Contents

Chapter 2 – Planning and design

2.1 Introduction

This section outlines the overarching design principles that should be applied to public transport infrastructure. It clearly sets out TransLink's expectations for consistent standards that must be applied to new and upgraded public transport infrastructure.

The planning, design and implementation of public transport infrastructure shall be guided by these design principles, whilst ensuring the context of the site/location is addressed to achieve the functional and operational needs of customers and services, as well as delivering accessible outcomes to the maximum extent possible.

2.2 Role of public transport infrastructure in the network

2.2.1 Public transport infrastructure network and hierarchy

Coverage and patronage are primary considerations in devising a public transport network. When planning the network decisions must be made regarding the relative importance and practicality of meeting these considerations. As a consequence there are two key service types:

- Coverage services - those designed to maximise access to public transport for the greatest area.
- Patronage services - those designed to achieve maximum ridership on key corridors or to and from key trip generators.

There are benefits and implications of each type of route, and they need to be balanced in their application across a network.

Coverage routes generally are less direct, have low frequency, connect to fewer major hubs and have lower patronage. They are intended to assist social inclusion and equity by providing access to transport. Patronage routes have higher frequency services, are direct and highly patronised. They connect a number and range of hubs and are intended to provide transport choice.

The following are important considerations when contemplating each service type:

Coverage services:

- Connector – These services generally are those coverage routes which are more frequent, more highly patronised and more direct, connecting prominent trip generators. A frequency of at least every 30 minutes is generally found on these routes.
- Local – These services connect people to their nearest transport hub. They are designed to allow travel for community members with limited travel options, and are designed to facilitate interchange with the broader network. They generally operate at 60 minute frequencies.

Patronage services:

- Rapid – These services are those which have a speed advantage in completing their trips, either through priority movement or have limited stop servicing.
- High-frequency – These routes operate at high (at least every 15 minutes) frequencies for extended periods, allowing a 'turn up and go' approach to travel. These routes attract ridership to public transport and are utilised along key movement corridors.

Coverage and patronage services:

- **Peak – These services are generally useful in servicing the markets such as commuter or school where demand only exists for a brief period and, as such, may only be in operation during peak travel periods. More information on school services is below.**

The Department of Transport and Main Roads (TMR) has established a hierarchy of transport facilities to assist with how public transport infrastructure sits within the network. Contact TransLink to assist in determining the hierarchy of facilities.

2.2.2 Access to public transport infrastructure

Providing safe and easy access to the public transport network is important to enhance the overall public transport trip and encourage greater use of the public transport network. TransLink supports access to public transport in the following order of priority:

- **walking**
- **cycling**
- **transferring from another public transport service**
- **taxis**
- **kiss 'n' ride**
- **park 'n' ride (including motorcycles).**

Access infrastructure provides the key connection between the public transport facility and the immediate surrounding environment.

TransLink will encourage as many people as possible to walk and cycle to relieve pressure on parking facilities (as well as help manage traffic congestion). This has the added benefit of supporting whole-of-government objectives for more sustainable transport and physically active communities.

Public transport infrastructure should be planned and designed to reflect TransLink's access hierarchy. For further details refer to the *PTIM, Supporting access infrastructure* Figure 3.1.

2.3 Integration of public transport infrastructure

Public transport infrastructure should be planned and designed to integrate with services to provide a seamless and connected journey for public transport users. The following sections detail some of the key design considerations for the planning and design of infrastructure.

2.3.1 Integration with land use

Integration with land use is critical for all public transport infrastructure, particularly in order to adequately cater for customers needs, ensures community access to services and contributes to reducing dependency on cars.

While other factors, such as operational capacity and network characteristics, influence the functionality of public transport infrastructure, ultimately the location is the key driver for passengers using the facility.

The majority of locality factors (for example population projections, demographics, major attractors and so on) for public transport infrastructure are led by the relevant land use plan for the location. This could include:

- regional plans
- local government land use plans
- transport strategies and plans.

Reference should also be made to the Queensland Government's development assessment processes and systems.

The overarching design guidelines within this chapter need to be applied giving consideration to site-specific characteristics to create an attractive, seamless integration with the surrounding environment.

In some cases, major public transport infrastructure (such as rail, busway, light rail or bus stations) is an integral part of supporting economic development of urban centres, and supports increased densities by encouraging transit-oriented developments (TOD).

TOD promotes the creation of sustainable communities focused around public transport infrastructure. A successful TOD should complement and integrate seamlessly with public transport, prioritising walkability and cycling of the precinct. For further detail regarding TOD projects and how they are to be planned and designed in the public transport context, refer to *Appendix 2-A*.

The proximity of transport facilities to attractive land use developments is vital, as urban consolidation is necessary for achieving increased public transport patronage and therefore justifying high-frequency services.

The following principles should be applied to the planning and design of public transport infrastructure:

- **stakeholder engagement:** partnering with stakeholders to support transit-oriented development opportunities
- **land use planning:** design is appropriate to surrounding community and considers potential future densities and land uses
- **legibility:** public transport facilities need to be easily identifiable in their built form
- **catchment area:** analyse the catchment area to inform existing and potential passenger volumes
- **permeability:** ensure there is high-quality, legible access between the surrounding environment and the transport facility as per the access hierarchy (refer to *PTIM, Supporting access infrastructure* Figure 3.1), including pedestrian connectivity between activity nodes and the public transport station
- **infrastructure footprint:** the physical and operational footprint impacts of station facilities are optimised (for example vehicle access, stormwater runoff catchments)
- **safety and security:** station is located to promote customer safety and security, as well as minimise opportunity for crime or terrorism.

2.3.2 Bus route infrastructure

TransLink is committed to providing an environmentally sustainable, comfortable and safe experience for passengers across the network. As such, TransLink considers traffic calming devices used where existing bus routes or future possible routes are being planned to be in conflict with these objectives.

It is therefore the preference of TransLink for traffic calming devices to not to be used along any routes in its current or future network.

Traffic calming devices are not supported due to a number of reasons, namely: the risk to passenger safety and comfort in negotiating such devices; the possible injury and discomfort to drivers; delays in passenger journey times; decrease in service efficiency as a result of negotiating such devices; noise and air pollution for local residents; and an increase in vehicle maintenance and fuel consumption.

TransLink acknowledges that traffic issues may occur in certain areas, however the need for road humps or chicanes must be determined as a site-specific case for neighbourhood streets.

Additionally, TransLink does not support the use of traffic calming devices for through streets in new residential developments, especially those which may feature neighbourhood bus routes in the future.

In the case where traffic calming devices have been determined as absolutely necessary, TransLink must be consulted on the design and type of device used along existing and proposed bus routes.

2.3.3 Operational considerations

The design of public transport infrastructure needs to consider current and future capacity requirements.

The project scoping for public transport infrastructure should determine the timeframe to be considered in planning and design (for example should 10, 20 or 30 year demand forecasts be used to inform facility design). Depending on the site consideration and long-term public transport network plans, planning should consider provision for future expansion to increase capacity.

Using modular infrastructure in the design makes it easier to expand capacity in the future. Modular infrastructure design will also provide an overall cohesive design as expansion takes place.

2.3.3.1 Demand analysis

Capacity requirements should be determined early in the planning phase and give consideration to:

- future patronage and service growth
- future transport network and corridor connections
- demographics, including surrounding land use in the vicinity of the facility.

In determining future patronage and service growth the following factors should be considered:

- understanding the trip purpose that is attractors seen as origins-destinations, interchanging and so on.
- baseline daily and/or peak volumes (includes passengers and/or vehicles)
- any forecast future daily volume (includes passengers and/or vehicles)
- other volume-related demand factors, including:
  - length and scale of peak demand
  - breakdown between flows associated with boarding and alighting
  - timing factors, including whether it coincides with other peaks in the surrounding area
  - number of peak periods per day per direction
  - likely directional travel mode-share.
- special needs demand, including:
  - potential volumes of special needs users, disability groups, schools etc.
  - potential for land use scale, intensity or typology change.

TransLink may be able to provide basic information, such as:

- existing patronage
- targets and forecast demand
- volume and frequency of current and future services for the location or corridor
- previous performance against reliability measures such as on-time running.

In some cases, additional counts, surveys or demand forecasts may need to be undertaken due to the absence of data. TransLink should always be consulted regarding appropriate demand identification methodologies and data validity.

For further information in determining pedestrian capacity and Levels of Service (LOS) requirements refer to *Section 2.4.2.3*.

2.3.3.2 Other operational considerations for planning and design of infrastructure

There are numerous issues that need to be considered when planning public transport infrastructure. Table 2.1 summarises these issues and should be used as a checklist to ensure all the relevant considerations are included in the planning and design of new infrastructure.

Table 2.1:
Operational considerations for planning and designing public transport infrastructure

Factors influencing planning and design	What to consider
Land availability	• **Footprint –** Public transport infrastructure should not consume more space than needed for effective operations. • **Land constraints –** Design needs to consider land constraints in determining size, configuration and function of the infrastructure. Where land is available (for example, greenfield sites) it should be preserved to provide short and long-term demand. • Consider on-street designs where the station forms part of the normal main street setting in a city or town centre, particularly where this offers significant operational benefits for customer and operator.
Surrounding land use and attractors	• **Future land use –** Consider future land use and demographics in determining capacity requirements and design. • **Attractors –** Consider adjacent and nearby attractors in determining capacity. Other capacity factors (such as network and service operations, events) should also be considered.
Service frequency	• **Frequency –** The peak and off-peak frequency of services needs to be considered. • **Demand –** Patronage increases should be catered for (to the life of the facility as determined in the early stages of planning). Forecast patronage increases will require public transport facilities to be able to accommodate multiple services at higher frequencies. For example bus stations will require an adequate number of bus bays to minimise delay to services using the facilities. Rail stations may require the possible upgrade of both station and track to accommodate additional services. • **Access considerations –** Cycle parking, kiss 'n' ride bays will need to consider future demand requirements.
Public transport vehicle access	• **Maintain public transport vehicle accessibility –** Public transport infrastructure design should not constrain vehicle access from the surrounding access routes as this affects not only the number of services able to access a site, but also contributes to delays of other scheduled services. For example capacity restrictions at road intersections providing access to and from a bus facility are of great importance, as delays at intersections can greatly affect the operation of the facility and the use of the network itself.

Factors influencing planning and design	What to consider
Fare collection	• **Fare collection considerations –** The method of fare collection affects operational capacity of public transport facilities. For example prepaid ticketing procedures enable faster boarding, reduced dwell times and allow greater person throughput. • **Pre-paid fare collection –** Where pre-paid fare collection is applicable, this needs to be included in the design. This could include pre-paid ticketing systems, especially those with high level-of-service. The provision of ticketing systems will be determined by facility layout, size, public comfort and level-of-service requirements, and revenue protection strategies. The facility layout must consider the appropriate location of the paid/unpaid threshold (position of fare collection barriers-gates) as part of ensuring sufficient and safe circulation and queuing of passengers particularly in peak operational periods. • Contact TransLink for preferred fare payment options.
Mobility aids, wheelchairs, pram and bicycle boarding	• **Operational impacts –** Mobility aids, wheelchairs, prams and bicycles increase boarding times and can impact operational capacity of public transport infrastructure. This needs to be considered in demand forecasting. • **Accessible design –** Design must accommodate all public transport and comply with the *Disability Standards* and *Australian Standards*.
Platform and access area design	• **Design space –** Typically, platform areas and access paths, during peak periods, should be at a LOS C. Further guidance is available in John J. Fruin's *Pedestrian Planning and Design* publication. Seating and waiting areas should be separated so that they do not interfere with boarding and alighting, facility entrances and exits, information points or other pedestrian circulation points. • **Given the typical LOS C requirements, platform widths and lengths will vary depending on a range of design criteria including:** – the type and size of facility layout (for example, bus and rail stations function differently in terms of boarding and alighting of passengers. Rail stations will typically allow for boarding and alighting from numerous locations along a station platform, whereas buses will board from the front end of the platform in a lead stop situation or from independent stops. This warrants separate design considerations for queuing and waiting passengers) – the anticipated peak passenger demand (that is, boarding and alighting) – the type of public transport mode and stopping arrangement – the number and types of services expected to utilise the facility. • **Personal comfort –** Platform and access areas should be designed to be within the range of personal comfort during peak periods. The loading area must accommodate passenger movements when waiting, queuing and accessing services. Passengers boarding/alighting should not inhibit waiting passengers.
Supporting access infrastructure	• **High-quality supporting access infrastructure –** Planning and design should consider how passengers will access the infrastructure, and incorporate appropriate access facilities and infrastructure. For detailed guidance please refer to *PTIM, Supporting access infrastructure.*

2.3.4 Asset management

While the *PTIM* is primarily concerned with the immediate planning and design of infrastructure from concept design to delivery, the ongoing maintenance and management of individual components of infrastructure or an entire facility is an important aspect of the planning and design process.

Collaborative working agreements between relevant stakeholders involved in asset management should be established at the planning stage, to promote a whole-of-life approach to infrastructure management and to contribute towards a functional, high quality, safe and easy-to-use public transport network.

The following must be considered when planning and designing public transport facilities:

- site ownership and management and maintenance agreements
- the general requirements for durability, cleaning and maintenance of infrastructure components
- surveillance and access control of the facility
- cost-effectiveness, commonality and replacement of components
- approved suppliers of the materials and components
- access to water, electricity and other resources
- general operating costs (such as electricity, water and staff)
- statutory requirements for buildings and facilities
- requirements for staff.

The above is not a definitive list and other considerations may be required depending on site-specific circumstances.

Relevant operational stakeholders should be engaged in the planning and design process to ensure that the requirements of asset management by operators and /or owners have been considered. All components of station infrastructure to be maintained by TransLink should use materials and finishings consistent and compatible with existing infrastructure and of a standard approved by TransLink. In consultation with relevant operating and maintenance stakeholders, through TransLink, detailed maintenance manuals should be developed for all components and operation schedules within a station facility.

2.4 Functional design elements for public transport infrastructure

Ensuring that the arrangement of key components is correctly incorporated and will contribute towards quality outcomes for the overall facility design.

Each of the following principles described in this section should be incorporated into the design of public transport infrastructure.

2.4.1 TransLink architectural theme

Passengers find it easy to recognise, interpret and navigate public transport infrastructure.

Public transport infrastructure should be designed to:

- be legible within the built environment
- be contemporary
- have a consistent visual appearance
- address climatic conditions.

Infrastructure is one of the most recognisable parts of the TransLink network. A consistent 'look and feel' across the network will increase passenger confidence, with customers having clear expectations. Design elements can be tailored to meet specific operational and functional requirements at individual sites, while still maintaining a consistent 'look and feel' across the network.

The TransLink architectural theme provides the framework for establishing a coherent network of public transport infrastructure across the state. Infrastructure planning and design should:

- reflect the relative importance of the infrastructure in the overall public transport hierarchy
- comply with network standards for components such as structures, pavements, signage and wayfinding
- be based on the use of modular components to reduce cost, as well as for ease of maintenance and future capacity enhancement
- use common materials that emulate a lightweight appearance to deliver a modern, open and safe environment
- comply with applicable standards and regulations including:
  - *Disability Standards for Accessible Public Transport 2002 (Cth)*
  - *Disability (Access to Premises - Buildings) Standards 2010 (Cth)*
  - relevant *Australian Standards*.

See *PTIM, Background and application* Section 1.4.

2.4.2 Arrangement of space

Customers enjoy free flowing movement within the station.

Public transport infrastructure can include public and private spaces. Public spaces form the pathway from the point of entry to the point of departure.

Private spaces should not obstruct paths of travel, sightlines to points of entry, information and decision points, and waiting and seating areas.

Private spaces can include:

- retail and commercial areas
- maintenance and management facility areas
- communications and electrical cupboards.

2.4.2.1 Sequence of movement

The layout of a transport facility should consider the sequence of passenger movement. Passenger movement is in response to the progressive sequence of actions and decision points along the path of travel. Movement should be in a forward direction from the entry to the platform, as illustrated in Figure 2.1.

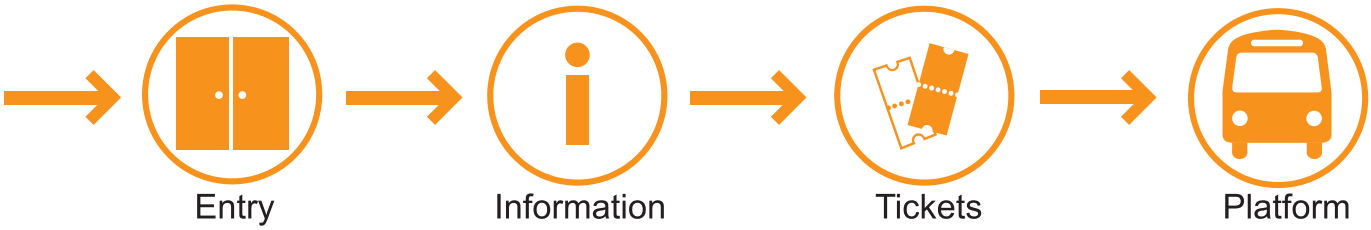

Figure 2.1 –
Sequence of movement

2.4.2.2 Circulation within public transport infrastructure

Table 2.2:
Principles of circulation

Type of circulation	Principles
Direct circulation	• Route between entry and boarding points should be as direct as possible. • Minimise turns in the path of travel and avoid turns greater than 180 degrees. • Changes of level should be through continuous straight flights of stairs or ramps and, if appropriate, escalators or lifts. Further: – if turning is required, landings are to be provided with necessary room for appropriate separation and manoeuvring, and – stairs circulating at 90-degree turns must adopt suitable measures to provide good sightlines for ascending and descending. See Figure 2.2.
Cross-path circulation	• Provide simple and clearly defined paths of travel that avoid conflict and maximise station capacity. • Paths of travel should be clearly established to meet the requirements of passengers on the dominant side of the pathway, away from the opposite flow path. • Avoid circulation systems that have people crossing the paths of others to access information, ticketing, amenities, platforms, ranks, seating, rubbish disposal and other requirements. See Figure 2.3.
Left-hand circulation	• Dominant movement pattern of pedestrians is based on the majority of travel undertaken on the left-hand side. • Circulation within the facility (including around components and amenities) should follow this convention for predictability and efficiency.
Vertical circulation	• Vertical circulation components such as stairs, ramps, lifts and escalators should be assembled together centrally. • Centralised location of components assists with convenient placement of public information. • All access components must comply with the relevant disability standards.

Type of circulation	Principles
Changing direction	• Changes in direction within circulation should only occur where there is sufficient space to allow passengers to maintain a sense of direction (use of transparent materials to enable views is preferable). • Appropriate space should be provided at information and decision points for people to avoid conflict with the flow path of travel to ensure comfortable and efficient movement.
Emergency evacuation circulation [1]	• Emergency evacuation considerations, including appropriate circulation paths, exits and assembly points, should cater for the maximum volume of people using the facility at any one time. • Effective signage and way-finding is a key consideration for public circulation in an emergency situation. This must be reviewed in the detailed design stage and receive approval by an emergency evacuation specialist. • Facilities which are structurally at-grade, elevated or below grade present different emergency and safety requirements that warrant project specific design investigation.

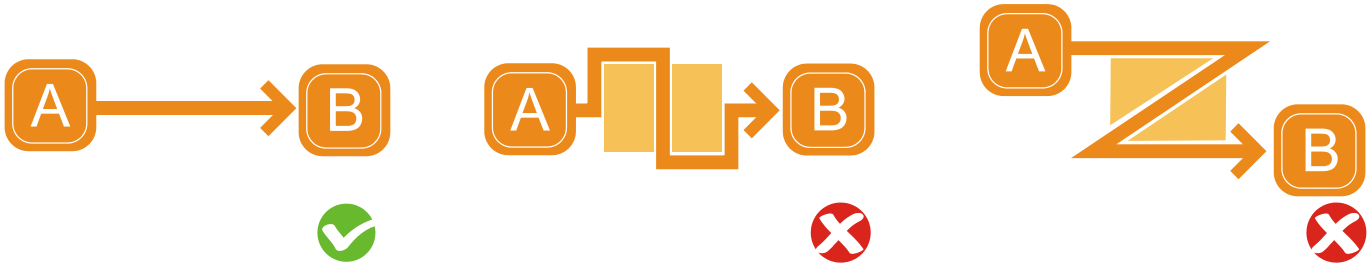

Figure 2.2 –
Direct circulation

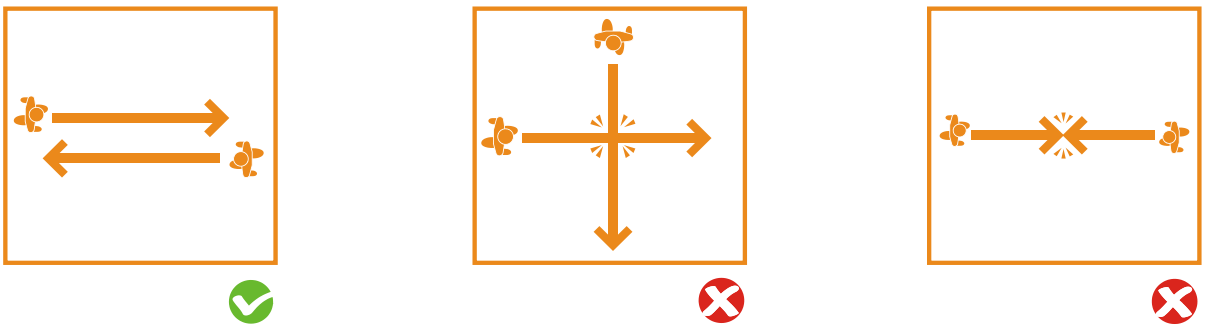

Figure 2.3 –
Cross-path circulation

[1] *The Building Code of Australia provides technical emergency and safety requirements and also cross references a range of Australian Standards.*

2.4.2.3 Density of occupation

The density of passengers to be accommodated should be within the range of personal comfort, and passengers should experience modest restrictions without coming into undesirable contact with any person. The public Level of Service (LOS) classification ranges from LOS A to F (Fruin, 1978, *Pedestrian Planning and Design*). Level A is the least crowded environment and Level F is the most crowded environment (and hence most undesirable). TransLink requires that an appropriate LOS be achieved for pedestrian areas to ensure comfortable pedestrian densities are not compromised during peak periods.

The areas of pedestrian occupation which typically require a LOS design response include:

- waiting and queuing areas including ticketing and information points such as information displays, fare machines, fare gates, and ticket validation equipment (SACIDS)
- seating
- walkways or other areas of circulation
- stairways
- overpasses
- lifts
- ramps
- escalators and travelators.

Note that the suitable LOS for different passenger areas of a station will warrant a different level of area allocation per pedestrian (for example the physical area of LOS C for stairways will be different from the LOS C for waiting areas). In addition to appropriate space allocation, all pedestrian areas of a station will comply with applicable disability standards.

For pedestrian horizontal travel (that is, walkways and overpasses) and platform waiting areas, TransLink typically prefers that a LOS C (between 0.65–0.9 square metres per person of personal space) be achieved as a minimum during peak periods. See Figure 2.4.

However, this preference may be subject to change depending on station and service functional arrangements.

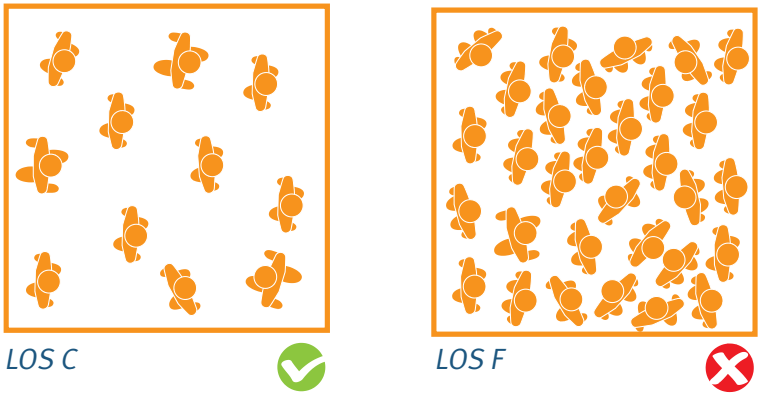

Figure 2.4 –
Density of occupation

2.4.3 Identifiable station entry and exit

Entry and exit points are clearly defined and highly legible to customers.

Clearly defined entry and exit points are essential; not only providing points of access, but also defining the station boundaries and where access infrastructure needs to link to the station from the surrounding built environment. See Figure 2.5. This is especially important where there are a multitude of competing uses and messages. For more information refer to the *PTIM, Supporting access infrastructure.*

Design considerations should include provision of entry plazas, information areas, station concourse, ticket office or facility, and fare gates.

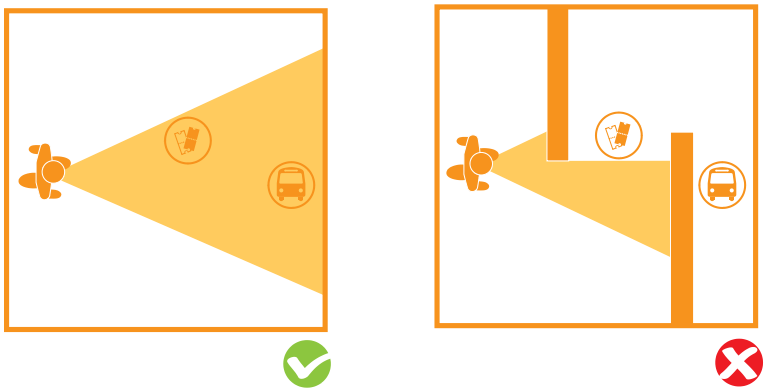

Figure 2.5 –
Identifiable entry/facility

2.4.4 Passive surveillance

Infrastructure is designed to provide passive surveillance and deter undesirable behaviour.

The physical environment of public transport facilities must be designed to include *Crime Prevention through Environmental Design (CPTED)* principles to reduce crime, property damage and anti-social behaviour associated with people gathering in public spaces. Creating defensible spaces that allow for surveillance from outside and within the facility will promote safe environments and will attract greater public use. For details on *CPTED* principles, refer to the current version of the Queensland Government's *Crime Prevention through Environmental Design Guidelines for Queensland.*

Figure 2.6 –
Passive surveillance

2.4.5 Climatic comfort and weather protection

Sun and weather protection is to be provided.

In developing the design of facilities the following should be considered:

- structures must provide sufficient physical width, length and height to achieve high-quality climatic comfort and weather protection for passengers to occupy this space
- passengers should be provided with appropriate protection with enclosed or covered station access points, public information and decision points, seating and waiting areas, and boarding and alighting areas
- consideration must be given to the management of sun, wind, rain, heat, glare and humidity.

An appropriate climate analysis should be included within the planning and design of public transport infrastructure to inform appropriate facility orientation and suitability for specific locations.

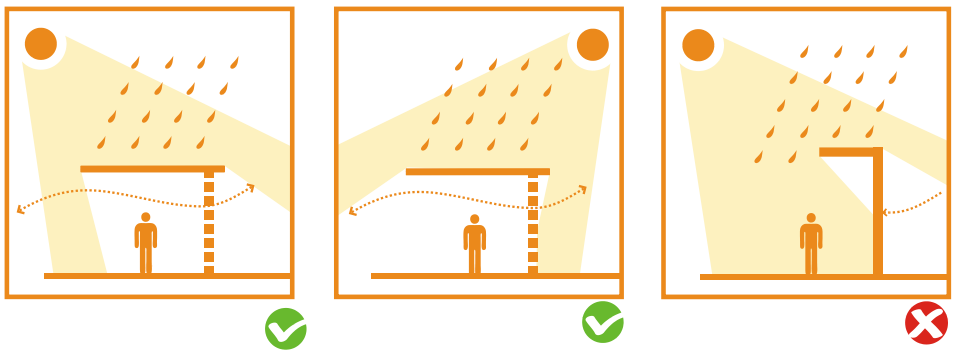

Figure 2.7 –
Climatic comfort and weather protection

2.4.6 Functionality and simplicity

Maintain simplicity and provide a functional station design that passengers can easily interpret and use.

The design of structures, platforms, ranks, seating, signage, pavements and other components must be incorporated within the overall design process to achieve highly functional station design outcomes.

The design should provide a legible and pleasant environment that is uncluttered, with minimal concealed spaces.

2.4.7 Sustainable energy use and design

Sustainability is to be considered in developing all public transport infrastructure.

Design and delivery of public transport infrastructure will focus on sustainability through:

- facility design that is fit for purpose now and into the future, and adaptable to change
- contributing to attractive community spaces and a local sense of place
- commitment to a low environmental footprint and whole-of-life approach through all design, construction and maintenance activities
- increasing visibility of sustainable features, and undertaking a participatory approach to design to improve community awareness and support.

Details of TransLink sustainability requirements are included in Table 2.3.

Table 2.3:
Key environmental sustainability design considerations

Key sustainability consideration	Requirement where possible
Water management	• on-site rainwater collection and reuse • on-site run-off treatment (that is, scrubbing using permeable surfaces, detention basins and swales) • local flooding mitigation and flow maintenance.
Resource minimisation	• water – employ water-saving devices • energy – aim for energy-neutral infrastructure through minimisation of energy use and generation opportunities (for example, solar for feeding back into electrical supply) • materials – apply whole-of-life design approach—construction, operation, maintenance, cleaning, and decommissioning. Materials should favour renewables and recyclables • processes – avoid operational processes that generate waste, especially toxins and pollutants.

Key sustainability consideration	Requirement where possible
Habitat and physical environment	• protect habitat (that is space, physical elements such as tree hollows and burrows, movement paths) • maintain water flows to aquatic and other habitats • avoid acid sulphate soils • minimise fugitive emissions of air, surface and groundwater-borne pollutants.
Social sustainability	• present minimal harm to employees or public • promote social justice, inclusion and equity • contribute to improving social capacity and community interaction • enhance community experience and integrate facilities with the surrounding environment to enhance economic viability and social benefits.

2.4.8 Operations and maintenance

The components and materials that make up a public transport facility should be durable and meet their intended operational requirements. For further details on requirements refer to *Section 2.3.4.*

2.4.9 Cultural and heritage places

Heritage values are protected in the upgrade and delivery of public transport infrastructure.

Existing sites may contain components or structures of cultural or heritage significance. Such sites may require particular investigation and attention in the facility design. For example rail stations are commonly listed as having heritage significance and require careful consideration and approval with respect to structural design and modification. Sites with cultural features or significance may require permission or approval prior to commencement of any planning and design work.

TransLink recommends an appropriate level of assessment is undertaken by an expert assessor.

2.4.10 Signage

Signage contributes to a simple, coherent and integrated public transport system.

Signage forms a major component of design to assist with navigation to and around public transport infrastructure. Logical information, wayfinding signage and overall facility signage is important to achieving a consistent and recognisable public transport system. The use of universal/international symbols and indicators is always preferable for a consistent message for all users.

Signage needs to identify, orientate and explain. For further details of TransLink's signage requirements, refer to *PTIM*, *Branding, theming and signage*.

2.4.11 Intelligent Transport System (ITS)

The use of ITS, to enhance passenger benefits.

ITS functionality should be considered for all public transport facilities within the context of the broader transport systems management network. These functions include security cameras, real-time information, public address systems, incident management systems, and monitoring and communications systems.

ITS hardware and connection points are typically located in a communications room within the overall facility. These ITS or communications control rooms may be adjoined to other facilities, such as toilets or storerooms. They should be located in discreet locations within the facility environment, not impede public spaces or free flowing pedestrian access, and generally be signed as staff only.

The specific installation (including power/data conduits and security) and asset management schedule requirements for ITS components should be investigated on a site-specific basis prior to detailed design. Specialist ITS personnel should be commissioned when proceeding to design the ITS components.

For further information on specific site requirements for ITS provisions contact TransLink.

2.4.12 Real-time information

Passengers are able to access real-time information.

Real-time information provides accurate predictions for the next services departing from a stop or station. It allows passengers to make public transport choices based on actual travel time, not just scheduled times, which may vary depending on traffic or weather conditions.

Customers want accurate information, with research finding that some customers (especially new or infrequent users) can feel quite anxious about using public transport. Real-time technology, whether accessed via personal mobile devices or through real-time components at public transport stops and stations, provides access to accurate service information for customer reassurance.

2.4.13 Security infrastructure

Security infrastructure is used to enhance passenger safety and deter anti-social behaviour and crime.

Security infrastructure includes security cameras, lighting and other items used for the creation of safe and well-monitored waiting environments. The intent is to ensure a visually discreet, easily maintained system that provides surveillance to all public areas of the facility environment. Details on the specifications and management schedules for these systems will be established in collaboration with the facility owner and/or asset manager. Appropriate design, construction and installation requirements must be considered when planning for the inclusion of security infrastructure. The use of signage informing people of the presence of security infrastructure within a facility can further enhance personal safety and highlight the perceived risk of detection to potential offenders.

Security help points are typically located at platform mid-points and/or other waiting areas. Ultimately, the location of all these elements should be the subject of facility-specific design, as each site is likely to have a range of differing sightlines and movement patterns.

Counter-terrorism and CPTED design considerations should be explored on a site-by-site basis depending on facility location, level-of-service and potential security risk. Where applicable, facility design should strive towards universal standards for security and counter-terrorism measures.

For further information on transport security refer to TMR's website dealing with transport security and safety and the *Intergovernmental Agreement on Surface Transport Security and the Queensland Counter-Terrorism Strategy*.

2.4.14 Lighting

Lighting should ensure a safe, comfortable, and functional environment.

The intent for facility design is to use a range of high quality lighting fixtures, features and effects to ensure a safe and visually attractive environment. An appropriate amount of bright white artificial light (that is, luminance) must be adopted to give the environment a safe and open feel for customers who access and wait at facilities at night. This can be achieved through approved fluorescent or light emitting diode (LED) lighting to maximise energy-efficiency and lamp life.

Light fixtures, fittings and features should be robust, tamper-proof, discreet, and consistently themed, and should complement the architecture. Fixtures should generally be from proprietary ranges to assist in easy maintenance and replacement when required.

During appropriate daylight, the use of translucent materials and structures, that emulate an open and spacious design, helps to achieve a more naturally lit facility environment.

Lighting levels are required to meet current regulation standards for public transport facilities. For details regarding lighting requirements refer to individual infrastructure modal chapters. Generally, all lighting requirements for various public transport situations are covered within the *Disability Standards, Premises Standards* and *Australian Standards.*

2.4.15 Graffiti deterrents and treatments

Components are durable and resistant to graffiti and vandalism.

Public transport facilities are vulnerable to unwanted offences such as vandalism, abuse and careless use of infrastructure components. In line with specifying durable, self-cleaning and easily maintainable materials and finishes, all infrastructure components: furniture, lighting equipment, information devices, walls, floors, ceilings, balustrades, glass panels, screens, elevators, escalators and other components—coming into contact with the public must be resilient to acts of vandalism and graffiti. This may involve facility components being protected with anti-graffiti coatings or constructed from non-porous graffiti-resistant materials.

Other options include specific design and arrangement of platforms and structures to maximise natural surveillance in order to minimise the incidence of graffiti and anti-social behaviour. In some instances, appropriate planting of vegetation may be used, adjacent to structures or walls, to prevent access by vandals.

Furthermore, the moderate application of artwork that complements the station architecture and theming can also be used to deter graffiti.

2.4.16 Animal and pest problems

Design minimises potential for animal and pest problems.

Within the facility design there must be no, or minimal, horizontal ledges, overhangs, or concealed spaces where birds and animals are tempted to perch, nest and pollute the station facility. If cavities and horizontal surfaces are unavoidable, then appropriate measures are to be used to prevent animals and pests congregating and/or nesting. Designing ledges of structures to be angled (45° or greater) may be a solution that will deter birds from perching and nesting within the facility.

2.4.17 Landscape treatment

Incorporate landscaping into infrastructure design.

Landscape treatment is to be incorporated (where appropriate) in and around the initial facility design. Appropriate landscaping can complement the facility's architecture, enhance the identification of a particular location and integrate the facility with the surrounding environment.

It is preferred that plants used for landscaping are:

- drought resistant
- consistent with the surrounding natural environment (for example, local flora)
- unlikely to intrude upon the integrity of the facility environment
- unlikely to interfere with above and below ground services and utilities
- not toxic, highly allergenic or noxious weeds
- not known to produce thorns, barbs, stings or noxious secretions
- not likely to inhibit sightlines, passive surveillance or allow for potential offenders to hide.

2.4.18 Commerce and advertising

Investigate potential for commercial and advertising opportunities.

Commercial and advertising infrastructure opportunities for each facility must be investigated with owners, asset managers and relevant stakeholders. These assets provide customers with goods and services to improve their experience while using the public transport network, but also may provide a way for generating revenue to improve the overall network.

With regard to facility planning considerations, it may be appropriate to integrate the following:

- commercial vending machines
- commercial advertising
- retail outlets, such as cafes or coffee carts, newsagents and convenience stores.

Each of these are typically developed and operated by external parties under a TransLink agreement.

Endorsement of commercial infrastructure prior to facility design is required due to the allowances for operational requirements such as available space and services connections (for example, power, data and water).

2.4.19 Other enhancements

Consider other enhancements, such as public art.

Public art standards should be investigated and incorporated where applicable within substantial facility design to complement the infrastructure and the surrounding environment in which it is located. As with landscaping, artwork can enhance a location's identity, but in most cases warrants prior approvals from relevant stakeholders. Public art should not conflict with station architecture, colour scheme and branding.

Recycle bins may be incorporated adjacent to general waste bins to promote recycling, with appropriate recycling collection arrangements in place.

Wireless internet access options and connections may be investigated and incorporated within the facility to accommodate current technology and improve public convenience by allowing passengers to use electronic communications devices while waiting for services. As a minimum, preliminary requirements for inclusion should be allowed for in the design, for future application.

The facility owner and/or asset manager, and relevant stakeholders, should endorse all enhancements prior to the detailed design stage of the facility. Appropriate space and function must be identified to accommodate all additional enhancements.

Appendix 2-A

Transit-oriented development

What is a TOD project?

Transit-oriented development (TOD) promotes the creation of sustainable communities focussed around public transport infrastructure.

TOD is recognised by:

- effective land use and transport integration where a rapid and frequent transit service is available
- high accessibility to the public transport network
- public spaces where walkability and cycling are prioritised
- higher density residential, retail, commercial and community uses or ideally, a mix of these where appropriate.

A successful TOD should achieve:

- increased patronage on the public transport network
- greater mobility choice
- improved safety and activation
- improved community inclusivity and access
- opportunities to revitalise urban areas
- increased localised business and economic activity
- reduced travel times to reach employment, goods and services
- a balanced mix of uses
- maintained legibility of the public transport system.

Roles and responsibilities

TMR is a consent authority for developments that are adjacent to, connect with, or gain additional floor space ratio as a result of the transport access provided by the transport systems TMR provides.

TMR represents the interests of the public, and the potential and existing residents and owners of TODs with a focus on ensuring that the benefits arising from public investment in public transport infrastructure and systems is maximised through customer-centred design resulting in seamless, quality access. In doing so, developers directly benefit from improved access, which directly improves value.

Commencing collaboration prior to design ensures maximum compatibility precinct-wide with TMR assets. With early engagement questions regarding appropriateness, scale, detail or integration of access can be resolved before significant investment in design and detail occur, improving public outcomes.

TMR encourages innovation that improves customer satisfaction and access without impeding on base requirements of operational safety and efficiency.

TMR can:

- actively promote or initiate development through land release, with contingent expectations of design excellence and integration
- review and co-create market-led proposals with early engagement that maximises benefits to the public and the developer through customer-centred design
- use its review powers and consent authority through a TOD lifecycle to prevent poor public outcomes.

Where a TOD project interfaces with a rail station/ is within a railway (i.e. commercial corridor land), the railway manager, will be a key stakeholder, with additional standards to be adhered to and approvals required.

PTIM overview

An overview of the *PTIM* chapters and the elements within each that can assist in the planning and design of TOD projects is illustrated in Table 2.4.

For information on further resources to support the planning and design of TOD, please refer to the *PTIM, Background and application*.

Table 2.4:
PTIM overview

***PTIM* chapter**	Planning and design considerations
Chapter 1: Background and application	• describes roles for application of *PTIM* • provides reference material and supporting information • provides overarching considerations for public transport infrastructure.
Chapter 2: Planning and design	• details the integration of public transport infrastructure and land use • describes the importance of and methods of demand analysis to be considered • functional design elements for public transport infrastructure.
Chapter 3: Supporting access infrastructure	describes the principles, integration, design considerations and any supporting components of the following supporting access infrastructure: • pedestrian • cycle • bus feeder • taxi • kiss 'n' ride • park 'n' ride.
Chapter 4: Branding, theming and signage	• outlines the preferred requirements for public transport infrastructure signage, wayfinding and branding • details the requirements for compliance with relevant standards and regulations • to be adopted to ensure consistent and best practice infrastructure signage design and wayfinding is applied across the TransLink network.
Modal chapters (bus stop, bus station, ferry terminal, rail station, taxi, park 'n' ride)	• outlines the TransLink requirements for infrastructure developed for each mode • provides detailed requirements for compliance with relevant standards and regulations for infrastructure associated with each mode.

Understanding the customer

The integration of TOD with existing public transport infrastructure should achieve the best outcomes for customers.

Customer outcomes

TMR is focussed on achieving the following customer outcomes:

1. **Accessible, convenient transport:** access and use of the public transport network should be accessible, convenient, direct and legible
2. **Safe journeys for all:** customers should feel comfortable and safe when using public transport infrastructure
3. **Seamless, personalised journeys:** public transport infrastructure is to be designed for the customer, and needs to be convenient and responsive to their individual needs and expectations. Design is to consider all modes of access to ensure seamless interchanging and customer journeys
4. **Efficient, reliable and productive transport for people and goods:** ensure local access and integration with all modes is achieved and customers are able to move efficiently through the stop/station
5. **Sustainable, resilient and liveable communities:** provide a balance between movement and place creating vibrant places for the community. Public transport infrastructure should be designed as sustainable, long term assets that are fit-for-purpose now and into the future, and adaptable to change.

Customer needs

In order to provide an enjoyable, safe and comfortable customer experience, an understanding of who the customers are and their differing expectations and needs is required. As a minimum, all users, regardless of their ability or how frequently/infrequently they use the public transport network, require the following:

- short and direct paths to and within the stop/station
- minimal barriers between the stop/station and each access mode
- ease of circulation to/through the TOD project and public transport infrastructure
- CPTED/personal safety
- legible, clear and consistent wayfinding and information.

Additional specific expectations and needs of customers using public transport is provided in Table 2.5.

In addition to the customer's needs and expectations, property owners within the TOD precinct and operators of the public transport network also have requirements that will need to be considered when designing a TOD project. These are demonstrated in Table 2.6.

Sam's local TOD really supports his needs! Sam commutes to the local TOD station via the pedestrian footpath on his electric wheelchair. He really enjoys this and does not feel like his is getting in other people's way as the walkways are wide enough for his large wheelchair and other users to get past.

Upon arriving at the TOD, he can clearly see the entry to the station and where there is lift access to the platforms as there are many open spaces with clear signage and wayfinding. The real-time information provided allows him to know when his train is arriving at a location where there is sufficient time to reach the platform.

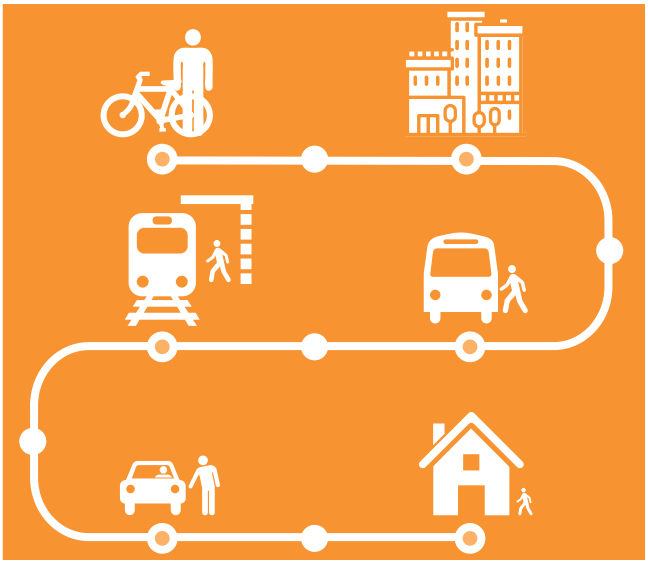

Table 2.5:
Customer outcomes

Customer types	Example(s)	Customer expectations or needs
Regular peak-hour commuters 	Customer who travels every business day to work or education frequently using the public transport network, and have strong familiarity with stop/station and routes through/via development.	• efficient entry and exit • legible/direct movement through TOD to/from stop/station • short and direct access between modes • convenient retail/food and drink facilities • dependent on escalators/elevators • information on service disruptions and ability to access alternative modes.
Off-peak travellers 	May include retired passengers, university students, families travelling with children, employees working shift or outside of regular business hours.	• easy, accessible, legible access and interchange • comfortable waiting areas.
First-timers/ infrequent users 	May include tourists business travellers, parents travelling with children, interstate guest visiting family. Customers might have luggage, prams or items unable to move easily.	• legible, clear and consistent wayfinding and information on schedule and surrounding area • easy to navigate • ramps and lifts etc. to navigate level changes • comfortable waiting areas including luggage facilities • convenient retail/food and drink facilities • direct access to park ‘n’ ride, kiss ‘n’ ride and taxi facilities.
Interchangers/ transferring customers 	Regular peak-hour commuter switching between modes. Might need to accommodate customers impacted due to a service disruption, or alighted at wrong stop/station.	• easy, legible interchange • multi-modal real-time information, signage and wayfinding • relationship between modes minimises delay, diversions, provides weather protection/shelter and the need to cross roads.
People with a disability 	Hearing impaired, vision impaired customer, pregnant women, customer with cognitive disability or permanent or short-term mobility issues.	• system that ensures equitable and direct access • allow users to get to their destination with minimum difficulty or stress • direct access to lifts/escalators and platforms • direct access to amenities • accessible parking • integrated and sensory wayfinding and signage.

Customer types	Example(s)	Customer expectations or needs
Precinct residents, employees and visitors 	May include TOD residents, employees, visitors and neighbours, bus/train driver, maintenance worker, local retail worker.	• comfortable, safe environment • generous spaces, noise/air quality • high quality design/visual outcome • contributes to development outcomes • agglomerates movements through key retail corridors.
Visitors/passer-bys 	May include non-travellers who use or pass through station/ interchange. e.g. Off-street going to the bathroom, buying a magazine from the kiosk, passing through the station, meeting a relative or friend.	• retail opportunities • access to short term parking and kiss 'n' ride facilities • real time information • comfortable waiting areas and meeting points • quality station amenity • avoidance of obstructions, public transport infrastructure impeding movement routes.

Table 2.6:
Stakeholder expectations and needs

Stakeholder	Example(s)	Stakeholder expectations or needs
Property owner	Owner of land/development rights	• high quality design/visual outcome • contributes to development outcomes • agglomerates movements through key retail corridors • allowance for loading/servicing, or operational access (building maintenance statements may be required) separate to pedestrian flows • clear maintenance and other responsibilities identified where facilities are integrated (shared spaces, lifts, escalators, access roads etc.) • maintain economic feasibility of integrated commercial opportunities.
Operators	Public transport operator, station manager	• allowance for loading/servicing, or operational/ maintenance access • future proofing for operational changes (e.g. layover nearby) and construction access for future upgrades • drivers' amenities

Understanding the site

Integration with public transport

A successful TOD features:

- seamless platform passenger movement between modes and services
- direct sightlines across the facility and maximise directness of travel routes through TOD
- minimised barriers to appropriate movement along desired travel paths
- intelligently managed pedestrian flows that promotes appropriate through-pedestrian traffic where capacity, behavioural conflicts and the integrity of pre-paid ticketing zones can be managed
- customer protection from weather.

To ensure a quality journey for passengers, its design should be user-friendly and easily interfaced with the various access modes passengers may use.

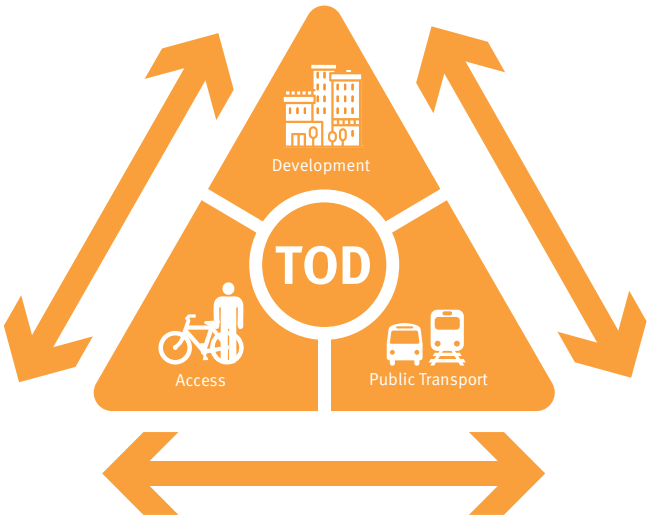

Figure 2.8:
TOD interface with public transport infrastructure

Integration with land use

TOD must be fully integrated with the public transport network by ensuring it, for example:

- prioritises customers of the public transport network
- does not create unnecessary conflict between users (i.e. it should separate vehicular access between cars, buses, service vehicles, kiss 'n' ride, park 'n' ride etc.)

- provides adequate queuing storage at all accesses including park 'n' ride
- provides adequate bus priority movements and swept paths
- separates pedestrian and cyclist movements and paths from vehicular traffic.

PTIM, Supporting access infrastructure Table 3.1 outlines the key principles for the integration of supporting access infrastructure within the surrounding environment and site and is applicable to TOD.

Refer to the *PTIM* modal chapters for bus stop, bus station, rail station, taxi facilities and park 'n' ride infrastructure to ensure due consideration to prioritising public transport infrastructure in TOD design has been incorporated.

Demand analysis

The design of TOD needs to consider the future patronage and service growth of the public transport network, corridor connections, the demand generated by the TOD itself and any planned intensification of land uses within and surrounding the TOD project.

A future focus for TOD design, will help build liveable, connected and sustainable public transport infrastructure, and communities that are agile and can embrace positive change.

Demand analysis should consider both existing and future planned land uses as this will affect the travel behaviour of public transport and TOD users, therefore influencing the scale and scope of access infrastructure required.

A greater level of future development should be expected where there is greater permeability in the street network, as this enables short and convenient access to the stop/station.

Some of the key challenges to be considered when understanding the future requirements are:

- protect area for future public transport connections
- consider additional kerbside space to accommodate additional/future public transport services
- design for development integration so that public transport stop/station capacity, operations and internal circulation requirements can be maintained or enhanced
- future passenger volumes may require grade-separated pedestrian walkways, separated entry/exit vehicle crossovers etc.
- ensuring the location of permanent elements do not impede plans to upgrade or expand public transport infrastructure
- incorporate proof-of-concept and other agile design approaches
- ensure infrastructure is designed in an agile manner that will suit changed transport customer behaviours without compromising user safety.

For further information in carrying out demand analysis and determining pedestrian capacity and Levels of Service requirements refer to *PTIM, Planning and design*.

Integration with other modes

In order to use public transport, passengers need to access it. TransLink supports access to public transport in the following order of priority when planning or designing infrastructure associated with public transport.

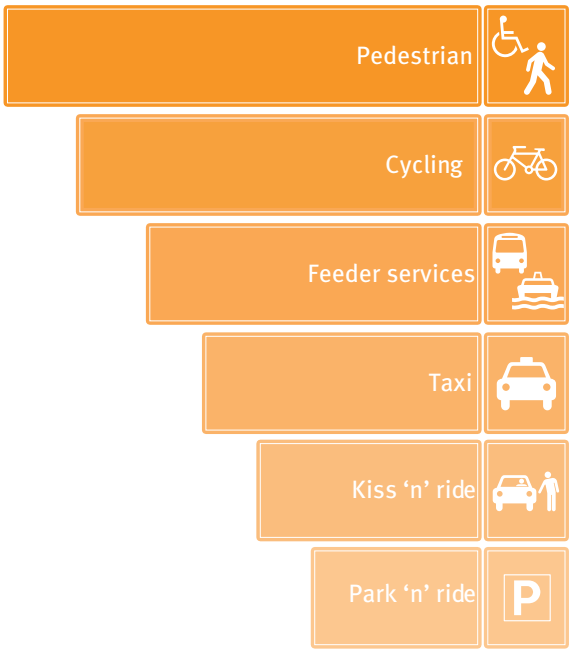

Figure 2.9:
TransLink access hierarchy

In many cases there will be a need or opportunity for shared multi-agency planning, provision and/or management to deal with overlaps in responsibility and land ownership. Co-operative planning should focus on acknowledging customer needs and objectives to create logical and coherent outcomes for the community.

Pedestrians

Pedestrian connections are critical to having a successful public transport network. To improve the liveability and sustainability of TOD communities, pedestrian infrastructure should be considered in terms of the following, with a focus on accessibility, continuity and integration:

- integrating the local and metropolitan pedestrian network with TOD and public transport infrastructure
- pedestrian access through TOD, including vertical circulation (i.e. stairs, ramps, lifts, escalators etc.)
- existing and future pedestrian demand using assessment methods previously agreed with TransLink and key stakeholders
- managing non-public transport activity.

Micro-mobility

Design of public transport infrastructure should consider accommodating journey start and end trip solutions, including micro-mobility. Designated storage areas may be required around stop/station for docked and undocked micro-mobility/rideable technology.

Cycling

Integrating cycling access with public transport dramatically increases the catchment areas of the public transport network. It also helps in reducing the impact of motor vehicle requirements providing a more accessible and safe environment for riders. All interface points between local bicycle networks and TransLink infrastructure through TOD projects must be functionally seamless with a focus on integrating with existing infrastructure. Connections must be direct, and legible with safe and convenient crossings.

Supporting access infrastructure

Supporting access infrastructure provides the key connection between public transport infrastructure, TOD and the immediate surrounding environment. Design of TOD projects should consider how customers access public transport using nearby feeder services, taxi facilities, kiss 'n' ride infrastructure and park 'n' ride infrastructure. The primary integration issue is to ensure passengers can transfer easily through TOD and readily identify the location of supporting access infrastructure upon exiting public transport facilities. This path must be accessible, direct and minimise the distance customers are required to walk.

Refer to Table 2.7 and *PTIM, Supporting access infrastructure* for detail on designing and incorporating feeder, taxi, kiss 'n' ride and park 'n' ride facilities. A detailed list of references to be used when designing and planning supporting access infrastructure is provided in *PTIM, Background and application* Section 1.4.

Table 2.7:
Supporting access infrastructure planning and design considerations

Consideration	Guideline description
Access paths	• path width to be compliant with Austroads *Guide to Road Design, Australian Standards* and *Disability Standards* and to cater for anticipated pedestrian and cyclist demands • pedestrian and cyclist demand relating to both TOD and public transport should be assessed to determine the spatial requirements (i.e. width of unobstructed paths and movement corridors). Refer to TMR *Traffic and Road Use Management (TRUM) Volume 1* and Austroads *Guide to Traffic Management* • area for assessment may include access paths, vertical transport, corridor widths, gatelines, run off requirements and location of storage facilities/ticketing facilities/retail uses etc. • consider desire lines from: – external key attractors to TOD and public transport infrastructure – parking structures within TOD to land uses – supporting access facilities to public transport infrastructure. • minimise pedestrian access path conflict with other transport modes, including cyclists • for cycle paths: – provide direct and convenient connections – minimise inter-modal conflict – specialist cycle design advice should be sought when designing cycle amenities including end-of-trip facilities – advice on standards and best practice to be sought through TMR *TRUM*, TMR Technical notes and Austroads *Cycling Aspects of Austroads Guides*.
Pedestrian crossings	• at-grade pedestrian crossings are preferred where safety and relative priority can be maintained. Refer to TMR *Manual of Uniform Traffic Control Devices, Part 10, Pedestrian Control and Protection, Austroads Guide to Traffic Management*, and *Australian Standards* etc. for design requirements • uncontrolled crossings (i.e. zebra crossings and shared zones), are preferred except where safety or capacity concerns exist • traffic should be diverted or de-prioritised where there are pedestrian concentrations. Where controlled crossings are necessary, this can be achieved by giving priority to the pedestrian movement and minimising waiting times for pedestrians • refer to Austroads *Australasian Pedestrian Crossing Facility Selection Tool [v2.1.2]* to inform pedestrian crossing facility type.

Consideration	Guideline description
Feeder infrastructure	• rail infrastructure is a focal point of access and egress to TOD, however it provides only linear access to stations on the rail route. Supplementary networks must be designed for in a way that emphasises easy, convenient access and minimises dependence on passenger vehicles. If this is not done then traffic congestion and pedestrian/vehicle conflicts are inevitable. By taking a precinct approach to attractor networks the travel task can be reduced and conflicts largely eliminated • where less direct interchange opportunities to feeder services can be provided, design should: – minimise the required walking distance – maintain direct sightlines across the facility and services – limit the need to cross roads and if crossing is required, incorporate appropriate treatments including wayfinding at key decision points • minimise vehicle/pedestrian conflict and ensure that any vehicle/pedestrian arrangements do not undermine the efficiency of bus services. • design of infrastructure associated with feeder services should also consider demand generated by TOD itself to ensure that the public transport infrastructure can accommodate any additional services triggered due to land use attraction and/or patronage growth. For example, office development within TOD generating additional commuter demand on the bus feeder network to the site.
Taxi facilities	• taxi facility capacity assessment to be undertaken as per *PTIM Taxi facilities*, noting that demands generated by both the TOD or public transport infrastructure may require additional capacity or a need to provide two separate ranks • taxi facilities should be provided parallel to the kerb and as close as possible to the entrance of the public transport infrastructure • provide clear, consistent and legible wayfinding and signage to ensure customers can easily identify the taxi facility location upon exiting the station • pedestrian footpaths adjacent to the taxi rank should provide clear space allowing adequate width for waiting passengers and passing pedestrians • direct access should be readily provided to the taxi facility from public transport infrastructure entrances, pedestrian pathways within the TOD project, and/or pedestrian footpaths on the road network • taxi facilities (including access paths, manoeuvring areas, ramps, waiting areas and surfaces) must comply with the requirements of the *Disability Standards* and relevant *Australian Standards*.
Kiss 'n' ride infrastructure	Kiss 'n' ride infrastructure should: • have a separate facility for TOD and public transport network access • clearly designate its use as a 'public' facility • where possible, segregate kiss 'n 'ride bays and their through-lanes from other traffic • minimise inter-modal conflict • provide direct connections to public transport infrastructure that are accessible, direct and legible and incorporate CPTED principles

Consideration	Guideline description
Kiss 'n' ride infrastructure (continued)	• be located at or near pedestrian crossings which then provide direct access to the primary stop/station entry point • have priority over park 'n' ride for proximity to the stop/station • meet the requirements of *Australian Standard AS2890.6* for accessible bays. These bays must be located as close as possible to the stop/station entrance and incorporate appropriate accessibility design features, such as kerb ramps and direct access.
Park 'n' ride infrastructure	Park 'n' ride parking should: • prioritise public transport customers • be separate (including its vehicular access point) to parking associated with the TOD project • have clear and legible wayfinding and signage • be consolidated • be compliant with *Australian Standards* and *Building Codes of Australia* • ensure commuters are not delayed by other circulating traffic associated with TOD • provide accessible parking bays and locate these close to the stop/station entry point • provide adequate queue storage at its access point • protect for the future implementation of access control devices (such as boom gates) and payment/validation infrastructure • minimise disruption to pedestrian and cycle movements at access points. Vehicular demand may require upgrades to road infrastructure on streets feeding the site. This may include intersection upgrades, carriageway reconfigurations, traffic calming or resurfacing. Analysis should also consider impacts from school peak (and associated bus movements). Refer to *PTIM, Park 'n' ride infrastructure* for further design detail.
Impact assessments	All users/modes are to be considered when planning and designing TOD projects, including (but not limited to) active transport impacts, public transport services impacts, development impacts on public transport infrastructure and vehicular traffic impacts. Refer to TMR's website for detailed guidance regarding applicable impact assessments that should be undertaken when planning and designing a TOD project. https://www.tmr.qld.gov.au/Community-and-environment/Planning-and-development/Planning-and-development-assessment-under-the-Planning-Act/Assessable-development

Functional design guidance

Simple and functional

Maintain simplicity and provide a functional design that minimises conflict between users and ensure passengers can easily interpret and use the space to access public transport infrastructure. The design of TOD should provide a legible and pleasant environment that is uncluttered, with minimal concealed spaces.

Appropriate space should be provided at information and decision points for people to avoid conflict with the flow path of travel to ensure comfortable and efficient movement during peak operations.

Legibility and visibility

Clearly legible and visible entry and exit points to public transport infrastructure is essential. These not only provide points of access, but also define the station boundaries where access infrastructure needs to link to the stop/station through TOD. This is especially important where there are a multitude of competing uses and messages. For more information refer to the *PTIM, Supporting access infrastructure*.

Safety and security

TOD should support access for all users to public transport infrastructure, increasing street activation and passive surveillance of these spaces, and contribute to the vibrancy of the street, deterring undesirable behaviour. The physical environment must be designed to include CPTED principles to reduce crime, property damage and anti-social behaviour associated with people gathering in public spaces.

High quality walking and bicycle connections to and from public transport nodes and adjoining uses (I.e. neighbourhoods, shopping centres and businesses) should be encouraged to achieve safe use during the day and after hours. Additionally, where appropriate, development should provide high-quality lighting that reinforces daytime and night-time presence and surveillance.

Signage and wayfinding

Signage forms a major component of design to assist with navigation to and around public transport infrastructure. Logical information, wayfinding signage and overall facility signage is important to achieving a consistent and recognisable public transport system. TOD design should incorporate signage and wayfinding:

- to ensure customers can easily recognise and find their way to public transport infrastructure, including fare machines and ticket offices.
- where line-of-sight to nearest decision point can be achieved considering signage height, colour contrast and orientation
- for multi-modal integration, maps and landmark information of wider TOD (and beyond) precinct
- using universal/international symbols and indicators.

For further details of TransLink's signage requirements, refer to *PTIM, Branding, theming and signage* and TransLinks's signage manuals for bus and rail stations.

Human factors

TransLink aims to incorporate human factors principles throughout planning and design to provide assurance to safe, effective and comfortable public transport systems and environments, for all users. The benefits of incorporating human factor principles into TOD design solutions ensure the following is considered:

- the physical effort and ability for a person to use a system or navigate and environment
- the adequacy and comfort of ones' surroundings
- the recognition and interpretation of interfaces and information
- the level of support and/or sensory feedback one is offered, able and/or willing to receive
- the understanding of the environment that a customer is in, was in, and/or aims to get to
- a customer's various behavioural states under certain conditions
- the various environmental and psychosocial conditions that one may be presented.

Accessibility and compliance

All infrastructure must meet the requirements of applicable *Disability Standards* and *Australian Standards*. It is not enough that the design is compliant or has compliant elements. The design of the precinct should be accessible to all its customers and accommodate them without the need for adaptation or specialised design.

Key accessibility and disability access design considerations to ensure accessible public transport infrastructure is available for everyone are described in *PTIM, Supporting access infrastructure* Section 3.3.

Seek advice and clarification on issues and current best practice from TransLink and relevant accessibility reference stakeholders.

Universal design

The philosophy of universal design considers the access outcomes for TransLink customers:

- the whole journey for the customer, regardless of preference or ability, to and through public transport
- infrastructure is continuously accessible
- customers can have direct access to the public transport network
- customers have confidence that the infrastructure will provide what they need for a seamless, continuous journey with no barriers to access.

TransLink recognises the importance of providing appropriate accessibility for customers as part of their door-to-door journey. Enabling a customer to navigate a continuously accessible path as part of the 'journey' helps to create an accessible network.

The Whole Journey: a guide for thinking beyond compliance to create accessible public transport journeys (Commonwealth of Australia, 2017) assists in enabling people with disability to genuinely participate in the community by promoting the importance of considering the accessibility of the whole of the passenger transport journey. TransLink sees this guide as a very important document and application of the principles presented in the guide will help to improve the accessibility of our customers' passenger transport journeys.

Specific considerations

Existing infrastructure

Construction of a TOD project must consider any existing infrastructure and continuation of that infrastructure through the construction period. For example, provision of temporary ticket offices or commuter car parking during the construction of TOD.

Returnable works

Should there be any infrastructure required as returnable works to TMR or other stakeholders, these need to be discussed and agreed on from the outset. Relevant stakeholders should be engaged in the planning and design process to ensure that the requirements of returnable works by operators and/or owners have been considered and that they will have been developed and designed to appropriate standards (note requirements may differ between stakeholders).

Railway operations

When a TOD project is adjacent to a railway, there are a number of additional matters that need to be considered including noise and amenity impacts, structures, preventing unauthorised access, dangerous goods and fire safety, stormwater and drainage, and collision protection etc.

All development, including volumetrically-titled development needs to be designed and constructed so that it does not cause disruption to railway services, damage to railway infrastructure or physical harm. Ensuring safe operation of railways can be achieved by:

- providing sufficient setbacks from rail infrastructure, including overhead line equipment and bridges
- maintaining existing railway access points or routes
- ensuring development can be maintained without access to the railway.

Further guidance regarding development in the vicinity of a railway is detailed in TMR *Guide for Development in a Transport Environment for Rail*.

Rail replacement bus

To ensure continuity and connectivity of the rail service, there may be need for a rail replacement bus service to access the rail station (e.g. planned maintenance, track closure, or unplanned disruption) or to supplement rail services. This may be provided in the form of a temporary bus stop (refer *PTIM, Bus stop infrastructure*) or at designated bus zone/kerbside space. Pedestrian access to the rail replacement bus must be compliant with accessibility standards, and provide for a seamless transition from rail to bus. Seek confirmation from TransLink on requirements for these services specific to the site.

Asset management

Collaborative working agreements between relevant stakeholders involved in asset management should be established at the planning stage, to promote a whole-of-life approach to infrastructure management and to contribute towards a functional, high quality, safe and easy-to-use public transport network. Refer to *PTIM, Planning and design* Section 2.3.4.


GCUH station
TRANSLink
Platform 2
Buses
Griffith University
Platform 2
Platform 4
Platform 3