

BEYOND

SMART CITIES

LOCATION AND TRANSPORTATION - GREEN BUILDING TECHNOLOGY TRAINING PROGRAM
FOR GREEN BUILDING AND SUSTAINABILITY SPECIALISTS
KRISHNAJI PAWAR, LEED AP BD+C, GSAS CGP, ISO 14001:2015, GCP
GREEN BUILDING SPECIALIST CURRICULUM

GREEN BUILDING SPECIALIST

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BICYCLE FACILITIES - CREDIT
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LEARNING OBJECTIVES

Intent of BICYCLE FACILITIES - CREDIT

Behind the intent

Step by Step Guidance

Requirements

Required Documentation

Connection to Ongoing Performance

Terms and Definitions

GREEN BUILDING SPECIALIST

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LT- CR (1) - DESIGN

INTENT

To promote bicycling and transportation efficiency and reduce vehicle distance traveled. To improve public health by encouraging utilitarian and recreational physical activity.

POTENTIAL TECHNOLOGIES & STRATEGIES

Bicycling offers many individual and global benefits. For every mile (1 600 meters) pedaled rather than driven, nearly 1 pound (450 grams) of carbon dioxide (CO₂) emissions is avoided.

BICYCLE FACILITIES

REQUIREMENTS

☒ Design or locate the project such that a functional entry or bicycle storage is within a 200-yard (180- meter) walking distance or bicycling distance from a bicycle network that connects to at least one of the following:

☐ at least 10 diverse uses (see Appendix 1);

☐ a school or employment center, if the project total floor area is 50% or more residential; or

☐ a bus rapid transit stop, passenger rail station, or ferry terminal.

IMPLEMENTATION

REQUIRED DOCUMENTATION

Documentation	Not applicable, One and Two-Story Buildings, Three-Story Buildings	Others	Notes
Provide the following bicycle-related information and details: • The bicycle route connecting the project to the qualifying uses (see Figure 1 and LT Overview, Walking and Bicycling Distance). • The bicycle route connecting the project to the qualifying uses (see Figure 1 and LT Overview, Walking and Bicycling Distance). • The bicycle route connecting the project to the qualifying uses (see Figure 1 and LT Overview, Walking and Bicycling Distance).			

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BEHIND THE INTENT

Bicycling offers many individual and global benefits. For every mile (1 600 meters) pedaled rather than driven, nearly 1 pound (450 grams) of carbon dioxide (CO₂) emissions is avoided.¹ People who shift from car to bicycle use for short trips extend their lives by an estimated three to 14 months, gaining such health benefits as a lower risk of cardiovascular disease.² Planners and developers whose investments support bicycling as a transportation option often win political and popular support.³

To promote bicycle-friendly design, this credit rewards two things: the provision of long- and short-term bicycle storage, and access to a "bicycle network" (paths, trails, designated bike lanes, and slow-speed roadways). Short-term and long-term bicycle storage capacity is considered separately because visitors and regular occupants have different bicycle storage needs. For residential spaces, long-term storage must be provided in an area outside individual dwelling units, because having to carry a bicycle into a living space is inconvenient and discourages bicycle use. Finally, being adjacent to a bicycle network means that building occupants can more easily bicycle to and from the building. The route destinations emphasize the role of bicycles for travel to and from home, work, and errands, as well as to other transportation modes such as transit.



STEP-BY-STEP GUIDANCE

STEP 1. IDENTIFY BICYCLE NETWORK AND ELIGIBLE DESTINATIONS

Obtain or create a map of bicycle networks in the area surrounding potential project locations.

- Survey and map schools, employment centers, transit stops, and other eligible uses (Appendix 1).
- A "bicycle network" is defined to include, in any combination, demarcated bike lanes, bike trails, and streets with a maximum speed limit of 25 mph (40 kph). Both bike lanes and bike trails must meet the credit's width requirements.
- For differences in eligible destinations for specific project types, see *Further Explanation, Rating System Variations*.

STEP 2. SELECT BIKE-FRIENDLY PROJECT LOCATION

Locate the project close to an existing or planned bicycle network that meets credit requirements for uses within the specified distance from the project boundary (see Figure 1 and LT Overview, Walking and Bicycling Distance).

- The bicycle route connecting the project to the qualifying uses may include any combination of trails, bike lanes, and slow-speed streets, provided the total distance traveled is less than 3 miles (5 kilometers).
- For planned bicycle trails or lanes, confirm the schedule for funding and completion.

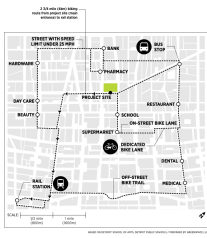
STEP 3. GATHER OCCUPANT COUNT INFORMATION

Determine the number of expected regular occupants in the building (see *Further Explanation, Rating System Variations, and Getting Started, Occupancy*, on which building users to include in calculations).

- For all rating systems except Schools and Retail, also determine the number of expected peak visitors.
- For mixed-use projects in all rating systems except Schools, Retail, and Healthcare, identify the project spaces as residential versus commercial or institutional and total the number of regular building occupants in each space type.

Projects with commercial-institutional space or residential space totaling less than 10% of the total building floor area may follow the requirements of the predominant use, at the discretion of the project team.





Calculate the number of required short-term and long-term bicycle spaces, using the following equations. Ensure that the project design includes the minimum bicycle storage spaces specified in the credit requirements (see *Further Explanation, Rating System Variations*).

$$\text{Short-term bicycle storage} = \text{Peak visitors} \times 0.025$$
$$\text{Long-term bicycle storage} = \text{Regular building occupants} \times 0.05$$

Long-term bicycle storage = (Regular building occupants) x 0.30
OR (# of dwelling units), whichever is greater

Short-term bicycle storage = $0.2 \times (\text{Building floor area (ft}^2\text{)} / 5000)$ Short-term bicycle storage = $0.2 \times (\text{Building floor area (ft}^2\text{)} / 5000)$
$$\text{Short-term bicycle storage} = (2 \times [\text{Building floor area (m}^2\text{)} / 465])$$

- For all siting systems except **Solaris** and **Retail**, calculate the number of required short-term and long-term bicycle spaces.
 - For **Solaris** and **Retail** subdivisions in the project, follow Equations 1 and 2. At least four short-term storage spaces and four long-term spaces are required.
 - For residential spaces in the project, follow Equations 1 and 3. At least four short-term storage spaces and four long-term spaces are required.
 - For **Leisure**, calculate the number of required long-term bicycle spaces by following Equation 2. At least four long-term bicycle spaces is not required.
 - For **Retail**, calculate the number of required long-term (Equation 2) and short-term (Equation 4) bicycle spaces. At least four long-term bicycle spaces is required.
- The following conditions apply to all calculations for short- and long-term bicycle storage:
- Results must be rounded up to the nearest whole number.
 - If a project is LEED certified and cannot be double counted, for example a project team may not count the storage of a nearby building toward its own storage requirements (if that storage is already used by the other building's occupants). In addition, if any new or existing storage space is located on the same lot as the project, the storage space must be provided for all occupants with access to amenities or the storage must be designated for the project.
 - For mixed-use buildings, identify nonresidential and residential portions of the building and meet the applicable requirements for each type based on parcel occupancy (see Appendix Equations, Example 1-Use Building).

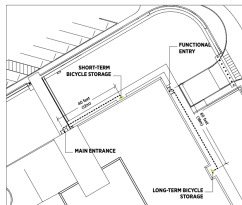
For all rating systems except Schools, use Equation 5 to determine the number of showers with changing facilities required and incorporate these facilities into the project design (see Further Explanation, Rating System Variations).

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EQUATION 5. Shower Solids

- Results must be rounded to the next whole number. For projects with 100 or fewer regular building occupants, only one shower is required.
- Showers are required for commercial or institutional spaces only. For residential spaces, no additional showers are required beyond those provided inside dwelling units.
- Projects with hotel guests may exclude these occupants from shower calculations.
 - If a project has a shower and changing facility, it may also provide on-site showers or health club shower facilities within the LEED project boundary may be provided to all occupants in lieu of in-house facilities. Health club or shower facilities must be accessible to occupants without their having to go outdoors and available during the project's hours of operation.
 - For mixed-use buildings, identify the corresponding portion of the building and make the applicable shower and changing facility calculation for that portion (space type based on permitted occupancy) (see Further Explanation, Example Mixed-Use Buildings).



Locate bicycle storage to meet the credit requirements for the project's rating system. Both short-term and long-term storage facilities are more likely to be used if they are located in a well-lit, safe, and accessible area (see *Further Explanation, Selecting Bicycle Storage*). ➤

- For all rating systems other than Schools, locate short-term and long-term storage within 100 feet (30 meters) of main and functional entrances, respectively.
- For Schools, locate long-term storage within 100 feet (30 meters) of a main entry to the project. Short-term storage is not required.

Provide on-site dedicated bicycle lanes that safely connect the edge of school property to school buildings.

Provide on-site dedicated bicycle lanes that safely connect the edge of school property to school buildings.

[illegible]

Implement a bicycle maintenance program for retail store employees or provide route assistance for both employees and customers. Consider the best way to promote the bicycling program to create and sustain participation.

- Examples of maintenance programs include coupons for yearly bicycle tune-ups for those who ride to work or on-site supplies for basic self-repairs (e.g., tire pumps, patch kits, basic tools).
- Examples of route assistance include a map identifying bicycle routes to the project site, posted online and in a location on the property that is easily accessible to employees and customers.

REQUIREMENTS

Bicycle Network

Design or locate the project such that a functional entry or bicycle storage is within a 200-yard (180-meter) walking distance or bicycling distance from a bicycle network that connects to at least one of the following:

- at least 10 diverse uses (see Appendix 1);
- a school or employment center; if the project total floor area is 50% or more residential; or
- a bus rapid transit stop, passenger rail station, or ferry terminal.

All destinations must be within a 3-mile (4800-meter) bicycling distance of the project boundary.

Planned bicycle trails or lanes may be counted if they are fully funded by the date of the certificate of occupancy and are scheduled for completion within three years of that date.

Bicycle Storage and Shower Rooms

Case 1. Commercial or Institutional Projects

Provide short-term bicycle storage for at least 2.5% of all peak visitors, but no fewer than four storage spaces per building.

Provide long-term bicycle storage for at least 5% of all regular building occupants, but no fewer than four storage spaces per building in addition to the short-term bicycle storage spaces.

Provide at least one on-site shower with changing facility for the first 100 regular building occupants and one additional shower for every 150 regular building occupants thereafter.

Case 2. Residential Projects

Provide short-term bicycle storage for at least 2.5% of all peak visitors but no fewer than four storage spaces per building.

Provide long-term bicycle storage for at least 15% of all regular building occupants, but no less than one storage space per three residential units.

Case 3. Mixed-Use Projects

REQUIREMENTS +

Meet the Case 1 and Case 3 storage requirements for the nonresidential and residential portions of the project, respectively.

Large-Denominator Projects Only

The following guidance must be applied when determining the number of showers needed for projects with a large number of occupants.

New Construction: Schools, Data Centers, Warehouses & Distribution Centers, Hospitals, Retail, Healthcare

Provide at least one on-site shower with changing facility for the first 100 regular building occupants and one additional shower for every 50 regular building occupants thereafter, up to 500 regular building occupants.

- one additional shower for every 200 regular building occupants, for the additional 1000 - 4,999 regular building occupants
- one additional shower for every 1000 regular building occupants, for the additional 5,000+ regular building occupants

Conversions

Provide at least one on-site shower with changing facility for the first 100 regular building occupants and one additional shower for every 50 regular building occupants thereafter, up to 500 regular building occupants.

- one additional shower for every 200 regular building occupants, for the additional 1000 - 4,999 regular building occupants
- one additional shower for every 1000 regular building occupants, for the additional 5,000+ regular building occupants

Fit all projects

Short-term bicycle storage must be within 200 feet (60 meters) walking distance of any main entrance, and long-term storage must be within 500 feet (150 meters) walking distance of any main entrance. Vertical circulation traveled by elevator or escalator from counting towards the walking distance requirements.

Bicycle storage capacity may be calculated as follows: storage that is fully available to the occupants of the project (bicycle racks and secure project or secure indoor storage is acceptable as long as it is readily accessible to the occupants). On-site bicycle parking within the project boundary may count up to 50% of the total on-site short-term bicycle storage space. For all projects that count publicly available bicycle parking towards their short-term storage requirements if it meets the provision otherwise stated herein.

Provide at least one on-site shower with changing facility for the first 100 regular building occupants and one additional shower for every 50 regular building occupants thereafter. Schools generally require 12 showers from the regular building occupant count. Residential projects do not need to provide additional showers.

Schools

Bicycle Network

Design or locate the project such that a functional entry and/or bicycle storage is within a 200-yard (180-meter) walking distance or bicycling distance of a bicycle network that connects to either of the following:

- a bus rapid transit stop or passenger rail station or ferry terminal; or
- at least one of the following uses within the school attendance boundary:

REQUIREMENTS +

The stops/stations or dwelling units must be within no more than a 1/2-mile (2400-meter) biking distance for grades 6 and below, or ages 14 and below, and 3 miles (4800-meter) biking distance (for grades 6 and above or ages 15 and above).

Provide dedicated bicycle lanes that extend at least to the end of the school property with no barriers (e.g., fences) on school property.

Bicycle Storage and Shower Rooms

Meet storage and shower requirements for all projects and provide long-term bicycle storage for at least 5% of all regular building occupants (excluding students grades 3 and younger), but no fewer than four storage spaces per building.

Retail

Bicycle Network

Meet Bicycle Network requirements for all projects.

Bicycle Storage and Shower Rooms

Meet storage and shower requirements for all projects and provide at least two short-term bicycle storage spaces for every 5,000 square feet (465 square meters), but no fewer than two storage spaces per building.

Provide long-term bicycle storage for at least 5% of regular building occupants, but no fewer than two storage spaces per building in addition to the short-term bicycle storage spaces.

Provide a bicycle maintenance program for employees or bicycle route assistance for employees and customers. Route assistance must be provided in a manner easily accessible to both employees and customers.

Healthcare

Bicycle Network

Meet Bicycle Network requirements for all projects.

Bicycle Storage and Shower Rooms

Meet storage and shower requirements for all projects and provide short-term bicycle storage for at least 2.5% of all peak visitors, but no fewer than four storage spaces per building.

Provide long-term bicycle storage for at least 5% of regular building occupants (excluding patients), but no fewer than four storage spaces per building in addition to the short-term bicycle storage spaces.

CONNECTION TO ONGOING PERFORMANCE

LEED Q+M LT Prerequisite Transportation Performance

Improving bicycle facilities and access to a bicycle network as well as implementing any corresponding bicycle programs may help improve a project's transportation performance score.

REQUIRED DOCUMENTATION

Documentation	New Construction, Core and Shell, Data Centers, Warehouses and Distribution Centers, Hospitality, Healthcare	Schools	Retail
Vicinity map showing bicycle network and route and distance along network to eligible destination(s). For planned bicycle networks, capital improvement plan demonstrating completion within one year of certificate of occupancy.	X	X	X
Site plan showing bicycle storage locations	X		X
Site plan showing bicycle storage location with walking route to main entrance and bicycling route to school boundary		X	
Calculations for storage and shower facilities	X	X	X
Description of programs to support bicycle use			X

REFERENCED STANDARDS

NONE

TERMS AND DEFINITIONS

Bicycling distance the distance that a bicyclist must travel between origins and destinations, the entirety of which must be on a bicycle network

Walking distance the distance that a pedestrian must travel between origins and destinations without obstruction, in a safe and comfortable environment on a continuous network of sidewalks, all weather-surface footpaths, crosswalks, or equivalent pedestrian facilities. The walking distance must be drawn from an entrance that is accessible to all building users.

Short-term bicycle storage non-enclosed bicycle parking typically used by visitors for a period of two hours or less

Historic urban context refers to limiting conditions linked to historic urban planning that may consequentially impact buildings and infrastructure within the associated jurisdiction. Such site conditions may make buildings act as traffic calming structures or may affect street access and the width of right-of-way. Historicity of the area and whether the site receives legal protection are determining factors for whether a bicycle network has a historic urban context.



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