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TRANSPORT FINDINGS

Assessing Bicycle Parking Infrastructure: A Townwide Study in Lexington, Massachusetts

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Findings

Bicycle parking has been added to municipal property in Lexington, Massachusetts, over many years, but no inventory existed. We located every bicycle rack on town property and recorded its rack type, capacity, and condition. The survey found 99 racks holding 1,134 spaces across 41 sites. Capacity was concentrated at a few sites, with the ten largest holding 71 percent of all spaces and schools alone holding 65 percent. At the nine K-12 public schools, parking ranged from 7.6 to 25.1 spaces per 100 students. Inverted-U racks were the most common type, but grid and schoolyard racks held more spaces.

1. Questions

Bicycle parking is a key component of effective cycling systems and urban planning (Egan et al. 2023; Honey-Rosés et al. 2023). However, many studies focus only on whether bicycle parking was present or absent without accounting for the quality of parking (Heinen and Buehler 2019). Inadequate parking can leave bicycles exposed to theft and damage, and can deter people from cycling (Chen et al. 2018; Cohen et al. 2024). To address this, we recorded rack type, capacity, and condition of bicycle parking in addition to location. Studies also commonly focus on transit stations or workplaces, while fewer studies cover bicycle parking across entire municipalities (Ito et al. 2023; Honey-Rosés et al. 2023; Heinen and Buehler 2019). This study examines bicycle parking across all town-owned property in Lexington, Massachusetts. Lexington contains established bicycle infrastructure including the Minuteman Bikeway that connects to Alewife station in Cambridge, and the town supports bike travel through the Safe Routes to School Program (Minuteman Bikeway, n.d.; Town of Lexington, n.d.). Bicycle parking has been added to town property over many years, but no inventory existed of what was installed, where, or in what condition.

We ask: How do the capacity, condition, rack type, and location of bicycle parking vary across town-owned sites in Lexington, Massachusetts?



(a) Inverted-U (staple)
Massachusetts Avenue, Follen Heights

(b) Triangle / schoolyard
Bowman School

(c) Grid
Fletcher Park

(d) Wave (serpentine)
Lexington Fire Department Headquarters

(e) Decorative / custom
Lexington High School

(f) Bollard / post-and-ring
Lexington Center

Fig. 1. The six rack types recorded in the survey, each shown with an example from Town of Lexington property. Photographs by the author.

2. Methods

A field survey of bicycle parking on Town of Lexington property was conducted from September 8, 2025, to July 2, 2026. Every bicycle rack was located and recorded using ArcGIS Survey123, a mobile application that logged the position of each rack. Survey data was compiled and analyzed in Excel, and maps were created in ArcGIS Pro.

The survey covered schools, parks, conservation land, civic buildings, the Minuteman Bikeway, town trails, and the public right-of-way along streets. Racks on private property, including businesses, apartment buildings, and private schools, were not surveyed. Town-owned parcels were identified from the Massachusetts Property Tax Parcels data layer (MassGIS 2025). Every parcel was visited, and those with no rack were recorded as such.

For each rack, the rack type, capacity, and condition were recorded. A rack was defined as one freestanding unit, or a group of units of the same type in the same spot. Where two rack types existed in the same spot, each was recorded separately.

As shown in Figure 1, rack type was divided into six categories: inverted-U, triangle/schoolyard, grid, wave, decorative/custom, and bollard/post-and-ring. Capacity was counted as two bikes for each element of a rack and one bike per slot on grid racks. Note S3 describes the rule for each type. Total capacity, rounded mean capacity, and number of racks were reported by type.

Racks were rated on four criteria: whether the rack was bent, whether the metal was sound, whether it could be reached without obstruction, and whether a bike could be locked to it. Each criterion was rated as good, fair, or poor. The overall condition of the rack was the lowest of the four ratings. Note S4 describes how the ratings were determined. The number of racks in each condition was reported.

The racks were grouped by the nearest place they served. Racks that did not serve a specific place were assigned to the street or trail where they were located. Racks at multi-rack sites were numbered north to south. Racks and capacity at multi-rack sites are reported in Table S1.

Each site was assigned one of five settings: schools, parks and open space, civic buildings, streets, and bikeway and trails. The number of sites, racks, and total spaces were reported by setting.

Capacity per 100 students was calculated for each of the nine K-12 public schools in Lexington, Massachusetts. Enrollment data for 2025–26 was obtained from the Massachusetts Department of Elementary and Secondary Education (2025).

The inventory is provided in Table S2 and a supplementary CSV, and mapped on the town website (Town of Lexington 2026).

3. Findings

Figure 2 displays the location of bike racks and their capacity.

Capacity was concentrated within the area bounded by Route 128 and Route 2, and clustered around Lexington Center. Most bike racks were close to shared-use paths or the Minuteman Bikeway. However, several high-capacity racks were in the town periphery at schools without nearby shared-use paths.

Table 1 shows the number of racks and total spaces by type.

Inverted-U racks made up nearly half of the 99 racks but held only 38 percent of the spaces. Grid and schoolyard racks were 38 of the 99 but held 49 percent of the spaces.

Table 2 shows bike parking by setting.

Capacity was concentrated at a few sites. The ten largest of the 41 sites held 71 percent of spaces, while the 24 sites with a single rack held 233 spaces, or 21 percent. More sites in a setting did not correspond to more parking. Parks and open space was the most common setting, with 19 of the 41 sites, but most had only one or two racks, and together they held 13 percent of spaces. There were fewer school sites, yet each usually had several large racks. Schools averaged 74 spaces per site, while parks and open space averaged 8. Most of the highest-capacity racks were on school grounds.

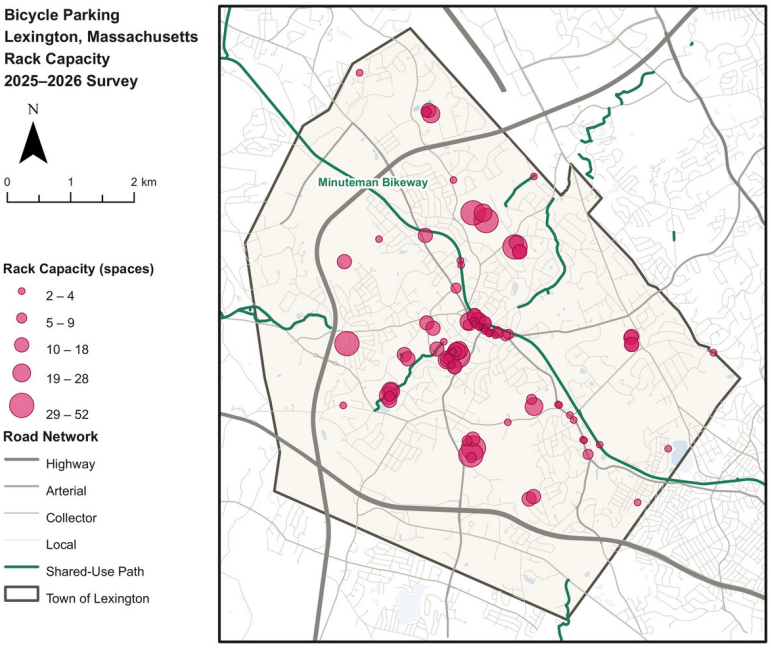


Fig. 2. Bicycle rack capacity in Lexington, Massachusetts. Circle area is proportional to the number of spaces at each rack. Sources: road network and water, © OpenStreetMap contributors, Open Database License (OpenStreetMap contributors 2026); town boundary, MassGIS Census 2020 Towns (MassGIS 2020); bicycle network, MassDOT Bicycle Facility Inventory (Massachusetts Department of Transportation, n.d.).

Table 1. Bicycle rack counts, capacity, and counting rules by rack type.

Rack type	Capacity rule (spaces)	Racks	Spaces	Share of spaces	Mean spaces per rack
Inverted-U (staple)	2 per hoop	45	432	38%	10
Triangle / schoolyard	2 per triangle element	23	300	26%	13
Grid	1 per slot	15	256	23%	17
Wave	2 per bend	5	86	8%	17
Decorative / custom	2 per lockable loop	3	32	3%	11
Bollard / post-and-ring	2 per ring	8	28	2%	4
Total	—	99	1,134	100%	11

Table 2. Bike parking by setting.

Setting	Sites	Racks	Spaces	Share of spaces	Mean spaces per site
Schools	10	41	739	65%	74
Parks and open space	19	24	150	13%	8
Civic buildings	7	9	106	9%	15
Bikeway and trails	1	7	76	7%	76
Streets	4	18	63	6%	16
Total	41	99	1,134	100%	28

Figure 3 maps bicycle parking by setting.

Schools held nearly two-thirds of bike parking. Table 3 compares each school's capacity with its enrollment.

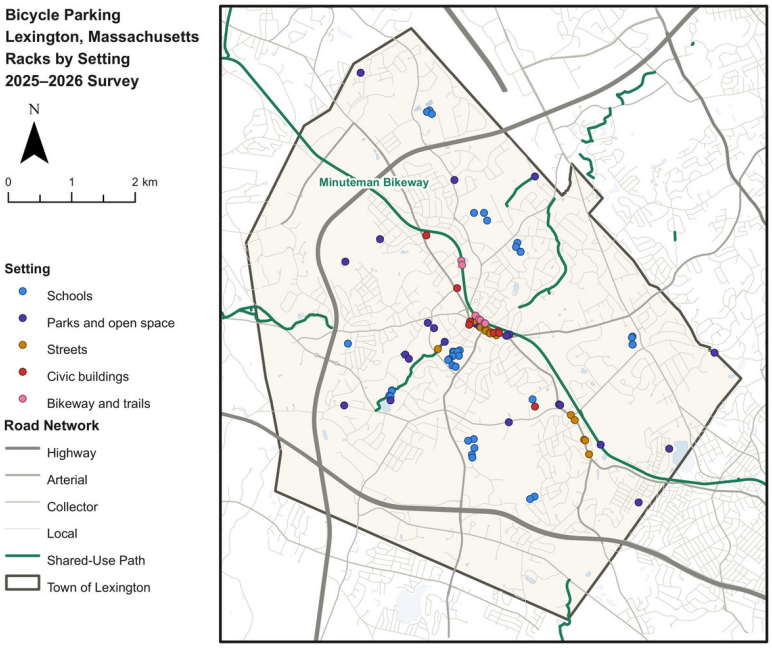


Fig. 3. Bicycle parking in Lexington, Massachusetts, by setting. Sources: road network and water, © OpenStreetMap contributors, Open Database License (OpenStreetMap contributors 2026); town boundary, MassGIS Census 2020 Towns (MassGIS 2020); bicycle network, MassDOT Bicycle Facility Inventory (Massachusetts Department of Transportation, n.d.).

Table 3. Bike parking at each school compared to enrollment. Lexington Children's Place, a public preschool with 8 spaces, is not included.

School	Spaces	Students	Per 100 students
Fiske School	70	279	25.1
Bridge School	67	348	19.3
Harrington School	52	363	14.3
Jonas Clarke Middle School	111	785	14.1
Joseph Estabrook School	56	467	12.0
William Diamond Middle School	105	907	11.6
Maria Hastings School	48	538	8.9
Lexington High School	190	2,348	8.1
Bowman School	32	421	7.6
All nine schools	731	6,456	11.3

Lexington High School had more bike parking spaces than any other site and the second fewest per 100 students. The three schools with the most parking per 100 students were all elementary schools.

Of the 99 racks, 88 were in good condition, 7 were fair, and 4 were poor. The four poor racks were all grid or schoolyard racks, and they held 72 of the 1,134 spaces.

There is now a record of the location, type, capacity, and condition of bicycle parking on municipal property. However, the survey did not measure how much of the parking supply is used. The approach could serve as a framework for other towns and future surveys and analysis of bicycle parking.

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SUPPLEMENTARY MATERIALS

Supplemental files

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