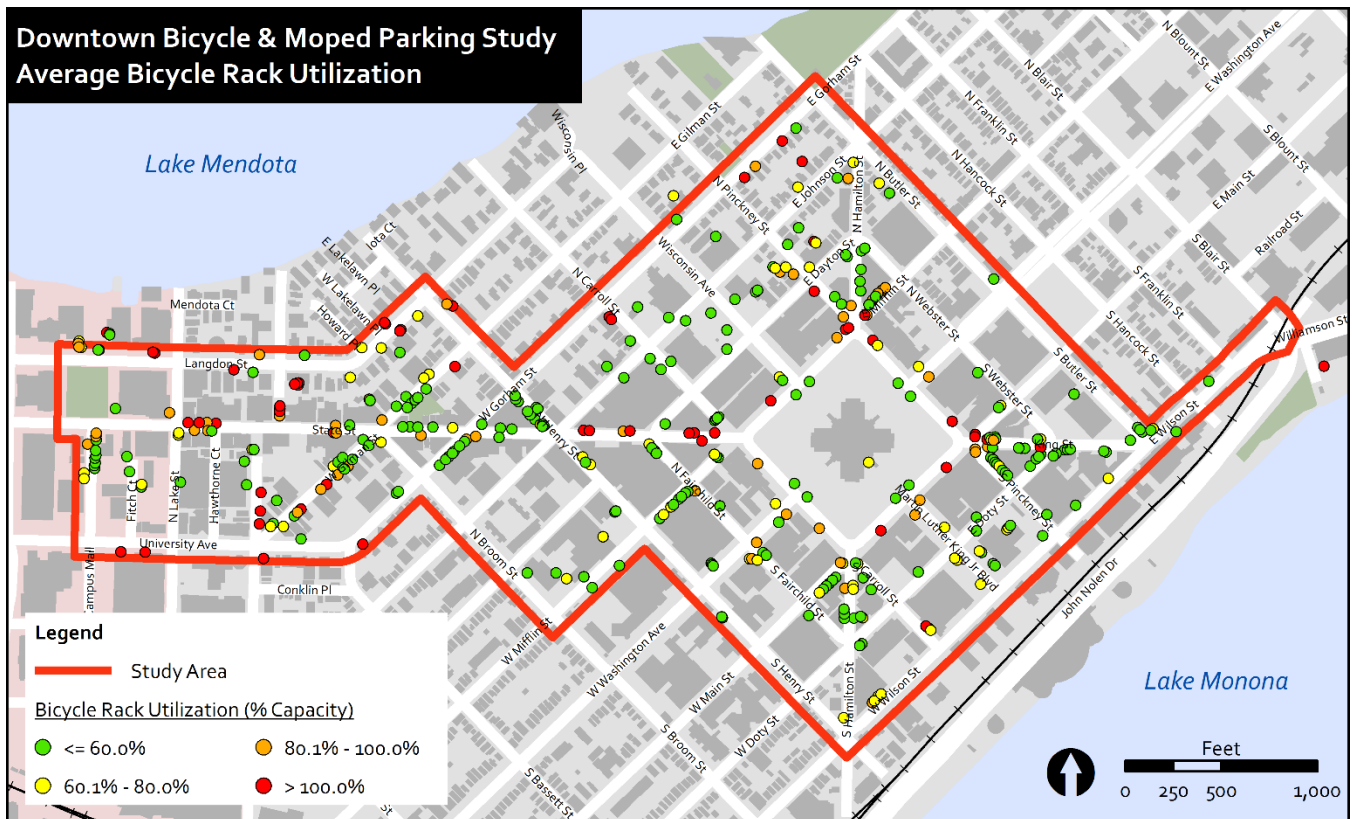
A series of counts were conducted to monitor the use of bicycle racks under different conditions. Dates for the counts were selected to cover a range of days of the week, special events, weather conditions, and other factors that may impact the use of bicycle racks within the study area. Table 2 displays a summary of the counts that were conducted.

Table 4: Bicycle inventory count dates and conditions

#	Day	Date	Time	Event	Weather	Comment
1	Mon – Thurs	7/7 –11/2014	Mid-day	None	Variable; pleasant	Initial inventory
1	Wednesday	7/30/2014	Early evening	Concerts on the Square	Lower 70s, partly cloudy	Partial count
2	Thursday	8/28/2014	Mid-day	None	70 degrees, overcast	
3	Saturday	8/30/2014	Mid-afternoon	Taste of Madison	80 degrees, sunny	Partial count
4	Monday	9/22/2014	Mid-day	None	70 degrees, sunny	
5	Saturday	10/4/2014	Late morning	Farmers Market	45 degrees, light rain	Partial count
6	Monday	10/20/2014	Mid-day	None	60 degrees, sunny	
7	Tuesday	3/10/2015	Early afternoon	None	40 degrees, sunny	
8	Thursday	5/14/2015	Mid-afternoon	None	60 degrees, sunny	Partial count
9	Thursday	6/18/2015	Late morning	None	75 degrees, sunny	
10	Wednesday	6/24/2015	Early evening	Concerts on the Square	75 degrees, cloudy	Partial count

Partial counts were conducted for a number of days/events to focus on the area around the Capitol Square and upper State Street where rack usage was expected to be high due to an event occurring; partial counts generally included racks within the Outer Square as well as the 10 – 300 blocks of State Street. Map 3 displays the average rack utilization across all of the count events.

Map 3: Average bicycle rack utilization across all bicycle count events



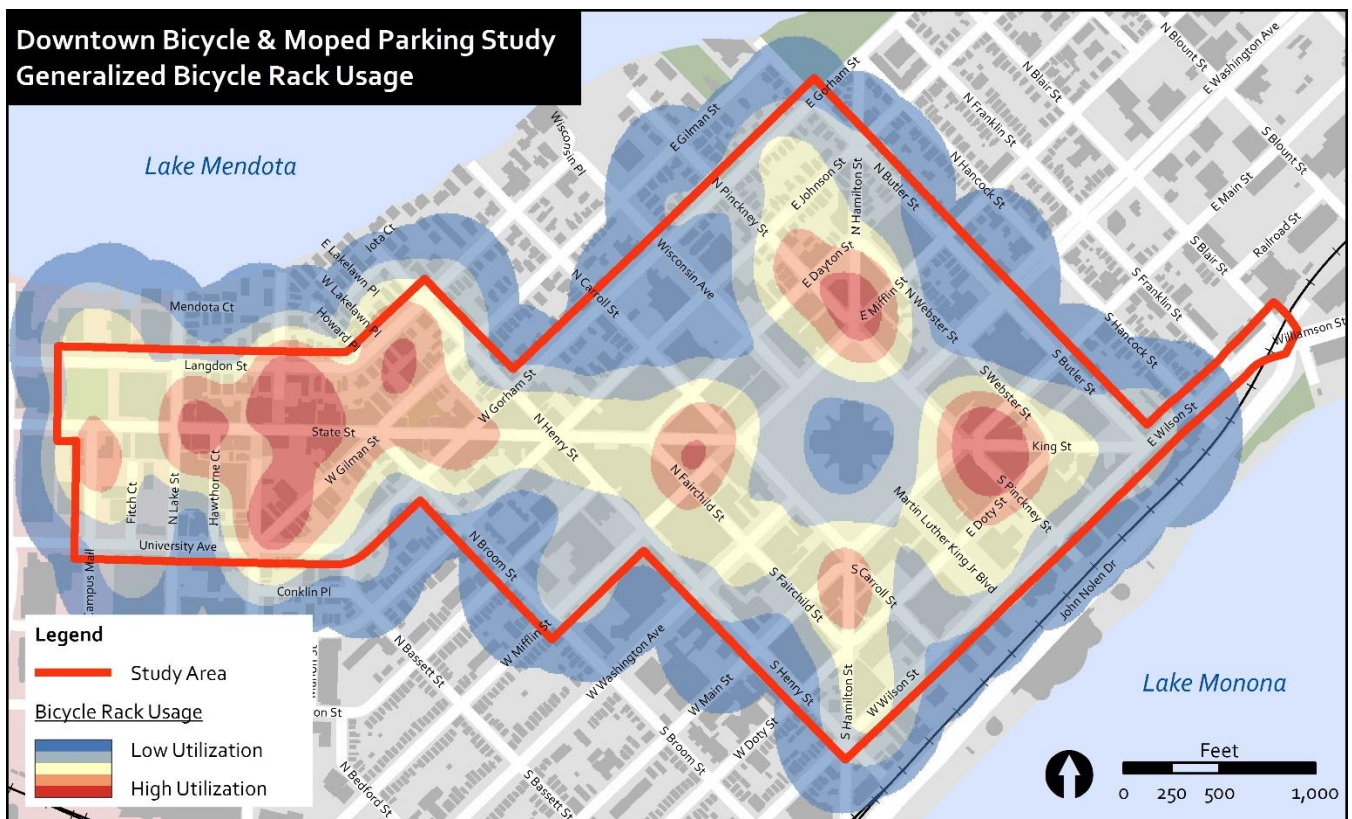
Map 4 displays a “heat map” of rack utilization with blue areas having lower average utilization and red areas having higher average utilization. It should be noted that both Maps 2 and 3 display average utilization across all count events – certain areas may experience significantly higher utilization than average when an event is occurring. An example of this may be a large event at the Orpheum Theatre or Overture Center which can bring large numbers of bicyclists to the 200 block of State Street.

A number of locations stand out where bicycle racks are often full to capacity:

- 100, 200, 500, and 600 blocks of State Street
- The North Frances Street pedestrian mall on both sides of State Street
- The intersection of East Mifflin Street and North Pinckney Street
- The intersection of East Main Street, King Street, and South Pinckney Street
- 100 and 200 blocks of Martin Luther King, Jr. Boulevard

Racks in these areas are often at capacity under normal usage conditions, that is, not during an event that brings large numbers of bicyclists to the area. Additionally, since the completion of the bicycle rack utilization counts, The Hub—a large mixed use development on the block bounded by State Street, North Frances Street, and West Gilman Street—opened and impacted bicycle parking demand and availability in the area: racks on the streets immediately surround The Hub are consistently well over capacity. Additionally, large numbers of bicycles are locked illegally to trees and other objects along the 500 block of State Street in front of The Hub and in the pedestrian mall where North Frances Street would intersect State Street.

Map 4: Generalized bicycle rack utilization



2.3 | Bicycle Rack Conflicts

Bicycle rack placement in the public right of way often competes with other potential uses for the area. These competing uses include sidewalk cafes, food cart and other vending areas, bus stops, and street furniture such as benches and planters. Among these uses, sidewalk cafes present the greatest conflict with providing bicycle parking. Sidewalk cafes generally consume all or most of the terrace area in front of a given business and preclude the placement of bicycle racks to serve that business or other businesses in the same building or block. At the same time, sidewalk cafes increase the need for additional bicycle parking by increasing the number of people that can be serviced by a business. Sidewalk cafes may preclude the addition of new racks and have at times displaced existing bicycle racks which may be relocated to nearby locations.



Sidewalk cafes preclude the placement of additional bicycle racks on East Main Street

2.4 | Moped Parking

Mopeds are defined in Wisconsin State Statutes as motorcycles with automatic transmissions and an engine of not more than 50 cc, or a bicycle type vehicle with fully operative pedals and an engine of not more than 130 cc. Mopeds are issued a registration plate that includes the word MOPED on it, to differentiate these vehicles from motorcycles. State statutes allow mopeds to be parked anywhere a bicycle can be parked. A recent change in state statutes now allows municipalities to instead treat mopeds as motorcycles for parking purposes and to regulate moped parking.

Moped parking in the study area, and other parts of downtown Madison, can be problematic. While mopeds were observed parked at bicycle racks during the rack utilization counts, particularly near the University of Wisconsin campus, mopeds were not generally a major obstruction at bicycle racks. However moped parking in terrace areas is problematic, particularly outside of large apartment buildings that primarily have student tenants and near the University of Wisconsin campus. Mopeds in these areas present an impediment to pedestrian traffic, hinder loading and unloading from on-street parking, present safety concerns as they are often operated on sidewalks and make snow removal difficult.



Mopeds line the sidewalk on North Frances Street



A moped blocking access to bicycle parking spaces

In recent years, there have been changes to moped parking regulations at the University of Wisconsin that impact moped parking in the study area. mopeds parked on campus now must display a parking permit and are only allowed to park in their permitted parking areas much of the time. Anecdotally, stricter moped parking regulations on campus has increased moped parking in areas of the city very near campus where permits are not required.

In 2012, the City of Madison Ad Hoc Committee on Moped Parking issued a report detailing many of the issues with moped parking in the greater downtown and campus areas. The final report is available from the City of Madison website: <https://madison.legistar.com/View.ashx?M=F&ID=4842757&GUID=DFE44F9A-D71A-491D-BE7F-69F870262A87>

The report specifically made the following recommendations:

- Introduce an ordinance resolution considering mopeds as Type 1 motorcycles and also banning moped parking from sidewalks and terraces except where permitted by marking and signing.
- Traffic Engineering Division develop a policy for how to designate locations for moped parking, procedures and design of the parking areas.
- The Planning Division proactively enforce zoning setback parking standards.
- The Planning Division with concurrence of the Plan Commission expand moped parking requirements in the new zoning code.
- The Traffic Engineering Division develop a consistent education strategy for public right-of-way moped parking.
- The Planning Division develop an education strategy focused on landlords for private property moped parking.
- Monitor moped abandonment and develop a more streamlined removal process if it is a persistent problem.

City staff are in the process of drafting an ordinance to consider mopeds as Type 1 motorcycles for parking purposes and banning moped parking from sidewalk and terrace areas except where permitted by marking and signing.

2.5 | Summary

Substantial amounts of public bicycle parking exists within the study area, however, daily demand in many parts of the study area exceeds the amount of bicycle parking available. Additionally, specific events such as the Farmer's Market, Concerts on the Square, and events at other downtown venues create additional strong demand for bicycle parking in the study area. Additional bicycle parking is needed throughout much of the study area, as is different types of bicycle parking including temporary valet parking for events, and secure bicycle parking such as lockers or cages.

3 | Bicycle and Moped Parking in the Zoning Code

The City of Madison Zoning Code has included provisions for bicycle parking in a variety of building types and land uses since 1988. The Zoning Code, including the bicycle parking provisions, and the inclusion of some moped parking provisions, was completely rewritten recently with an effective date of 1/2/2013. A component of this study was to analyze the current zoning code as it relates to bicycle and moped parking, identify deficiencies, and recommend improvements.

3.1 | Current Regulations

The City of Madison zoning code includes detailed requirements for the provision and siting of bicycle and moped parking. The requirements are set forth in Section 28.141: Parking and Loading Standards, along with parking requirements for motor vehicles.

For bicycles, the code focuses on the minimum number of spaces required. The requirements vary based on a parcel’s land use type. A sampling of Table 28I-3: Off-Street Parking Requirements from the code is included in Table 5 to illustrate:

Table 5: Sampling of entries from Table 28I-3 Off-Street Parking Requirements

Use	Automobile Minimum	Automobile Maximum	Bicycle Minimum
Coffee shop, tea house	15% of capacity of persons	40% of capacity of persons	5% of capacity of persons
Restaurant			
Restaurant-tavern, tavern, brewpub			
Retail	1 per 400 square feet of floor area	1 per 250 square feet of floor area	1 per 2,000 sq. ft. floor area
Office	1 per 400 square feet of floor area	1 per 250 square feet of floor area	1 per 2,000 sq. ft. floor area
Place of worship	1 per 10 seats or 15 lineal feet of seating area in the main worship space. If no fixed seats, 1 per 70 sq. ft. of floor area in main worship space	150% of minimum	1 per 50 seats or 75 lineal feet of seating area or 1 per 350 feet of floor area in main worship space
Multi-family dwelling	1 per dwelling	2.5 per dwelling	1 per unit up to 2-bedrooms, ½ space per add’l bedroom; 1 guest space per 10 units

The code also includes stipulations regarding the substitution of motor vehicle parking with bicycle and moped parking spaces. Specifically, three moped spaces may replace one required automobile space and four bicycle spaces above the minimum may be substituted for one automobile space.

Bicycle parking was first required for new developments in 1988. Very few existing structures in the study area built prior to 1988 provide the minimum number of bicycle and moped parking spaces required by the zoning code. A number of large multi-use buildings that have been constructed in recent years provide the required long-term bicycle parking for the residential component of the building, but provide little, if any, parking for commercial components of the building. State Street and the City side of the Capitol Square are part of a special assessment area and all of the street furnishings within the public right of way, including bicycle racks, are provided by the City in this area.

In addition to minimum space requirements, the code provides guidance on the design and siting of bicycle parking spaces. Bicycle parking is divided into short- and long-term parking. In general, residential uses are required to dedicate at least 90% of required bicycle parking to long-term use. For other uses, at least 90% must be designated as short-term parking.

The design guidelines require that short-term parking be located near a building's main entrance at least as close to the entrance as the nearest non-accessible automobile parking space. Long-term parking, on the other hand, must be located in an "enclosed and secured or supervised" area.

The moped parking design guidelines treat mopeds separately from bicycles. Current state code classifies mopeds as bicycles for parking regulation purposes but does allow municipalities to classify them otherwise.

3.2 | Zoning Code Deficiencies and Solutions

The zoning code's current treatment of bicycle and moped parking raises the following key issues:

- Minimum bicycle space requirements do not consider the parcel's context within the urban makeup of the city. For example, private student dorms near campus may require more bicycle parking than other large residential developments.
- Design requirements for long-term bicycle parking may inadvertently incentivize long-term usage of short-term spaces. Observations of long term bicycle parking usage versus short term bicycle parking usage at large residential developments in the study area indicate that the convenience of short term bicycle parking locations outweighs the security provided by long term bicycle parking locations.
- Requirements for non-residential developments should accommodate the desire for employee parking to be located further from the entrance, in secure areas and include the ability to use structured parking and vertical or wall mounted racks.
- Requirements for bicycle parking do not apply to existing structures. Buildings constructed before 1988 are grandfathered by the current ordinance and state law. This places additional demand on bicycle parking provided by newer developments in areas with a mix of newer infill projects alongside older developments.
- It is unclear whether property owners can count adjacent bicycle parking in the public way provided by the city towards satisfying their minimum requirements; and
- Mopeds are often parked in areas designated for bicycle parking. This reduces the available supply of bicycle parking spaces. State statutes treat mopeds as bicycles for parking purposes. In 2012 this was amended to allow local jurisdictions to regulate moped parking. The City is considering classifying mopeds as Type 1 motorcycles but has not yet done so.

Each of these issues is detailed below.

Lack of Context

At present, minimum bicycle space requirements are dependent on the land use of a parcel without regard for its context relative to the rest of the city. On other questions, the zoning code attempts to establish this context through the assigned zoning district. In other words, a restaurant on State Street (zoning: Downtown Commercial) is held to the same bicycle parking standards as a restaurant on the far west side (zoning: Commercial Center), despite the fact that one would expect

very different levels of bicycle usage at each location based on the surrounding context. One way to address this problem is to create a more direct connection between zoning districts and minimum bicycle parking requirements. There is precedent for this approach within the zoning code itself. Certain districts are granted special exemptions or reductions in minimum requirements for automobile parking. By the same logic, some districts could be required to provide additional bicycle parking above and beyond the minimums dictated by the land use. In fact, the same rationale for abolishing automobile parking minimums in certain districts (to transition off-street automobile parking to more efficient uses of land and to encourage alternative forms of transportation) would make these districts ideal candidates for expanded minimum bicycle parking requirements.

Long-Term vs Short-term

Another issue relates to the design requirements related to short- and long-term bicycle parking. The code requires that long-term parking be covered and sited in a secure location. Short-term parking, on the other hand, is intended to be located for maximum convenience without similar regard for security or weather.

From one standpoint this makes sense; it is important that building residents have a space to store their bicycles free of concerns about property damage or theft. However, it appears that one unintended consequence is that long-term parking is not always an attractive option for parking a bicycle. Some building residents simply find short-term parking locations more convenient all the time and are not as concerned about theft or weather damage to their bicycles. The net result is that visible, convenient short-term parking spaces are chronically full to capacity while long-term parking spaces remain underutilized.

It is difficult to effectively address this problem by encouraging different usage patterns. Short of metered short term bicycle parking or time limits, both of which would be impossible to enforce, users will continue to gravitate toward the most conveniently-placed bicycle parking locations.

There is still a need to accommodate long-term bicycle parking needs, but the 90/10 ratio of long-term to short-term parking in multi-family residential buildings, particularly in mixed-use buildings or mature neighborhoods, may need to be modified to better reflect actual usage patterns.

Existing Structures

When the zoning code was rewritten in 2012 it represented a major change in land use regulations for the City and included significant improvements in the way bicycle parking had been treated in the past. Sections of the code related to bike parking only become applicable at the time of a major change to a parcel, such as a major building renovation or new construction. This is typical for most provisions in a zoning code; however, this approach results in a lack of power to address issues that are attributable to existing structures. With respect to bicycle parking, many of the downtown neighborhoods with the highest levels of bicycling activity and the greatest need for bicycle parking are also mature neighborhoods where most parcels may not be subject to the new bicycle parking regulations for decades to come.

Some communities have attempted to address this issue by mandating compliance for existing parcels in certain zones by an appointed deadline. Miami-Dade County, FL included the following text in its zoning code under *Section 33-122.3*:

Requirement of bicycle racks or other means of storage:

Application to existing uses. All property owners of existing establishments that are required by this section to provide bicycle parking spaces shall comply within one (1) year from the effective date of the ordinance from which

this section derives and shall be responsible to maintain such facilities. Existing multifamily uses are exempt from this subsection.

Washington, DC, has addressed this issue for residential buildings by mandating compliance upon the request of one or more residents. The relevant code, established in Rule 18-1214, reads as follows:

1214.1 All existing residential buildings with eight (8) or more units shall provide secure bicycle parking spaces for the storage of bicycles in operable condition.

1214.2 Each existing residential building covered by § 1214.1 shall provide a reasonable number of bicycle parking spaces within thirty (30) days after written request from one (1) or more tenants or property owners. A reasonable number shall be defined as the lesser of either:

- (a) One (1) bicycle parking space for each three (3) residential units; or*
- (b) Enough bicycle parking to meet the requested demand.*

These types of requirements may be difficult due to state law in Madison.

Adjacent Parking in the Public Way

In recent decades, the City has made a concerted effort to provide bicycle parking in areas of high demand by installing racks, corrals, or other parking solutions within the public right-of-way. It is unclear in the current zoning regulations whether these public spaces can be counted towards the minimum requirements for adjacent property owners.

This issue may be less important in areas of the city with relatively less intense land usage. But in more mature neighborhoods, the ability of property owners to provide bicycle parking outside of the public right-of-way may be particularly challenging. For example, some buildings in the downtown area have 100% lot coverage. In some cases, the zoning regulations do not require that such properties provide any motor vehicle parking, but they may still need to include bicycle parking.

4 | Bicycle and Moped Parking Policy Recommendations

This chapter provides recommended policy changes that impact bicycle and moped parking in the Downtown study area and beyond. The recommendations are presented with a description of the issue being addressed, and the recommended course of action for the City to address the issue. Although the scope of this project was for a defined Downtown study area, most of the recommendations in this chapter are appropriate citywide.





4.1 | Rack Design and Installation

Issue: Current City guidance on acceptable rack design is not in alignment with national best practices and standards.

Recommendation 4.1.1: The City should recommend the following bicycle rack design standards:

- Support bicycles at two points of contact (preventing fallen bicycles)
- Allow locking of bicycle frames and wheels with U-locks
- Minimize maintenance costs (for example: galvanized finish or stainless steel)
- Provide secure mounting to concrete pad or similar hard surface
- Offer visibility to pedestrians and meet any ADA requirements
- Standard bicycle parking stalls should be a minimum of 2 feet wide by 6 feet long
- Oversize bicycle parking stalls, if installed, should be 3 feet wide by 10 feet long
- Short-term bicycle parking spaces shall not require lifting of the bicycle
- “Wave” and “fence” racks should not be allowed
- Some rack styles that meet these recommendations are displayed in Table 6.
- High-density rack styles may be appropriate in long-term parking areas, but only if the rack provides appropriate spacing so bicycle pedals and handlebars do not interfere with maneuvering adjacent bicycles in and out of spaces, or with bicyclists’ ability to access the front of the bicycle when locking and unlocking.

Table 6: Examples of acceptable bicycle rack types for short-term parking (source: adapted from APBP and City of Madison)

Rack Type	Sample Image	Description
Inverted-U (Staple, Loop)		Common style appropriate for many uses; two points of ground contact. Can be installed in series on rails to create a free-standing parking area in variable quantities. Available in many variations.
Post & Ring		Common style appropriate for many uses; one point of ground contact. Compared to inverted-U racks, these are less prone to unintended perpendicular parking. Products exist for converting parking meter posts.
Wheelwell Secure		Includes an element that stabilizes one wheel in a manner that does not threaten damage to the wheel and provides an upright element that supports the frame of the bicycle. Racks that only support the bicycle wheel, and not the bicycle frame, are not acceptable.
Hanging Loop		Provides a series of loops suspended from a crossbar to secure bicycles to; each loop is intended for one bicycle. May be single or double sided. Racks have only two contact points with the ground easing snow removal and their maintenance.

Issue: A single style of bike rack has been installed downtown; public feedback strongly indicated a desire for diverse parking options to accommodate different styles of bicycles, locks, and parking styles.

Recommendation 4.1.2: Do further study on the need for a variety of rack types to meet the needs of different users including cargo bikes (both long frame bicycles and cargo tricycles), bicycles with trailers, recumbents, tandems and other non-standard bicycles.

Recommendation 4.1.3: Do further study on requiring the provision of oversize bicycle parking stalls to allow space for tandems, cargo bikes, bikes with trailers, recumbents and other non-standard bicycles.

Issue: Bicycle racks within the study area display rust and corrosion which creates structural issues with the racks and is not aesthetically appealing.

Recommendation 4.1.4: All racks within the public right-of-way, whether installed by the City or a private party, should be galvanized or stainless steel to prevent corrosion. If a color treatment is desired, powder coat or thermoplastic color can be applied over galvanized or stainless steel. This should be enforced via the privilege-in street agreements or via the Minimum Housing and Property Maintenance Code (MGO §27.05(2)(l)). Funding should be dedicated to replacement of city-owned racks that are rusty and corroded or otherwise damaged.

Issue: The City's formal guidance on acceptable bicycle rack types and placement for use by private parties lacks in specifics about rack placement and acceptable rack types.

Recommendation 4.1.5: The City should produce a Bicycle Parking Guide to replace the existing City of Madison Bike Rack Requirements flyer. The Guide should detail the City's bicycle parking standards for use by both City agencies and private developers and property owners required to install parking under the Zoning Code. The Guide should succinctly describe:

- The rationale for providing bicycle parking;
- The requirements of the Zoning Code;
- Bicycle parking requirements including acceptable rack types, placement, and design; and
- Other relevant materials.

Best practice example Guides are available from:

- The San Francisco Metropolitan Transit Agency
https://www.sfmta.com/sites/default/files/pdfs/2015/SFMTA_bicycle_parking_guidelines.pdf
- The City of Cambridge, Massachusetts
https://www.cambridgema.gov/~media/Files/CDD/Transportation/Bike/Bicycle_Parking_Guide_20130926.ashx

These examples are provided for types of content and layout generally. Specific recommendations on rack types, spacing, etc. will need to be developed based on Madison's ordinances. The Guide should be regularly updated.

Issue: It is often difficult for users to find bicycle parking at a particular site, particularly in parking garages or within larger building sites.

Recommendation 4.1.6: Where short-term bicycle parking areas are not located in an outdoor location clearly visible to bicyclists approaching from adjacent public roadways or paths, signs should indicate the locations of the facilities on the exterior of the building at each major entrance and in other appropriate locations. Such signs shall be not less than 12 inches square. Where necessary additional directional signage or pavement markings to the bicycle parking area can be provided.



Sample signs for directing users to bicycle parking.



Recommendation 4.1.7: City parking garage signs should be updated to indicate that bicycle parking is available within the facility.

Recommendation 4.1.8: Long-term bicycle parking should be visible to bicyclists and relatively easy to access. If the parking facilities are not situated in obvious locations where bicyclists would expect to find parking, then managers of the facilities should provide signs directing bicyclists to the long-term parking location.

Issue: Long-term bicycle parking can be difficult to site within structures due to the amount of floor space necessary to provide required automobile parking.

Recommendation 4.1.9: Allow up to 50 percent of long-term bicycle parking to be wall-mounted or utilize double decker racks. All racks must allow for the use of “U” locks that can secure the bicycle frame, be spaced so that adjacent bicycles do not interfere with maneuvering bicycles in and out of spaces and provides room for users to get to the front of the bike and rack to lock and unlock their bicycles, and the location must provide adequate clear distance behind the rack for easy maneuvering. If double decker racks are used, the second level must offer a device that assists with lifting the bicycle up on the rack.

4.2 | Provision of Bicycle Parking by the City

Issue: There is insufficient public bicycle parking to meet demand in the Downtown area.

Recommendation 4.2.1: Bicycle racks should be installed at as many of the specific locations detailed in Chapter 5 of this document as possible.

Recommendation 4.2.2: Meter racks should be installed on parking meter posts with a parking number stall (as opposed to a meter head) in the public right of way in the city where practicable, regardless of if the post is within the study area. This recommendation does not apply to meter posts in public parking lots or garages.

Issue: Within the State Street and Capitol Square assessment area the City does not consistently monitor changes of use of properties and ensure that the amount of City-provided bicycle parking meets the requirements described in the Zoning Code.

Recommendation 4.2.3: The City should monitor changing uses of properties within the special assessment area and adjust the amount of bicycle parking provided nearby accordingly.

4.3 | Provision of Bicycle Parking by Private Parties

Issue: Existing buildings may not have space on the property to install required short-term bicycle parking.

Recommendation 4.3.1: If required short-term parking cannot be provided on site for an *existing building* due to site constraints, parking may be provided in the public right of way (within 50 feet of the building entrance). Parking provided in the public right of way shall require a Privilege in the Streets permit. Privilege in the Streets permits should not be issued to accommodate short-term bicycle parking for new construction; newly constructed buildings should provide all required short-term bicycle parking within the property's lot lines.

Issue: Existing buildings constructed prior to 1988 are largely exempt from existing bicycle parking requirements, which limits the ability of residents and employees to securely lock their bicycles on-site.

Recommendation 4.3.2: Encourage property owners to provide as much bicycle parking as they reasonably can whenever permits are required for work on existing buildings. The City should establish a program similar to the current Façade Improvement Program to assist property owners that are exempt from the existing bicycle parking requirements in providing adequate bicycle parking.

4.4 | Event Bicycle Parking

Issue: Events that attract large numbers of people, whether in a formal building or in an open space, do not provide adequate bicycle parking to meet demand.

Recommendation 4.4.1: Requirements for providing attended temporary bicycle parking should be established. Attended bicycle parking uses portable racks that can be stored on-site or brought to a large public event and set up quickly and easily. A secure area is typically roped or fenced off and staff, volunteers or a paid contractor check bicycles in and out. Attended bicycle parking greatly reduces theft potential, clutter at events, barriers to pedestrian travel, and can potentially increase attendance and bicycle transportation to the event if secure bicycle parking is planned for and advertised in advance of the event. Attended bicycle parking should be required for the following:

- Events occurring in a building (i.e. stadiums, arenas, and amphitheatres) with an expected attendance greater than 500 people. Stadiums, Arenas and Amphitheatres shall provide at least 75 percent but not more than 90 percent of short-term parking in the form of an attended facility for patrons.
- Outdoor events requesting a street closure permit or allowing alcohol sales and expecting over 250 attendees per day; this requirement should explicitly include the Dane County Farmer's Market which requests a street closure permit for the 100 block of State Street.

Recommendation 4.4.2: Attended bicycle parking should include the following features:

- Continuously staffed;
- Available to patrons of events from not later than one hour before the event begins to not earlier than one hour after the event finishes;
- Sufficient parking provided to accommodate at least five percent of expected daily attendees for events offering in buildings, and ten percent of expected daily attendees for outdoor events;
- Located within one block radius of regular event entrance;
- All event publicity should include information on the attended bicycle parking including availability, location and cost (the event sponsor may charge a small fee which would cover the cost of providing this service); and
- Bicycle parking must receive an equal amount of advertising space as other transportation information.

Recommendation 4.4.3: Attended bicycle parking is currently offered as a service by the Wisconsin Bike Fed. The City should work to ensure that attended bicycle parking services are offered by at least one organization in the city that has the capacity to serve multiple events at one time.

4.5 | Sidewalk Cafés and Vending in Relation to Bicycle Parking

Issue: Sidewalk cafés and vending compete with bicycle parking for limited space in the public right of way; at the same time, these uses increase demand for bicycle parking.

Recommendation 4.5.1: The following changes should be made to the café/vending permit process and the zoning code as necessary:

- Sidewalk cafés that require relocation of a bicycle rack should only be permitted if the rack plus the additional spaces required by the sidewalk café seating can be reinstalled within 50 feet of the existing location;
- Permits issued for vending should not impede access to any existing bicycle racks including the required access aisles required for maneuvering bicycles in and out of the racks; and
- Vending sites should be relocated as necessary to allow bicycle parking installation recommended in Chapter 5; this should occur as permits expire and not to existing permits.

4.6 | Other Bicycle Parking Recommendations

Issue: Damaged or abandoned bicycles limit available bicycle parking capacity and often block access to bicycle parking spaces until they are removed by city staff.

Recommendation: Bicycle racks within the study area should be surveyed weekly from March through November (every other week December through February) for damaged or abandoned bicycles; such bicycles should be tagged for removal and promptly removed if the City is not contacted by the owner of the bicycle. The current program to remove damaged or abandoned bicycles will require a funding increase, and potentially increased storage capacity, to accomplish this recommendation.

4.7 | Moped Parking Recommendations

The Final Report of the Ad Hoc Committee on Moped Parking (2012) provided clear and concise recommendations for addressing the moped parking concerns in Madison. The recommendations of this project utilize many of the recommendations of the Ad Hoc Committee report, as well as a number of new recommendations. In short, under all circumstances related to parking, mopeds should be treated the same as Type 1 motorcycles in the City of Madison.

Moped Parking

- **Recommendation 4.7.1:** Consistent with the recommendations of the Ad Hoc Committee on Moped Parking, introduce an ordinance classifying mopeds as Type 1 motorcycles for parking purposes and also prohibiting moped parking from all sidewalks and terraces except where designated moped parking stalls are marked and signed. The ordinance should apply citywide. The ordinance should specify an effective date that allows adequate time for Traffic Engineering, the Parking Utility, and any other impacted departments to make adequate preparations. Appropriate lead time should also be provided for educating moped users, dealers and repair shops about the changes to parking regulations. It is recommended that the ordinance take effect at the beginning of a University of Wisconsin semester.

- **Recommendation 4.7.2:** Traffic Engineering should work with Real Estate to establish a process through which property owners can use the Privilege in Street process to request moped parking stalls within the public right of way. Traffic Engineering should establish minimum standards for the consideration of such facilities. At a minimum, the standards should specify:
 - All moped parking areas must be on paved surfaces;
 - Moped parking stalls should be a minimum of six feet long by three feet wide;
 - Moped parking areas in the terrace should not interfere with access to vehicles legally parked on the street;
 - Alder approval should be required for all applications;
 - The applicant shall maintain the parking area including annual remarking and snow clearance;
 - Moped parking areas should be for the exclusive use of vehicles with moped license plates.

Moped Parking Standards in the Zoning Code

- **Recommendation 4.7.3:** The Planning Division proactively enforce zoning setback parking standards.
- **Recommendation 4.7.4:** Consider establishing categories on the City Report-A-Problem website to allow the anonymous reporting of moped parking violations. Reporting areas may be included in the Exterior Housing section for mopeds parked on private property, and in the Parking Enforcement section for mopeds parked in the public right of way.
- **Recommendation 4.7.5:** The Planning Division with concurrence of the Plan Commission should consider expanding moped parking requirements in the zoning code to include:
 - Minimum stall requirements for both residential and non-residential parking and specifically one on-site moped stall for every seven bedrooms;
 - Staff develop a methodology for flexibility in the moped parking requirements; and
 - Create an overlay district where moped parking standards would be in place. At the same time consider, but not require moped parking outside the overlay district.

Education and Enforcement

- **Recommendation 4.7.6:** The Traffic Engineering Division should develop a consistent education strategy for public right-of-way moped parking. Information about the new parking requirements should be widely disseminated well in advance of the effective date. Specifically, mopeds parked in the greater Downtown and Campus areas should be posted with fliers noting the regulation changes during the last week of classes at the University of Wisconsin-Madison prior to the ordinance taking effect.
- **Recommendation 4.7.7:** The Planning Division should develop an education strategy focused on landlords for private property moped parking.
- **Recommendation 4.7.8:** For the first 30 days that the new ordinance is in effect, the Police Department and Parking Enforcement shall issue warnings for moped parking violations in the public right of way; following the 30 day warning period parking violations shall be issued.
- **Recommendation 4.7.9:** Parking Enforcement officers should be trained to recognize the differences between mopeds (engine less than 50cc) and motorcycles that resemble mopeds (engine 50cc or greater).
- **Recommendation 4.7.10:** Monitor moped abandonment and develop a more streamlined removal process if it is a persistent problem.

Preparing for Impact due to the Changes

- **Recommendation 4.7.11:** New moped parking strategies may have to be developed. For example, they may include new parking in ramps, more on street motorcycle/moped spaces both metered and unmetered, educating operators that up to three mopeds may be parked in an automobile space, adding parallel motorcycle/moped parking spaces on narrow streets, moped parking areas in the terrace, etc. On private property encourage owners to retrofit moped parking stalls.
- **Recommendation 4.7.12:** The Parking Utility should consider providing at least one on-street motorcycle/moped parking stall in areas with marked on-street parking stalls by the effective date of the new ordinance. This may be accomplished by converting standard parking spaces into multiple motorcycle/moped parking stall or by creating new motorcycle/moped parking stalls from “leftover” space on each block.

Mopeds parked at bicycle racks commonly compound overcrowding: the silver moped is utilizing two bicycle spaces.



5 | Short-Term Bicycle Parking Recommendations and Cost Estimates

This section provides site-specific recommendations for providing additional short-term bicycle parking in the Downtown study area. Recommendations are provided for bicycle parking in the public right-of-way as well as for short-term bicycle parking in municipal parking garages.

5.1 | Cost Estimates

Cost estimates are provided for installing the recommended racks; these estimates are based on the following specifications:

- Where Wheelwell Secure racks are specified, prices are based on the Madrax Sentry Rack with the Mad Shield finish (powder coat over galvanized steel).
- Where Post & Ring racks are specified, prices are based on the Dero Bike Hitch with a thermoplastic over galvanized steel finish.
- Cost estimates are based on single rack prices as of January 2016; orders of multiple racks will typically result in lower per-rack costs.
- For all rack styles, specifying a galvanized finish without a thermoplastic or powder coat overlay will result in lower costs; specifying stainless steel will result in substantially higher costs.
- Labor costs are based on a rate of \$200 per hour with the following time estimates to install different rack styles:
 - Wheelwell, U Rack, and Post & Ring: one hour per rack
 - Meter Ring: half hour per rack

Details about different rack styles are presented in Appendix B.

Wheelwell secure racks help prevent bicycles from falling over at racks unlike the rack shown in this example.



5.2 | Right-of-Way Parking

Observations of bicycle parking in the study area indicates that available bicycle parking in the public right-of-way commonly does not meet demand throughout much of the Downtown study area. It is recommended that the City install additional bicycle parking at as many of the locations displayed on Map 5 and noted in Table 7 as possible. These are the areas with the greatest observed need for additional bicycle parking. A large map of the recommended rack installation locations is provided at the conclusion of this report, and detailed maps of each location are provided in Appendix C of this report.

Recommended rack locations are based on areas that demonstrated a consistent need for additional bicycle parking during utilization counts conducted for this study. Every attempt was made to identify locations where additional parking could be located in areas of high demand, while avoiding other competing uses for public space. However, some of the rack locations recommended in this section may conflict with existing sidewalk café or vending permits; such conflicts are noted in recommendations Table 7. Vending activities and sidewalk cafés were not always present when fieldwork was being conducted for rack placement recommendations; final rack locations, vending locations, or café locations may need to be modified slightly to accommodate the recommended racks.

Map 5: Recommended bicycle rack installation locations

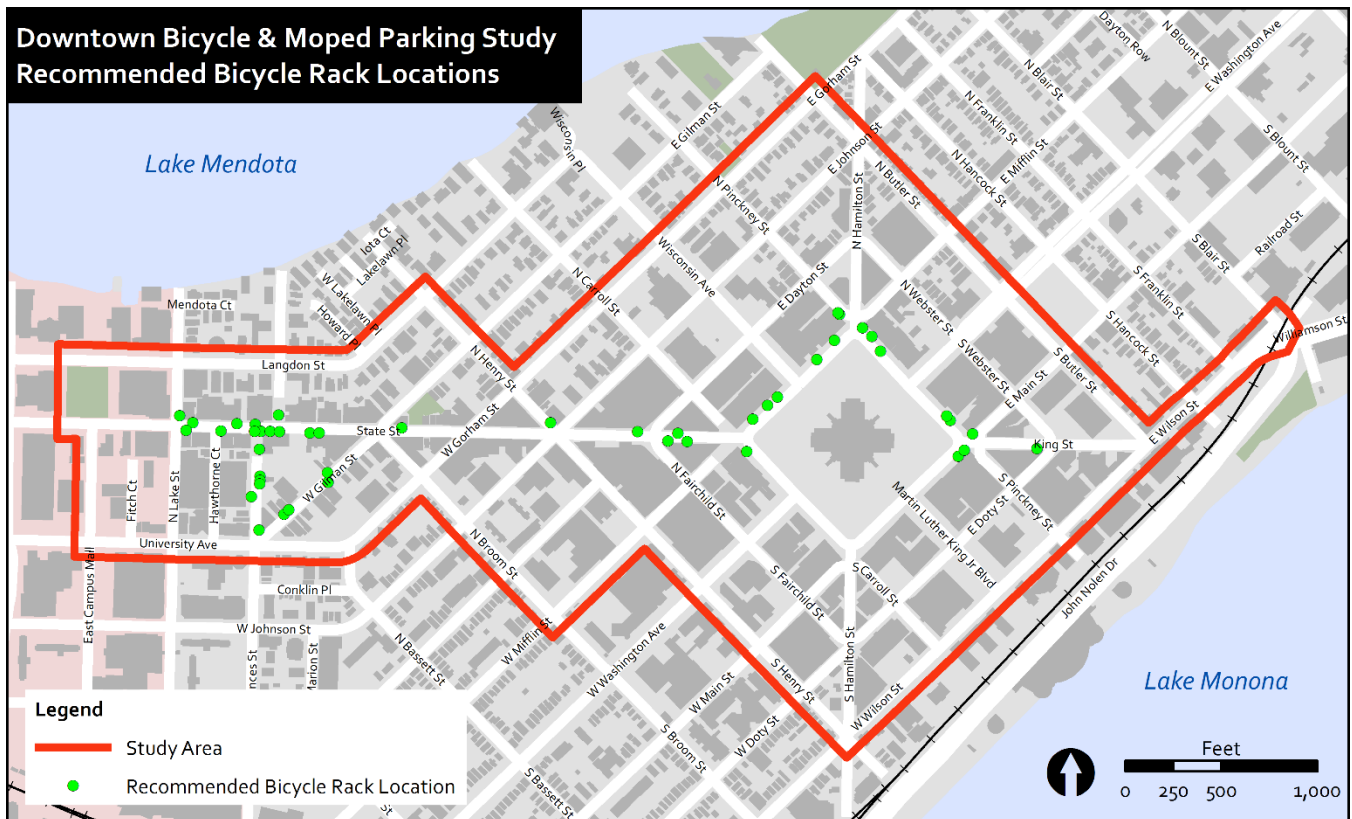


Table 7: Recommended bicycle parking locations.

ID	Recommended Rack	Capacity	Placement	Notes / Potential Constraints
Map C-1: State Street, 600 Block				
2	Wheelwell, double sided	5	Terrace	On Lake St, 300 block
21	Wheelwell, single sided	3	Terrace	
22	Wheelwell, double sided	7	Terrace	
23	Wheelwell, single sided	5	Terrace	
24	Wheelwell, double sided	7	Terrace	
25	Wheelwell, single sided	5	Terrace	
35	Wheelwell, single sided	4	Terrace	10' clearance between planter and crosswalk apron
36	Wheelwell, double sided	7	Terrace	
37	Wheelwell, double sided	5	Terrace	On N Frances St, 400 block
Map C-2: North Frances Street, 400 Block				
3	Wheelwell, double sided	5	Terrace	
29	Wheelwell, single sided	3	Terrace	
39	Wheelwell, single sided	4	Terrace	
40	Wheelwell, single sided	5	Terrace	
41	Wheelwell, single sided	5	Terrace	
Map C-3: State Street, 500 Block				
26	Wheelwell, double sided	7	In line with existing racks	On N Frances St, 300 block Vent; May conflict with Saturday vending permit E7
27	Wheelwell, single sided	3	Terrace	
28	Wheelwell, single sided	5	Terrace	May conflict with café (Monday's)
38	Wheelwell, single sided	5	Terrace	
42	Wheelwell, single sided	5	Terrace	
Map C-4: West Gilman Street, 400 Block				
30	Wheelwell, double sided	5	Terrace	
43	Wheelwell, single sided	5	Terrace	
44	Wheelwell, single sided	5	Terrace	
45	Wheelwell, single sided	5	Terrace	
Map C-5: State Street, 400 Block				
46	Wheelwell, single sided	5	Terrace	
Map C-6: State Street, 300 Block				
34	Wheelwell, single sided	5	Terrace	
Map C-7: State Street, 200 Block				
19	Wheelwell, single sided	5	Terrace	May conflict with café (Paul's Club)
Map C-5: State Street, 100 Block				
17	Wheelwell, single sided	5	Terrace	May conflict with café (Buck & Badger)
18	Wheelwell, single sided	4	Terrace	May conflict with café (Red Elephant)
33	Wheelwell, single sided	5	Terrace	May conflict with café (Tiki Shack)
Map C-9: North Carroll Street, 10 Block				
1	Wheelwell, double sided	9	Terrace	May conflict with Saturday vending site F54
48	Wheelwell, double sided	9	Terrace	May conflict with Arts and Crafts Saturday vending sites F27 and C16

Table 7 continued

ID	Recommended Rack	Capacity	Placement	Notes / Potential Constraints
Map C-10: East Main Street, 10 Block				
14	Wheelwell, single sided	5	Terrace	May conflict with Saturday vending permit C31
15	Wheelwell, single sided	3	Terrace	May conflict with food cart permit F41
Map C-11: King Street, 100 Block				
11	Wheelwell, single sided	3	Terrace	
Map C-12: South Pinckney Street, 10 Block				
12	Wheelwell, double sided	9	Terrace	Replaces existing single-sided rack immediately to the southeast.
13	Wheelwell, single sided	5	Back of bus shelter*	
49	Wheelwell, single sided	5	Terrace	14.5 feet of sidewalk width
Map C-13: North Pinckney Street, 10 Block				
4	Wheelwell, single sided	5	Back of bus shelter*	May not provide adequate pedestrian width to cafe
5	Corral; Wheelwell, single sided	2x5	NE end of existing parking spaces	
6	Wheelwell, double sided	2	Terrace	
Map C-14: North Pinckney Street, 100 Block				
7	Post & Ring	2	Terrace	
8	Post & Ring	2	Terrace	
Map C-15: East Mifflin Street, 10 Block				
9	Wheelwell, single sided	5	Terrace against planter	Vent; May conflict with Saturday vending permit E12
10	Wheelwell, double sided	9	Terrace	May conflict with vending site T16
Map C-16: West Mifflin Street, 10 Block				
31	Wheelwell, single sided	3	Terrace	May conflict with Saturday vending permit C21
32	Wheelwell, single sided	3	Terrace	May conflict with Saturday vending permits C25, C26

* May require permission from Madison Metro

Right-of-Way Parking Cost Estimate

Table 8 provides a cost estimate for purchasing and installing the racks detailed in Table 7.

Table 8: Cost estimate for purchase and installation of recommended right of way bicycle racks in the study area.

Racks	Quantity	Cost / Rack	Labor / Rack	Estimated Total
Post & Ring	2	\$173	\$200	\$746
Wheelwell – 3 Single	7	\$575	\$200	\$5,425
Wheelwell – 4 Single	3	\$779	\$200	\$2,937
Wheelwell – 5 Single	22	\$983	\$200	\$26,026
Wheelwell – 2 Double	1	\$359	\$200	\$559
Wheelwell – 5 Double	4	\$911	\$200	\$4,444
Wheelwell – 7 Double	4	\$1,271	\$200	\$5,884
Wheelwell – 9 Double	4	\$1,631	\$200	\$7,324
			Total	\$53,345

5.3 | Parking Meter Post Bicycle Parking

In addition to the bicycle racks recommended in Table 7, it is recommended that the City install meter ring racks on as many street-side parking number stall posts as practicable throughout the city. Meter rings generally should not be installed on posts with active meter heads as bicycles locked to these posts could obstruct access to the meter for payment. Meter rings should also not be installed on parking number stall posts in parking lots or garages. The City Parking Utility estimates that there are approximately 433 parking stall number posts in the city. Table 9 provides a rough cost estimate for installing meter rings on 300 of the parking number stall posts in the city, not just the Downtown study area. This would provide 300 to 600 bicycle parking spaces in the areas of the City that have the most congested bicycle parking (Downtown, Monroe Street, Atwood Avenue).

Table 9: Cost estimate for installing meter ring racks throughout the city.

Racks	Quantity	Cost / Rack	Labor / Rack	Estimated Total
Meter Ring	300	\$110	\$100	\$63,000
			Total	\$63,000

The recommended Meter Ring racks should be installed over the course of two years.

5.4 | Parking ramps

The City should continue to provide short-term bicycle racks in all municipal parking garages with the following recommendations:

- Bicycle parking equivalent to five percent of the garage’s motor vehicle capacity should be targeted for each garage. Table 10 displays the existing bicycle parking capacity of each municipal garage, the recommended bicycle parking capacity, and the number of racks and cost estimate to achieve the recommended capacity.
 - Racks are assumed to be single-sided multi-space style unless otherwise noted.
- Recommended bicycle racks may be added in phases with monitoring of rack usage to determine if more bicycle parking spaces are needed at each location.
- Bicycle racks in garages should be located as close to each garage entrance as possible and should not require bicyclists to pass through access control gates.
- Bicycle racks should be located within the garage structure to provide shelter from the elements.
 - Racks currently located outside parking structures are noted in Table 10 but are not counted toward the recommended total number of bicycle parking spaces.
- Signage for all municipal parking garages should indicate that bicycle parking is available within the garage, and signage and/or pavement markings should guide users to bicycle parking areas if they are not readily viewable from the entrance.
- It may be necessary to remove one or more motor vehicle parking spaces in each garage to install bicycle parking to accommodate the recommendations provided in Table 10. This implies a loss of revenue from the motor vehicle parking spaces converted to bicycle parking.

Recommendations for providing long-term bicycle parking in municipal parking garages is provided in Chapter 6.

Table 10: Bicycle parking recommendations and cost estimate for installing additional short-term bicycle parking in municipal parking garages.

Garage	Motor Vehicle Capacity	Rec. Bike Capacity	Existing Bike Capacity	Additional Racks Needed	Cost / Rack	Labor / Rack	Estimated Total
Capitol Square North	613	30	4 + 4 outside	3 9-bike (double sided)	\$959	\$80	\$3,117
Government East	516	25	22	None	-	-	-
Overture Center	620	30	10	4 5-bike	\$599	\$80	\$2,716
State Street Campus	1,063	50	24 + 21 outside	5 5-bike	\$599	\$80	\$3,395
State Street Capitol	844	40	18	3 7-bike (double sided)	\$743	\$80	\$2,469
						Total	\$11,697

Note: The Government East Parking Garage is scheduled to be demolished and reconstructed in an undecided configuration. The final garage design should provide bicycle parking for five percent of the total motor vehicle capacity of the garage.

6 | Long-Term Bicycle Parking Recommendations

This chapter provides recommendations for the provision of long-term bicycle parking in the study area.

6.1 | Long-Term Facility Descriptions

For the purposes of this study, long-term bicycle parking can be divided into three categories:

Bicycle Lockers

Metal or heavy-duty plastic lockers that can accommodate one bicycle. Lockers can be assigned to single users or made available on-demand using an access control system.

Bicycle Cages

Bicycle Cages provide bicycle parking in a fenced, secure, sheltered area. Cages may be standalone structures or may be built within existing structures such as parking garages. Because multiple people have access to bicycle cages, bicycles must still be secured within the cage. Bicycle cages often offer high-capacity bicycle racks and can accommodate as many bicycles as will fit within the defined cage space. Some bicycle cages include amenities such as pumps and bicycle repair stands and tools, or small lockers in which users can store items such as helmets and lights. Bicycle cages can be keyed with users being guaranteed a space in the cage or can use an on-demand access control system in which spaces are available on a first-come, first-served basis.

Bicycle Centers

Bicycle Centers vary greatly in the services offered, but generally offer more services than a self-service bicycle cage. Bicycle Centers often are staffed, at least part of each day. Some bicycle centers offer bicycle repair service on-site, and some include restrooms, changing rooms, showers and lockers. Bike Centers always use an on-demand system with spaces available on a first-come, first-served basis.

6.2 | Logistics

The City should consider offering a variety of locations for long-term bicycle parking available to the public for a fee. This parking will typically serve long-term parking needs for downtown residents and workers but may also serve as a short-term parking option for users who place a premium on parking in a secured area. Demand for paid, secure parking was demonstrated in the survey conducted for this study, although the demand is relatively low (see pages 49 and 50 of this report).

Whenever possible, the City should focus efforts on requiring or encouraging the provision of secure bicycle parking in all existing buildings downtown, whether residential, commercial or other use. The provision of secure bicycle parking for residents and employees of specific buildings will alleviate much of the demand for public long-term parking downtown and will provide such parking in a location most convenient to the user: within their own building. Even with the widespread implementation of long-term bicycle parking within private buildings, the City should provide secure bicycle parking, for a fee, in select Downtown locations to serve people who do not have access to secure parking within private buildings, particularly all the buildings constructed prior to the implementation of Madison's bicycle parking ordinance in 1988.

Reserved versus On-Demand Systems

Long-term public bicycle parking can be provided as either reserved systems, where users have assigned spaces in cages or lockers that are available for their exclusive use 24/7, or on-demand, where spaces are available to any users on a first-come, first-served basis using an access control system. While reserved systems offer a level of confidence to users that

they will have a space available at their destination, they are also highly inefficient, as spaces may only be in use on occasion. It is recommended that all long-term public parking implemented by the City operate on-demand, where users purchase a membership to the system, and can then access bicycle spaces as needed for a small fee. This may result in users not being able to access a parking space if the facility is full, but it can also result in greater overall utilization of bicycle parking spaces.

Access

A single membership should operate all long-term public bicycle parking in the City of Madison, and ideally, in any adjoining municipalities or entities (i.e. the University of Wisconsin, the Dane County Airport, etc.). It is possible to provide access control systems that allow members to use cards that they may already possess, such as a BCycle card, or a mobile phone.

Operations

A system of public long-term bicycle parking will require staffing, or a contract with a vendor, for ongoing operations. These operations can be divided into the following areas:

- **Administration**
A system of paid bicycle parking typically requires users to obtain a membership. Administration time is needed to recruit and maintain memberships, provide access credentials to new members, bill members for service and deactivate non-renewing members so they can no longer access the system.
- **Maintenance**
Bicycle lockers, cages, and centers all require regular maintenance to ensure the facility is clean and operating correctly; to ensure that only authorized users can access the facility; and to verify that only bicycles and bicycle equipment is being stored in the facility.

A single entity other than the City could be responsible for operations of all public long-term bicycle parking supplied by the City. This entity could be an existing company such as BikeLink, which operates bicycle parking facilities across the country, or a non-profit formed specifically for this task. The new entity being established to operate the BCycle bike share system in Madison may be particularly well-suited for this task as they will already have staff operating in proximity to recommended long-term parking locations, they already operate a membership system, and the BCycle card could operate access control features of long-term bicycle parking areas.

6.3 | Long-Term Parking Recommendations

Bicycle Cages

The City’s municipal parking garages provide ideal locations for installing on-demand bicycle cages: they are dispersed throughout Downtown and some of them contain space that could be used to install a bicycle cage with little or no loss of existing motor vehicle parking and revenue. The City should install a single bicycle cage in the State Street Capitol Garage as a pilot project for the overall long-term bicycle parking program. This bicycle cage should include on-demand access control that allows members of the system to access the cage 24 hours a day, 7 days a week. The bicycle cage should be located where bicycle parking currently exists within a marked area in the central area of the garage. In this location no loss of motor vehicle parking is required, and users have easy access from West Dayton Street, West Johnson Street, and North Carroll Street. A sample diagram of the bicycle cage design with capacity for 25 bicycles is provided in Figure 3 while estimated costs for the racks only for the bike cage are provided in Table 11. Existing short term bicycle parking will need to be relocated to accommodate the proposed bicycle cage; this can be accommodated near the parking garage entrances without impacting existing motor vehicle parking stalls.

Table 11: Cost estimate for purchase and installation of racks only for the State Street Capitol Garage bike cage.

Racks	Quantity	Cost / Rack	Labor / Rack	Estimated Total
Wheelwell Secure Rack – 5 Bike	1	\$500	\$200	\$700
Wheelwell Secure Rack – 6 Bike	1	\$610	\$200	\$810
Wall Mounted – 4 Bike	3	\$800	\$200	\$3,000
			Total	\$4,510

Note: Prices for Wheelwell Secure rack costs based on Madrax Shark single-sided racks with galvanized finish; wall mount rack costs based on custom spaced Saris Vertical Rack with powder coat finish.

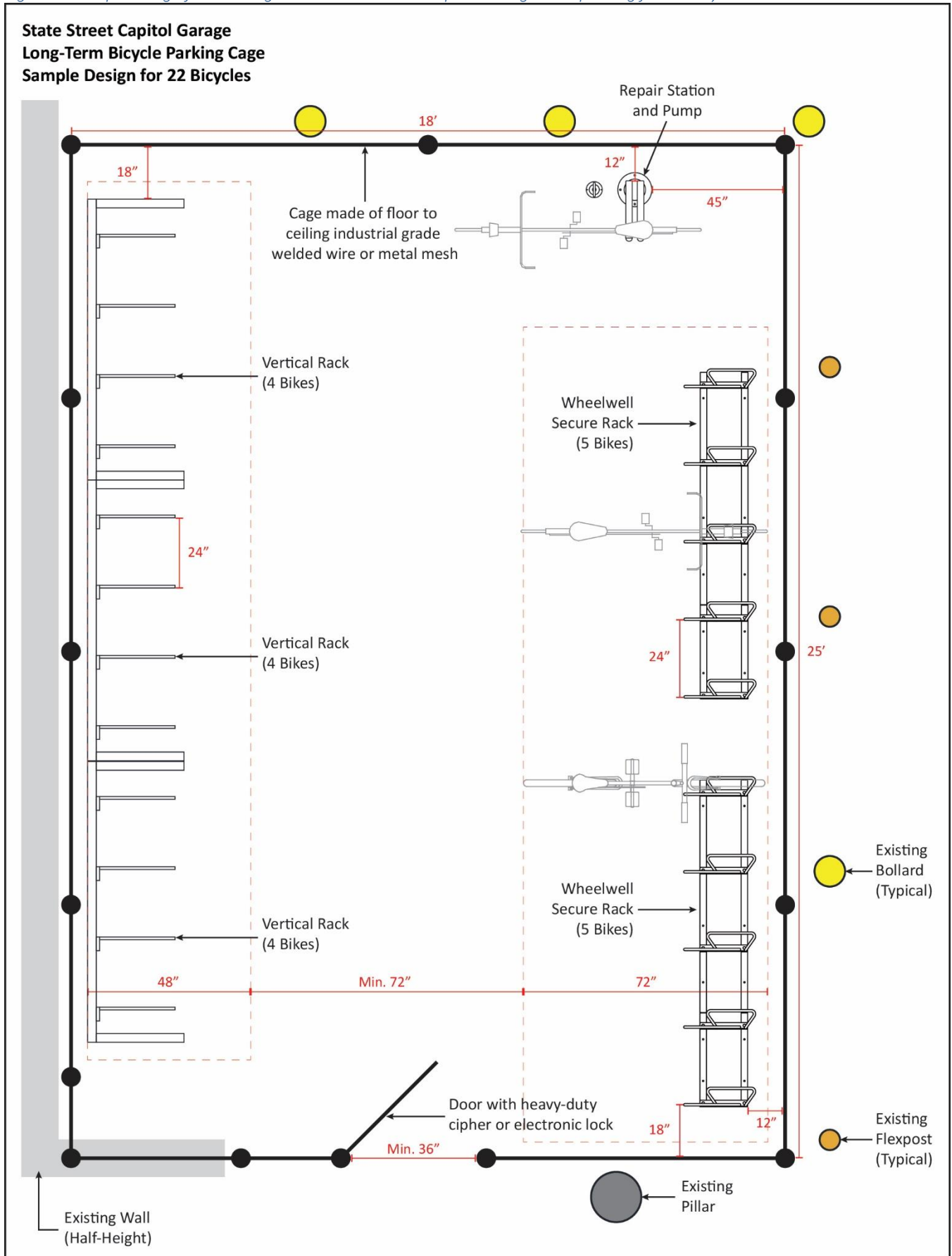
Dane County installed a bicycle cage in the Dane County parking ramp at the corner of West Main Street and South Fairchild Street in 2016. The cage provides parking for 35 bicycles, small lockers for the storage of personal items, a bench, and a bicycle repair station. Parking in the cage is available to County and City employees for an annual cost of \$60.00. If the cage is not fully utilized by County and City employees, spaces may be made available to the public. Cage users are issued a RFID tag that allows access to the case 24 hours a day, seven days a week. The bicycle cage cost approximately \$70,000 for all components and installation; more detailed costs are provided in Table 12. It is anticipated that cages installed by the City would be approximately the same cost.

Table 12: Approximate cost for the Dane County Parking Ramp bicycle cage.

Item	Cost
Bicycle Racks (35 bicycles)	\$5,500
Fencing and doors	\$21,500
Access system (RFID)	\$7,500
Lockers	\$2,500
Bench	\$175
Repair station	\$1,265
Labor	\$32,000
Total	\$70,440

Bicycle cages installed by the City should be interoperable with the bicycle center proposed for the Judge Doyle Square development (more information below). It may be desirable to wait until an operator is selected for the JDS bike center and to have that same operator run all bike cages in the city. If the pilot bicycle cage located in the State Street Capitol Garage is successful, cages should be installed in all municipal parking garages.

Figure 2: Sample design for bike cage in the State Street Capitol Garage with parking for 22 bicycles.



Bicycle Lockers

No bicycle lockers are recommended by this study. Bicycle lockers provide some distinct advantages over bicycle cages, primarily the ability to secure more belongings than just a bicycle and the ability to install small numbers of lockers at specific locations. However, lockers are generally not aesthetically acceptable in locations outside of transit stations or parking garages and can be challenging to site politically. If other long-term public bicycle parking is installed by the City and is found to be successful, bike locker installation could be reevaluated.

Bicycle Center at Judge Doyle Square

The City should continue to pursue the inclusion of a bicycle center in the Judge Doyle Square (JDS) development. At a minimum, the bicycle center should provide secure bicycle parking and small lockers for members that is accessible 24 hours a day, 7 days a week. Additional amenities that should be considered include:

- Self-service bicycle tools and pumps;
- A vending machine with basic bicycle supplies including tubes, patch kits, and snack bars;
- Shower facilities and locker rooms;
- A bicycle wash station
- A full service bicycle repair center.

The access system for the JDS Bicycle Center should be compatible with all other long-term public bicycle parking. For example, a membership with the JDS Bicycle Center should provide access to the proposed bicycle cage in the State Street Capitol Garage, and the access method should be the same. Examples of a variety of bicycle centers are provided below.

- Palo Alto and Santa Barbara, California, as well as Washington D.C. have memberships to bikestation.com for bike parking center. The fee is \$20 annually which includes an electronic tag for access into secure parking areas. Parking itself ranges from \$1 per day for occasional users and \$96 per year (\$8 per month) for heavy users.
- In Long Beach, California, bike parking at a Mobis station is free and staffed during regular hours.¹
- The University of Minnesota has a bike center located in the University's Oak Street Parking Ramp. The Bike Center offers full-service tune-ups, spot repair, merchandise, classes, bike lockers, storage, and shower facilities. Membership is \$85 per year for students and faculty that features a key card to use 24/7 if needed.²
- The City of Saint Louis offers a bike parking station downtown that features 120 bike racks, showers and locker rooms. There is a \$20 application fee, followed by an annual, monthly or daily parking fee. In addition, the station offers corporate memberships. Membership includes key fob entry, 20-hour access, locker room access with showers, hair dryer and bathrooms, discounts on bicycle repair and bicycles, a guaranteed ride home program, and free air pump access.³
- The McDonald's Cycle Center in Millennium Park offers 500 annual memberships for \$199, monthly passes for \$35 or daily passes for \$3 to \$5 depending on towel service. Additional fees are charged for locker room and towel usage. Member benefits include 24/7 access to secure bicycle parking, showers, lockers, towels, discounts on repair service, retail and bicycle education programs.⁴

¹ How It Works. (2016). Retrieved January 26, 2016, from <http://home.bikestation.com/how-it-works>

² Bikestation Long Beach. (2016). Retrieved January 26, 2016, from <http://home.bikestation.com/bikestation-long-beach>

³ Downtown Bicycle Station. (2016) Retrieved January 26, 2016, from <http://trailnet.org/work/bicycling/downtown-bicycle-station/>

⁴ Become A Member. (2016) Retrieved January 26, 2016, from <http://bikeandpark.com/city/chicago/become-a-member>

7 | Moped Parking Recommendations

The moped parking policies provided in section 4.7 of this report call for the City to establish a process whereby property owners can apply or petition for the placement of a moped parking area in the public right of way adjacent to their property. Additionally, it is recommended that the Parking Utility consider providing additional moped/motorcycle parking spaces throughout Downtown.

8 | Conclusion

There is inadequate bicycle parking in much of the Downtown study area during many times of day and days of the week. The recommendations put forth by this plan are unlikely to fully satisfy this demand but will provide more bicycle parking and will help ease congestion at existing bicycle racks. Additionally, recommendations related to moped parking, if implemented, will remove mopeds from most terrace areas, reducing conflicts with other uses, including bicycle parking.

Appendix A | City of Madison Bicycle Parking Guidelines

The existing City of Madison Bike Rack Requirements flyer is displayed on the following pages. This document is available at: <http://www.cityofmadison.com/bikeMadison/documents/bikeRackRequirements.pdf>.

City of Madison Bike Rack Requirements

1) Bicycle Parking Space Size, Access Aisles, and Vertical Clearance

- Bicycle parking spaces shall be a minimum of two (2) feet by six (6) feet.
- There shall be an access aisle a minimum of five (5) feet in width.
- Have a vertical clearance of at least 6 feet.

2) Bicycle Rack Design

- Shall permit the locking of the bicycle frame and one (1) wheel to the rack
- Shall support a bicycle in a stable position.
- All racks shall accommodate cable locks and “U” locks including removing the front wheel and locking it to the rear fork and frame.
- Each required bicycle parking space must be accessible without moving another bicycle
- Placement shall not result in a bicycle obstructing a required walkway.
- Shall be located on paved or pervious, dust-free surface with a slope no greater than three percent (3%).
- Surfaces shall not be gravel, landscape stone, or wood chips.






3) Bicycle Rack Location on Site

- Required short-term bicycle parking spaces shall be located in a convenient and visible area at least as close as the closest non-accessible automobile parking and within one hundred (100) feet of a principal entrance
- Required long-term bicycle parking spaces shall be located in enclosed and secured or supervised areas providing protection from theft, vandalism and weather and shall be accessible to intended users
- Required long-term bicycle parking for residential uses shall not be located within dwelling units or within deck, patio areas, or private storage areas accessory to dwelling units.

Examples of Bicycle racks that do not meet the design requirements above:

			
Grid or Fence Style Racks	Wave or Ribbon Style Racks	Racks that hold the bike by the wheel with no way to lock the frame and wheel to the rack with a U-lock	

Examples of Bicycle racks that do meet the design requirements above:

				
Dero Campus Rack	Saris City Rack	Madrax Spartan Rack	Madrax Sentry Rack	Madrax Shark Rack

Examples of Inverted-U and Post & Ring Type Racks

See attached sheets for proper installation instructions for Inverted-U and Post & Ring type racks



If you have questions about whether a particular bicycle parking rack you are considering using meets these requirements, please contact Arthur Ross, Pedestrian-Bicycle Coordinator, 608/266-6225

Updated August 1, 2014

Inverted-U, Post & Ring Other Similar Bicycle Parking Racks Installation instructions

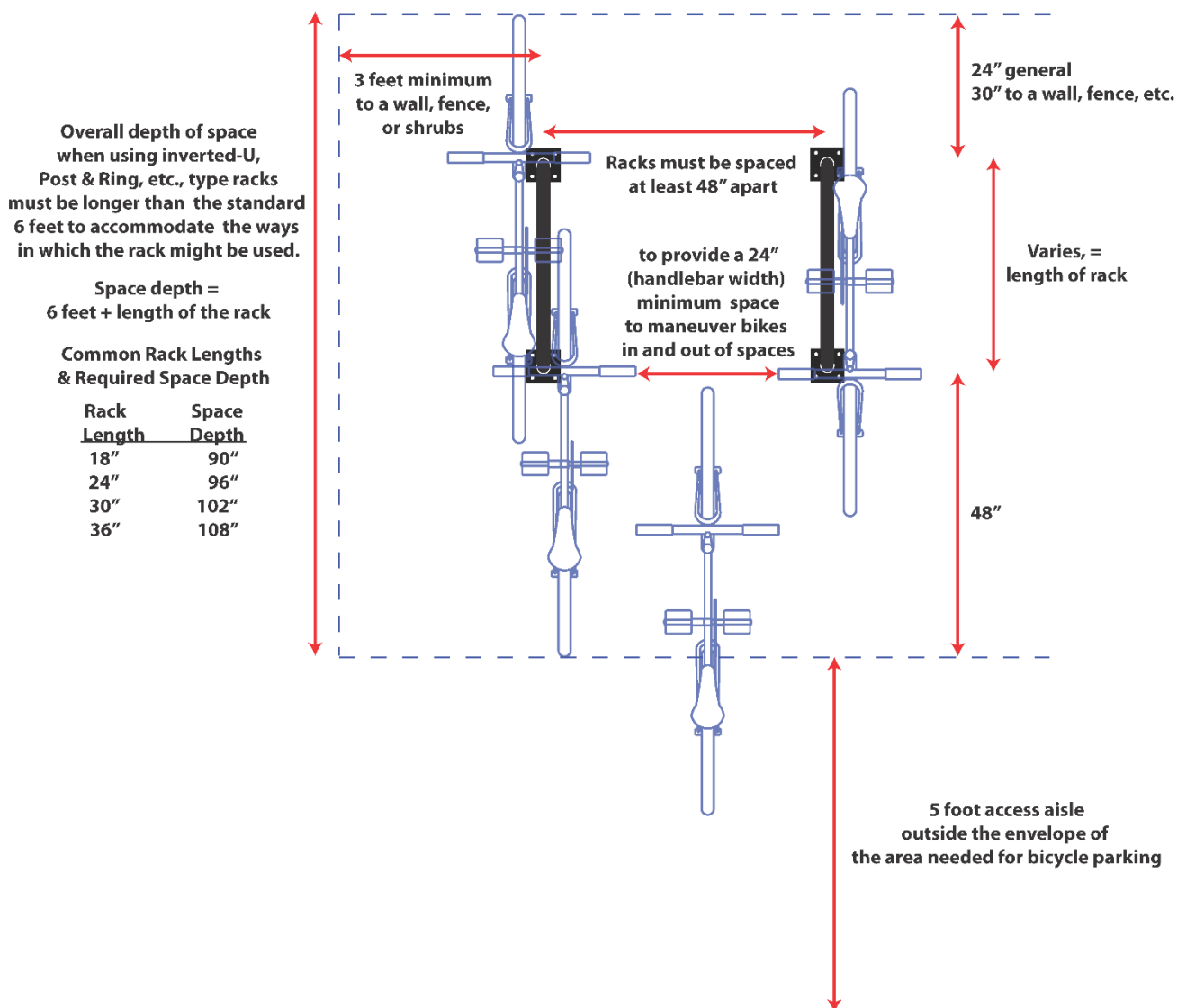
Inverted-U, Post & Ring, and other similar type racks for use in the City of Madison need to be installed per the following instructions.

A) Horizontal Spacing (width) and Space Length (or depth) for a Single Row of Racks

Overall width needed is 2 feet per bicycle, same as for any well designed rack.
 In the example below, for 4 bikes the minimum width needed is 96", the same as for a rack with 4 individual spaces. There is no space savings with this rack design since you still need room to get bikes in and out without handlebar interference.

The space length, or depth, when using inverted-U type racks will be longer than for other types of racks due to the variety of ways people may use these racks. Instead of 6 ft. you will need between 90" and 108" (7.5 - 9 ft.).

The diagram below explains both the width and length/depth requirements if you decide to use inverted-U type racks.

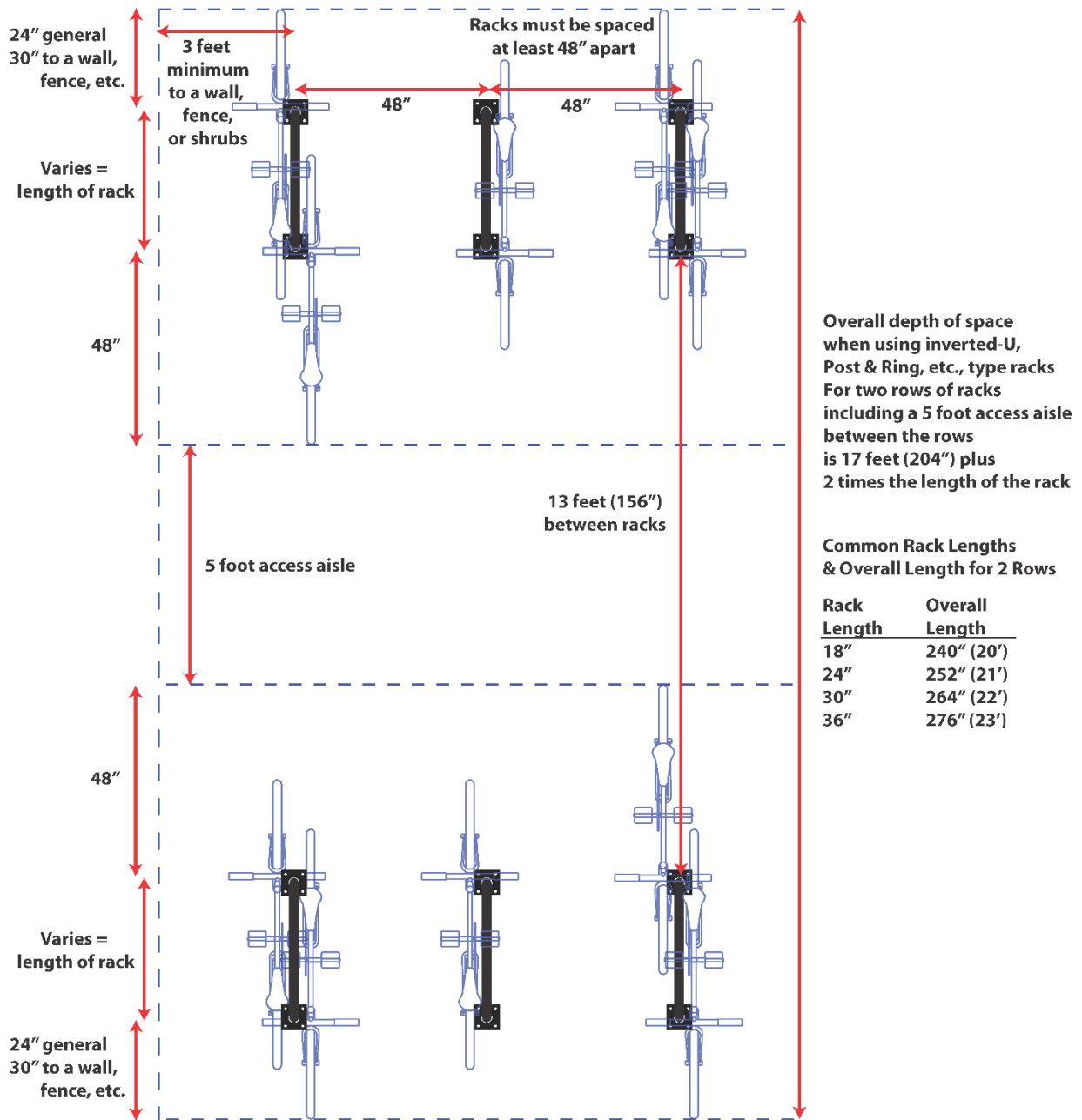


Inverted-U, Post & Ring Other Similar Bicycle Parking Racks Installation instructions

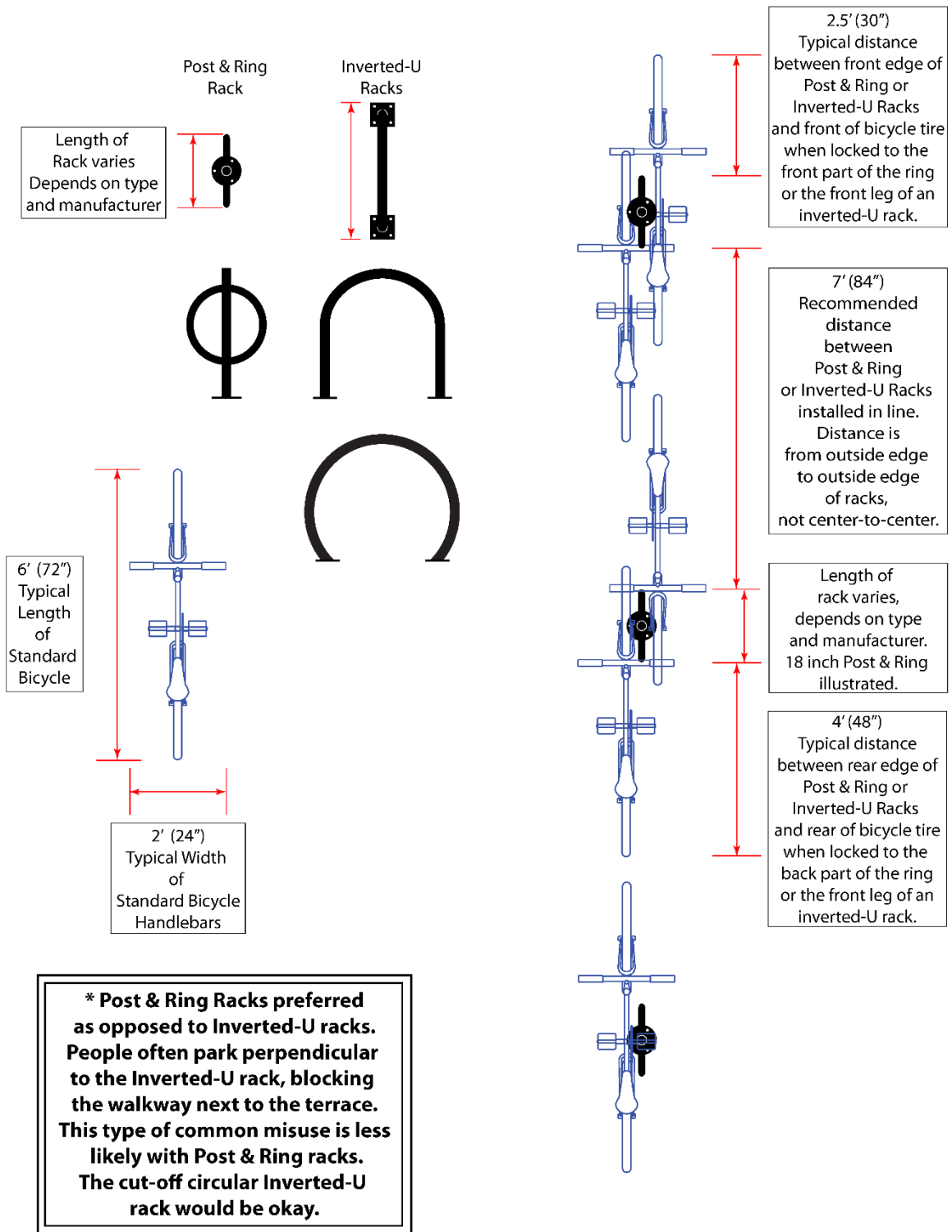
Inverted-U, Post & Ring, and other similar type racks for use in the City of Madison need to be installed per the following instructions.

B) Layout for a Multiple Row Installation

(See Sheet A for general width and depth spacing information)







**Installation of Post & Ring or Inverted-U type Racks
when installed in a line.
For example in a narrow space such as a street terrace. ***

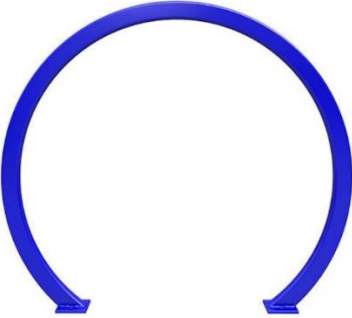








Appendix B | Sample Bicycle Rack Descriptions

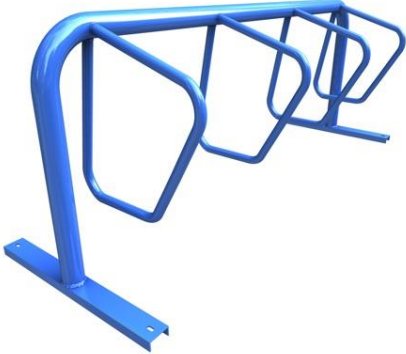


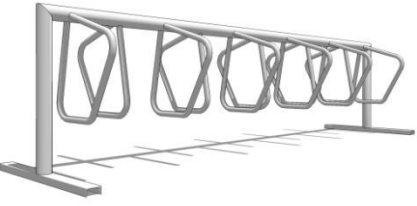

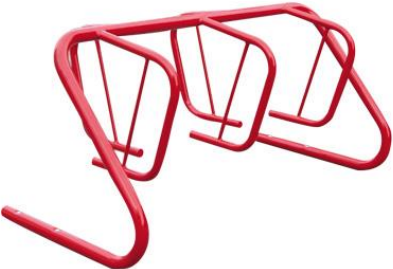
This appendix details recommended rack styles for installation by the City in public bicycle parking areas. Racks by specific manufacturers are included in the descriptions, but most bicycle rack manufacturers make a variation of each rack style and should be able to provide competitive quotes to the City for rack purchases.

Meter Ring	
Description	Metal ring that is secured to existing parking meter posts to provide more support for locked bicycles. Meter rings should only be applied to meter posts that display a parking stall number, and not active parking meters, as bicycles locked to active meters can limit access to the meter.
Use	Used on existing parking meter stall number posts to add additional locking locations for bicycles as well as stability to locked bicycles.
Material	Galvanized Steel
Capacity	1 to 2 bikes
Installation Notes	To be installed per City of Madison installation specifications, not manufacturers' recommendations. See City of Madison installation specifications in Appendix A.
Madrax Meter Rack, Madison Spec.	
 <p>The diagram shows a vertical metal post with a circular ring mounted on it. The ring has a bicycle silhouette in the center and the word 'MADISON' arched above it. An arrow points to the top of the ring with the label '16" dia.'. A vertical double-headed arrow below the ring indicates a height of '13" from the ground to the center of the ring.</p>	

Post & Ring		
Description	Freestanding post with loop for support for locked bicycles.	
Material	Galvanized Steel; Powder Coat or Thermoplastic over Galvanized Steel; Stainless Steel	
Use	Typically used in narrow areas where bicycle parking is desired such as terraces. Two bikes parked on a single Post & Ring rack (bikes parked parallel to the ring) forms two rows of bicycles, one on the front of the rack and one on the rear of the rack; this requires a longer space than 6 feet. Depth of space needs to be 6 feet plus the length of the rack. When installed side by side, racks need to be spaced 48 inches apart. When installing in a line, racks need to be 7 feet apart, edge to edge. Decorative bollards with small loops on the sides are not the same as Post & Ring racks and are not an acceptable form of bicycle parking.	
Capacity	2 bikes	
Installation Notes	To be installed per City of Madison installation specifications, not manufacturers' recommendations. See City of Madison installation specifications in Appendix A.	
Dero Bike Hitch	Madrax Post & Ring	Saris Post & Ring
		
Ring Width: 16.5" Height from ground to bottom of ring: 13" Tubing: 2.375" OD Post 1.5" OD Ring	Ring Width: 17.5" Height from ground to bottom of ring: 13.125" Tubing: 2.375" OD Post 1.625" OD Ring	Ring Width: 21.0" Height from ground to bottom of ring: 17.1" Tubing: 1.5" Square Post 1.5" Square Ring

Inverted U		
Description	Single length of material that looks like an inverted “U” or an “O”. It is recommended that O shaped racks be used as they reduce the likelihood of users locking bicycles perpendicular to the rack instead of parallel to the rack, as intended.	
Use	Typically used in narrow areas where bicycle parking is desired such as terraces. Two bikes parked on a single inverted-U rack (bikes parked parallel to the rack) forms two rows of bicycles, one on the front of the rack and one on the rear of the rack; this requires a longer space than 6 feet. Depth of space needs to be 6 feet plus the length of the rack. When installed side by side, racks need to be spaced 48 inches apart. When installing in a line, racks need to be 7 feet apart, edge to edge.	
Material	Galvanized Steel; Powder Coat or Thermoplastic over Galvanized Steel; Stainless Steel	
Capacity	2 bikes	
Installation Notes	To be installed per City of Madison installation specifications, not manufacturers’ recommendations. See City of Madison installation specifications in Appendix A.	
Dero Round or Arc Rack	Madrax Orion	Saris Circle Dock
		
Height: 35” Width: 40” Tubing: 1.9” OD (Round) or 2” square (Arc)	Height: 32.375” Width: 35.75” Tubing: 2.375” OD round or 2” square	Height: 32” Width: 36” Tubing: 2” square

Wheelwell Secure		
Description	Multiple spaces connected on one or two rails. Each space an area that stabilizes front wheel of a bicycle as well as an upright structure to lean the bicycle against and provide a locking area.	
Use	Can be used anywhere space permits.	
Material	Galvanized Steel; Powder Coat or Thermoplastic over Galvanized Steel	
Capacity	1 – 9 bikes. Can be single sided or double sided.	
Installation Notes	To be installed per City of Madison installation specifications, not manufacturers' recommendations. See City of Madison installation specifications in Appendix A.	
	Madrax Shark 3 (Single)	Madrax Shark 2 (Double)
		
	Spacing (center-to-center): 24"	Spacing (center-to-center): 24"
	Madrax Sentry 4 (Single)	Madrax Sentry 5 (Double)
		
	Spacing (center-to-center): 30"	Spacing (center-to-center): 30"

Hanging Loop		
Description	Multiple spaces connected on rail above the bicycle loops. Each loop is intended for use by one bicycle.	
Use	Can be used anywhere space permits.	
Material	Galvanized Steel; Powder Coat or Thermoplastic over Galvanized Steel	
Capacity	1 – 11 bikes. Can be single sided or double sided.	
Installation Notes	To be installed per City of Madison installation specifications, not manufacturers' recommendations. See City of Madison installation specifications in Appendix A.	
Dero Campus Rack (Single)	Saris City Rack (Single)	Madrax Spartan Rack (Single)
		
Spacing (center-to-center): 25"	Spacing (center-to-center): 24"	Spacing (center-to-center): 25"
Dero Campus Rack (Double)	Saris City Rack (Double)	Madrax Spartan Rack (Double)
		
Spacing (center-to-center): 25"	Spacing (center-to-center): 24"	Spacing (center-to-center): 25"

Appendix C | Recommended Bicycle Rack Location Maps

The maps in this appendix display the locations of additional bicycle racks recommended in Table 7 of Chapter 5. Rack locations are approximate and may require verification and adjustment by city staff.

Maps are provided as a separate PDF.

Appendix D | Online Public Survey Results

This appendix highlights key points from the online survey that was administered for the Downtown Madison Bicycle & Moped Parking Study. Not all survey questions are addressed in this summary, but the full survey results are provided at the end of the appendix. Responses to open ended questions or “Other” fields are not provided due to the large number of responses. All survey results, including those from partially complete surveys, are included in this appendix. The survey results will help inform the recommendations in the final Downtown Madison Bicycle & Moped Parking Study.

D.1 | Online Survey Summary Results

Survey availability and participation

The online survey was available from April 22 through May 15, 2015. During this time 1,382 people completed the survey with an additional 491 people partially completing the survey. Over half (55%) of the respondents reported that they were male, with 43% reporting that they were female, and 2% not reporting their gender. Figure 1 displays the age breakdown of survey respondents (nobody reported being under the age of 18).

The vast majority of survey respondents (79%) reported that they were employed either part time or full time. Only 8% of survey respondents reported that they were students, despite the proximity of the study area to the University of Wisconsin and the likelihood that students make up a large percentage of people living and parking bicycles and/or mopeds in the study area. The low percentage of students responding to the survey may reflect a variety of factors:

- The survey may have been better publicized and distributed to non-students than to students.
- Students may be less likely than non-students to complete an online survey.
- Bicycle and moped parking issues may not be a significant concern to students.

These factors are speculation however, and the actual reasons for low student participation are unknown.

Vehicle ownership and access

Nearly all of the survey respondents (95%) reported that they own or have easy access to a bicycle, while the ratio was almost exactly reversed for respondents who own or have easy access to a moped (7%). Ninety percent of respondents reported that they own or have easy and free access to a motor vehicle. Survey questions about bicycling or moped use were only directed to those respondents who stated that they had access to a bicycle or moped, respectively.

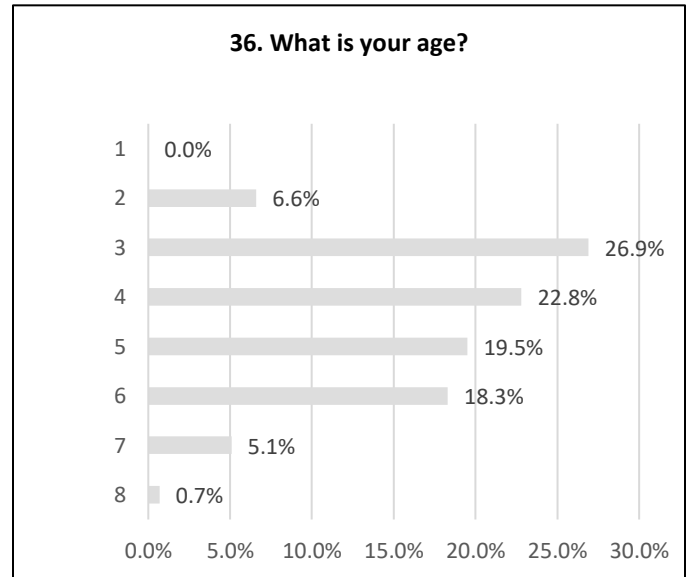


Figure 3: Age of survey respondents

Reasons for not bicycling more often to or within the study area

A variety of reasons were cited for not using a bike more often in the study area. Over 28% of respondents stated that finding bicycle parking was difficult enough to deter them from bicycling more. Over 22% of respondents stated that they do not feel comfortable locking their bicycle in the study area. These responses point to the need for both more bicycle parking throughout the study area, as well as the need for more secure parking options such as on-demand bicycle lockers or bicycle cages that require a key or key fob for access. Figure 2 displays the reasons cited for not bicycling more in the study area.

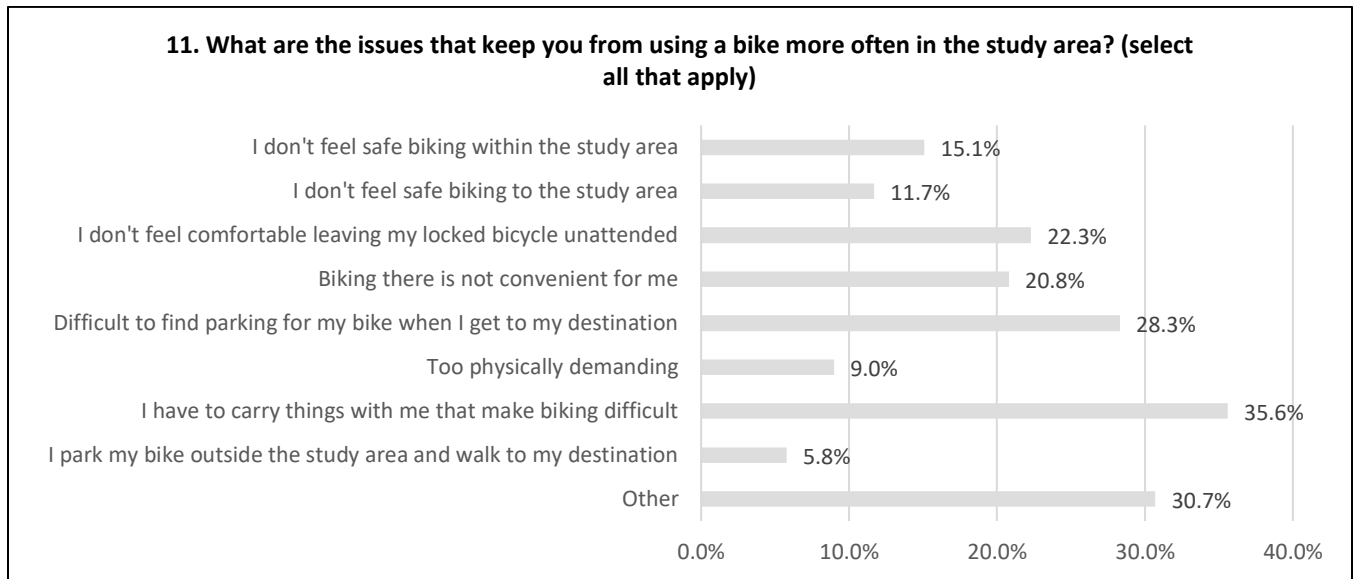


Figure 4: What are the issues that keep you from using a bike more often in the study area?

Reasons for visiting the study area and time spent there

Reasons for visiting the study area varied. Approximately 6% (98) of respondents stated that they live within the study area – a relatively low number or responses given the large amounts of housing within the study area. The vast majority of the housing within the study area is student housing, and the low number of people stating that they live in the study area likely corresponds with the low student input in the survey. Nearly half of survey respondents (46%) stated that they work or attend school in the study area, and nearly all respondents (99%) stated that they visit the study area for events, dining, or entertainment.

The length of time people park their bicycles in the study area varies with their reason for visiting the area. Residents obviously tend to park for long periods of time and overnight. The vast majority of people visiting the area for work or school park for four or more hours, with 42% reporting that they park for eight or more hours at a time. On the other hand, people visiting the area for dining, entertainment, shopping, or other errands, tend to park for much shorter periods of time, with 92% reporting that they park for between 30 minutes and 4 hours.

These differences point to the need for different types of bicycle parking facilities. Standard bicycle racks located frequently throughout the study area are ideal for serving people dining, running errands, or attending events who don't tend to park for long periods of time and want to park as close to their destination as possible. People parking for longer periods may be more inclined to park slightly further from their destination if a rack is protected from the elements or provides a higher level of security than a standard rack.

Where people park bicycles

The types and locations of bicycle racks that people use for locking their bicycles varies by the reason they are in the study area. Residents, as might be expected, tend to park in their buildings, with over one third of respondents stating that they keep their bicycle in a secured on-site garage or storage area and nearly a quarter of respondents bring their bicycle into their housing unit (Figure 3). Only 3% of respondents who live in the study area report that they park their bicycle at public bicycle racks on the street, a number that seems low based on the rack utilization counts and observations that have been conducted for the study. Given the small number people reporting that they live in the study area, the numbers presented in Figure 4 likely are not representative of all people living in the study area.

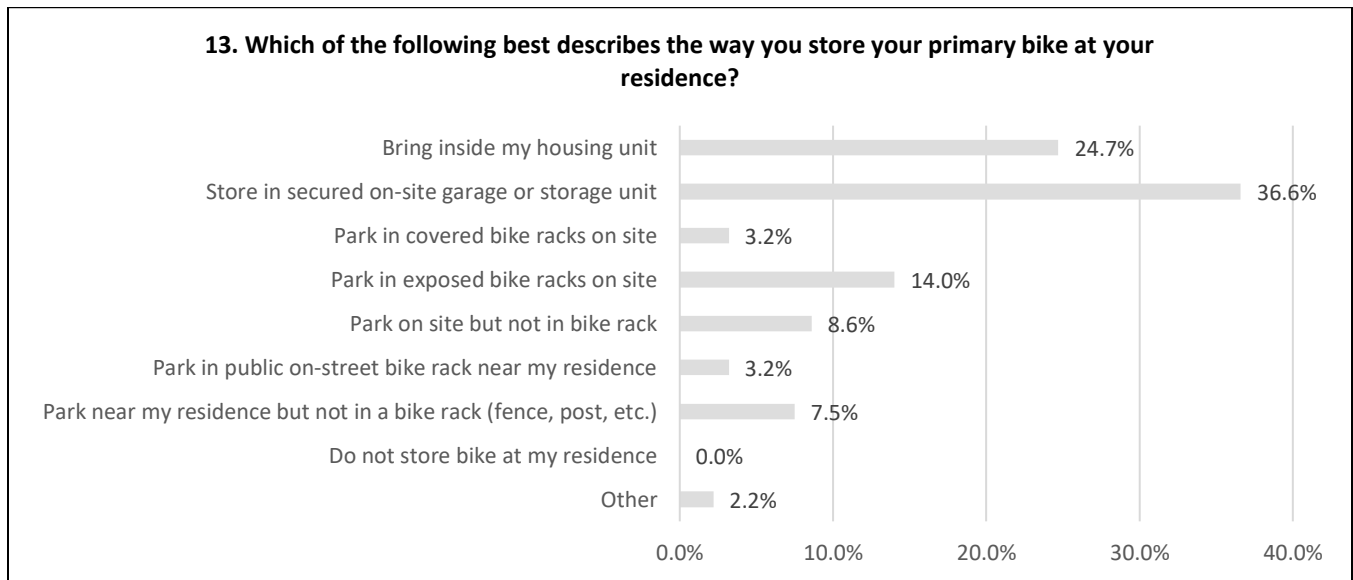


Figure 5: Which of the following best describes the way you store your primary bike at your residence?

In general, people parking in the study area for work, school, entertainment, dining or other purposes park in exposed bicycle racks near their destination.

Respondents were asked why they would not use bicycle parking that is provided on-site at their residence, school, or place of employment. In each instance, substantial numbers of respondents stated that parking was provided at an inconvenient location, was frequently overcrowded, or that the racks provided were inadequate to lock a bike properly (respondents could select multiple options). Newly constructed residential and commercial buildings in the study area have been required to provide bicycle parking for a number of years; responses to this question indicate that the bicycle parking that is being provided is often provided in locations or using racks that are not useful to residents.

Issues with bicycle parking

A variety of issues were cited with bicycle parking in the study area, as shown in Figure 4. Primary among the issues is that the racks closest to the respondent's destination are full. Related to this, nearly half of respondents stated that they regularly encounter bicycles that appear to be abandoned taking up space at racks. Additional concerns include racks not being located convenient to destinations, and users not liking the type of racks that are provided.

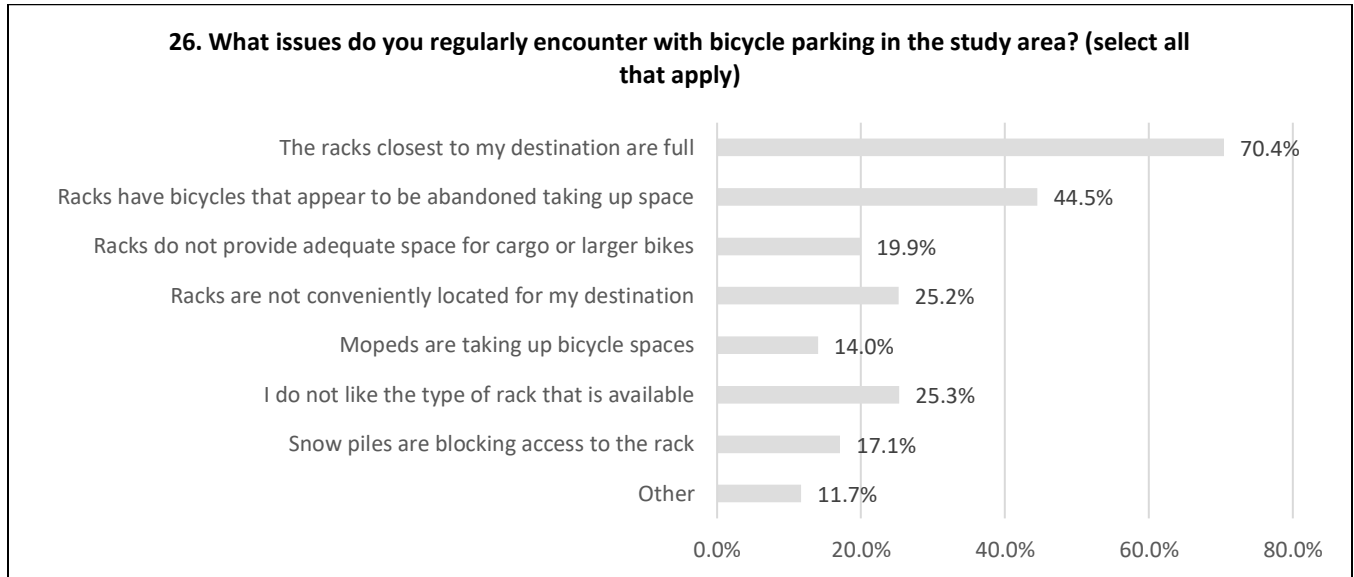


Figure 6: What issues do you regularly encounter with bicycle parking in the study area? (select all that apply)

Willingness to Pay for Bicycle Parking

Survey respondents were asked about their willingness to pay for using bicycle lockers or cages or a full-service bicycle center to park their bicycles. Such facilities provide greater security than standard bicycle racks, protection from the elements, and the ability to secure personal belongings. In general, willingness to pay for these types of facilities is low. Fewer than half of the survey respondents completed these questions, and among those who did, over half replied that they were not willing to pay anything for the use of such facilities. Among the small percentage of survey respondents who stated a willingness to pay for bicycle parking, residents who live in the study area were willing to pay less than non-residents of the study area.

Figures 5 and 6 display the average amount that people were willing to pay for given facility types in specific locations relative to their destination. Only people citing any willingness to pay are included in the average displayed in Figures 5 and 6; when accounting for all responses to the questions, the median amount is zero for all circumstances, and the average is less than half of what is displayed in the figures below.

The farther a bicycle parking facility is from a destination, the less people are willing to pay to use the facility. In general, people would be willing to pay slightly more to use a full-service bicycle center than to use bicycle lockers or a bicycle cage (with the exception of the annual rate, which may be skewed by the small number of respondents). In all instances, secure bicycle parking would require a subsidy to cover the capital costs of installation as well as ongoing operational and maintenance costs.

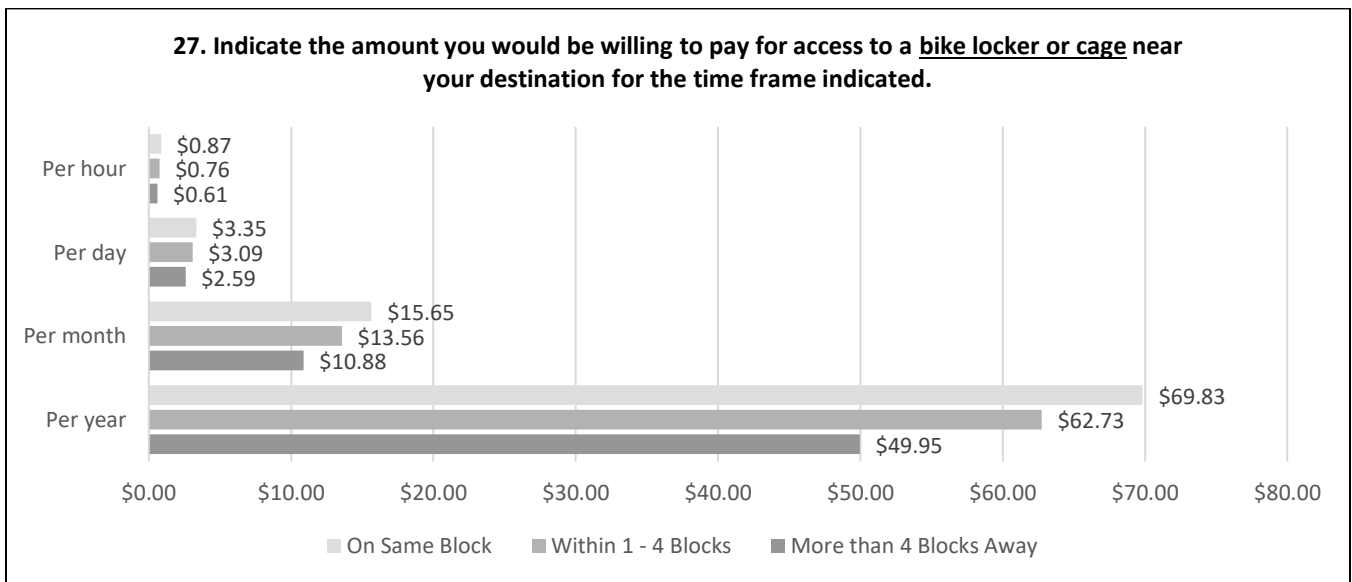


Figure 7: Average amount people who indicated a willingness to pay would be willing to pay for bicycle parking.

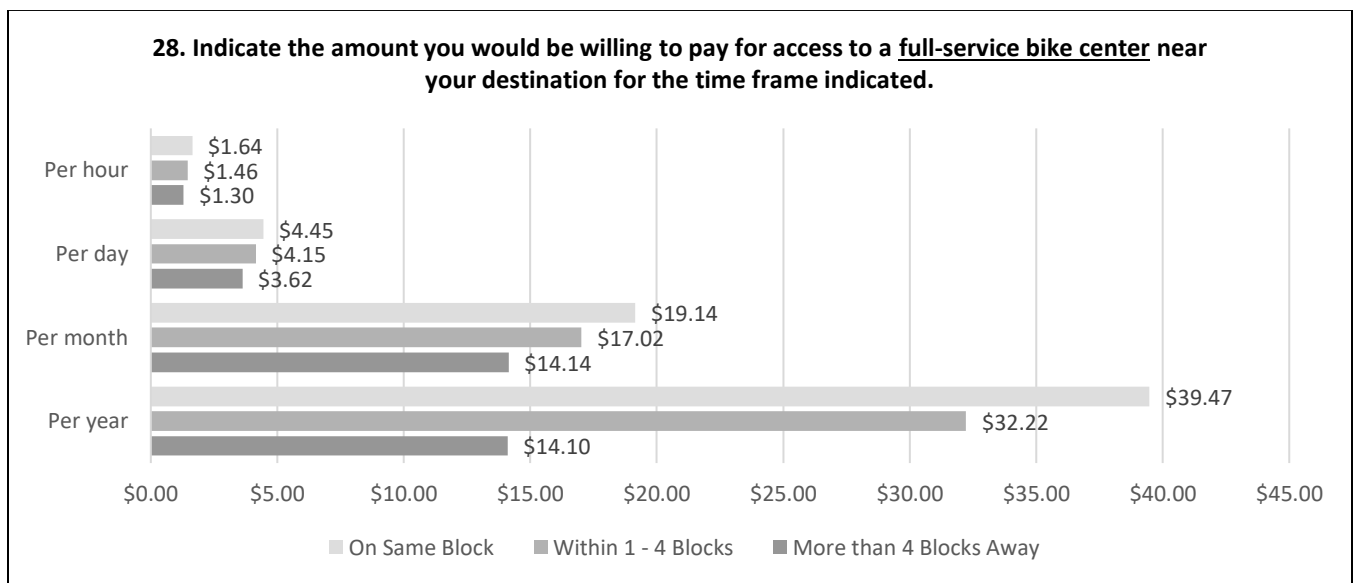


Figure 8: Average amount people who indicated a willingness to pay would be willing to pay for bicycle parking.

Moped parking

A small number of people, less than 100, responded to the questions about moped parking in the study area. Given the small number of respondents, and the small number of students also replying to the survey, it is likely that the data gathered regarding moped parking is not representative of moped parking as a whole in the study area.

Moped use in the study area is primarily for travel to school or work – over half of respondents reported parking a moped in the study area for those purposes at least two days a week during warmer months. Less than a third of respondents reported parking a moped in the study area with that frequency for entertainment, dining, or other purposes. As shown in Figures 6 and 7, moped parking locations vary with the purpose of the trip. The majority of people parking a moped in the study area for work or school park either in an on-site parking garage or lot, or near their final destination but not at a bicycle rack. On the other hand, a greater percentage of users park at bicycle racks when traveling for events, dining, or entertainment. For all trip purposes, parking in the public right of way, but not at a bike rack, is the most popular parking location.

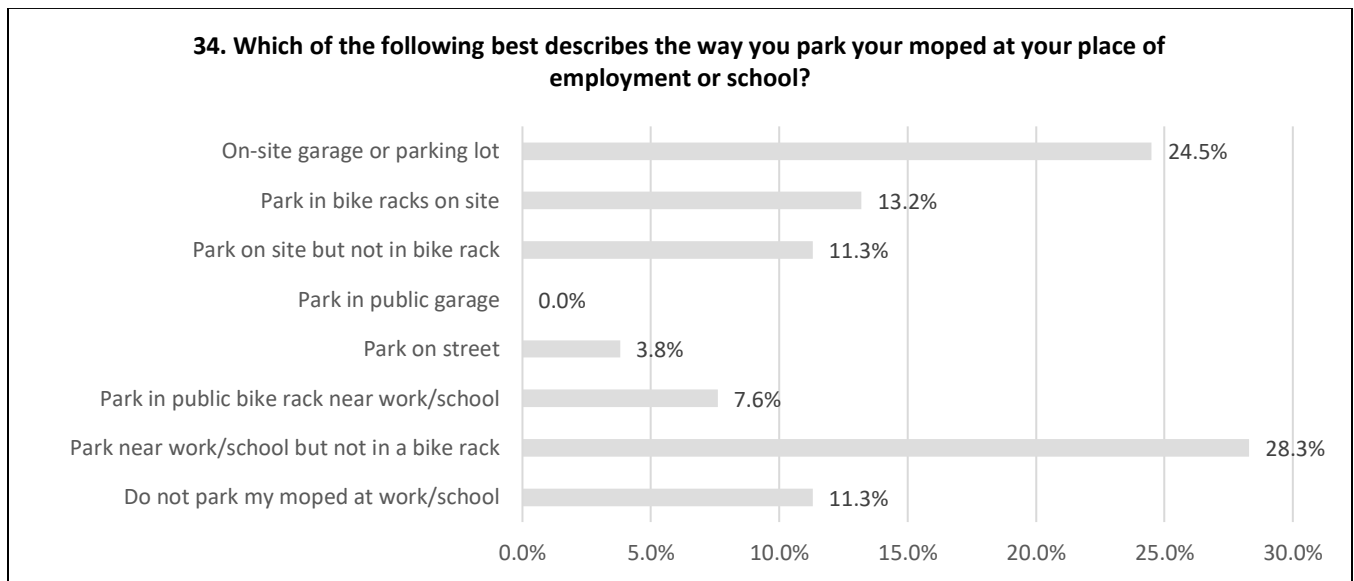


Figure 9: Which of the following best describes the way you park your moped at your place of employment or school?

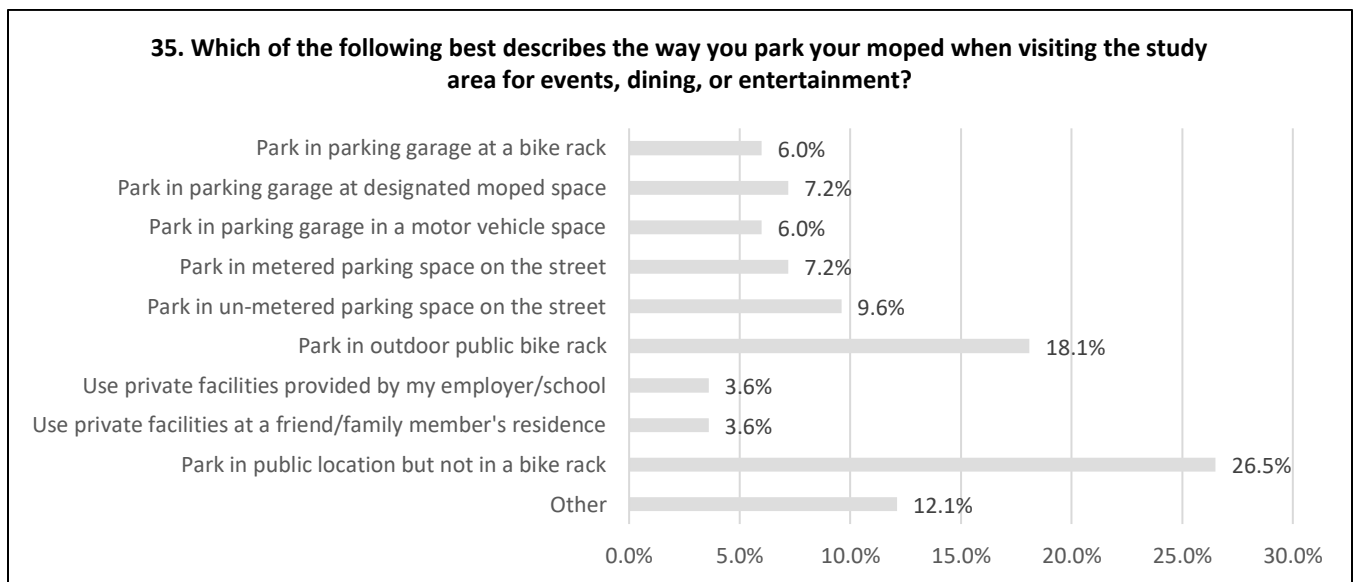


Figure 10: Which of the following best describes the way you park your moped when visiting the study area for events, dining, or entertainment?

Conclusion

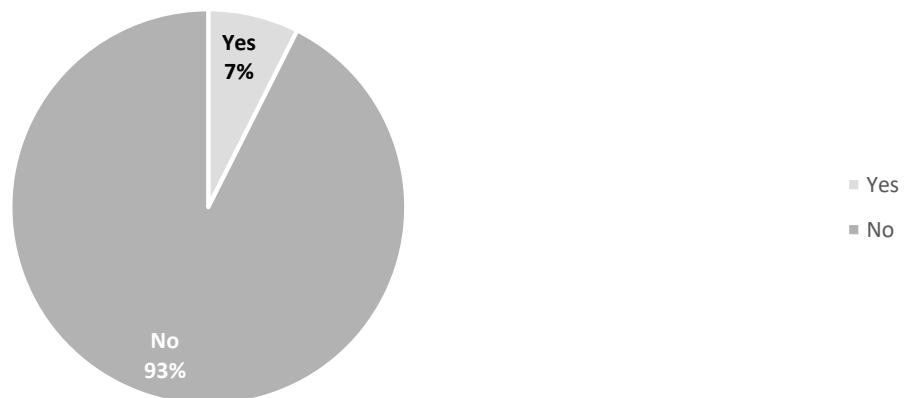
The online survey presented interesting insights about bicycle and moped parking in the study area. The full survey results are provided following this conclusion, with the exception of text responses, which are too numerous to include. The survey results, including the text responses that are not included here, will help inform the final recommendations of the study.

D.2 | Full Survey Results

1. Do you own or have free and convenient access to a bike?



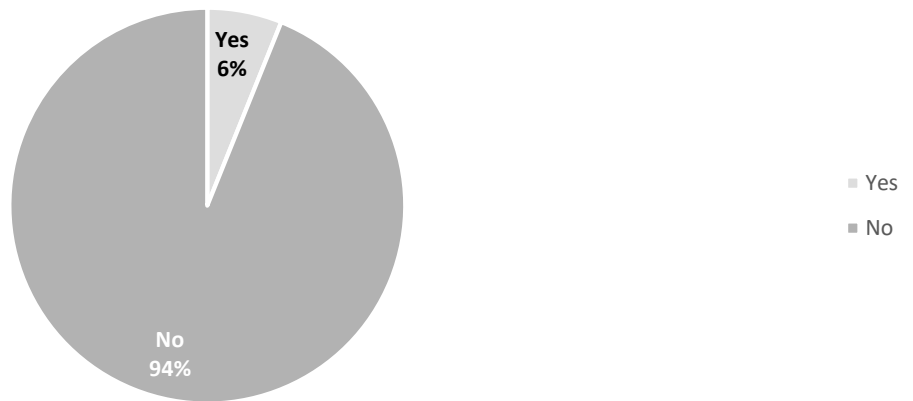
2. Do you own or have free and convenient access to a moped?



3. Do you own or have free and convenient access to a car or other motor vehicle (truck, van, motorcycle)?



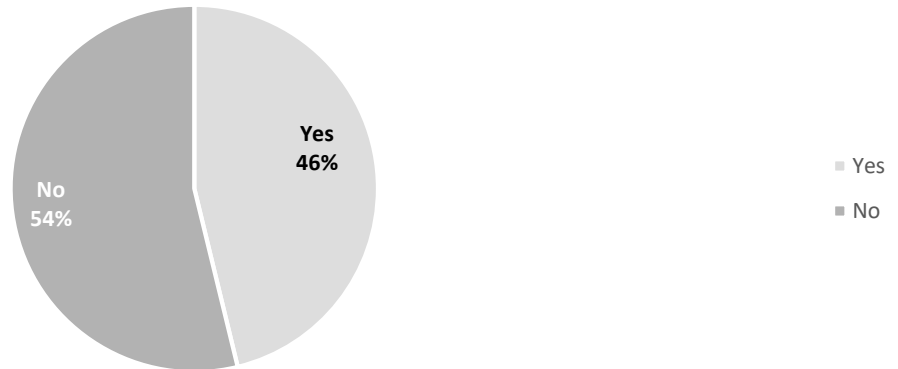
4. Do you live in the study area?



5. What is the nearest intersection to your place of residence?

Text response

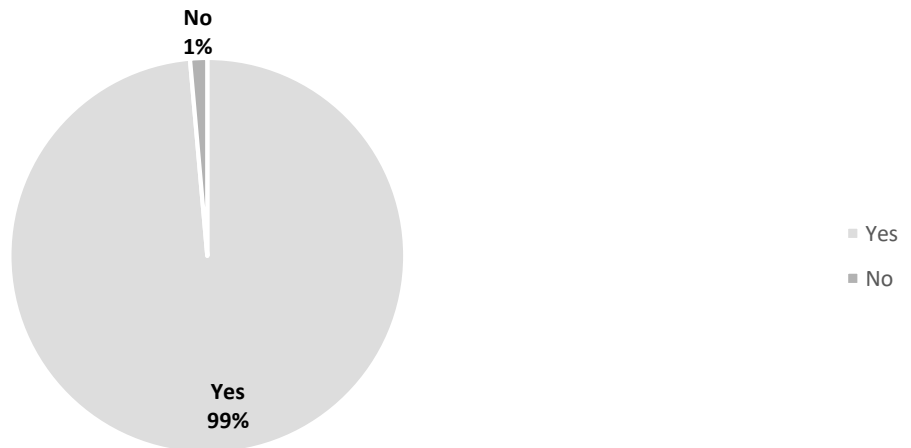
6. Do you work or attend school in the study area? (If you park a bike in the study area answer YES)

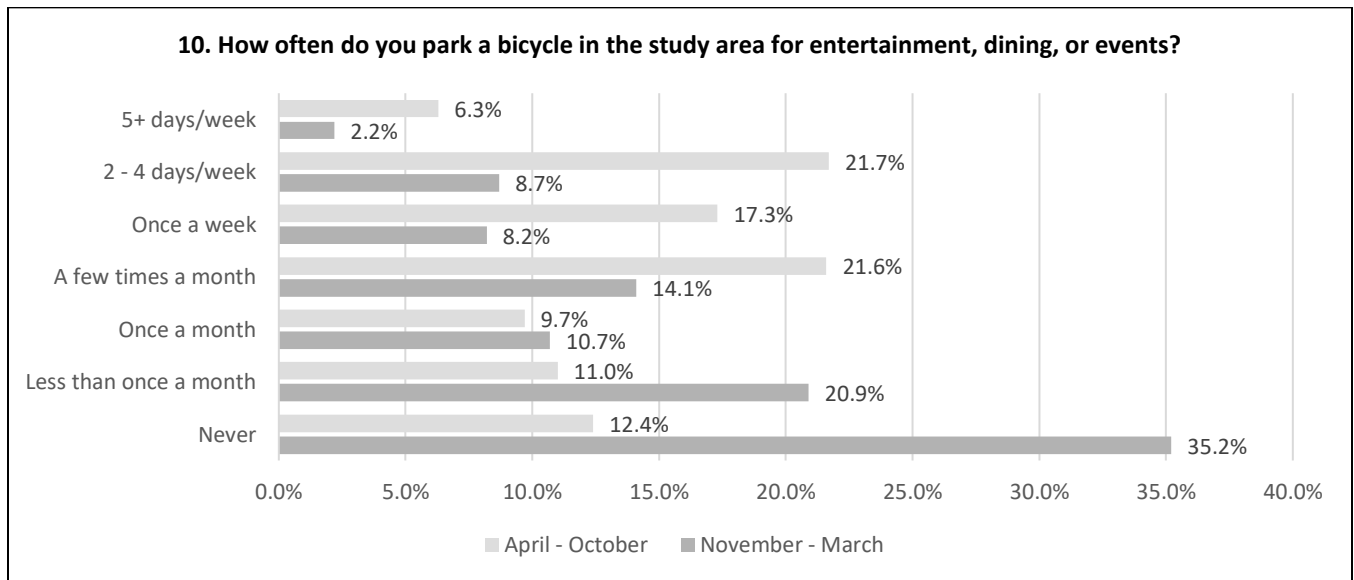
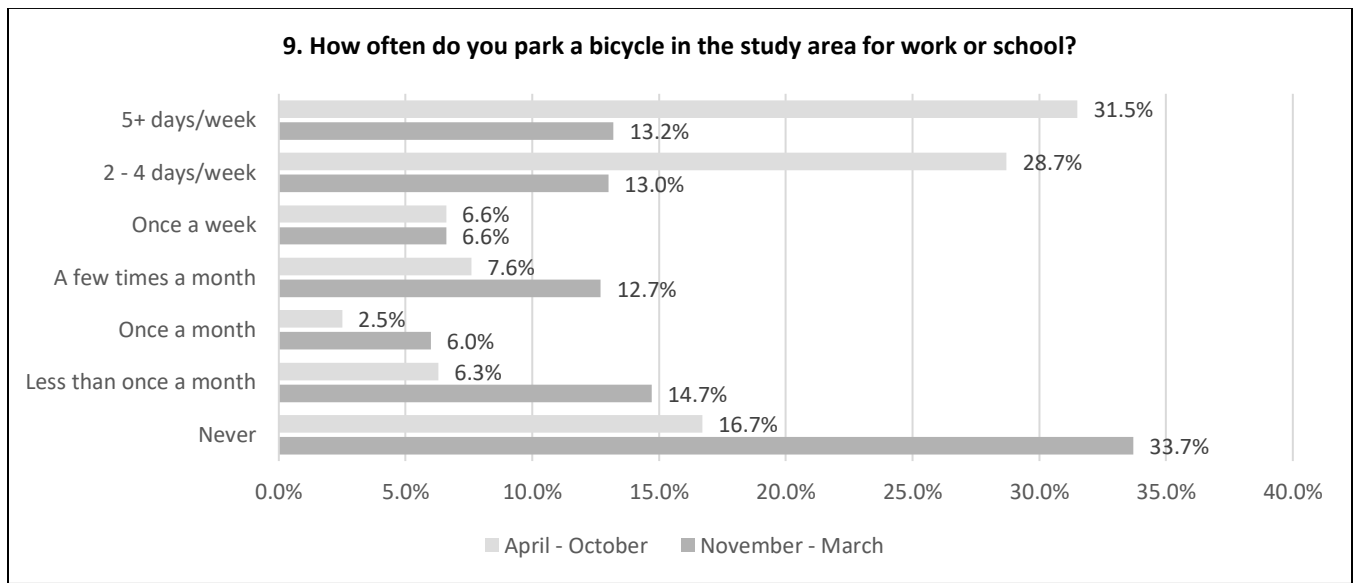


7. What is the nearest intersection to your work/school destination? (If destination is outside the study area, indicate the nearest intersection to where you park your bike.)

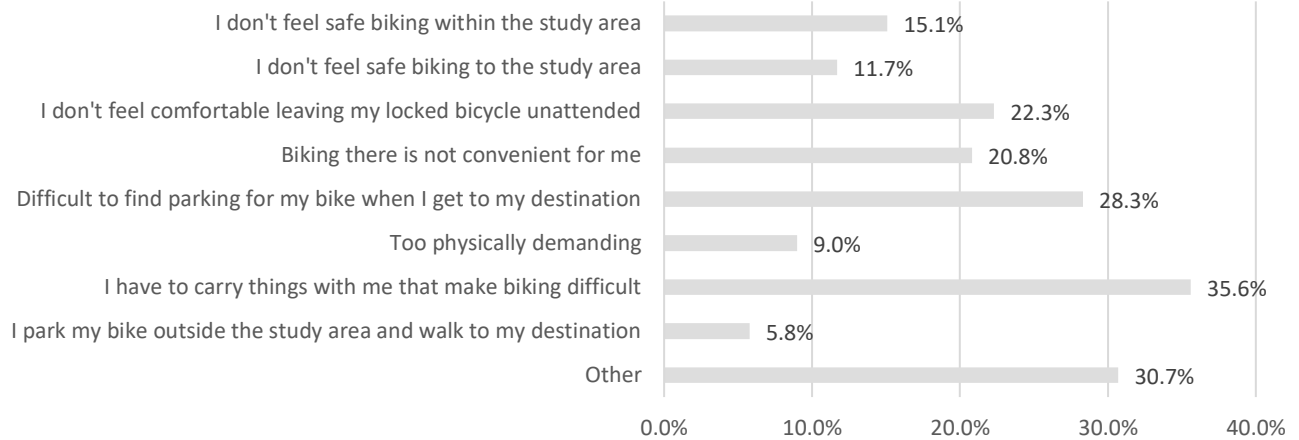
Text response

8. Do you occasionally visit the study area for events, dining, or entertainment?

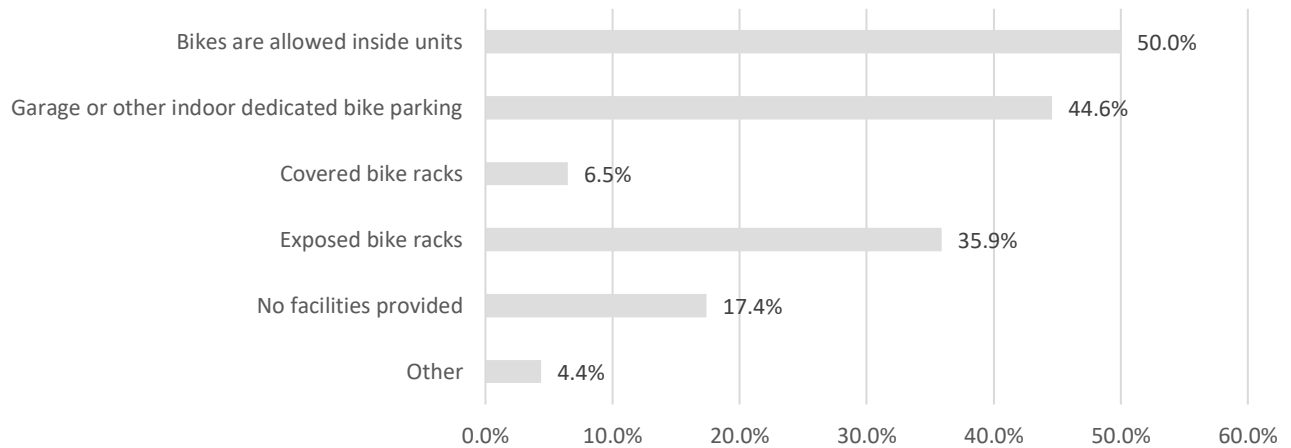




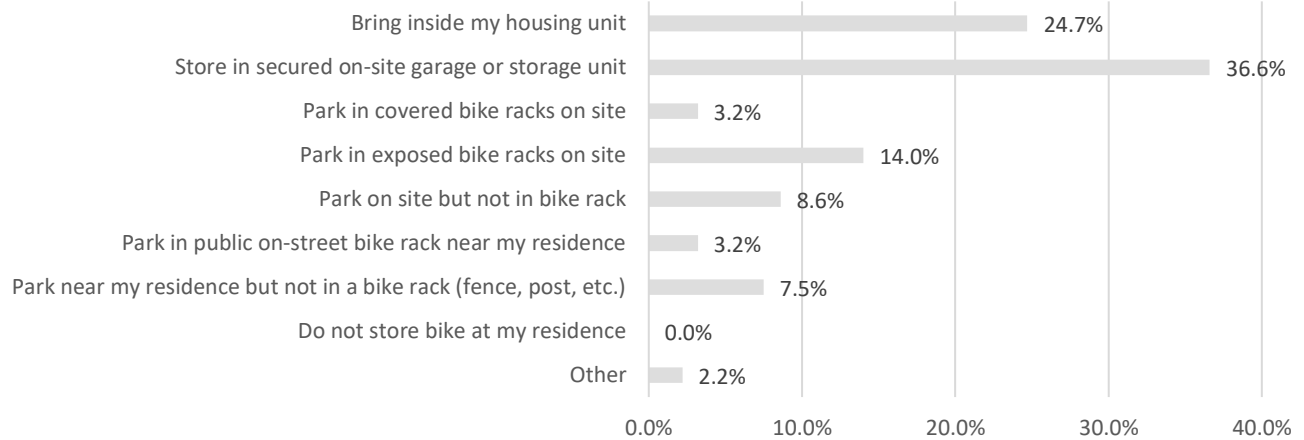
11. What are the issues that keep you from using a bike more often in the study area? (select all that apply)



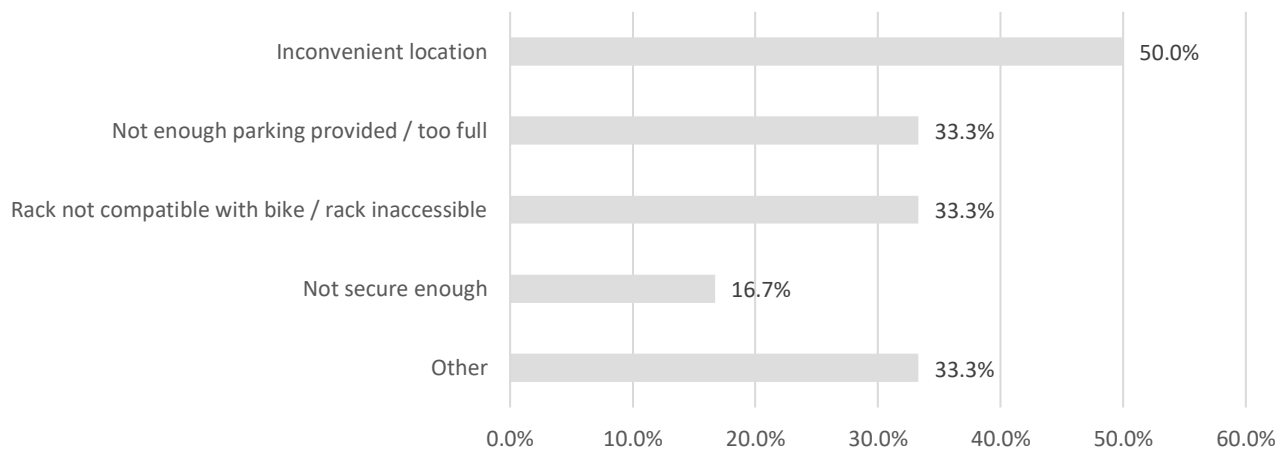
12. Which of the following bike storage facilities are provided at your residence? (select all that apply)



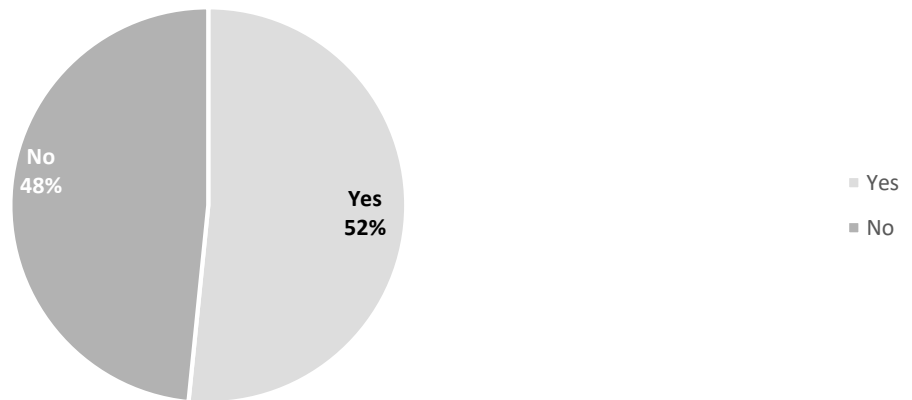
13. Which of the following best describes the way you store your primary bike at your residence?



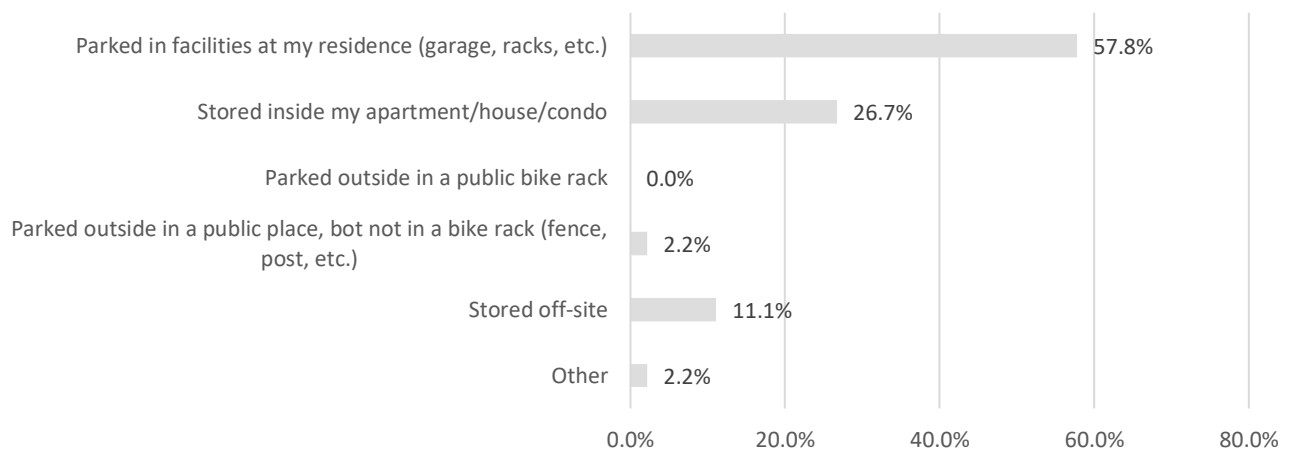
14. Which of the following would you give as reasons for not using the provided on-site bike parking? (select all that apply)



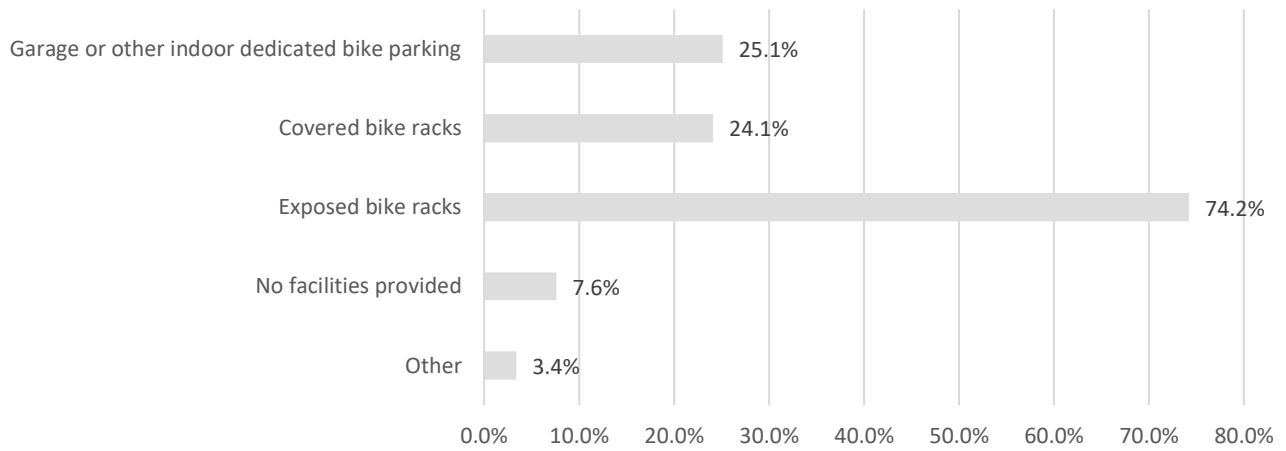
15. Do you continue to ride your bike during the winter (November - March)?



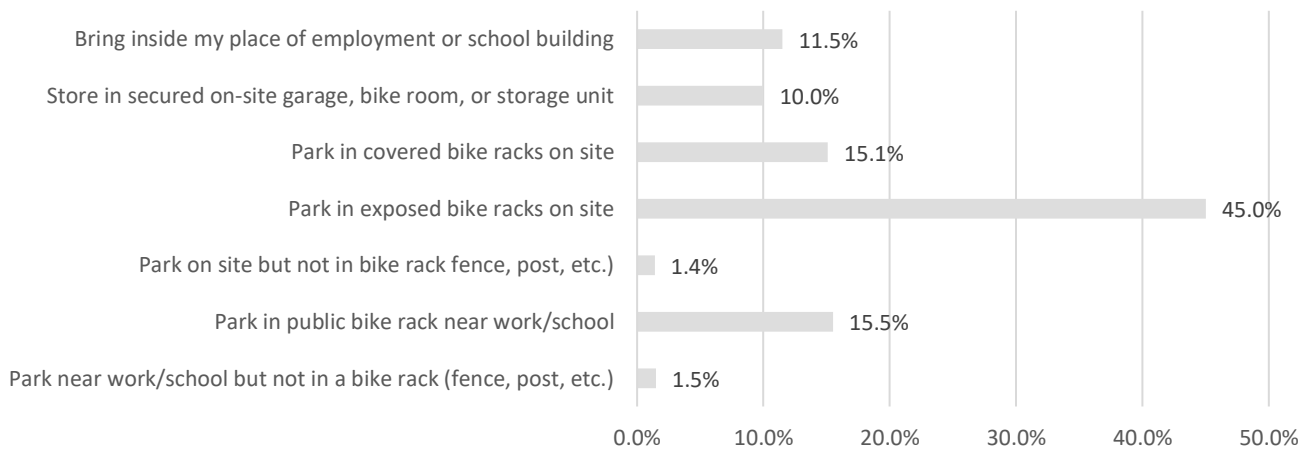
16. Where do you store your bike during the winter?



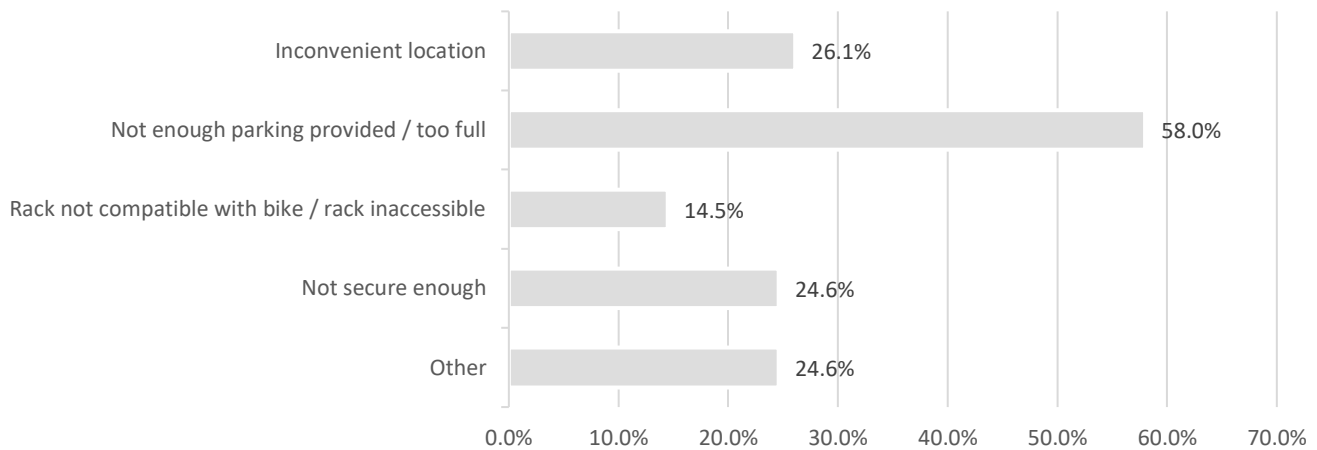
17. Which of the following bike storage facilities are provided at your place of employment or school? (select all that apply)



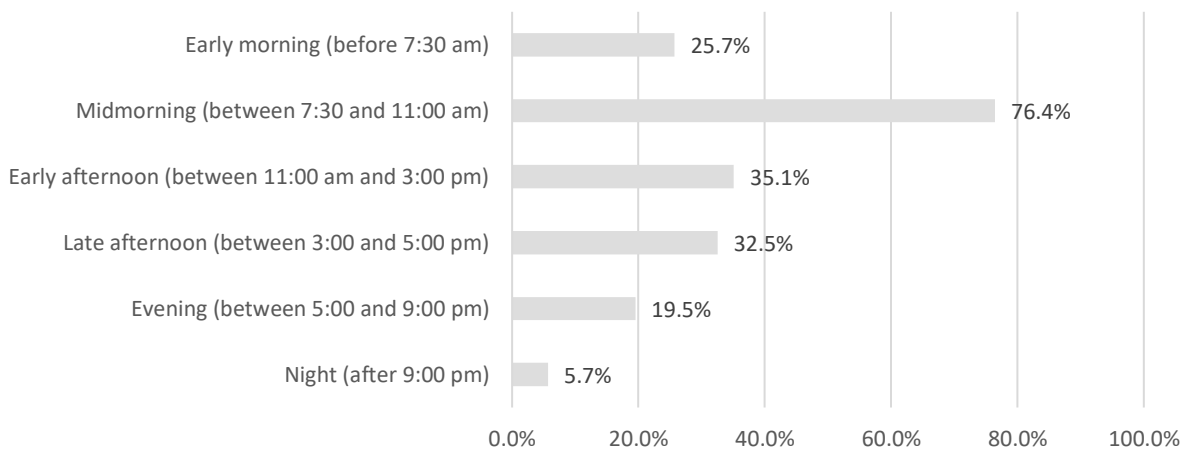
18. Which of the following best describes the way you store your bike at your place of employment or school?



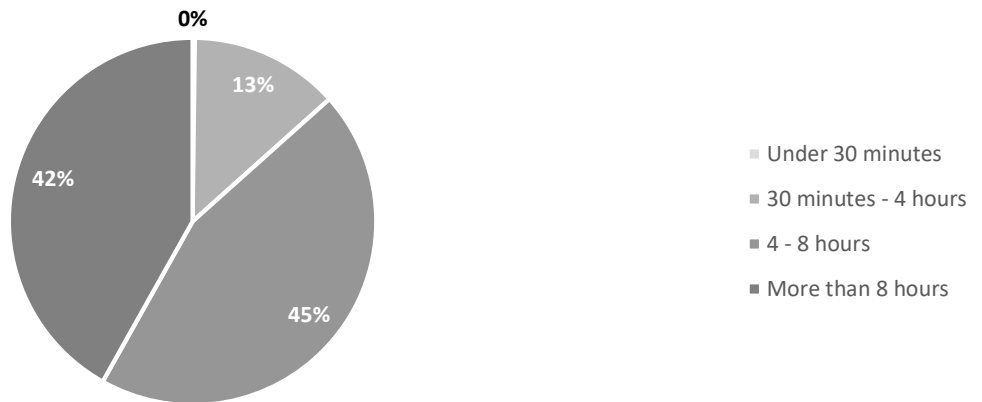
19. Which of the following would you give as reasons for not using the provided on-site bike parking? (select all that apply)



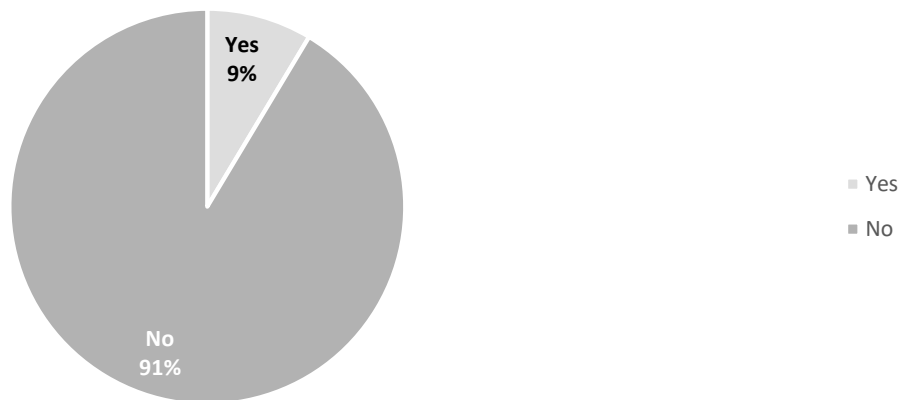
20. What time of day do you typically park your bike in the study area for work or school? (select all that apply)



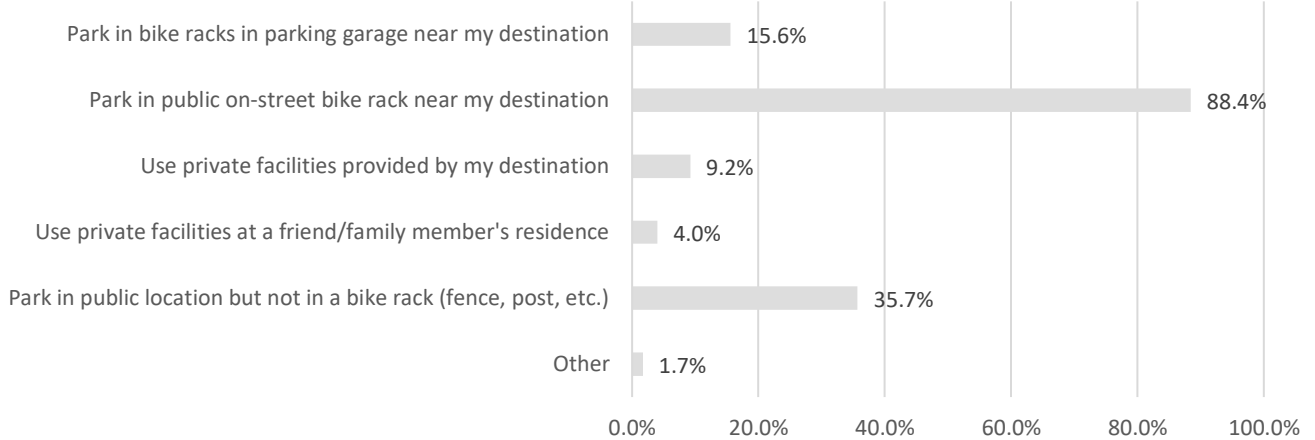
21. Which of the following best describes the length of time you generally leave your bike parked when at work or school in the study area?



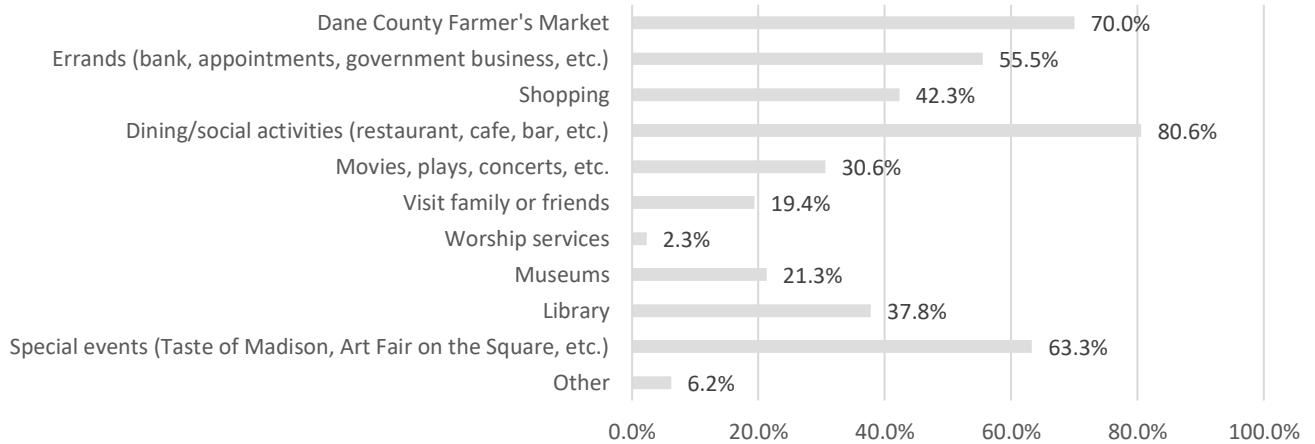
22. Do you park your bike overnight in the study area for work or school?



23. Which of the following describe the way you typically park your bike when visiting the study area for events, dining, or entertainment?



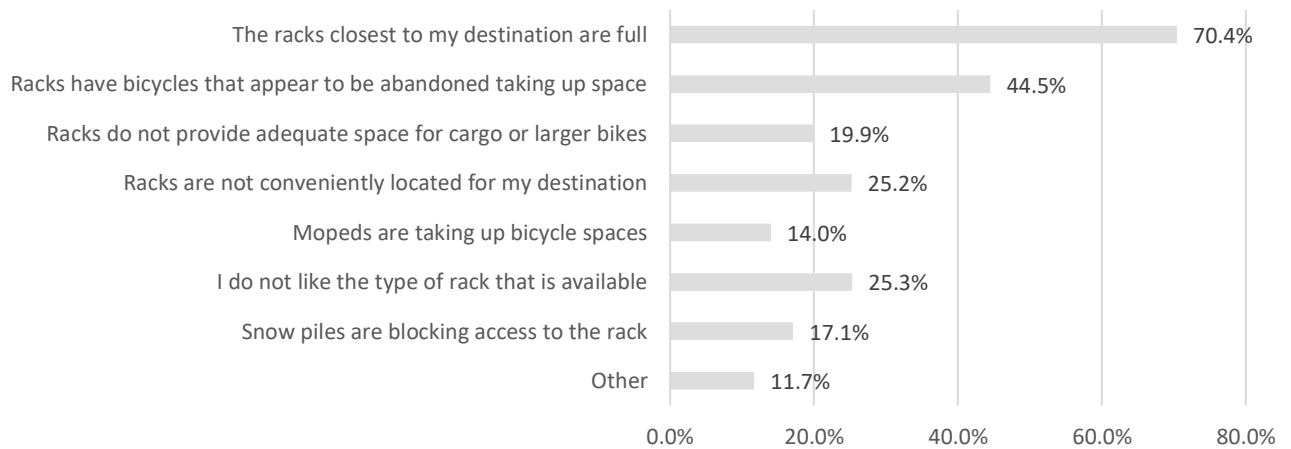
24. What are the primary destinations when you park your bike in the study area for events, dining, or entertainment? (select all that apply)

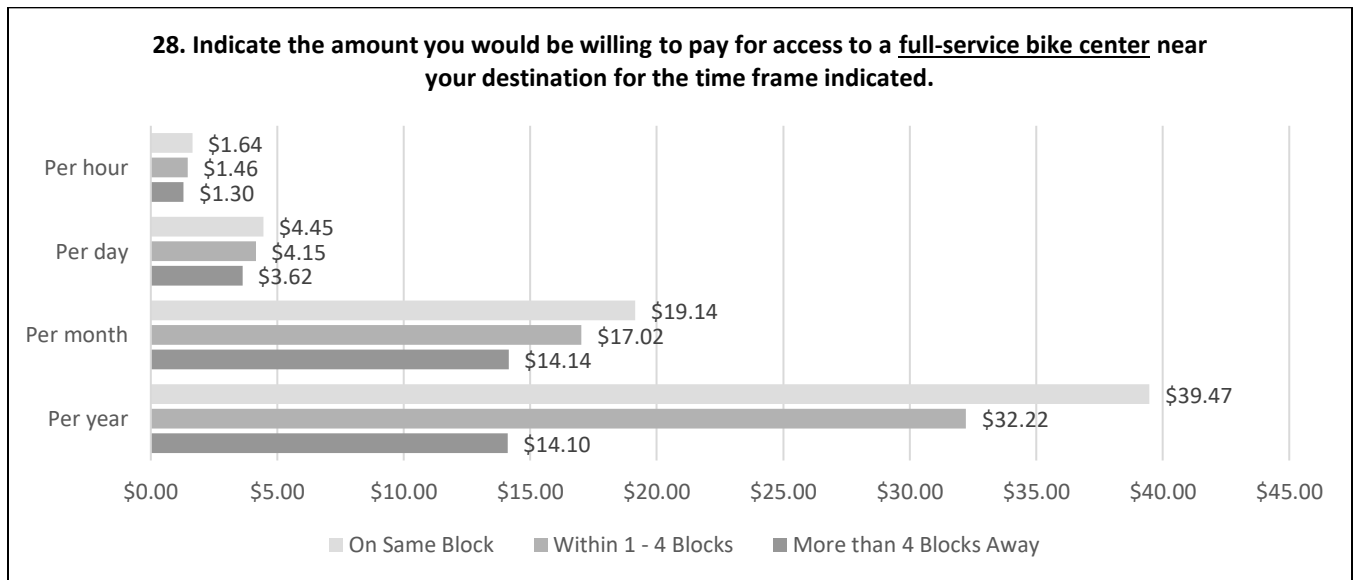
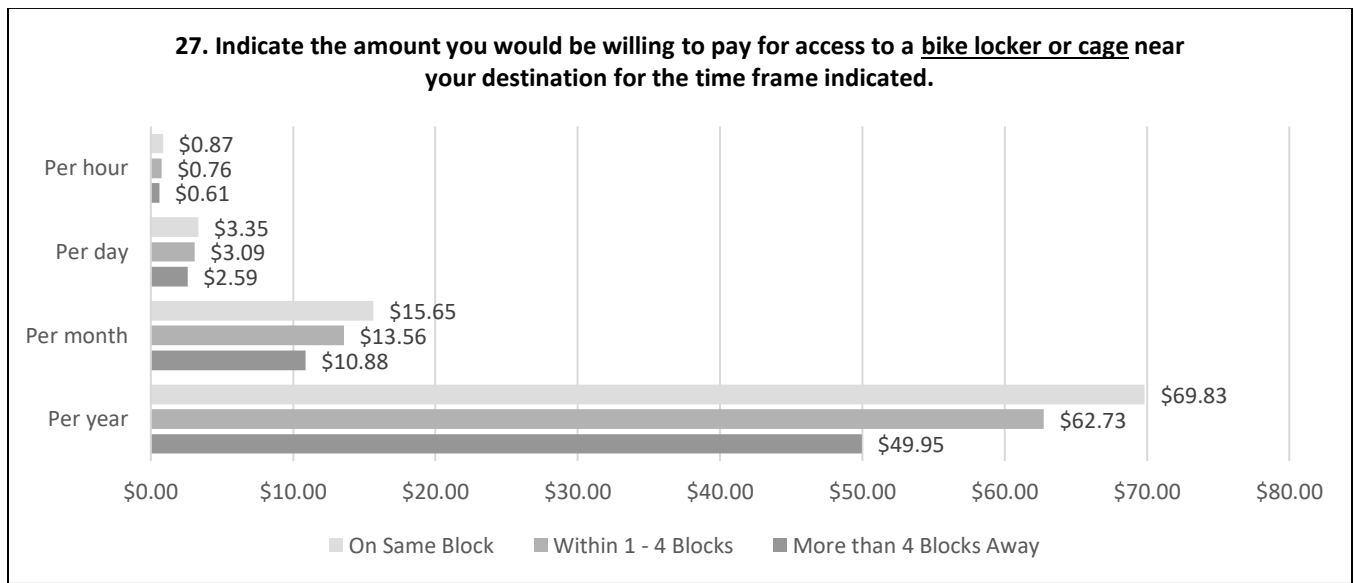


Which of the following best describes the length of time you generally leave your bike parked when visiting the study area for events, dining, or entertainment?

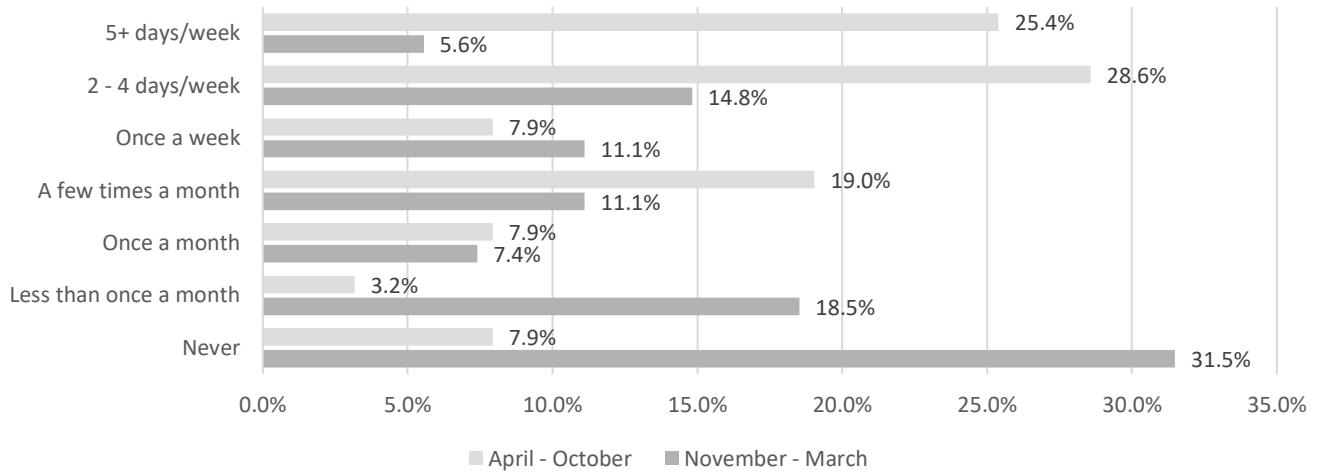


26. What issues do you regularly encounter with bicycle parking in the study area? (select all that apply)

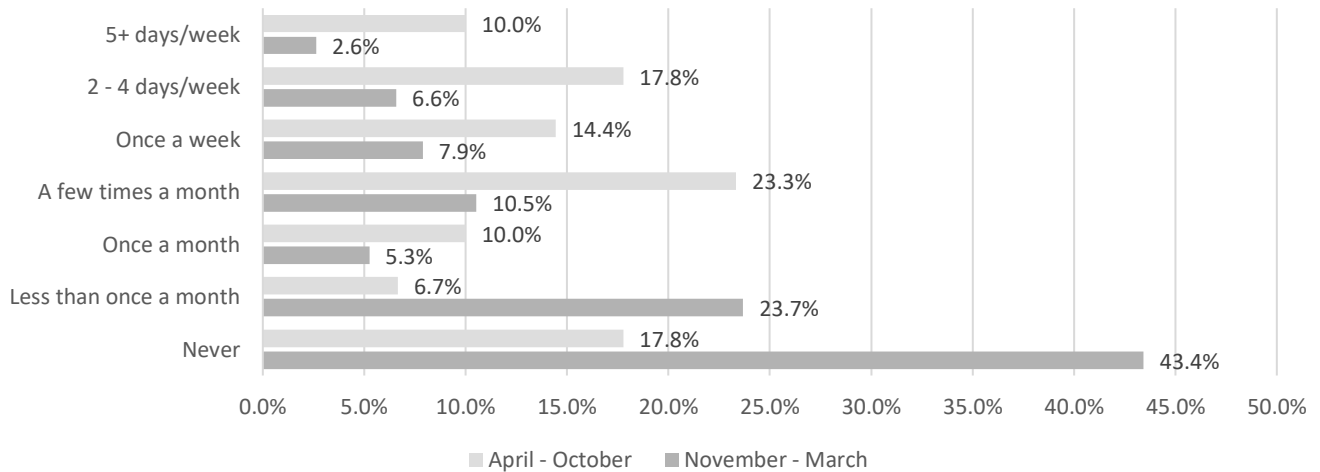




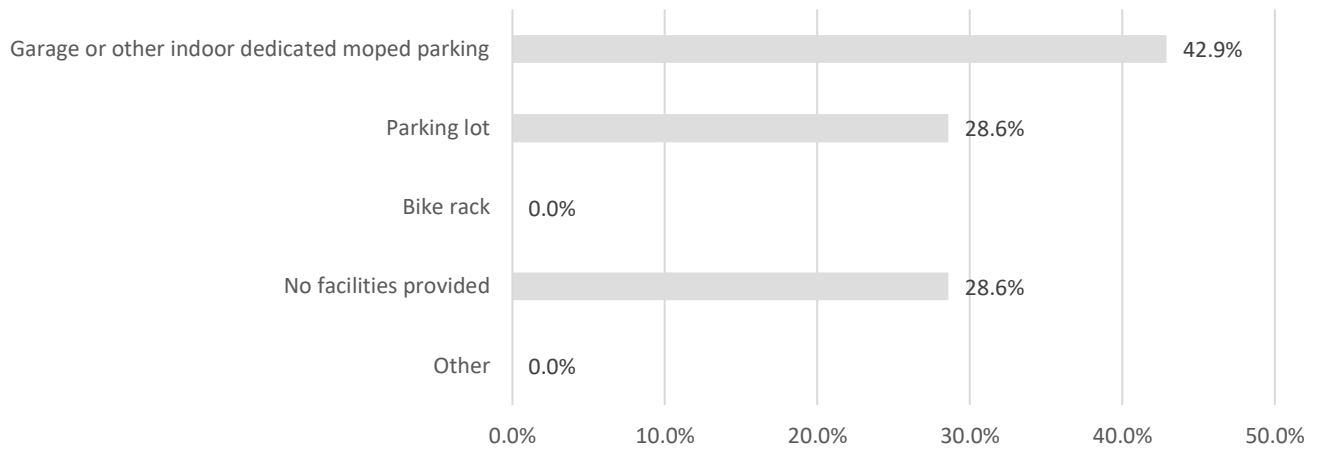
29. How often do you park a moped in the study area for work or school?



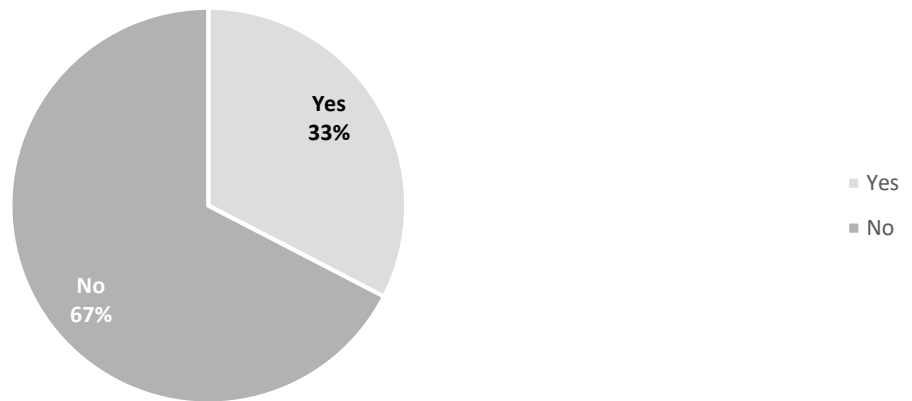
30. How often do you park a moped in the study area for events, dining, or entertainment?



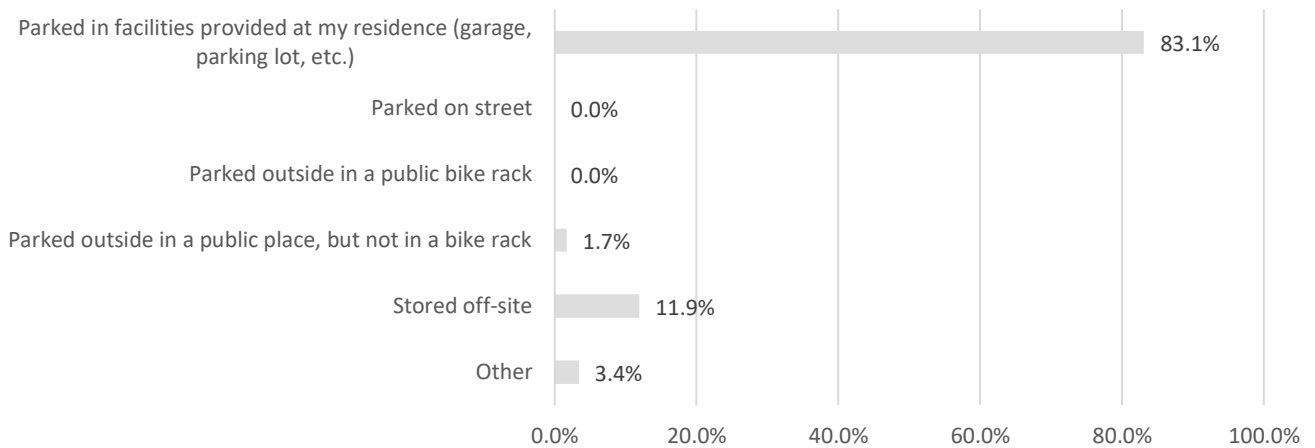
31. Which of the following moped storage facilities are provided at your residence? (select all that apply)



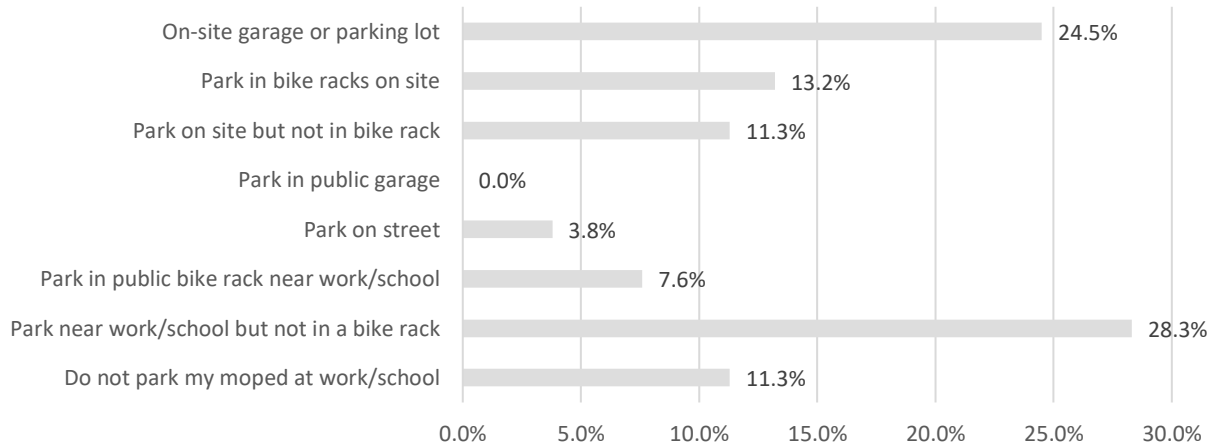
32. Do you continue to ride your moped during the winter (Nov - March)?



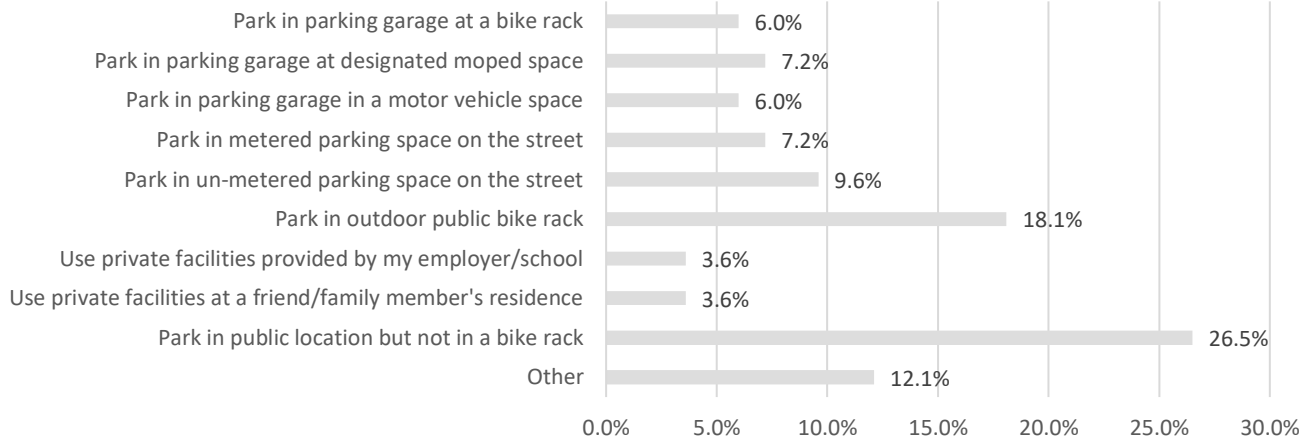
33. Where do you store your moped during the winter?



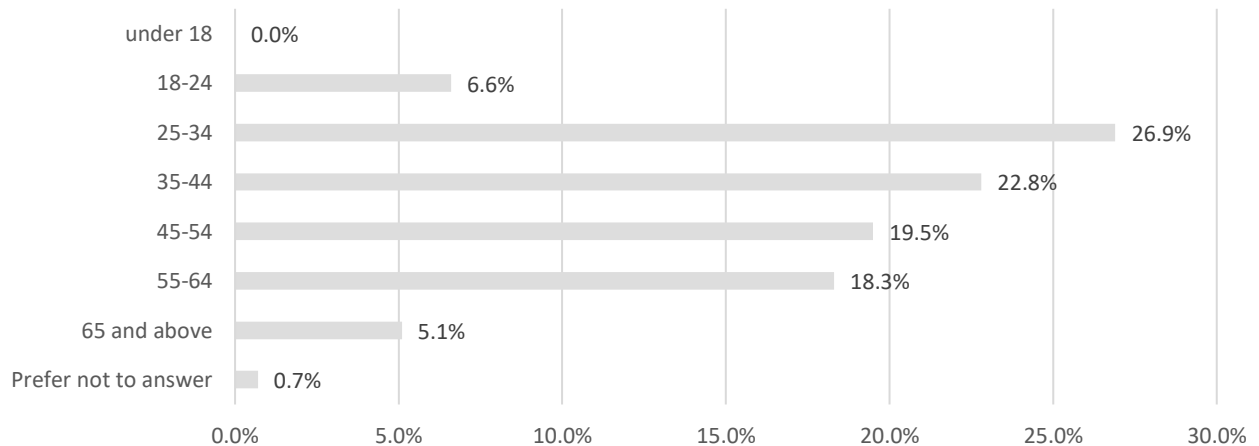
34. Which of the following best describes the way you park your moped at your place of employment or school?



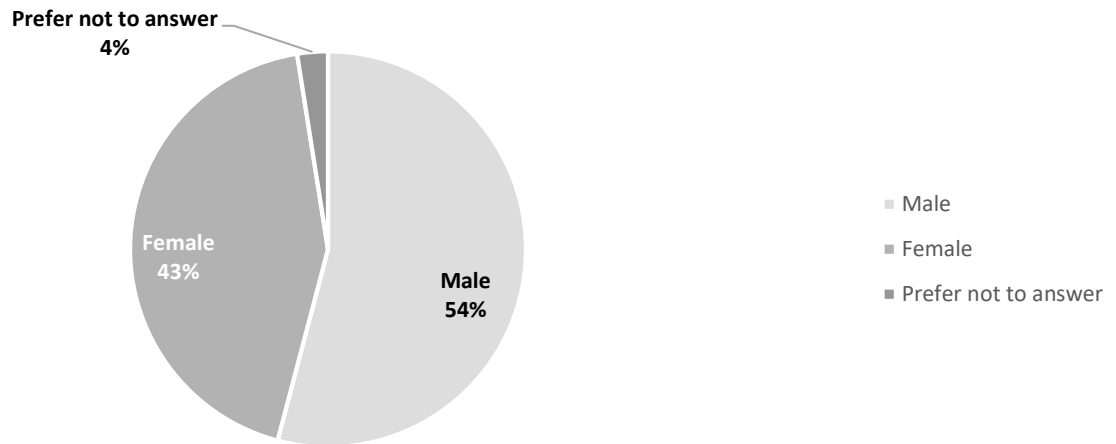
35. Which of the following best describes the way you park your moped when visiting the study area for events, dining, or entertainment?



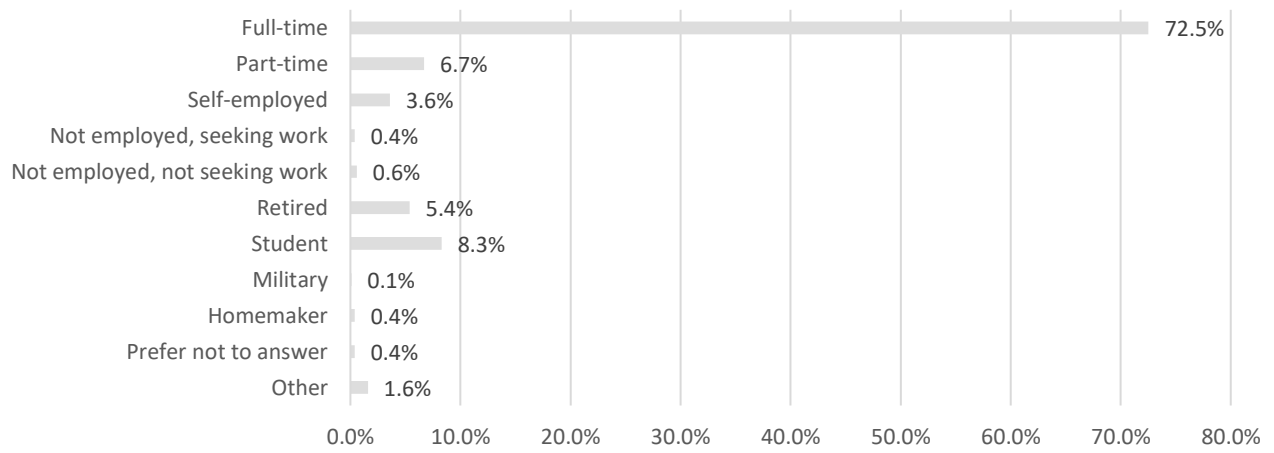
36. What is your age?



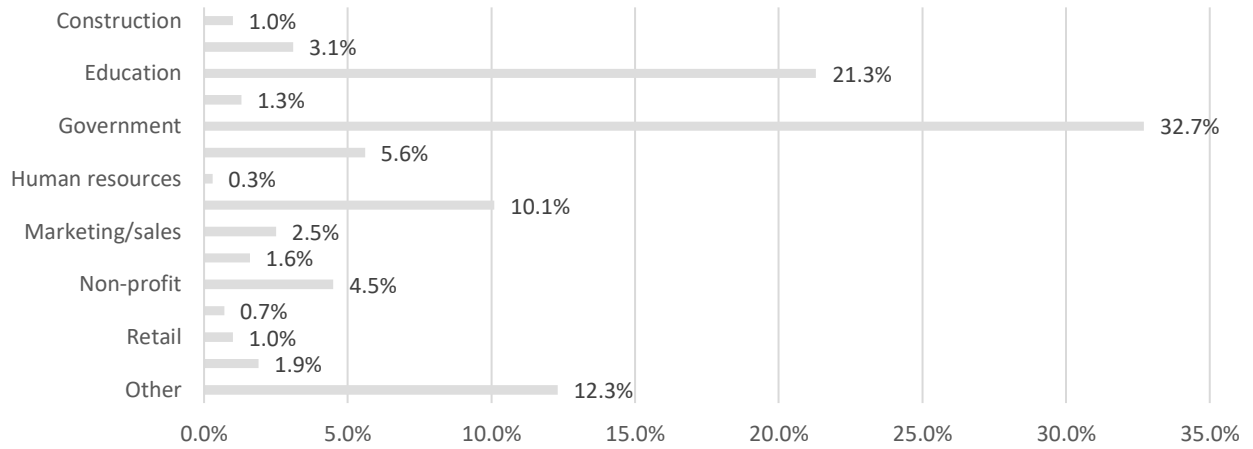
37. What is your gender?



38. Which best describes your employment status?



39. Which category best describes the industry in which you work?



40. What is your annual household income?

