Providing Bicycle Parking and End-of-Trip Facilities in Central Perth

A Guiding Framework

Providing Bicycle Parking and End-of-Trip facilities in Central Perth

Prepared for Department of Transport

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About this report

The information contained in this publication is provided in good faith to assist property owners, property managers, developers, planners, local councils and other planning authorities in planning and providing bicycle parking and end of trip facilities. The document does not contain any statutory requirements.

Version control

Version No.	Date	Prepared by	Revision or issue descriptions	Issues to
1	March 2025	Urban Mobility	Final	

Amendment record

This document is reviewed to ensure its continuing relevance to the systems and process that it describes.

A record of contextual revisions is listed in the following table.

Page No.	Context	Revision	Date

Contents

Abbreviations

Abbreviation	Term
DoT	Department of Transport Western Australia
EOT	End of Trip
ERD	Electric rideable device such as a e-scooter
WA	Western Australia

1. Introduction

In this framework **bicycle parking** refers to the infrastructure related to the parking of bicycles and other rideable devices including eScooters.

The term **EOT includes bicycle parking, as well as the complementary amenities** such as showers, changerooms and lockers.

1.1 About this framework

The purpose of this framework is to provide consistent advice to local governments, developers, employers, site managers and staff about good practices in the supply, management and upgrade of bicycle parking and end-of-trip facilities (EOT) for office, non-residential and residential developments in central Perth. It addresses both long stay (commuter) demand for bicycle and eRideable parking and associated EOT for riders and for those walking or jogging to work, or during breaks, as well as catering for short stay/visitor bicycle and eRideable parking.

This framework aims to:

- support a shift to active transport modes for a more connected and vibrant city.
- reduce barriers to walking, wheeling or riding to workplaces through enabling suitable supply and quality of design of bicycle and eRideable parking and EOT.
- maximise benefits of significant state and local government investment in the city's walking and riding network infrastructure.

This framework is not designed to impose statutory requirements on landholders or developers, nor to duplicate existing guidance on design and supply requirements provided in other policies and standards. Rather, it provides guidance for proponents of new facilities on factors for bicycle parking and EOT to consider that can help improve existing practice and encourage more people to walk or cycle to work.

Information in this document may also assist local governments that are updating planning scheme requirements or developing planning policy.

While this framework is based on the central Perth environment, it is likely to be relevant to growing major activity centres that may be starting to experience similar issues such as traffic congestion, employment and resident density and barriers to access. With consideration of local conditions, it may also guide the provision of EOT in smaller activity centres.

Figure 1: Active Transport to central Perth

2. Rationale

2.1 Benefits of active travel

Replacing car trips with active transport trips delivers a range of benefits for individuals and businesses, as well as the local and broader community.

- **Increased neighbourhood liveability and vibrancy** – more people walking, wheeling and riding helps to activate neighbourhoods and increases community interaction.
- **Improved physical and mental health benefits.**
- **Reduced traffic and congestion** including fewer vehicle crashes, and better travel-time reliability.
- **Improved environmental benefits** with reduced greenhouse gas emissions, particulate matter and noise pollution.
- **Community economic benefits** including lowered costs associated with congestion, health and transportation, and more retail activity and expenditure at local businesses.
- **Lower infrastructure costs** by avoiding the need to build and widen roads or provide parking and increased use and optimisation of local and State government investments in walking and riding infrastructure.
- **More equitable and improved accessibility** to services, jobs and recreation opportunities for people who do not, or cannot, drive a car, or have limited public transport access.

2.2 Research findings

In a range of studies and surveys undertaken in recent years, planners, developers and other stakeholders in central Perth have indicated that there is a need for consistent guidance around the provision of EOT in commercial or residential buildings. Developers also have currently no reference to a consistently agreed mode share target for walking or bike riding trips to, from and within central Perth.

Having access to good facilities not only satisfies existing demand from people walking and riding but induces more people to engage in active travel to, from and within the city.

Market research targeted at city workers, conducted in 2019 by the Department of Transport (DoT), identified significant latent demand for bicycle parking and EOT. This research clearly showed that a lack of access to good EOT creates a major barrier for people who are interested in walking, wheeling or riding to work, or exercising during their lunchbreak.

Further findings from this market research can be found in '*End-of-Trip Facilities in Perth: What the research says'* on the Transport website[1].

Both international and local studies demonstrate that providing a full range of high-quality and readily accessible EOT is a key factor to make people more likely to commute to work or other destinations by bike. Having access to good facilities not only satisfies existing demand from people walking and riding but induces more people to engage in active travel to, from and within the city.

Figure 2: Commuting to work in central Perth

[1] Transport planning guidelines

3. Issues to consider in planning EOT provision

3.1. Journey to work mode share targets

When developing an EOT facility, proponents should cater for the projected active transport mode share for the medium term of the lifespan of a new building, generally a 15 to 20-year horizon.

Since there are generally no agreed mode share targets for a precinct or activity centre, it can be difficult to determine the potential scale of provision needed to meet future journey to work demand.

Setting a realistic target mode share should be based somewhere between the existing mode share of cycling and walking trips to a site and an aspirational target which addresses latent demand from other people not riding or walking because they do not currently have access to EOT facilities.

Additional demand in the short to medium term future is also likely to be generated by:

- an increased range of options such as eRideables;
- increased investment in walking and riding infrastructure;
- active transport and health promotional activities;
- increased density of housing in areas convenient to employment;
- economic conditions increasing the cost of transport by private car or public transport; and
- increased attractiveness and convenience, as congestion increases road travel times.

A Green travel plan is a site specific suite of initiatives and services aimed at encouraging and incentivising travel mode behaviour change to more sustainable transport options.

Existing active transport mode share for the journey to work for central Perth (2021 census data) has 'bicycle' and 'walked only' modes at almost 18 per cent (predominantly 'walked only') after peaking in the 2016 census at 22 per cent. For Greater Perth, the share is much lower at less than 3 per cent.

Austroads' 'Bicycle Parking Facilities: Updating the Austroads Guide to Traffic Management' research report proposes potential aspirational targets for different activity centres as follows:

- **CBD/Principal activity centres: 30 per cent bicycle mode split target**. This rate reflects the high propensity for these urban environments to attract bicycle use, since they are major trip attractors and employment generators.
- **Town centres/Major activity centres: 20 per cent bicycle mode split target**. This rate reflects the moderate propensity for these urban environments to attract bicycle use, especially for local and short trips.
- **Other urban: 10 per cent bicycle mode split target**. This rate is considered a reasonable starting point for general urban environments.

Where mode share targets are not already agreed, a 'Green Travel Plan' is a good option for developing reasonable targets with site specific considerations such as location, availability of access via bicycle, shared path infrastructure and expected tenant and employee characteristics.

A Green Travel Plan is a site-specific suite of initiatives and services aimed at encouraging and incentivising travel mode behaviour change to more sustainable transport options such as walking, riding, public transport and car-pooling and decreasing the number of single occupant car trips.

Bike and eRideable trips that require short stay parking, such as business visitors, shoppers, recreational bike riders, courier and other delivery services, are harder to quantify through determining an appropriate mode share. However, there is considerable evidence that demand for this type of bike parking is increasing, particular from eRideables and delivery services, and will need to be more fully considered in future EoT facilities.

3.2. Relevant influences and trends

Changes in community, environment and technology may impact on local planning scheme requirements, as well as Austroads and Australian Standards. Relevant trends include:

- **An 'all ages and abilities' approach to building bicycle network infrastructure means that it now supports an increasing range of bicycle sizes, weights and types including electric, recumbent and cargo bikes**. These may require changes in storage space to cater for a larger and wider bicycle envelope or decreased storage provided as hanging space.
- **The increasing popularity of eScooter and other eRideable devices** which may require eScooter storage, charging facilities or locker provision.
- **The rise in delivery of parcels, food and groceries via eRideables** which may require increased short stay bicycle parking for both food outlets and delivery recipients in residential apartments and commercial buildings.
- **Increases in bicycle and device ownership** and associated increases in riding for recreation and commuting.[i] The People's Pulse Report (Active Transport) identified that while push bikes tend to be used for mainly recreational purposes, the purpose of trips made by eBikes and other eRideables was more evenly split between recreation and transport.
- **Developments in greenhouse gas emission reduction targets** which will require active transport to play an increasing role in reducing single occupant private vehicle trips.
- **Continued strong investment in walking and riding infrastructure and a focus on enabling active transport environments** which will increase demand for bicycle parking and EOT.
- **The increased provision of a high comfort, low stress bicycle network** that by providing a high level of protection for riders, including dedicated bicycle paths, low speed streets, shared spaces and allowing for riders to lawfully ride on footpaths, is attracting more riders of all ages and abilities.

Figure 3: Food delivery in the City

3.3. Planning environment

Local planning schemes may provide requirements for bicycle parking and other EOT. However, these vary from scheme to scheme and are sometimes significantly below levels required to increase the current active transport mode share or cater for future demand. Local planning schemes can also be silent on provision of amenities other than the supply of bike parking, such as showers and lockers.

This document does not override or replace planning authority requirements in respect of EOT provision. It provides additional guidance for developers and planners and may be of value when authorities are reviewing existing minimum requirements for these statutory requirements. In many cases, this framework reflects recent EOT standards applies to Development WA precincts.

In central Perth the Perth Parking Policy applies to all developments. For developers seeking policy concessions for additional tenant parking under that Policy, this framework offers consistent advice on levels of bicycle parking and EOT facilities and can help inform any overall proposal seeking an exemption from the Policy's requirements.

Many valuable guides already exist that specify important design and supply requirements for EOT which this framework does not seek to duplicate. Reference to many of these other guidelines is recommended for detailed design and other advice.

- Australian Standard for Bicycle Parking (AS 2890.3:2015)
- State Planning Policy 7.3 Residential Design Codes Volume 2 - Apartments
- Austroads Guide to Traffic Management Part 11: Parking Management Techniques: This content guides the design of bicycle parking facilities and helps identify appropriate provisions of bicycle parking and EOT for different building uses.
- Austroads Bicycle Parking Facilities: Guidelines for Design and Installation. The content of this report expands on the information provided in the 'Guide to Traffic Management Part 11' to assist in providing bicycle parking and EOT that are fit for purpose and highlights common mistakes.
- Austroads Bicycle Parking Facilities: Updating the Austroads Guide to Traffic Management: The content of this report provides recommended updates to the 'Guide to Traffic Management Part 11' including provision rates.
- Green Council of Australia's rating system
- How to Setup Cycle Facilities in Your Workplace: A grass-roots guide to assist employers, facilities managers and staff in the provision of bicycle parking and EOT in their workplace.

3.4. Ongoing maintenance and management

Research indicates that people are more interested in using bicycle parking and EOT that are well maintained, clean and in good working order. Planning of EOT should include a management plan for the facility which addresses:

- how the facilities will be regularly cleaned and maintained;
- how security and secure access to the facility will be managed;
- how use and occupancy rates of bicycle parking, as well as demand for suitability of drying areas of other amenities, are monitored on an ongoing basis;
- how lockers are fairly and appropriately allocated with regular reviews of ownership; and
- possible use of a towel service and other items, such as hairdryers, iron and ironing boards.

Figure 4: Providing wayfinding signage to EOT

3.5. Fire safety for eRideables

With a growing prevalence of eRideables in the community, the government's Lithium-Ion Working Group identified an emerging risk of fire associated with storage and charging of eRideables for which appropriate planning and management should be implemented to maintain building safety.

When used for commuting these devices require secure storage facilities at the workplace, usually in EOT originally designed to store bicycles. There is often an expectation from the employees that the devices can also be charged in the storage facility.

ERDs are powered by Lithium-ion (Li-ion) batteries which have significant utility value across many applications. However, they also pose fire and safety risks because of:

- Malfunction of the battery system such as manufacturing defects, including: material defects, poor construction, or contamination.
- Physical damage through crash, exposure to water, shipping, handling, crushing or puncture by waste collectors.
- Electrical damage, including: Battery Management System failure, overcharging, over discharging, using the wrong charger, overloading, and short circuit.
- Thermal damage through exposure to high temperatures.
- Charging: batteries are at a higher risk of thermal runaway or fire while being charged.

Fires from lithium-ion batteries are particularly severe and difficult to extinguish. They create noxious gas, significantly high heat and can grow and spread quickly.

It is important that the managers and owners of facilities housing these devices take measures to mitigate risks to staff and property. Implementation of measures will depend on what practicalities allow and subject to an appropriate risk assessment and decision-making. The characteristics of the facility, including its age and construction materials will also be factors in the decision-making process.

Risk reduction measures may include:

- Providing a safe designated area separated from work or living spaces that is suitable for storing and charging. This should include hard surfaces, ventilation, smoke/heat detectors and no storage of flammable materials like cleaning fluids. The storage area must not block exits or escape routes.
- Managing the electrical system such as installing timers on power points used for charging and not allowing use of extension cords and power boards.
- Promoting safer ERDs and charging practices such as providing safety brochures as part of the staff induction process addressing the fire risks, safe charging practices and identifying signs of battery damage;
- Maintaining the safer charging environment such as including the area in maintenance schedules, keeping the area clear of flammable materials and ensuring ERDs are only stored and charged in the designated area.
- Promoting appropriate disposal of Li-ion batteries so they are not disposed of in the building's waste disposal or recycling system.

A benefit of providing a suitable area to store and charge ERDs is that it will reduce the risk of batteries being taken into living or work spaces where they pose a greater threat to staff and residents if there is a fire.

Fire prevention and management advice related to eRideables is still an emerging area so **current and expert fire and safety advice addressing eRideables should be sought at the time of planning**.

Useful information about fire safety can be found on the Department of Fire and Emergency Services lithium-ion batteries webpage (refer to the section on Light Electric Vehicles), as well as Lithium-ion batteries | Product Safety Australia and section 3 of the CSIRO's lithium-ion battery safety report.

4. Residential Apartments

4.1. Bike parking for residents

Residential apartments are generally located in areas where there are many local services, retail, food and beverage options, jobs, community services and recreational facilities within walkable and bikeable distances.

A 2023, 55 per cent of Perth households had at least one operating bicycle with 21 per cent having three or more according to the National Cycling Participation survey by Austroads and the Australian Bicycle Council.

To cater for likely existing demand and potential future increases in demand, provision of secure bicycle parking at a rate of two bicycles per apartment is encouraged of which at least 50 per cent is catered for in a shared bicycle enclosure with the remainder provided as additional space in personal storage areas.

Where developments are (partly) catering for increased bicycle parking through additional space in personal storage areas[ii] the following should apply to these storage spaces:

- The bike parking space be additional to the minimum size requirements set out for the individual storage space in the State Planning Policy 7.3 Residential Design Codes Volume 2 - Apartments requirements.
- The additional space provided be no less than the standard bicycle envelope as identified by Australian standards (AS 2890.3:2015) being 1,200 mm high, 1,800 mm long and 500 mm wide (handlebars will protrude beyond this envelope).
- The space be provided in the front section of the storage area and marked as bicycle parking (irrespective of whether the resident decides to use it as such).
- The space not impede access to the storage behind.
- The space not impede, or be impeded by, the opening of the storage area door.

Higher rates of bike parking should be encouraged when apartments:

- are designed for high levels of occupancy per apartment (such as three and four bedroom apartments);
- are located with direct access to a high-quality bike network and other major walking/riding infrastructure, or
- are provided with low levels of vehicle parking per apartment, or are targeted at residents who are likely to have low car ownership rates, such as student housing. [iii]

The shared facility/enclosure should:

- provide shelter and protection from the elements;
- be located close to the building or car park entrance;
- be well lit;
- be designed to minimise interaction with vehicles through dedicated walking/riding/shared paths (where possible) or appropriate traffic management controls;
- include managed access to electrical charging facilities for eBikes and eScooters (refer to ‘fire safety for eRideables’ section of this framework);
- include controlled (secure) access for residents only;
- include a basic bicycle repair station;
- not be easily visible or accessible by the general public to reduce potential incidents of theft from passing foot traffic;
- provide for securing of bicycles in line with Australian standards;
- provide sufficient aisle and walkway space to cater for movement of bikes in and out of spaces; and
- include at least 50 per cent of spaces at horizontal/ground level for heavier and larger bikes.

Refer to *Guide to Traffic Management Part 11: Parking Management Techniques* available at AGTM11-20 | Austroads **and Australian Standards for Bicycle Parking (AS**

2890.3:2015) for detailed information on design and parking location principles.

4.2. Other amenities

No additional EoT amenities for residents, such as showers, are considered necessary, since their apartments effectively cater for these types of facilities.

4.3. Retro-fitting bike parking in existing residential apartment buildings

One key issue to address when designing and retro-fitting existing apartments to provide increased bike parking is consideration of safety, both personal safety and bike security/safety. This was the most important characteristic of EoT facilities according to survey respondents contacted as part of DoT's market research.

4.4. Residential visitor and delivery bike parking

Provision of **one bicycle parking space for visitors per 10 dwellings is recommended, or at least four spaces, whichever is greater on the site**.

Higher rates of bike parking provision to this recommendation should be considered when residential apartments:

- have direct access to a high-quality bike network; and/or
- provided with low levels of visitor or on-street car parking.

Conversely, lower rates can be considered where there is a nearby supply of public visitor parking.

In addition to providing for likely visitors to residential apartments, short stay bicycle parking should cater for projected growth in deliveries of post, parcels, groceries and food services by bicycle and eRideables, and ensure public access on footpaths is not hindered.

This parking should:

- be adjacent to the building entrance;
- be visible;
- be well lit;
- be readily accessible by the public; and
- not impede access to the building entrance or public access on footpaths.

Where a building includes both residential and commercial uses, visitor parking should be provided for both sets of visitors. If entrances are adjacent or shared, combining the two supplies of visitor bike parking may be appropriate to enable reciprocal use of the overall space. In these cases, an application an overall discount of 25 per cent to 50 per cent of the total (residential and non-residential) supply may be relevant.

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Figure 5: Secure bicycle parking for building tenants

5. Office / Commercial building provisions in new developments

Whilst all new development and redevelopment of sites in central Perth should encourage building occupants to make sustainable transport choices, guidance on appropriate EOT facilities will vary according to the different uses of land and buildings that impact the demand patterns for bike parking and other amenities.

For example, floor areas for office use will have a higher density of staff than those based in medical or hospitality venues where EOT supply would be more logically advised based on the number of employees. Educational institutions will also need a volume and type of facility for students that differs from that suitable for staff/employees.

While the same standards that apply to new developments would ideally also apply to retrofitting sites and redevelopments, this may not always be possible. Accordingly, this section includes additional guidance on undertaking upgrades of this type and facilities that should be considered for different building types.

5.1 Long Stay bicycle parking for building occupants

It is recommended tenants of office buildings be supplied with on-site bicycle parking at **a rate of 0.15 spaces per staff** (catering for 15 per cent mode share), **one space per 100 m² NLA, or a minimum total of four spaces, whichever is greater**.

For other non-residential buildings **a rate of 0.15 per (daytime) staff or a minimum of four spaces, whichever is greater**.

Since mode share of active transport (including eRideables) may reach 15 to 20 per cent in the foreseeable lifespan of new developments, the above recommendation caters for future demand and required capacity.

Bicycle parking facilities in new offices or other non-residential buildings should:

- be located close to the building or car park entrance, where possible, no more than a 30-metre walk from the building entrance;
- be conveniently located next to lockers, changerooms/showers, drying space and building lifts/stairs with a logical flow between each component;
- be well lit;
- be designed to minimise interaction with vehicles through dedicated walking/riding paths (where possible) and appropriate traffic management controls (where not possible);
- include access to electrical charging facilities for eBikes and eScooters (refer to ‘fire safety for eRideables section within this framework);
- include controlled (secure) access available only to building tenants or others with appropriate approval;
- not be easily visible or accessible by the general public (to reduce risk of theft);
- include at least 50 per cent of spaces at horizontal/ground level for heavier and larger bikes;
- provide for securing of bicycles in line with Australian standards;
- provide sufficient aisle and walkway space to cater for movement of bikes in and out of spaces; and
- include a basic bicycle repair station.

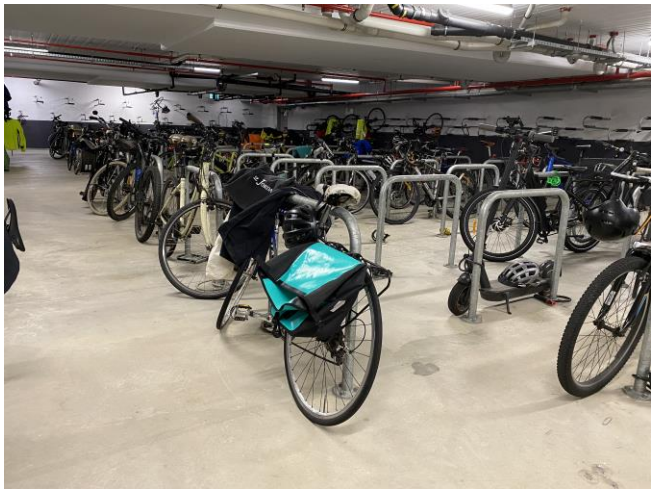

Figure 6: Secure bicycle parking for building tenants

5.2 Lockers

It is recommended that lockers **be provided at a minimum rate of two lockers per bicycle parking space**.

Demand for lockers is driven by both people who commute by riding and those who choose to walk to work or exercise during the working day. Supply of lockers should therefore exceed the rate of bicycle parking. Ideally lockers should be large enough to hang clothing items incorporating a two-tier design. However, smaller lockers that cater for people with a reduced need for clothing storage, such as those arriving at the building in work clothes, may be suitable to supplement overall locker supply.

5.3 Showers and Changing Rooms

A minimum of **two female and two male showers**, located in separate changing rooms, is recommended **for up to the first 10 non-residential bicycle spaces** with additional showers provided at a rate of one male and one female shower for every 30 bicycle spaces (or part thereof) thereafter.

One for every 10 showers, or part thereof, should be accessible.

Research shows that high quality showers and changing areas are a critical factor to support active travel amongst building occupants. A green travel plan is recommended to establish appropriate provision and should ensure the facilities provided:

- are well-lit;
- are secure with controlled access;
- include sufficient accessible showers being at least one in every 10 of part thereof;
- include basic amenities such as soap dispensers, mirrors and hair dryer;
- are easy to clean and dry; and
- are well ventilated.

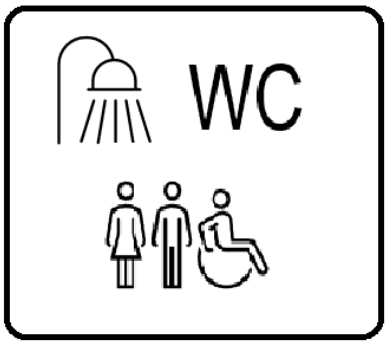

Figure 7: Secure bicycle parking for building tenants

DoT's market research also highlighted that inclusion of individual shower and dressing cubicles was a highly desired and attractive feature of EOT facilities. Cubicles also create private spaces with a more comfortable and inclusive environment for those with privacy concerns, including transgender and non-binary users. Providing additional, separate and accessible individual unisex bathroom(s) is a further option to improve inclusivity.

5.4 Toilets

At least **two accessible toilets (one male and one female) should be provided for the first 10 showers or part thereof**.

Further toilets should be provided at a rate of **one for each additional five showers**.

Where facilities include individual accessible unisex changerooms/showers, providing additional toilets in the male and female changerooms should also be considered.

5.5 Drying space

Well-ventilated drying space for towels and wet or sweaty clothing should be provided and sized appropriately to cater for wet weather.

Well-ventilated drying space commensurate with the facility size is a key requirement for drying towels and clothing.

Options that cater for drying space include a drying room, drying cupboards, dedicated line space within a bike parking enclosure or measures incorporated into changing rooms. The amount of space should be provided with consideration of the impact of wet weather on demand for drying clothing and towels. Providing a towel service will reduce the amount of space required for drying towels.

Figure 8: Towel service

5.6 Short Stay bicycle parking for visitors and deliveries

It is recommended non-residential buildings without easy access to public bicycle parking provide for visitor bicycle parking at a rate of **one space for every 200 staff or part thereof, or a minimum total of four spaces, whichever is greater**. Consideration may be given to increasing this rate for **food and beverage outlets with high levels of delivery pick-ups by bicycles and other eRideables**.

Where approved by local government, visitor parking may sometimes be best provided as shared facilities (to be maintained by local government authorities) in communal public spaces that provide easy access to visitor destinations (refer to the section on shared public visitor parking information).

Visitor bicycling parking facilities should provide only for securing and temporary storage of bicycles (and eRideables) and does not need to include additional amenities such as showers and lockers.

Australian Standards AS2890.3.2015 and Austroads Bicycle Parking Facilities: Guidelines for Design and Installation provides comprehensive guidance on considerations for location and design of visitor bicycle parking and addresses issues such as security, safety concerns and how to maximise use of the facilities.

Short-stay parking for students of new tertiary education institutions should be considered separately as outlined in the following section.

Figure 9: Cycle path use including delivery bicycle

6. Tertiary education Facilities (for students)

6.1 Bicycle parking

New tertiary education facilities in central Perth should address student need for bicycle parking, catering for **at least 15 to 20 per cent of peak student numbers**.

Students are less likely than other regular city commuters to either hold a driver's licence or own a passenger vehicle[iv]. Generally, they rely on higher levels of active or public transport than other travellers and, in line with global trends that show young people driving less and becoming less likely to obtain a driver's licence, numbers of students walking and cycling to their destination are only likely to increase over the medium to longer term.

Given this context, and to cater for projected future growth in student numbers and demand education premises should adopt an active transport mode share of a target rate identified in a customised green travel plan that has been developed for the site. It is recommended that this green travel plan should consider catering for at least 15 to 20 per cent mode share of expected peak student population (the maximum number of students to be on campus at any one time) and identify potential areas for expansion of EOT facilities as demand increases.

Determining provision of student bike parking and EOT is significantly more complex than applying standard rates (as identified above) to other office and non-residential buildings. However, failure to adequately cater for current and future bicycle parking demand has the potential to contribute to significant pedestrian safety and site access issues, such as parked bicycles obstructing pedestrian areas and walkways, or collisions between riders and pedestrians in pedestrian priority areas as well as theft and personal safety incidents.

Figure 10: Tertiary student bicycle parking with shelter [v]

Tertiary student bike parking should:

- be provided with cover from the elements;
- maximise facility convenience for users by:
  - locating bike parking conveniently close to entrances to reduce incidence of bikes being informally secured in places that could represent risks to safety, access and building aesthetics;
  - considering increased aisle widths to reduce the time required to navigate congested areas for shorter visit/higher turnover use; and
  - providing bike parking at all entrances in cases where there are multiple entrances or points of access to the building;

- be safe and secure by:
  - ensuring that infrastructure allows for secure fixing of bikes in line with Australian standards (relying on enclosures with secure access may have limited benefit when catering for a large student population);
  - ensuring bike parking is in view (passive surveillance) and not in hidden or secluded areas to address theft and personal safety risks;
  - ensuring the area is well lit and appropriately monitored (for example CCTV); and
  - providing for separation from vehicle traffic in accessing the bike parking;
- not impede pedestrian movements or access;
- have supporting EOT including lockers and showers provided for students (see following information for recommended supply of these).

6.2 Lockers

It is recommended lockers be provided for students as per a green travel plan, with a rate equivalent to quarter the number of student bike parking spaces as a recommended starting point.

Small (backpack) sized lockers are likely to be suitable and may be provided on a user-pays basis.

6.3 Showers

Showers to be provided for students as per a green travel plan. A recommended starting point is **initial supply of two male and two female showers for the first 10 spaces, with additional showers provided at one half the rate of those provided for employees**. That is, one male and one female, or two unisex showers for up to the first 10 spaces and additional showers at a rate of one male and one female for every 60 bike spaces thereafter.

It is recommended that at least some of the supply of male and female showers should be provided as individual shower cubicles with adequate changing space. In addition, consideration should be given to providing some of the overall supply as unisex shower cubicles that incorporate adequate changing space to improve inclusivity.

6.4 Toilets

Toilet supply for students associated specifically with the EOT is recommended to be determined through linking it to the number of provided showers, similar to the model proposed for office building employees.

At least **two accessible toilets (one male and one female) should be provided for the first 10 showers or part thereof**.

Further toilets should be provided at a rate of **one for each additional five showers**.

Where individual accessible unisex changerooms/showers are provided, providing additional accessible toilets in the male and female changerooms should also be considered.

7. Retro-fitting in existing buildings with insufficient or low quality EOT

7.1 Addressing undersupply and latent demand

To encourage more workers choosing to walk, wheel or ride to work, developers and local governments should aim to work together to increase bicycle parking and the EOT in existing buildings that have no facilities, or where provision is low quality or insufficient for potential demand.

Market research undertaken by the DoT has found that there is unmet demand for EOT across the city either because:

- a building does not provide any;
- the building has low quality or unsuitable facilities; or
- the demand outstrips supply.

In a Perth CBD survey regarding EOT, 37 per cent of respondents identified “no secure place to store my bike”, 33 per cent identified “nowhere to store my clothes”, and 49 per cent identified “no decent place to shower and change” as barriers for why they don’t ride to work or study more often.

Other research undertaken by DoT to assess the feasibility of providing a public EOT in the CBD indicated that people prefer EOT amenities to be located at, or very near to, their destination and for those facilities to be provided free of charge or at very low cost.

The best strategy to meet EOT shortfall is therefore to increase its overall supply in or near people’s workplaces throughout the city. This can be achieved through:

- retrofitting or upgrading facilities at buildings where EOT are non-existent, insufficient or of unsuitable/low quality; and/or
- increasing EOT supply in nearby existing buildings and making this available to commuters who have no facilities located at their workplace.

7.2 Retrofitting or expansion of existing EOT

Evidence indicates that low quality or unsuitable upgrades will have minimal impact on inducing additional active transport.

Developers and building owners who are redeveloping or refurbishing older buildings should consider upgrading or retrofitting EOT as part of the overall project. Research conducted in 2015 by Colliers International clearly indicated that employees’ expectations and demands have changed in recent years and modern EOT are in high demand from prospective tenants. Provision of high-quality EOT is sometimes considered more important than car parking by the current workforce and can significantly improve a property’s competitiveness within the overall property market.

Local government authorities may consider imposing minimum requirements, or advocating for, bicycle parking and EOT for certain types of commercial redevelopments or in certain locations. Determining where these are relevant, and how these should differ in relation to new developments, may need to be determined according to specific cases.

Where an existing apartment building is redeveloping or is retrofitting EOT into an existing building, **the design and supply should be guided by the same design considerations for quality and the same rates of provision as new buildings as much as possible**,.

8. Public Facilities

8.1 Public Long Stay EOT

Developers and building owners that have excess supply or unused EOT in buildings (because of high building vacancy rates or EOT built to cater for future demand that has not yet been reached) could consider leasing out those spaces to users of nearby workplaces.

Long term lease arrangements, either with neighbouring organisations or directly with individuals, are recommended to minimise security issues. Revenue generated by leasing of excess EOT supply can support ongoing maintenance and management of the facilities.

As part of their efforts to achieve sustainable transport outcomes in their areas, **local government authorities** could facilitate the above by coordinating and matching potential providers and customers where there is known need for EOT in specific workplaces or areas and where it would not contravene the development approval.

Proposals for public EOT should include the same quality design considerations as tenant facilities and cater for a reasonable number of users. This may differ according to location characteristics but as a guide, it should cater for a minimum of 10 bicycles with one male and one female shower, lockers at a rate of 1.5 per bicycle space and drying space. Provision of drying space may be problematic in a public facility where there is a risk of theft and alternative options may include well-ventilated lockers and provision of a towel service.

For further information on the potential market demand for a public EOT in central Perth see DoT's 'End-of-trip facilities in Perth: What the research says' document.

8.2 Public Shared visitor facilities (communal visitor parking hubs)

In some circumstances local government-provided visitor parking in a shared location within public space may be the best option for surrounding businesses and offices. This kind of parking can service a range of nearby attractions including retail, health and entertainment precincts, tourism sites, pedestrian malls and recreational spaces.

Figure 11: Public visitor bicycle parking

Where target mode share targets for cycling have been identified for a precinct or neighbourhood, these should guide the provision of bike parking. Where this is not possible, it is recommended that the local government assess existing supply, and likely demand increases in the medium term, and develop a guiding plan or strategy (potentially as part of a broader active transport or bicycle infrastructure plan).

When providing public visitor parking in shared facilities/locations, considerations should include:

- maximising facility convenience for users by locating bike parking where it is easy to access from shared paths and conveniently close to the attractors it will be serving;
- accommodating a range of bicycles and eRideable devices of different sizes;
- ensuring pedestrian access or pedestrian movements are not impeded;
- providing passive surveillance and ensuring parking is not in secluded or hidden areas;
- providing some level of shade or shelter for at least part of the bike parking supply;
- providing appropriate devices to fix bikes and devices in line with Australian standards;
- potentially co-locating it with other public amenity such as seating or drinking fountains;
- ensuring the area is well-lit and appropriately monitored; and
- providing signage and wayfinding for users.

9. Bicycle parking and EOT framework summary

9.1 New residential apartments

*Note: Existing apartment buildings undertaking upgrades should be guided by the information in this document as much as is possible, tailored to the specific case.

Bicycle parking spaces		Visitor and delivery (pick up/drop-off) spaces) - short stay		Showers and changerooms		Other amenities		
Recommended supply	Key considerations	Recommended supply	Key considerations	Recommended supply	Key considerations	Lockers	Drying space	Toilets
Two per apartment with at least 50 per cent provided in a shared facility and an option of providing remainder as additional space in personal storage areas.	(Shared) Bicycle parking or storage should: • be easy for residents to access; • provide shelter from the elements; • be located close to a building entrance; • be well lit; • minimise interaction with vehicles; • provide managed electrical charging; • include a basic repair station; • have controlled secure access; • not be accessible to, or easily visible by, the general public.; • provide for securing of bicycles in line with Australian standards; and • provide for at least 50 per cent storage horizontal/ground level for heavier larger items. Where provided as additional space in personal storage units the following should apply: • additional space no less than the standard bicycle envelope as per Australian standards (1,200x1,800x500 mm) • be provided at the front of the storage unit and marked as bicycle storage • not impede access to the storage behind or the opening of the storage door.	One per every 10 dwellings, or a minimum of four spaces, whichever is greater. Plus Any visitor parking for commercial tenancies in mixed use buildings (see below).	Bicycle parking spaces should: • be adjacent to the building entrance; • be visible; • be well lit; • be readily accessible by the public; and • not impede access to the building entrance or footpath. All short stay spaces for mixed use buildings (residential and commercial uses) may be located together to maximise reciprocal use, thereby allowing a discount to the total of up to 25 to 50 per cent.	N/A	N/A	N/A	N/A	N/A

9.2 New Office / commercial development

Bicycle parking spaces		Visitor and delivery (pick up/drop-off) spaces) - short stay		Showers and changerooms		Other amenities		
Recommended supply	Key considerations	Recommended supply	Key considerations	Recommended supply	Key considerations	Lockers	Drying space	Toilets
0.15 spaces per staff OR One per 100 m^2 of NLA* (for office development) OR A minimum of four spaces. (Whichever is greater)	As well as meeting Australian standards, the bicycle parking should: • be located close to the building entrance (car park entrance) at no more than a 30 m walk; • be conveniently located to lockers changerooms/showers and building lifts/stairs with a logical flow between; • be well lit; • minimise interaction with vehicles with dedicated entrance paths where possible and have appropriate traffic management controls where not possible; • include access to electrical charging; • include controlled access; • not be easily visible by the general public; • include at least 50 per cent horizontal/ground level storage for heavier larger bikes; and • include a basic bicycle repair station.	One per 200 staff OR A minimum of four spaces (Whichever is greater) Consider increasing where there are tenancies with high levels of delivery and pick-ups.	On-site visitor bicycle parking spaces should: • be adjacent to the building entrance; • be visible; • be well lit; • be readily accessible by the public; and • not impede access to the building entrance or footpath. May alternatively be provided as shared facilities on public land (to be maintained by local government authorities).	• For the first 10 bicycle spaces, a minimum of four showers including at least one male and female accessible shower. • For every additional 30 bicycle spaces or part thereof, an extra male and female shower.	Shower and changeroom facilities should: • be well-lit; • be secure with controlled access; • provide high air flow; • include basic amenities such as soap dispensers, mirrors and hair dryer; and • be easy to clean and dry. Consider inclusion of shower cubicles with changing space and/or some individual unisex provision to improve comfort and inclusivity for those who are uncomfortable with shared changing space or gendered changing space.	Two per bicycle parking space. Lockers large enough to cater for hanging space preferred (e.g. two-tier).	Drying space suitable for towel and clothing with high air flow. Note: this may be minimised with provision of a towel service.	Two accessible toilets (one male and one female) for the first 10 showers or part thereof, with potential for additional as part of accessible individual unisex changerooms. Further toilets to be added at a rate of one for each additional five showers.

9.3 Tertiary education (students)

Note: Lockers, showers and changerooms for staff should be provided for as per office and other non-residential buildings (see previous table).

Bicycle parking spaces		Showers and changerooms		Other amenities		
Recommended supply	Key considerations	Recommended supply	Key considerations	Lockers	Drying Space	Toilets
15 to 20 per cent of peak student numbers.	Location and convenience issues: • Provide at least some bays with cover from the elements. • Locate conveniently to all entrances or risk informal parking with safety, access and aesthetic risks. • Provide wide aisles to improve ease of access to encourage use of this formal bicycle storage. Security and safety considerations: • Ensure infrastructure allows for secure fixing (in line with Australian standards). • Ensure parking is in view, not hidden or in secluded areas. • Parking should be well lit and appropriately monitored. • Provide access separate from vehicle movements.	One male and one female shower for the first 10 bicycle bays, with additional provided at one half the rate of office tenant parking provision, i.e.: • two showers (one male one female) for the first 10 bicycle parking spaces; and • of one male and one female for every 60 bike spaces thereafter. Alternatively, some of this supply may be provided as non-gendered (unisex) accessible bathrooms.	Showers and changing space should: • be well-lit; • be secure with controlled access; • provide high air flow; • include basic amenities such as soap dispensers, mirrors and hair dryer; • be easy to clean and dry; and • consider privacy concerns such as provision of shower cubicles with changing space. Some of this supply may alternatively be provided as non-gendered shower and changing space.	0.5 lockers per bike parking space. Small (backpack) sized lockers may be suitable).	N/A	To be located with the showers, separate from other student toilet supply - two accessible toilets for the first 10 showers or part thereof (either unisex or one male and one female). Further toilets to be added at a rate of one for each additional five showers.

9.4 Retrofitting in existing buildings with insufficient or low quality EOT

Bicycle parking spaces		Visitor and delivery (pick up/drop-off) spaces) - short stay		Showers and changerooms		Other amenities		
Recommended supply	Key considerations	Recommended supply	Key considerations	Recommended supply	Key considerations	Lockers	Drying space	Toilets
Increase to 0.15 spaces per staff where possible, or as close to as can be catered for.	• See (new) office/non-residential building design considerations. • Potential upgrades of EOT facilities may be limited in refurbishments and minor redevelopments of buildings. • Major redevelopments should aspire to provide modern facilities at a similar standard to new developments, noting difficulties in retrofitting and lack of available space may limit supply.	Where possible aim for one per 200 staff OR A minimum of 4 spaces, Whichever is greater	Supply requirements may be lower than for new developments where building envelopes do not allow space.	As per (new) office/ commercial where possible.	Refer (new) office/commercial design considerations.	Aim for two per bicycle parking spaces.	Drying space suitable for towel and clothing with high air flow. (Drying space may be minimised with a towel service)	Aim for as per (new) office and commercial where possible.

9.5 Public EOT

9.5.1. Long stay (commuter) EOT

Bicycle parking spaces		Visitor and delivery (pick up/drop-off) spaces) - short stay		Showers and changerooms		Other amenities		
Recommended supply	Key considerations	Recommended supply	Key considerations	Recommended supply	Key considerations	Lockers	Drying space	Toilets
Excess or unused office or other non-residential building facilities.	• Consider leasing of temporary excess supply in buildings that have catered for future demand. • Long term lease arrangements with neighbouring organisations, or directly with individuals, are recommended to minimise security and administrative issues. • Local government authorities could consider promotion and coordination of providers and potential customers as part of sustainability responsibilities.	N/A	N/A	Excess or unused facilities.	N/A	Excess or unused facilities.	Within existing supply.	Within existing supply.

9.5.2. Communal visitor parking

Long Stay Bicycle parking spaces		Visitor and delivery (pick up/drop-off) spaces) - short stay		Showers and changerooms		Other amenities		
Recommended supply	Key considerations	Recommended supply	Key considerations	Recommended supply	Key considerations	Lockers	Drying space	Toilets
N/A	N/A	To meet any mode share targets for the precinct or as part of a guiding plan as determined by the local government. Supply should be higher: • in areas well served or accessed from key bicycle network infrastructure; and • for land uses that attract higher numbers of visitors (for example, developments with tourist attractions and food and beverage outlets situated on key recreational bike paths).	• Be able to accommodate a range of bikes and eRideable devices of different sizes. • Not impede key pedestrian networks or pedestrian access. • Provide for passive surveillance not in secluded or hidden areas. • Provide some level of shade or shelter for at least part of supply. • Provide appropriate devices to fix bikes and devices in line with Australian standards. • Be well lit and appropriately monitored.	N/A	N/A	N/A	N/A	There may be value in co-locating with other public facilities such as seating, drinking fountains or public toilets.

10. Appendices

10.1 List of figures

10.2 Endnotes

[i] People's Pulse Report. Active Travel Community Insights 2022-23 (transport.wa.gov.au) Refer page 9
[ii] The Perth Girls School Design Guidelines Armadale City Centre West of Railway Precinct Design Guidelines (developmentwa.com.au) provide guidance on the size and dimensions of personal storage area before additional bike parking space is added.
[iii] Melbourne Planning Scheme encourages one bicycle parking space per student for student housing 16.01 RESIDENTIAL DEVELOPMENT Melbourne Planning Scheme - Ordinance
[iv] Charting Transport:Update on Australian transport trends December 2019 and January 2024 reports available at Charting Transport | Looking at transport and cities through graphs and maps
[v] Photo by Karl Abuid on Unsplash
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