

## Burlington Planning Commission

149 Church Street  
Burlington, VT 05401  
Telephone: (802) 865-7188  
(802) 865-7195 (FAX)  
(802) 865-7144 (TTY)

[www.burlingtonvt.gov/pz](http://www.burlingtonvt.gov/pz)

Andy Montroll, Chair  
Bruce Baker, Vice Chair  
Yves Bradley  
Alex Friend  
Emily Lee  
Harris Roen  
Jennifer Wallace-Brodeur  
Eamon Dunn, Youth Member



### **PUBLIC HEARING NOTICE**

#### ***Burlington Comprehensive Development Ordinance*** **ZA-18-05 Article 3 Amendments** **ZA-18-06 Article 8 Bike Parking**

Pursuant to 24 V.S.A. §4441 and §4444, notice is hereby given of a public hearing by the Burlington Planning Commission to hear comments on the following proposed amendments to the City of Burlington's *Comprehensive Development Ordinance* (CDO). The public hearing will take place on **Tuesday, April 10, 2017 beginning at 6:45pm** in Conference Room 12, City Hall, 149 Church Street, Burlington, VT.

Pursuant to the requirements of 24 V.S.A. §4444(b):

**Statement of purpose:** This amendment is proposed to the Burlington CDO as follows:

- **ZA-18-05:** The purpose of this proposed amendment is to update Article 3 of the Burlington Comprehensive Development Ordinance (CDO) relative to zoning permit release, timelines for pending permit applications, permit extensions, and permit duration.
- **ZA-18-06:** The purpose of this proposed amendment is to modify bike parking regulations in Article 8, and in Table 8.2.5-1. These changes increase the required ratios of bicycle parking for selected uses to more closely align with the APBP guidelines, and establish a payment in lieu option for required bike parking.

**Geographic areas affected:** the proposed amendments are applicable to the following areas in the City of Burlington:

- **ZA-18-05:** The proposed amendment applies to all areas of the City.
- **ZA-18-06:** This proposed amendment applies to all areas of the City.

**List of section headings affected:**

- **ZA-18-05:** This amendment affects *Sec 3.2.5, Sec 3.2.7 (c), Sec 3.2.9 (b), (d), and (e)*.
- **ZA-18-03:** This amendment affects *Sec 8.2.1- 8.2.7*, adds a new *Sec 8.2.8*, and amends existing sections *8.2.8- 8.2.9*, and modifies *Table 8.2.5-1 Bicycle Parking Requirements*.

**The full text** of the *Burlington Comprehensive Development Ordinance* and the proposed amendment is available for review at the Department of Planning and Zoning, City Hall, 149 Church Street, Burlington Monday through Friday 8:00 a.m. to 4:30 p.m. or on the department's website at [www.burlingtonvt.gov/pz](http://www.burlingtonvt.gov/pz).

## Department of Planning and Zoning

149 Church Street  
Burlington, VT 05401  
Telephone: (802) 865-7188  
(802) 865-7195 (FAX)  
(802) 865-7142 (TTY)

[www.burlingtonvt.gov/PZ](http://www.burlingtonvt.gov/PZ)



### **Burlington Planning Commission Report Municipal Bylaw Amendment ZA-18-06 Article 8 Bike Parking**

This report is submitted in accordance with the provisions of 24 V.S.A. §4441(c).

#### ***Explanation of the proposed bylaw, amendment, or repeal and statement of purpose:***

The purpose of this proposed amendment is to modify bike parking regulations in Article 8, and in Table 8.2.5-1. These changes increase the required ratios of bicycle parking for selected uses to more closely align with the Association of Pedestrian and Bicycle Professional (APBP) guidelines, and establish a payment in lieu option for required bike parking.

#### ***Conformity with and furtherance of the goals and policies contained in the municipal development plan, including the availability of safe and affordable housing:***

The proposed amendment has no direct impact on the goals and policies contained in the *Municipal Development Plan* regarding safe and affordable housing. However, the amendment expands the required bicycle parking facilities that must be available for residences, ensuring that the appropriate facilities are in place for residents to live in dense and mixed-use neighborhoods in close proximity to employment and commercial destinations, and which may not require or make available vehicle parking.

#### ***Compatibility with the proposed future land uses and densities of the municipal development plan:***

The purpose of this proposed amendment is to ensure that developments provide bicycle access to employment, commercial destinations, and other transportation alternatives, and that the provision of bicycle facilities encourages the use of bicycles to aid the reduction of traffic congestion, influence a modal split, and increase the safety and welfare of residents and visitors. The Transportation Plan contained within the Municipal Development Plan supports biking as a practical alternative to cars for day-to-day transportation; bicycle parking facilities are an essential element to the feasibility of this mode of transportation. Together, these support the Municipal Development Plan's land use policy to "encourage mixed use development patterns, at a variety of urban densities, which limit the demand for parking and unnecessary automobile trips, and support public transportation."

#### ***Implementation of specific proposals for planned community facilities:***

The proposed amendment has no impact on planned community facilities.

## Department of Planning and Zoning

149 Church Street  
Burlington, VT 05401  
Telephone:(802) 865-7188  
(802) 865-7195 (FAX)  
(802) 865-7142 (TTY)

*David White, AICP, Director*  
*Meagan Tuttle, AICP, Comprehensive Planner*  
*Jay Appleton, GIS Manager*  
*Scott Gustin, AICP, CFM, Principal Planner*  
*Mary O'Neil, AICP, Principal Planner*  
*Ryan Morrison, Associate Planner*  
*Layne Darfler, Planning Technician*  
*Anita Wade, Zoning Clerk*



**TO:** Planning Commission  
**FROM:** Scott Gustin  
**DATE:** February 13, 2018  
**RE:** Article 8: Bicycle Parking Standards

---

At their January 23, 2018 meeting, the Planning Commission reviewed a revamped bicycle parking amendment. That draft directly addressed recommendations from the PlanBTV: Walk Bike, including changes to specific bike parking standards for various uses in Table 8.2.5-1. Express provision was made for bike parking within the public right-of-way, and a payment in lieu option was included. Greater locational flexibility was provided as to short term parking as well.

Following their review, the Planning Commission requested some additional changes including:

- Revision of employee-based bike parking standards to a fixed number such as building square footage;
- Reference to the appropriate version of the APBP bike parking standards (and provision of those standards for review); and,
- Reference to residential uses in Sec. 8.2.9 (b) 4.

The bike parking amendment has been revised to address all of the foregoing points, and a copy of the current APBP standards is included for review.

In the attached amendment deleted language is ~~crossed out~~, and proposed language is underlined red.

## ARTICLE 8: PARKING

### PART 1: GENERAL REQUIREMENTS

As written.

### PART 2: BICYCLE PARKING

#### Sec. 8.2.1 Intent

It is the intent of this subpart to:

- (a) Ensure the provision of parking spaces that are designed for bicycles and to ensure that bicycle parking needs of new land uses and development are met, while ensuring bicycle parking spaces are designed and located in a consistent manner. Provide bicycle access to employment, commercial destinations, and other transportation alternatives;
- (b) Provide safe, convenient, and adequate bicycle parking facilities that:
  1. Meet the demands of the use of the property;
  2. Reduce hazards to pedestrians;
  3. Enhance the visual quality of the city;
  4. Reduce the adverse impacts associated with the bicycle parking, which includes bicycles parked on parking meters, signs, street-trees, etc; and,
  5. Encourage the use of bicycles which has the effect of as an alternative to motor vehicle transportation, thereby reducing traffic congestion, influencing modal split, and increasing the safety and welfare of residents and visitors to the city.

#### Sec. 8.2.2 Provisions Applicability

Bicycle parking requirements as set forth in this subpart shall apply to new development, changes in land use, and changes to a structure that cause an increase or decrease of 25% or greater in gross floor area, seating capacity, or number of dwelling units~~building expansions, or occupancy changes requiring a zoning permit where automobile parking is required pursuant to Part 1 of this Article.~~

#### Sec. 8.2.3 Existing Structures

~~Any expansion or change of use proposed for an existing structure where four (4) bicycle spaces or less would be required shall be exempt from providing those spaces.~~

#### Sec. 8.2.4 Joint Use of Bicycle Parking Facilities

Required bicycle parking spaces for two (2) or more adjacent uses or structures may be satisfied by the same parking facilities used jointly, provided that such right of joint use and maintenance is evidenced by a deed, lease, contract, reciprocal easement, or similar written instrument establishing the joint use, and that the facilities are within 200 feet of the building or parcel housing the use.

## **Sec. 8.2.5 Bicycle Parking Requirements**

Bicycle parking for all uses and structures in all Parking Districts shall be provided in accordance with Table 8.2.5-1.

- (a) Where no requirement is designated, and the use is not comparable to any of the listed uses, bicycle parking requirements shall be determined by the DRB upon recommendation of the city's bicycle and pedestrian planner based upon the capacity of the facility and its associated uses.
- (b) When the calculation yields a fractional number of required spaces, the number of spaces shall be rounded to the nearest whole number.
- (c) Where bicycle parking is required, the minimum number of bicycle parking spaces provided at each site shall be two (2) ~~and the maximum shall be fifty (50)~~, not including long term parking.
- ~~(e)~~(d) Bicycle parking that meets the requirements for both long term and short term bicycle parking may contribute to the minimum requirement of one type or the other but not both.

**Table 8.2.5-1 Bicycle Parking Requirements**

	Specific Use	Long Term Spaces	Short Term Spaces
	<b>Per Square Feet of Gross Building Area, except as noted otherwise</b>		
<b>RESIDENTIAL</b>			
Household Living	Multi unit	1 per <del>4 units</del> <sup>2</sup> <u>bedrooms</u>	1 per 10 units
Group living	Elderly housing	1 per 10 units	1 per 10 units
	Fraternity, sorority, & dormitory	1 per <del>4</del> <sup>3</sup> residents	1 per <del>6</del> <sup>8</sup> residents
Temporary lodging	Hotel, motel, bed & breakfast, boarding house, campground	1 per 20 rooms/sites	2 per 20 rooms/sites
<b>COMMERCIAL</b>			
Office		1 per 5,000 sq. ft.	1 per 10,000 sq. ft.
	Medical, dental	1 per 5,000 sq. ft.	1 per 8,000 sq. ft.
Retail sales and service		1 per <del>20</del> <sup>12</sup> ,000 sq. ft.	1 per <del>5</del> <sup>2</sup> ,000 sq. ft.

	Auto, boat, motorcycle related sales, service and retail	1 per 30,000 sq. ft.	1 per 10,000 sq. ft.
	Restaurants, bars, taverns	1 per <del>10</del> <u>employees</u> <u>1,000 sf</u>	<del>6% of occupancy load</del> <u>1 per 500 sf seating space</u>
<b>INDUSTRIAL</b>			
Industrial, manufacturing, production, and warehousing		1 per 20,000 sq. ft.	1 per <del>50</del> <u>25,000</u> sq. ft. <u>(at least 2 per public entrance)</u>
<b>PERMITTED PUBLIC/INSTITUTIONAL USES</b>			
Colleges or Universities	Excluding dormitories	1 per <del>20</del> <u>15,000</u> sq. ft.	<del>3</del> <u>1</u> per <del>5</del> <u>1,000</u> sq. ft.
Daycare, except home		1 per 20,000 sq. ft.	1 per 10,000 sq. ft.
Schools	Grades 2-5	1 per 20,000 sq. ft. <u>plus 1 per 10 of student capacity</u>	2 per classroom
	Grades 6-12	1 per 20,000 sq. ft. <u>plus 1 per 10 of student capacity</u>	4 per classroom
Community Services	Museums, aquariums, libraries, community centers, municipal buildings, post office	1 per 20,000 sq. ft.	<del>3</del> <u>1</u> per <del>5,000</del> <u>1,500</u> sq. ft.
Medical Center	Excluding medical or dental offices	1 per 10,000 sq. ft.	1 per 20,000 sq. ft.
Worship, places of		1 per 20,000 sq. ft.	1 per <del>40</del> <u>20</u> seats
Recreation, government owned	Parks	Per DRB review	1 per 10 daily users
<b>OTHER</b>			
Terminal	Taxi/Bus/Passenger/Ferry	As determined during Site Plan Review by DRB	As determined during Site Plan Review by DRB
Parking	<u>P</u> arking lot, garage; public or private	<del>4, or 5% of</del> <u>1 per 20</u> automobile spaces; <u>whichever is greater</u> <u>(minimum of 6)</u>	<del>None</del> <u>1 per 10</u> automobile spaces <u>(minimum of 6) – to be located within view of entrance</u>

### **Sec. 8.2.6 Limitations**

- (a) No bicycle parking spaces required by this standard shall be rented or leased to employees or residents residing at the location at which bicycle parking is required; however, a refundable deposit fee may be charged. This does not preclude a bike parking rental business.
- (b) ~~Short term bicycle parking may be provided within the public street right-of-way. Providing bicycle racks on the public right of way must be approved. Provision of bicycle parking within the public right-of-way requires an encumbrance permit issued at the discretion of the City Council with recommendation from by the Department of Ppublic Wworks.~~

### **Sec. 8.2.7 Location & Design Standards**

- (a) All bicycle parking facilities shall be installed in accordance with the Association of Pedestrian and Bicycle Professionals' department of public works "Bicycle Parking Guidelines." (Revision 1.0, September 2015).
- (b) ~~Short term b~~Bicycle parking or a sign leading thereto shall be visible from the main entrance of the structure or facility.
- (c) ~~Short term b~~Bicycle parking shall be ~~visible, well lit, and~~ as convenient to cyclists as auto parking.
- (d) Short term bicycle parking may be provided within the interior of a building. In such cases, the bicycle parking must be located such that it is immediately apparent and accessible to the public, such as within the front lobby. Outdoor directional signage shall indicate the availability of such parking indoors.
- ~~(e)~~(e) Bicycle parking facilities such as bicycle racks and lockers shall provide sufficient security from theft and damage. ~~They~~ Bicycle racks shall be securely anchored to the ground, shall allow the bicycle wheel and frame to be locked to the ~~facility~~rack, and shall be in a location with sufficient lighting and visibility.
- ~~(e)~~(f) Bicycle parking facilities shall be visually compatible and of a design standard consistent with their environment and the development standards of Art 6.
- ~~(f)~~(g) Required bicycle parking spaces shall be of a sufficient dimension to accommodate a full-sized bicycle, including space for access and maneuvering.
- ~~(g)~~(h) Bicycle parking facilities shall be sufficiently separated from motor vehicle parking areas to protect parked bicycles from damage by motor vehicles.
- ~~(h)~~(i) The surfacing of bicycle parking facilities shall be designed and maintained to be clear of mud and snow.
- (j) Bicycle parking racks and lockers shall be anchored securely. Bicycle parking facilities shall be kept in place and maintained for year-round use.
- ~~(j)~~(k) Covered bicycle parking facilities are encouraged whenever feasible.
- ~~(j)~~(l) Existing bicycle parking may be used to satisfy the requirements of this section provided the rack design is consistent with the Association of Pedestrian

~~and Bicycle Professionals' department of public works~~ "Bicycle Parking Guidelines."

### **Sec. 8.2.8 Payment in Lieu**

In instances wherein the total requirement for short term bicycle parking cannot be accommodated onsite, the applicant may make a payment to the Department of Public Works to construct short term bicycle parking facilities in the public street right-of-way. The payment shall be sufficient to cover the cost of the bicycle parking equipment (i.e. such as racks), installation, and 5 year estimated maintenance costs. The short term bicycle parking installed in the public right-of-way shall be enough that the minimum requirement for short term bicycle parking is met or as much as may be reasonably accommodated in the public right-of-way as determined by the Department of Public Works, whichever is less. The option to provide an in lieu payment shall be at the discretion of the Director of Public Works or their designee and will be based on evidence that short term bicycle parking cannot be accommodated onsite. Alternatively, the applicant may apply for an encumbrance permit to install and maintain the short term bicycle parking within the right-of-way per Sec. 8.2.6 (b).

### **Sec. 8.2.98 Long Term Bicycle Parking**

- (a) Long term bicycle parking shall:
1. Protect bicycles from the weather;
  2. Provide secure storage that prevents theft of the bicycle and accessories; and,
  3. Be located in a well lit area.
- (b) Long Term bicycle parking requirements can be met in any of the following ways:
1. A bicycle storage room;
  2. Bicycle lockers, pods, or lids;
  3. Lockable bicycle enclosure; or
  4. By certifying to the city's bicycle and pedestrian planner that employees may store their bicycles within their workspace and that residents may store their bicycles within their dwelling unit.
- (c) When long term parking is required, showers and changing facilities for employees shall be required in accordance with Table 8.2.8-1, except for parking garages, parking lots, and residential units, which are exempt from the requirements of this section. Shower and changing facilities shall be provided onsite or through an agreement for offsite use.

Table 8.2.8-1 Shower and Changing Facilities	
Required Long Term Spaces	Minimum Number of Required Shower and Changing Facilities
1-4	1
5-10	2
11-20	3
21+	4 plus one for each additional 15 Long Term spaces or part thereof

### **Sec. 8.2.109 Waivers from Bicycle Parking Requirements**

- (a) Requests for reductions to bicycle parking requirements shall be made and documented separately from requests made for reductions in the automobile parking requirements.
- (b) The requirements of Sec. 8.2.5 may be reduced upon approval of the DRB based upon recommendation of the city's bicycle and pedestrian planner to the extent that the applicant can demonstrate the regulation is unnecessarily stringent due to:
1. The characteristics of the use, structure, or facility makes the use of bicycles unlikely;
  2. The characteristics of the site or area preclude the installation of bicycle parking; and/or,
  3. Results from a documented survey of bicycle parking use in similar situations.
- (c) For reductions granted due to the characteristics of a site or area, applicants must mitigate the loss of bicycle parking through contribution into the capital fund. The amount shall be equal to the cost required for installation of required bicycle parking.

## **PART 3: INSTITUTIONAL PARKING PLANS**

As written.

### **ARTICLE 13: DEFINITIONS**

**Bicycle Parking, Long Term:** Facilities which protect the entire bicycle, its components, and accessories against theft inclement weather, including wind-driven rain.

**Bicycle Parking, Short Term:** Bicycle racks which permit the locking of the bicycle frame and one wheel to the rack and which support the bicycle in a stable position without damage to wheels, frame, or components

DRAFT

ESSENTIALS OF

# BIKE PARKING

Selecting and installing bicycle parking that works



*apbp*

Association of Pedestrian  
and Bicycle Professionals  
Expertise for Active  
Transportation

## Essentials of Bike Parking

Revision 1.0, September 2015

© 2015 by Association of Pedestrian and Bicycle Professionals (APBP).



This work is licensed under the Creative Commons Attribution-NonCommercial 4.0 International License. You may freely share, reproduce, excerpt, and build upon this work—provided that your work is not commercial and that you acknowledge the source.

### Acknowledgments

**Lead author** - Nathan Broom

**Contributors** - Eric Anderson, Vince Caristo, Ryan Dodge, Jennifer Donlon-Wyant, Sarah Figliozzi, Elco Gauw, Dan Jatres, David Loutzenheiser, Heath Maddox, Brian Patterson, Cara Seiderman



*Alta Planning + Design donated their expertise in the design and illustration of this guide. Cat Cheng, lead designer, Jillian Portelance, production designer.*

**Cover image:** Sign D4-3 from Standard Highway Signs, 2004 Edition, [http://mutcd.fhwa.dot.gov/ser-shs\\_millennium\\_eng.htm](http://mutcd.fhwa.dot.gov/ser-shs_millennium_eng.htm)

Bicycle parking manufacturers and distributors shall not use APBP's logo or imply product endorsement by APBP without express written permission from APBP.

*APBP is an association of professionals who plan, implement and advocate for walkable and bicycle-friendly places.*

### Association of Pedestrian and Bicycle Professionals

bikeparking@apbp.org  
www.apbp.org



## TABLE OF CONTENTS

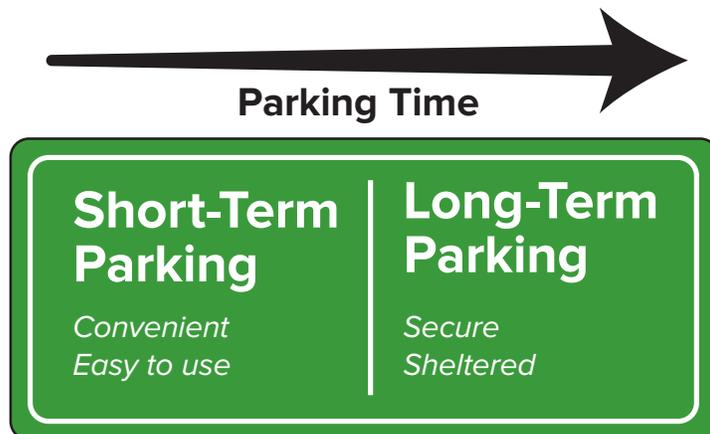
- 01 INTRODUCTION**
- 02 SHORT-TERM PARKING**
  - Site planning
  - Bike corrals
- 03 LONG-TERM PARKING**
  - Site planning
  - Special considerations for long-term parking
- 04 INSTALLATION**
  - Installation surface
  - Installation fasteners
  - Installation techniques
- 05 BICYCLE RACK SELECTION**
  - Performance criteria for bike parking racks
  - Rack styles
  - Rack materials and coatings
- 10 PLACEMENT**

## INTRODUCTION

Among the necessary supports for bicycle transportation, bike parking stands out for being both vital and easy. Still, it requires some attention to get it right. Bike parking may go unused if it's not more appealing to users than the nearest sign post. A minor mistake in installation can make a quality rack unusable. The variety of bicycle sizes, shapes, and attachments continues to increase, and good bike parking should accommodate all types.

The Association of Pedestrian and Bicycle Professionals (APBP) prepared this guide for people planning to purchase or install bike parking fixtures on a limited scale. It is a brief overview of APBP's comprehensive *Bicycle Parking Guidelines* handbook, available at [www.apbp.org](http://www.apbp.org).

This guide divides bike parking into short-term and long-term installations. These two kinds of parking serve different needs, and the starting point for most bike parking projects is recognizing whether the installation should serve short-term users, long-term users, or both. If users will typically be parking for two hours or longer, they are likely to value security and shelter above the convenience and ease that should characterize short-term parking.



# SHORT-TERM PARKING

Effective bike parking for short-term users depends on two main factors: 1) proximity to the destination and 2) ease of use.

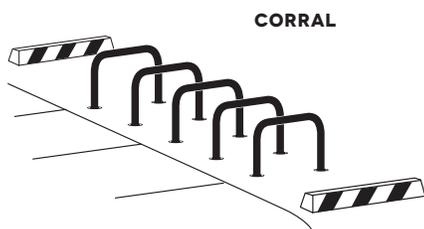
Short-term parking is designed to meet the needs of people visiting businesses and institutions, and others with similar needs—typically lasting up to two hours. Short-term users may be infrequent visitors to a location, so the parking installation needs to be readily visible and self-explanatory.



**INVERTED U**



**POST & RING**



**CORRAL**

## SITE PLANNING

### Location

Short-term bike parking should be visible from and close to the entrance it serves—50' or less is a good benchmark. Weather-protected parking makes bicycle transportation more viable for daily and year-round use, and it can reduce the motivation for users to bring wet bicycles into buildings. Area lighting is important for any location likely to see use outside of daylight hours.

### Security

All racks must be sturdy and well-anchored, but location determines the security of short-term parking as much as any other factor. Users seek out parking that is visible to the public, and they particularly value racks that can be seen from within the destination. Areas with high incidence of bicycle theft may justify specific security features such as specialty racks, tamper-proof mounting techniques, or active surveillance.

### Quantity

Many jurisdictions have ordinances governing bike parking quantity. APBP's full *Bicycle Parking Guidelines* offers complete recommendations for the amount and type of parking required in various contexts. In the absence of requirements, it's okay to start small—but bear in mind that perceived demand may be lower than the demand that develops once quality parking appears.

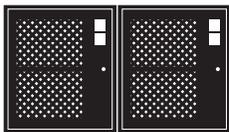
## BIKE CORRALS

Some cities with limited sidewalk space and strong bicycle activity place bike parking in on-street "bike corrals" located in the street area adjacent to the curb. Bike corrals can sometimes make use of on-street areas that are unsuitable for auto parking. When replacing a single auto parking space, a corral can generally fit 8 to 12 bicycles. APBP's full *Bicycle Parking Guidelines* provides details about designing and siting bike corrals. [➔ apbp.org](https://apbp.org)

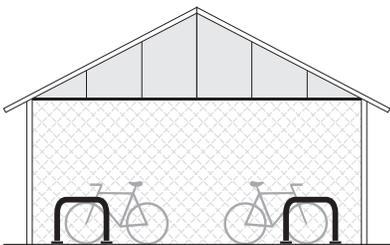
# LONG-TERM PARKING

Users of long-term parking generally place high value on security and weather protection. Long-term parking is designed to meet the needs of employees, residents, public transit users, and others with similar needs. These users typically park either at home or at a routine destination such as a workplace. They often leave their bicycles unmonitored for a period of several hours or longer, so they require security and weather protection that let them park without unreasonable concern for loss or damage.

Long-term parking can take a variety of forms, including a room within a residential building or workplace, a secure enclosure within a parking garage, or a cluster of bike lockers at a transit center. Some long-term parking is open to the public—such as a staffed secure enclosure at a transit hub—and some of it is on private property with access limited to employees, residents, or other defined user groups.



**BIKE LOCKERS**



**SHELTERED SECURE ENCLOSURE**

## SITE PLANNING

### Location

Appropriate locations for long-term parking vary with context. Long-term parking users are typically willing to trade a degree of convenience for weather protection and increased security. Long-term installations emphasize physical security above public visibility. Signage may be needed for first-time users.

### Security

Security is paramount for quality long-term parking. Access to parked bicycles can be limited individually (as with lockers) or in groups (as with locked bike rooms or other secure enclosures). Options for access control include user-supplied locks, keys, smart cards, and other technologies.

### Quantity

Refer to local ordinances or the comprehensive APBP *Bicycle Parking Guidelines* to determine the amount and type of parking required for various contexts.

## SPECIAL CONSIDERATIONS FOR LONG-TERM PARKING

In many ways, short-term and long-term parking function similarly and are served by the same guidelines. Some exceptions are noted below.

### Density

The competition of uses for high-security and sheltered locations creates particular pressure on long-term parking to fit more bicycles in less space. When parking needs cannot be met with standard racks and spacing recommended in this guide, consider rack systems designed to increase parking density. See the high-density racks table on page 7. Note that increasing density without careful attention to user needs can create parking that excludes people because of age, ability, or bicycle type. This may result in people parking bicycles in other less desirable places or choosing not to bike at all.

### Bicycle design variety

Long-term parking facilities should anticipate the presence of a variety of bicycles and accessories, including—depending on context—recumbents, trailers, children’s bikes, long-tails, and others. To accommodate trailers and long bikes, a portion of the racks should be on the ground and should have an additional 36” of in-line clearance.

### Performance criteria

The bike rack criteria in the next section apply to racks used in any installation, regardless of its purpose. Long-term installations often use lockers and group enclosures not discussed in this guide. Such equipment raises additional considerations that are discussed in detail in APBP’s full *Bicycle Parking Guidelines*. [➔ apbp.org](https://www.apbp.org)

# INSTALLATION

Selecting an appropriate installation surface and technique is key to creating bicycle parking that remains secure and attractive over time.

## INSTALLATION SURFACE

A sturdy concrete pad is an ideal surface for installing bicycle parking. Other surfaces often encountered include asphalt, pavers, and soft surfaces such as earth or mulch. These surfaces can accommodate in-ground mounting or freestanding bike racks such as inverted-U racks mounted to rails. See APBP's *Bicycle Parking Guidelines* for details. [➔ apbp.org](https://apbp.org)

## INSTALLATION FASTENERS

When installing racks on existing concrete, consider the location and select appropriate fasteners. Drill any holes at least three inches from concrete edges or joints. Some locations benefit from security fasteners such as concrete spikes or tamper-resistant nuts on wedge anchors. Asphalt is too soft to hold wedge and spike anchors designed for use in concrete. Installing bike parking on asphalt typically requires freestanding racks and anchor techniques specific to asphalt.

### FASTENERS

#### CONCRETE SPIKE



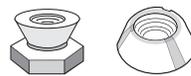
Installs quickly in concrete with a hammer. Tamper-resistant. Removal may damage concrete and/or rack.

#### CONCRETE WEDGE ANCHOR



Allows for rack removal as needed. Not tamper-resistant, but can accommodate security nuts (below).

#### SECURITY NUTS



Use with concrete wedge anchors. Security nuts prevent removal with common hand tools.

## INSTALLATION TECHNIQUES

When installing racks on existing concrete, choose those with a surface-mount flange and install with a hammer drill according to the specifications of the mounting hardware selected. When pouring a new concrete pad, consider bike parking fixtures designed to be embedded in the concrete. Because replacing or modifying an embedded rack is complicated and costly, this installation technique requires particular attention to location, spacing, rack quantity, and material.



# BICYCLE RACK SELECTION

## PERFORMANCE CRITERIA FOR BIKE PARKING RACKS

*These criteria apply to any rack for short- or long-term use.*

CRITERIA	DETAILS
<b>Supports bike upright without putting stress on wheels</b>	The rack should provide two points of contact with the frame—at least 6” apart horizontally. Or, if a rack cradles a bicycle’s wheel, it must also support the frame securely at one point or more. The rack’s high point should be at least 32”.
<b>Accommodates a variety of bicycles and attachments</b>	The racks recommended on page 6 (“racks for all applications”) serve nearly all common bike styles and attachments—if installed with proper clearances (see placement section). Avoid designs and spacing that restrict the length, height, or width of bicycles, attachments, or wheels.
<b>Allows locking of frame and at least one wheel with a U-lock</b>	A closed loop of the rack should allow a single U-lock to capture one wheel and a closed section of the bike frame. Rack tubes with a cross section larger than 2” can complicate the use of smaller U-locks.
<b>Provides security and longevity features appropriate for the intended location</b>	Steel and stainless steel are common and appropriate materials for most general-use racks. Use tamper-resistant mounting hardware in vulnerable locations. Rack finish must be appropriate to the location (see materials and coatings section).
<b>Rack use is intuitive</b>	First-time users should recognize the rack as bicycle parking and should be able to use it as intended without the need for written instructions.

# RACK STYLES

The majority of manufactured bike racks fall into one of the categories on pages 6-8. Within a given style, there is wide variation among specific racks, resulting in inconsistent usability and durability. APBP recommends testing a rack before committing broadly to it.

## RACKS FOR ALL APPLICATIONS

When properly designed and installed, these rack styles typically meet all performance criteria and are appropriate for use in nearly any application.

### INVERTED U

also called  
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 unused parking meter posts.

### WHEELWELL-SECURE



Includes an element that cradles one wheel. Design and performance vary by manufacturer; typically contains bikes well, which is desirable for long-term parking and in large-scale installations (e.g. campus); accommodates fewer bicycle types and attachments than the two styles above.

This guide analyzes the most common styles of bike racks, but it is not exhaustive. Use the performance criteria on page 5 to evaluate rack styles not mentioned. Custom and artistic racks can contribute to site identity and appearance, but take care that such racks don't emphasize appearance over function or durability.

## HIGH-DENSITY RACKS

These rack styles do not meet all performance criteria but may be appropriate in certain constrained situations.

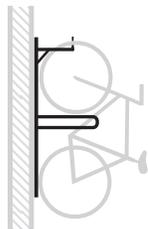
High-density rack systems can maximize the use of limited parking space, but they don't work for all users or bicycles. If installing these racks, reserve additional parking that accommodates bicycles with both wheels on the ground for users who are not able to lift a bicycle or operate a two-tier rack, or for bikes that are not compatible with two-tier or vertical racks.

### STAGGERED WHEELWELL-SECURE



Variation of the wheelwell-secure rack designed to stagger handlebars vertically or horizontally to increase parking density. Reduces usability and limits kinds of bikes accommodated, but contains bikes well and aids in fitting more parking in constrained spaces.

### VERTICAL



Typically used for high-density indoor parking. Not accessible to all users or all bikes, but can be used in combination with on-ground parking to increase overall parking density. Creates safety concerns not inherent to on-ground parking.

### TWO-TIER



Typically used for high-density indoor parking. Performance varies widely. Models for public use include lift assist for upper-tier parking. Recommend testing before purchasing. Creates safety concerns not inherent to on-ground parking, and requires maintenance for moving parts.

## RACKS TO AVOID

Because of performance concerns, APBP recommends selecting other racks instead of these.

### WAVE

also called undulating or serpentine



Not intuitive or user-friendly; real-world use of this style often falls short of expectations; supports bike frame at only one location when used as intended.

### SCHOOLYARD

also called comb, grid



Does not allow locking of frame and can lead to wheel damage. Inappropriate for most public uses, but useful for temporary attended bike storage at events and in locations with no theft concerns. Sometimes preferred by recreational riders, who may travel without locks and tend to monitor their bikes while parked.

### COATHANGER



This style has a top bar that limits the types of bikes it can accommodate.

### WHEELWELL



Racks that cradle bicycles with only a wheelwell do not provide suitable security, pose a tripping hazard, and can lead to wheel damage.

### BOLLARD



This style typically does not appropriately support a bike's frame at two separate locations.

### SPIRAL



Despite possible aesthetic appeal, spiral racks have functional downsides related to access, real-world use, and the need to lift a wheel to park.

### SWING ARM SECURED



These racks are intended to capture a bike's frame and both wheels with a pivoting arm. In practice, they accommodate only limited bike types and have moving parts that create unneeded complications.

## RACK MATERIALS & COATINGS

Most bicycle parking racks are made of carbon steel or stainless steel. Carbon steel requires a surface coating to resist rust while appropriate grades of stainless steel need no coating. Not all materials and coatings with the same name perform equally. Square tubing provides a security advantage as round tubing can be cut quietly with a hand-held pipe cutter. Before purchasing racks, talk to suppliers about your particular conditions and choose a material and coating that suit your needs. The following are common choices, depending on local considerations and preferences.

RACK MATERIAL - COATING	RELATIVE PURCHASE COST	DURABILITY	CAUTIONS
<b>Carbon steel - galvanized</b>	Usually lowest	Highly durable and low-maintenance; touch-up, if required, is easy and blends seamlessly	Utilitarian appearance; can be slightly rough to the touch
<b>Carbon steel - powder coat* (TGIC or similar)</b>	Generally marginally higher than galvanized	Poor durability	Requires ongoing maintenance; generally not durable enough for long service exposed to weather; not durable enough for large-scale public installations
<b>Carbon steel - thermoplastic</b>	Intermediate	Good durability	Appearance degrades over time with scratches and wear; not as durable as galvanized or stainless
<b>Stainless steel - no coating needed, but may be machined for appearance</b>	Highest	Low-maintenance and highest durability; most resistant to cutting	Can be a target for theft because of salvage value; maintaining appearance can be difficult in some locations

\* When applied to carbon steel, TGIC powder coat should be applied over a zinc-rich primer or galvanization to prevent the spread of rust beneath the surface or at nicks in the finish.

# PLACEMENT

The following minimum spacing requirements apply to some common installations of fixtures like inverted-U or post-and-ring racks that park one bicycle roughly centered on each side of the rack. Recommended clearances are given first, with minimums in parentheses where appropriate. In areas with tight clearances, consider wheelwell-secure racks (page 6), which can be placed closer to walls and constrain the bicycle footprint more reliably than inverted-U and post-and-ring racks. The footprint of a typical bicycle is approximately 6' x 2'. Cargo bikes and bikes with trailers can extend to 10' or longer.

