Contents

Chapter 11 – Light rail station infrastructure

11.1 Introduction

11.1.1 Overview of the Light rail station infrastructure chapter

The Light rail station infrastructure chapter is a referenced component of the overarching *Public Transport Infrastructure Manual (PTIM)*.

This Light rail station infrastructure chapter is to be used in conjunction with:

- ***PTIM, Background and application,*** which establishes the guidelines for application of the entire *PTIM*
- ***PTIM, Planning and design,*** which provides the overarching design guidelines and principles for public transport infrastructure across Queensland
- ***PTIM, Supporting access infrastructure,*** which details the supporting access infrastructure required to support public transport stops and stations
- ***PTIM, Branding, theming and signage,*** which provides branding, theming and signage that should be used for identifying coherent public transport infrastructure throughout Queensland.

For information on further resources to support the planning and design of light rail stations, including specifically the integration with other modes please refer to *PTIM, Background and application*.

11.1.2 Purpose and objectives

The Light rail station infrastructure chapter will inform infrastructure design by providing a clear and consistent set of principles and guidelines for stations on the light rail network.

It will ensure that a standard of infrastructure is planned and delivered to meet the needs and objectives of the TransLink passenger transport system and passenger expectations. Ultimately, quality and consistent light rail station infrastructure will provide customers with a transport system that is safe, convenient, coherent, functional and encourages passenger use.

The objectives of this chapter are to:

- ensure design incorporates a focus on achieving customer needs and enhancing their experience
- ensure a consistent approach to maximise customer access, convenience, safety, comfort, efficiency, reliability and accessibility
- ensure infrastructure design is applied consistently across the light rail network
- consolidate and standardise the existing guiding principles for the planning and design of light rail station infrastructure
- provide an overview of available design standards
- detail TransLink's requirements for compliance with relevant standards and regulations
- to promote light rail station design principles which achieve inclusiveness, accessibility and flexibility.

11.1.3 Technical references

The following technical documents should be referred to when planning and designing new or upgraded light rail stations:

- **Department of Transport and Main Roads (TMR)*, Guide to Development in a Transport Environment: Light Rail***, which provides important information for those involved in the planning, design or delivery of development in the vicinity of light rail infrastructure in Queensland
- **TMR, *Public Transport Conveyance Manual: Designing accessible vehicles, vessels, aircraft and rollingstock,*** which provides a practical framework to maximise universal accessibility when embarking or disembarking transport conveyances
- **TMR, *Road Safety Policy,*** which provides the policy direction to prioritise the safety of customers in the delivery of transport infrastructure
- **TMR, *Road Planning and Design Manual,*** is the primary reference for planning and design of roads and are to be read alongside the relevant Austroads technical requirement publications
- **TMR Technical Notes** are a suite of technical documents detailing additional TMR requirements in planning and design. They should be read alongside the relevant standard, manual or guideline
- **TMR, *Rail Station Signage Manual***, provides guidance to the provision of signs at rail stations within the TransLink network.

For full list of technical references refer to *PTIM, Background and Application*.

11.1.4 Roles and responsibilities

The roles and responsibilities of the key stakeholders for the planning and design of light rail stations are described in Table 11.1. As shown, the planning, provision, management and operation of public transport is the core responsibility of the State government, with most responsibilities carried out by TransLink (a division of TMR).

TransLink will work in partnership with and assist the asset owner, light rail managers, Queensland Treasury and local governments to:

- reviewing the Chapter to ensure it remains up to date and relevant
- supporting and communicating the importance of customer focussed features of the Chapter to relevant stakeholders
- providing recommendations to ensure compliance with the Chapter.

Table 11.1:
Roles and responsibilities

Organisation	Key public transport responsibilities
TMR including TransLink division	TMR is responsible for the coordination of transport services, infrastructure, management, transport policy and planning in Queensland. TransLink's role within TMR is to: • plan and design an accessible, efficient and connected passenger transport network that is simple for customers to identify, understand and use • be responsible for enhancing customers' experience, ticketing, public transport information and infrastructure. TransLink has State-wide responsibility for managing service contracts to deliver public transport services for light rail.
Light rail managers	Light rail managers have the following principal functions: • managing, maintaining and operating light rail transport infrastructure • responsible for managing works and activities in a light rail corridor.
Queensland Treasury	• responsible for regulating planning and development and responsible for administrating the Planning Act.
Local government	• responsible for land use planning and built environment as per local planning schemes • responsible for aligning complementary urban planning policies and strategic local planning with light rail to achieve urban outcomes, including catalytic land use changes, stronger land use integration and transit oriented development.

11.1.5 Glossary

Table 11.2:
Key light rail terms

Term	Definition
AFC	Automatic Fare Collection
AVVM	Add Value Vending Machine
CER	Communications Equipment Room
CPAS	Customer Public Address System
LRT	Light Rail Transit
LRV	Light Rail Vehicle
PTIM	Public Transport Infrastructure Manual
PTCM	Public Transport Conveyance Manual
PWD	Person With Disabilities
ROW	Right-of-Way
SACID	Stand Alone Card Interface Device
SISTO	Security Identified Surface Transport Operations
TGSI	Tactile Ground Surface Indicator
TLER	TransLink Equipment Room

11.2 Application of the Light rail station infrastructure chapter

11.2.1 Intended audience

This chapter is intended for use by professionals in the transport planning and delivery industry. This generally involves, but is not limited to, designers, planners, engineers, architects, developers, contractors, private operators and others involved in the planning, design and delivery of light rail station projects in Queensland. This may involve professionals charged with protecting the State's existing and future transport infrastructure assets.

11.2.2 Application of this chapter

This chapter must be used in conjunction with overarching applications of the *PTIM*.

This chapter details TransLink requirements for planning and design and should be referred to before starting to plan new light rail stations or upgrades, including intermodal connections, neighbourhood and active transport connections, and safety improvements, to existing light rail stations. This is particularly important where light rail stations are affected by, or a catalyst for, urban development.

For existing sites, direct application of the approaches outlined in this chapter may not be feasible due to existing physical site constraints. The application of *PTIM* may therefore vary to achieve TMR's customer outcomes whether undertaking works in a constrained or built up corridor, greenfield site or when undertaking and upgrade.

TransLink, in partnership with local governments and in collaboration with relevant stakeholders and delivery partners, shall be consulted on the design for new infrastructure and upgrade of existing light rail stations.

11.2.3 Planning, legislation, policies and guidelines

See *PTIM, Background and application* for specific detail on relevant planning references, and relevance to light rail station infrastructure and light rail corridors.

11.3 Principles of light rail station infrastructure planning

Light rail is a high-capacity, high-frequency public transport mode within urban corridors which can support liveable communities and enhance well-being and social inclusion. When light rail stations are planned and designed to allow customers of all ages and abilities to easily and safely interchange between modes, they can contribute to an accessible public transport journey.

11.3.1 What is the light rail station precinct?

The light rail station precinct comprises three distinct zones including:

1. **Local precinct:** area immediately surrounding the light rail station where people interact with adjacent and nearby land uses and activities.

   Light rail stations should be considered in the context of their surrounding precinct, including how they will be accessed by all transport modes. Light rail stations, successfully integrated with the community, can create precincts that are attractive places for economic development and social interaction.

   The planning and design of light rail station infrastructure should reflect the local precinct in which it is situated. This includes connections to its cultural or heritage significance, the surrounding physical environment and its integration with the adjacent land uses.

2. **Access and interchange:** location that passengers use to gain access to/from the light rail station and transfer between other transport modes such as bicycle, bus, kiss 'n' ride, taxi, passenger heavy rail.

   Supporting access infrastructure is required to ensure passengers can interchange seamlessly between the light rail station and different transport modes. Where accommodating customer transfers at street level, an unobstructed accessible route and close proximity of other modes to a light rail station's entry and exits will improve the ease and comfort of these movements. For light rail stations with concourses, ticketing areas and platforms underground, the location and design should ensure these are easily recognisable and identifiable as part of the public transport integrated network.

3. **Light rail station:** where passengers dwell at a platform, use amenities, buy tickets, board and alight light rail vehicles etc.

   The design of the station should allow the spatial requirements to accommodate customer demand, staff needs and the legibility, safe circulation and comfort of passenger movements along the platform.

The zones comprising the light rail station precinct are illustrated in Figure 11.1.

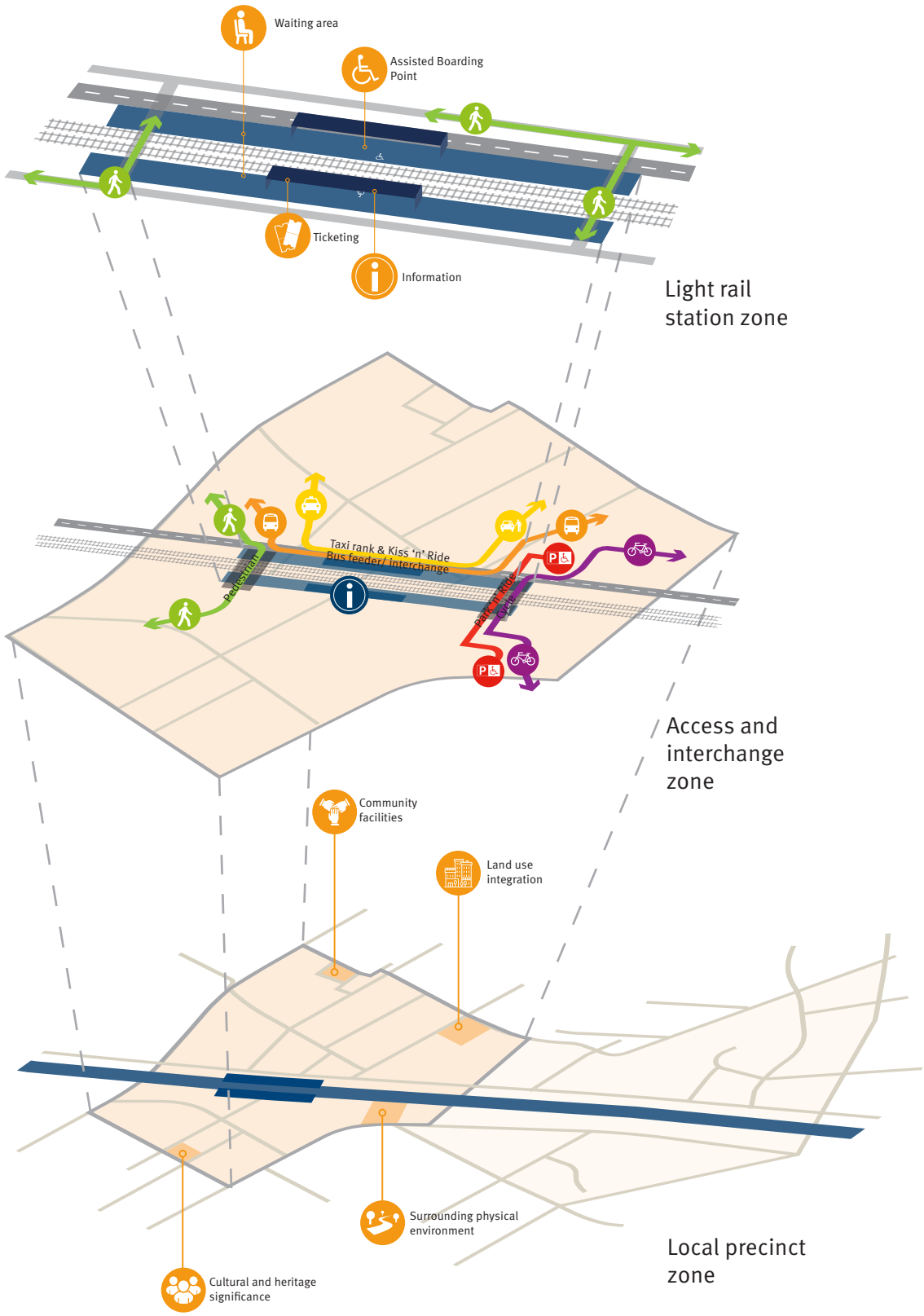


Figure 11.1 –
Light rail station precinct zones

11.3.2 Light rail services

The existing Queensland service categories and routes across the state are currently located in the Gold Coast:

- G:link network, Gold Coast [https://ridetheg.com.au/stations/]

11.3.3 Who uses the light rail service?

TransLink customers using light rail services across the light rail network include frequent and infrequent users (for example, commuters/full-time workers, students, tourists, retirees, long distance travellers, and customers using the service for recreational purposes and events).

Customers may use light rail stations for non-travelling purposes such as retail, cross-corridor access, meeting travelling users and other activities, and as such should be considered in the planning and design of a light rail station and the light rail station precinct. How TransLink customers access this mode of travel varies by location, adjacent land use, light rail station facilities (e.g. mobility and accessibility) and trip purpose.

11.3.4 Light rail station categories

TransLink, through the *PTIM*, has developed the categorisation of light rail stations.

The hierarchy is based upon infrastructure function, station configuration and multi-modal connections. These categories must work in conjunction with the public transport infrastructure hierarchy in *PTIM*, *Planning and Design*. This will establish infrastructure hierarchy and function based on its locality and to ensure customer functional needs are met, particularly where integrated with wider public transport services.

1. **Major Interchange** – bespoke or terminus light rail stations which include high frequency multi-modal connections
2. **Local Interchange** – light rail stations which include multi-modal connections
3. **Standard** – typical light rail station infrastructure and facilities with limited multi-modal connections.

11.3.4.1 Major Interchange

The key elements that define a major interchange light rail station are described as follows:

	Description
Customer	commuters, off-peak, first-time, infrequent, long-distance, tourists, events persons with disability, travelling with children, travelling with luggage high patronage
Wider precinct	located within a key destination place adjacent to mixed use urban land uses (for example, knowledge, tourism, health, commercial, retail, residential and cultural) high pedestrian activity
Operation	high frequency services intermodal interchange with passenger heavy rail, high frequency bus services with reach to regional and long distance destinations. For example, University Hospital, Broadbeach South and Helensvale stations.

So that customers can get to their destinations using the light rail network with minimum difficulty and stress, they can expect the following conditions when accessing an interchange light rail station:

Must haves

1. accessible, efficient, safe and seamless access to connecting modes and between platforms
2. independent access to station and platform
3. legible, clear and consistent wayfinding and information
4. timetable information for feeder connections
5. customer services and general information displays
6. ticket purchasing facilities
7. Crime Prevention Through Environmental Design (CPTED) principles incorporated
8. comfortable waiting areas and shelter

Desired

9. urban design elements reflecting local context and environment
10. passenger loading zone, for example an accessible kiss 'n' ride.

11.3.4.2 Local Interchange

The key indicators of a local interchange light rail station are described as follows:

	Description
Customer	commuters, off-peak, first-time, infrequent, tourists persons with disability, travelling with children high patronage
Wider precinct	may be adjacent to an activity centre and employment hub mixed use urban land uses (for example, knowledge, tourism, health, commercial, retail, residential and cultural) high pedestrian activity
Operation	high frequency services intermodal interchange with other public transport services and connections to local destinations. For example, Southport, Griffith University and Parkwood stations.

The conditions that customers expect at a local interchange light rail station are:

Must haves

1. accessible, efficient, safe and seamless access to and within light rail station
2. independent access to station and platform
3. legible, clear and consistent wayfinding and information
4. customer services and general information displays
5. ticket purchasing facilities
6. CPTED principles incorporated
7. timetable information for feeder connections
8. comfortable waiting areas

Desired

9. urban design elements reflecting local context and environment
10. cycle parking facilities
11. passenger loading zone, for example an accessible kiss 'n' ride
12. direct access to adjacent bus stop.

11.3.4.3 Standard

The key indicators of a standard light rail station are described as follows:

	Description
Customer	commuters, off-peak, first-time, infrequent, long-distance persons with disability, travelling with children, travelling with luggage low to medium patronage
Wider precinct	residential neighbourhood, community facilities local activity centre for example Nerang Street, Broadwater Parklands, Queen Street stations nearby local bus stop
Operation	high frequency services feeder services available in the surrounding precinct primary means of access by pedestrians and cyclists.

The conditions that customers expect at a standard light rail station are:

Must haves

1. accessible, efficient, safe and direct access
2. independent access to station and platform
3. legible, clear and consistent wayfinding and information
4. timetable information
5. ticket purchasing facilities
6. incorporate CPTED principles

Desired

7. integration into local environment
8. comfortable waiting areas
9. cycle parking facilities.

11.4 Light rail station environment

11.4.1 Understanding existing and future customers

11.4.1.1 Customer outcomes

TMR is focussed on achieving the following customer outcomes:

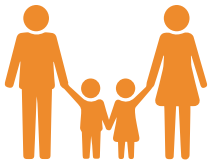
1. **Accessible, convenient transport:** access and use of the light rail network should be accessible, convenient, direct and legible
2. **Safe journeys for all:** customers should feel comfortable and safe when using and accessing the light rail network
3. **Seamless, personalised journeys:** Light rail stations are to be designed for the customer and need to be convenient and responsive to their individual needs and expectations. Light rail stations to consider all modes of access to ensure a seamless interchange and journey for the customer
4. **Efficient, reliable and productive transport for people and goods:** ensures local access and integration with all modes is achieved and customers are able to move efficiently through the light rail station. The station design balances in-service efficiency and on-time running with customer needs
5. **Sustainable, resilient and liveable communities:** providing a balance between movement and place can create vibrant places for the community. Light rail stations should be designed as sustainable, long term assets that are fit-for-purpose now and into the future, and adaptable to change.

11.4.1.2 Customer needs

The expectations or needs of different customer types must be recognised for the location using customer research. As a minimum, all users, regardless of their ability or how frequently/infrequently they use the public transport network, customers require the following:

- safe, direct and convenient paths to and within the station
- minimal barriers between the station and each access mode
- CPTED/personal safety
- legible, clear and consistent wayfinding and information
- inclusive and accessible design.

Table 11.3:
Customer expectations and needs

Customer type	Example(s)	Customer expectations or needs
Regular peak-hour commuters 	Customers who travel every business day to work or education frequently using the light rail network and have strong familiarity with light rail station and routes through/via development.	• legible/direct movement through light rail station • efficient transfer • efficient access • information on service disruptions and ability to access alternative modes.
Tourists 	Customers may need more information on local wayfinding and events. May include local, interstate and international tourists. These customers might have luggage, prams or items unable to move easily. English may not be their first language.	• easy to navigate • direct access to taxi, kiss 'n' ride and park 'n' ride facilities within the precinct • comfortable waiting areas • real-time information and easy-to-understand wayfinding • information about feeder services • ramps and lifts etc. to navigate level changes.
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 • easy-to-understand wayfinding • comfortable waiting areas • infrastructure supporting lower service frequency (e.g. seating, shading) • personal safety in unmanned locations.
Infrequent users/ first-timers 	May include tourists, visitors, business travellers, parents travelling with children, Interstate guests visiting family (e.g. typically includes discretionary travellers). Customers might have luggage, prams or items unable to move easily.	• easy to navigate • direct access to taxi, kiss 'n' ride and park 'n' ride facilities within the precinct • comfortable waiting areas • real-time information and wayfinding • information about feeder services • ramps and lifts etc. to navigate level changes.
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 light rail station.	• easy, legible interchange • multi-modal, real-time information and wayfinding • information about feeder services • minimal physical barriers to interchange/ transferring between modes.

Customer type	Example(s)	Customer expectations or needs
People with a disability 	Customers who are deaf, hard of hearing, blind or have low vision, customers with cognitive disability, permanent or temporary mobility disabilities.	• system ensures equitable and direct access • allow users to get to their destination with minimum difficulty or stress • direct access to ramps/lifts/escalators to platforms • direct access to assisted boarding point[1].

The light rail station needs to provide an appropriate mix of functional elements to meet the needs of these customers (refer Table 11.3) and reflect the site-specific requirements of the light rail station while still aligning with consistent design standards.

For example, a major destination such as a hospital may have the following needs over a standard facility:

- easy, accessible, legible access and interchange
- multi-modal connections
- consideration to first time users - simplicity, ease of use and attractiveness
- spatial arrangements to consider use by persons with a disability, whether permanent or temporary
- regular maintenance needs.

When planning and designing light rail stations, the following passenger activities should be considered:

- Boarding and alighting - passengers entering and exiting light rail vehicles
- Transfer within the light rail station - where passengers walk between the light rail platform to other modal platforms within the station, for example heavy passenger rail and bus services
- Station access & egress - where passengers enter or exit the light rail station to transfer to another transport mode, or to access their final destination
- Transfer within the interchange - where passengers are required to leave the station to access their next transport mode.

In addition to the customer's needs and expectations, light rail managers for the light rail network also have requirements that will need to be considered when planning and designing a light rail station. These are demonstrated in Table 11.4.

1 *The assisted boarding point is a designated and identifiable area on the platform that includes, but is not limited to, priority seating area, lighting, emergency phone, hearing augmentation loops, next train information, and enhanced CCTV coverage. Assisted boarding points also provide shelter and are identifiable by blue and white PWD markings.*

Table 11.4:
Stakeholder expectations and needs

Stakeholder type	Example(s)	Stakeholder expectations or needs
Property owner	Owner of land/development rights	• quality design/visual outcome • Light rail station contributes to desired or planned land use development outcomes • allowance for loading/servicing, or operational access (building maintenance statements may be required) • maintain economic feasibility.
Service providers	Public transport operator	• allowance for loading/servicing, or operational/ maintenance access • future proofing for operational changes and construction access for future upgrades • facilities for staff at agreed locations [2] • clear maintenance and other responsibilities identified where station components are integrated (for example, shared spaces, escalators, lifts, access roads etc.).

11.4.1.3 Existing and future demands

The light rail station precinct must be appropriately designed to accommodate a range of passenger movements and the volume of anticipated passengers, including those waiting/dwelling, accessing public transport services (boarding/alighting), through movements and queuing.

The planning and design of light rail stations should accommodate future growth and opportunities for the local and wider community. Demand analysis should be used to inform staging opportunities for the delivery of access infrastructure, as well as protect for any land requirements to cater for future customer demand.

Forecast patronage increases may potentially require public transport facilities (for example, local bus stops, kiss 'n' ride, new cycle route) to be able to accommodate additional future services (for example, new interchange services, change in land use).

Footpath space should cater for the anticipated pedestrian demands around the entrances to the light rail station. Refer Section 11.4.2.5 and PTIM, Supporting Access Infrastructure for more detail addressing the requirements for users at the journey start and end within the light rail station precinct.

For further information in determining capacity and Levels of Service requirements refer to *PTIM, Planning and Design*.

[2] *Locations for staff facilities to be agreed in line with operational requirements.*

11.4.2 Understanding the site

This section provides guidance on the light rail station environment considerations in the early planning and design phase. With each site having unique characteristics, a site-specific response needs to consider:

- the corridor the service will operate within
- understanding existing and future passenger demands
- the surrounding land uses
- integration with other modes
- land constraints.

11.4.2.1 Light rail corridor

Light rail transit offers the flexibility of operating within its own corridor/segregated alignment in areas with lower land use density and greater distances between stations, or shared/mixed with other vehicles or pedestrians in high land use intensity areas with closely spaced stations.

The preferred configuration needs to address the specific issues or opportunities within the environment it will be operating in, as well as the proposed operational efficiency, design speeds and customer objectives for the service.

This chapter recognises the following types of light rail transit corridors:

- Segregated corridor at-grade or grade separated (i.e. elevated sections)
- Dedicated right of way within the street
- Shared corridor with regular road traffic users (including other public transport)
- Light rail corridor with other public transport modes
- Light rail corridor with pedestrians.

Table 11.5 outlines the differing design considerations of the typical light rail corridors and alignments.

Table 11.5:
Light rail alignment characteristics

Corridor	Benefits	Considerations
Dedicated right of way with centre or side-running alignment	• ensures priority at intersections for light rail vehicles and improved reliability of service • opportunity for higher light rail running speed • at-grade segregated alignment offers opportunities for greater integration with land uses • median space can be allocated to stations or landscaping.	• may be opportunity for traffic priority with light rail in main movement at intersections • consider opportunity to concurrently run parallel pedestrian phases with light rail priority • consider opportunity for dedicated and protected right hand turns on strategic routes • may potentially require a larger corridor footprint • consider provision of safe and protected pedestrian access to station • consider legibility at intersections for general traffic • if grade-separated (elevated alignment), there may be less opportunity for integration with surrounding land use.
Shared corridor with general road traffic	• can be introduced in corridors with limited road width • may enable a shift from the corridor's movement function towards greater place outcomes in an urban environment.	• consider speed differentials between light rail vehicle and general traffic • consider conflict between on-road vehicles, private transport, buses, cyclists etc. and light rail • consider complementary urban design elements that support safe, comfortable and legible access to public transport services • consider provision for safe pedestrian access • consider the effect on other traffic when light rail pulls into stations.
Light rail corridor with pedestrians (including passengers)	• ability to have light rail service major pedestrian corridors in city centres, urban environments and community precincts • contribute to place making/transit oriented development opportunities as well as integration with built form.	• minimise conflict between pedestrians and light rail through design, delineation and demarcation (for example, formal signalised pedestrian crossings where higher speeds are proposed, or imposing reduced light rail vehicle speed limits) • consider speed differentials between light rail vehicle and pedestrians • consider access for logistics or servicing of land uses.

Corridor	Benefits	Considerations
Light rail corridor with other public transport modes	• opportunities to co-locate services for short durations in constrained corridors • opportunities for seamless interchange between modes.	• consider potential integration with bus services that are operating on limited stop/express priority services or where indented bus stop/bays are provided to maintain light rail priority and reliability • consider interface between modes at intersections and stops • consider type of infrastructure to address both vehicle needs/requirements • consideration of bus fleet dimensions, specifically height, for example, bus would need to be single decker • consider provision for safe pedestrian access.

11.4.2.2 Integration with land use

Public passenger transport infrastructure integration with land use enables the creation of better places, and supports the following outcomes:

- adequately catering for customer needs
- ensuring essential community access to jobs, facilities and services
- community health and well being and social inclusion
- contributing to reducing dependency on cars
- support economic development of communities.

The majority of locality factors (for example, population projections, demographics, major attractors) for public transport infrastructure are led by the relevant land use plan or urban renewal strategy for the location, precinct and corridor. These 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 the *PTIM* 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 is an integral part of supporting economic development of urban centres, and supports increased densities by encouraging TOD. This concept of changing the design emphasis from a place for transport to a place for the community reflects the focus on customer needs, for those who pass through the facility as well as those who live and work nearby.

Development surrounding light rail stations should support access for all users to the public realm, increase street activation and passive surveillance of these spaces, and contribute to the vibrancy of the street. Additionally, where appropriate, development should provide quality lighting that reinforces daytime and night-time presence and surveillance. The proximity of transport stations with complimentary land use developments is vital, as urban consolidation is necessary for achieving increased public transport patronage and therefore justifying high-frequency services.

The planning, design and operation of light rail infrastructure should see coordination between identified key stakeholders, including government and private transport operators and authorities, local councils, land owners, tenants, community, Emergency Services, event organisers and other relevant Authorities. This should include for example early co-ordination and engagement with key stakeholders, the sharing of essential information, participating in place making/branding, and coordinating and managing special events, passenger service disruption, maintenance, accident events and incidents.

Refer to *PTIM, Planning and design* for further detail regarding integration with land use, including TOD.

11.4.2.3 Integration with other modes

Light rail stations forms part of the integrated transport network. To maximise seamless connections and ease of use, access to light rail stations should be accessible, safe, convenient, direct and legible.

Planning and design must consider how passengers will access the infrastructure with consideration to the TransLink access hierarchy presented in Figure 11.2, and incorporate appropriate access facilities and infrastructure. This includes pedestrian and cyclist facilities, interchange (e.g. with passenger heavy rail) and bus feeders, taxi, kiss 'n' ride and park 'n' ride facilities.

The design should consider protecting the integrity of entry and exit points by:

- managing safety, congestion and intermodal conflict at key access points
- appropriately designing decision points at transition zones, with a focus on legibility and ease of navigation
- simplicity and economy of movement to, from and through the light rail station and access infrastructure

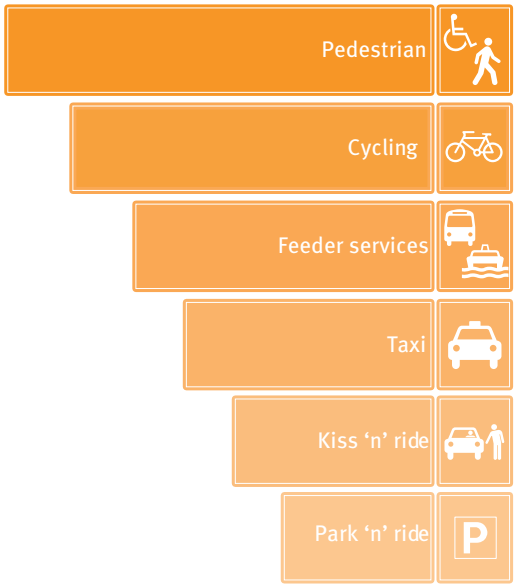


Figure 11.2 –
TransLink's access hierarchy

- minimise barriers to appropriate movement along:
  - desired travel paths for design of new stations
  - primary travel path when upgrading existing stations.

Light rail stations are to be designed so that they are easily identifiable as a station by customers. This is achieved through clearly defined entry and exit points, light rail station (or where applicable, interchange) boundaries and use of clear wayfinding and signage to demonstrate where there are access infrastructure links to the light rail station from the surrounding built environment.

The design of light rail stations should allow for seamless passenger movement between modes and services to encourage public transport use and to maximise the quality of the customer experience, in accordance with TransLink stop and station policy and guidelines.

Pedestrian

Pedestrians should have clear and direct access to supporting infrastructure and surrounding facilities. Pedestrian infrastructure should be considered in terms of:

- interface between the light rail station and the wider pedestrian network
- pedestrian access through the light rail station, including vertical circulation (i.e. stairs, ramps, lifts, escalators etc.) and grade-separation (to be integrated into the primary facility structure where possible to minimise passenger travel)
- existing and future pedestrian volumes and pedestrian paths of travel to/from adjacent land uses and attractors and events, using methods prescribed in TMR technical guidance for walking
- provision of a safe and convenient path of travel to/from station (i.e. minimise conflict with other access modes) and light rail vehicle.

Pedestrian demand assessment:

- is to be carried out to determine spatial requirements (for example, width of unobstructed paths and movement corridors)
- may include access paths, vertical transport, corridor widths, gatelines, concourse sizing, run off requirements and location of ticketing facilities/ retail uses etc.
- to consider desire lines and dwelling areas of different movements through, to and pass the station and how it interfaces with public transport passenger movements. For example, waiting areas, on-street alfresco dining, conflicts with other demand (particularly in mixed-use developments/ TOD)
- is to consider pedestrian demands at each level of the facility.

Refer to *PTIM, Planning and design*, Section 2.3.3.1 for further detail regarding demand analysis.

Cycling

Integrating cycling access with public transport dramatically increases the catchment areas of the light rail network.

When planning and designing cyclist infrastructure, the following should be considered:

- all interface points between local bicycle networks and TransLink infrastructure must be functionally seamless
- cycle infrastructure to integrate with existing infrastructure
- cycle connections to/from the station must be direct, and legible with safe and convenient crossings
- minimise (where possible) access infrastructure conflict with cyclists. This will be dependent on the existing type of cycle facility (for example, on road cycle lane or off road separated path), whether it forms part of a designated cycle network, and whether users on this cycle infrastructure are accessing or passing the station. The TransLink access hierarchy is to be adopted when confirming priority at conflict locations.
- specialist cycle design advice should be sought when designing cycle amenities including wayfinding to end-of-trip facilities, particularly when provided as part of an interchange.

Micro-mobility

Design of light rail stations should consider accommodating journey start and end trip solutions, including micro-mobility. Designated storage areas may be required around light rail stations for docked and undocked micro-mobility/rideable technology.

Feeder services

Design of light rail stations should consider nearby or adjacent passenger heavy rail stations, bus stops/ stations, and feeder services to ensure that passengers can access the wider public transport network conveniently and safely and to their end destination.

For transferring and destination customers, connecting modes should be close to the light rail station entry/ exit (ideally visible or within line of sight) and limit the need to cross roads.

Passenger set-down

Passenger set-down facilities, including kiss 'n' ride, taxi ranks, maximise access to the rail station for all users. Design of kiss 'n' ride infrastructure within the light rail station precinct should:

- minimise potential for vehicle/pedestrian/cycle conflict
- provide accessible, direct and legible connections to rail station facilities
- incorporate CPTED principles.

Park 'n' ride

Refer to *PTIM, Park 'n' ride infrastructure* for detail regarding the planning and design of park 'n' ride infrastructure for public transport.

11.5 Functional design guidelines for light rail stations

Ensuring that the arrangement of key components is appropriately considered will contribute towards positive customer outcomes for the overall light rail station design. Each of the following principles described in this section should be incorporated into the design of public transport infrastructure.

11.5.1 Access

11.5.1.1 Accessibility and compliance

TransLink requires that the relevant standards and guidelines for disability access are followed, along with the engagement of relevant disability reference groups, where required. The legislative requirements of the Commonwealth *Disability Discrimination Act 1992 (DDA)* set out the responsibilities of the Department with regards to access to public transport, with the specifics and details given in the *Disability Standards*:

- *Disability Standards for Accessible Public Transport 2002 (DSAPT* or *Transport Standards)*
- *Disability (Access to Premises – Buildings) Standards 2010 (Premises Standards)*.

The design of the light rail station precinct should be accessible to all of its customers and accommodate them without the need for adaptation or specialised design. When upgrading existing stations, minimising barriers to the provision of unassisted and equitable access should be pursued.

11.5.1.2 Universal design

Public transport infrastructure should consider universal design to support and enable a diverse range of customers to access and use the public transport network. The philosophy of universal light rail station design considers the access outcomes for TransLink customers:

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

TransLink also 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 a 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.

Key accessibility and disability access design considerations are described in *PTIM, Supporting access infrastructure* Section 3.3. The principles of universal design are provided in *PTIM, Background and application*.

Station precinct amenities and facilities are to be designed to cater for a range of different customers with different needs and level of experience.

The following list provides examples of what customers may expect or need, however the inclusion of these facilities within the station precinct will be dependent on station type (refer Section 11.7.1 for guidance regarding component selection).

Customers who use a wheelchair:

- provision of lifts and ramps
- platform height and gap to rollingstock, allows for ease of access into vehicle at assisted boarding point.
- unisex accessible toilet.

Customers who are elderly or use mobility aids:

- short distance from accessible bays or kiss 'n' drop facility to the light rail station and platform
- hearing loops.

Customers who are blind or have low vision

- remove hazards/obstacles from path
- uncluttered and open environment
- clear wayfinding through use of colour contrast and tactile ground surface indicators (TGSI)
- access to audible messaging of information
- hearing loops.

Customers travelling with luggage:

- provision of lifts and ramps
- accessible fare gate openings
- platform height and gap to rollingstock, allows for ease of access into vehicle at assisted boarding point
- clear information for onward journey.

Customers who are unfamiliar with the light rail station or have mental health or intellectual or cognitive impairment:

- clear lines of sight
- orientation of signage and progressive/relevant signage for navigation through station and onward journey to the wider precinct
- consistent wayfinding
- consistent look and feel across light rail network
- remove hazards/obstacles from path
- uncluttered and open environment.

11.5.2 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
- have a consistent visual appearance
- address climatic conditions.

Infrastructure is one of the most recognisable parts of the TransLink network. A consistent design language (i.e. 'look and feel') across the network will promote clearer customer recognition of public transport facilities, helping to increase passenger confidence. 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 infrastructure, with a prefabricated kit of parts utilised in design to reduce costs, 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)* and relevant *Australian Standards*.

11.5.3 Sequence of movement

The layout of a transport facility should consider the sequence of public movement. Public movement is in response to the progressive sequence of actions and decision points along the path of travel from the entry to the boarding point on the platform, as illustrated in Figure 11.3.

The growth of integrated facilities can lead to conflicts between public and private spaces and the components needed to allow a clear movement sequence for travelling customers. The planning stage of a facility should acknowledge this conflict and aim to reconcile the different elements within an integrated facility, with clear signage and wayfinding, to allow for efficient public movement for both travelling and non-travelling customers.

11.5.4 Circulation within light rail station

For details regarding the principles of circulation within public transport infrastructure, refer to *PTIM, Planning and design*.

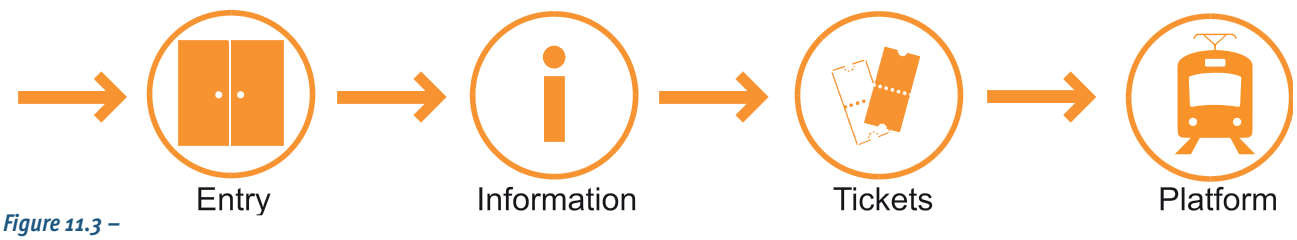


Figure 11.3 –
Sequence of movement

11.5.5 Safety and security

Safety and security of customers and other users of the station, particularly at night may see the need to consider in addition to appropriate lighting levels, well monitored waiting environments, and access paths to and from the station to supporting access infrastructure that offer sufficient active and passive surveillance.

11.5.5.1 Active surveillance

The safety and security measures employed to maximise actual and perceived safety for customers may consider the use of the following:

- security cameras in operational areas
- adequate lighting appropriate to the type/category of light rail station
- visual monitoring of the station/precinct.

11.5.5.2 Passive surveillance

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

The physical environment of public transport facilities must be designed to discourage the possibility of crime, property damage and anti-social behaviour associated with people gathering in public spaces. Creating defensible spaces (as far as reasonably practicable) that allow for surveillance from outside and within the facility will promote safe environments and will attract greater public use. Refer to the current version of the Queensland Government's *Crime Prevention Through Environmental Design* guidelines.

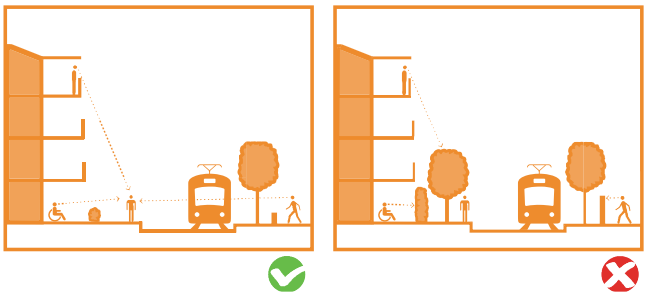


Figure 11.4 –
Passive surveillance example

11.5.5.3 Anti-social behaviour, 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 coming into contact with the public must be resilient to acts of vandalism, littering and graffiti.

This can be achieved through design options such as maximising natural surveillance and using for example, landscaping treatments or artwork, to prevent access.

11.5.5.3 Road safety

Customers' safety on the road network needs to be considered as they access public transport infrastructure.

Access design to public transport infrastructure and services should consider the TMR *Road Safety Policy*. This policy focuses on achieving safety outcomes and benefits for their customers that reduce both the likelihood and severity of crashes on the road network through the Safe System approach.

The design of access intersections and adjacent road links should consider the interface of public transport customers and other road users, and what interventions can be incorporated to improve the safety outcomes for all users.

11.5.6 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 light rail station/precinct boundaries and where access infrastructure needs to provide a connection between the station and the built environment.

Design considerations for interchange light rail stations should include provision of entry plazas, information areas, station concourse, ticket facility, and fare gates (where relevant to the size/scale of the station and its integration with other modes).

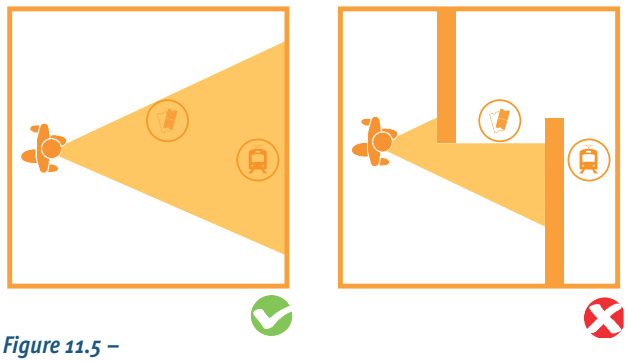


Figure 11.5 –
Identifiable entry/ facility

11.5.7 Climatic comfort and weather protection

Resilience to weather and climate should be considered when planning and designing light rail stations, with quality climatic comfort and weather protection for customers to be provided.

Sun and weather protection is to be provided. In developing the design of facilities and their access, the following should be considered:

- structures must provide sufficient physical width, length and height to achieve quality climatic comfort and weather protection for the anticipated number of passengers expected to occupy this space
- passengers should be provided with appropriate protection with covered light rail 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 (including heat spots particularly on platforms or waiting areas), glare and humidity.

An appropriate climate analysis should be included within the planning and design of light rail stations to inform appropriate facility orientation, shelter design and location suitability.

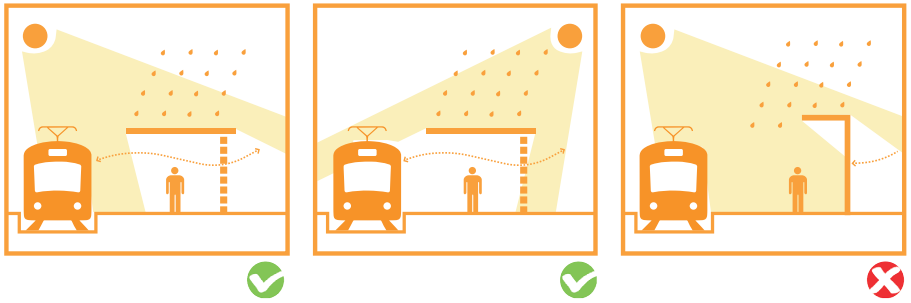


Figure 11.6 –
Climatic comfort and weather protection

11.5.8 Sustainable assets

Design and delivery of light rail stations 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
- identification and implementation of ecologically sustainable development initiatives
- incorporate water sensitive urban design (WSUD) principles and use of hardy, drought tolerant landscape treatments to minimise irrigation and ongoing maintenance requirements.

Table 11.6:
Sustainable considerations

Key sustainability consideration	Requirement where possible
Water management	• on-site rainwater collection and reuse • stormwater mitigation strategies for example, on-site run-off treatments • 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 lighting and for feeding back into electrical supply) • materials - apply whole-of-life design approach—construction, operation, maintenance, cleaning, and decommissioning • processes - avoid operational processes that generate waste, especially toxins and pollutants.
Habitat and physical environment	• protect habitat (that is, space, physical elements such as movement paths) • maintain water flows to aquatic and other habitats • maintain water quality • 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.

11.5.9 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, railway stations and other passenger transport infrastructure can be 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.

11.5.10 Functionality and simplicity

The design should provide a legible and pleasant environment that is uncluttered and easy to understand and navigate.

Maintain simplicity and provide a functional light rail station design that minimises conflicts between users and ensure passengers can easily interpret and use the space/transport infrastructure.

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

11.5.11 Wayfinding and signage

Signage forms a major component of design to assist with navigation to and around light rail stations.

Logical information, wayfinding signage and overall facility signage is important to achieving a consistent and recognisable public transport system.

Light rail station design should incorporate signage and wayfinding:

- to ensure customers can easily recognise and find their way to light rail stations, 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 precinct
- using universal/international symbols and indicators.

For further details of TransLink's signage requirements, refer to the *PTIM, Branding, theming and signage*.

11.5.12 Arrangement of space

For details regarding the design and arrangement of space for public transport infrastructure, refer to *PTIM, Planning and design*.

11.5.13 Fare collection

The method of fare collection affects the operational capacity of light rail station design. Automatic fare collection can be carried out through the incorporation of Stand Alone Card Interface Device (SACID), AVVM and fare gates (as required). The provision of ticketing facilities will be determined by light rail station type, size, public comfort, level-of-service requirements, and revenue protection strategies. The facility layout must consider the appropriate location of the automatic fare collection facilities as part of ensuring sufficient and safe circulation and queuing of passengers particularly in peak operational periods.

Liaison with TransLink shall be undertaken to identify the requirements for installation of ticketing infrastructure at the light rail station. This is required to address existing and future ticketing infrastructure needs (including the ability to incorporate smart ticketing etc.), and installation requirements (for example, power, conduits, cabling, connections, and so on). Final approval of the design and installation of ticketing infrastructure must be sought from TransLink.

Liaison with TransLink and other stakeholders will also be required to determine the appropriate assessment methodology and level of service for the operation of the ticket facilities (e.g. static or dynamic assessment).

11.5.14 Flexible design

The design of light rail stations and associated infrastructure needs to consider current and future capacity requirements. Some of the key issues to consider include:

- prioritising investment to protect for future public transport connections
- consider additional kerbside space to accommodate additional/future public transport services where possible
- design for development integration so that light rail 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 does not impede plans to upgrade or expand light rail stations or the light rail network.

There are several emerging technologies that change Queenslanders' reliance on personal cars and offer more integrated mobility solutions.

These emerging technologies and trends offer choice and dynamic travel options which need to be considered when designing light rail stations:

- incorporate proof-of-concept and other agile design approaches in a time of high change
- ensure light rail stations are designed in an agile manner that ensures it will be suited for changed transport customer behaviours.

11.5.15 Asset management

Light rail stations are major elements of passenger transport infrastructure and they need to be managed and maintained to provide consistent customer communication, service standard and sufficient operational conditions suitable for passenger comfort and safety.

The light rail station components need to be maintained and managed on an ongoing basis to ensure the effective operation of a light rail station. The framework for how a light rail station will be managed after the delivery of infrastructure needs to be considered within the planning and design process.

Relevant stakeholders should be engaged in the planning and design process to ensure that the requirements (including Safety in Design requirements for maintenance) of asset management by operators and/or owners have been considered.

All components of light rail station infrastructure should use materials and finishings consistent and compatible with existing infrastructure of an approved standard.

In consultation with relevant operating and maintenance stakeholders, detailed maintenance manuals should be developed for all components and operation schedules within a light rail station. These should be prepared as part of the light rail station project.

For further details on asset management requirements refer to *PTIM, Planning and design*.

11.6 Specific considerations for light rail stations

11.6.1 Catchment and spacing

TransLink, in consultation with the local government, will determine the most appropriate spacing of light rail stations. This should take into account the present and future TransLink integrated transport network requirements specific to a local government area, customer needs (such as demographics and ridership types) and maximising service coverage, particularly in areas which are less densely built-up.

The size of the catchment of a light rail station is generally influenced by:

- the permeability of the surrounding street network that is the quality, walkability and ease of access available through the street network
- other barriers (e.g. rivers, infrastructure, topography)
- willingness of potential customers to walk/ride
- frequency and reliability of the service
- operating speed of the service
- proximity of connecting modal interchange opportunities
- how light rail supports/is supported by connected modes (for example, greater spaced light rail stations may require more bus feeder services to maximise coverage)
- proximity of land use/destination.

11.6.2 Location of light rail station

Table 11.7:
Location of light rail stations

Key consideration	Requirement where possible
Appropriate sightlines	• sightline requirements apply for light rail operators, waiting passengers, other pedestrians and road vehicles • they must be adequate and comply with the relevant standards.
Adequate footpath area	Sites must have the available space for sufficient pavement area so pedestrians can safely walk past the station area.
Convenient boarding and alighting	Locate stations to optimise access to the immediate catchment: • with platforms in pairs ideally directly opposite each other, so that boarding and alighting occurs in close proximity • enable access to surrounding land uses • close to community facilities and services that attract a high proportion of people with a disability • close to significant attractors (such as shopping centres, commercial premises, places of employment, residential areas, educational facilities, hospitals and other primary services) • enable integration with other modes • close to other public transport infrastructure and interchanges, as this will minimise walking if transferring between services and reduce interchange time penalties.
Safe access	Locate stations: • close to dedicated and protected pedestrian road crossings (for example, dropped kerbs, refuge islands, signals) • with appropriate separation, where possible, from driveway crossovers providing access to a high parking turnover facility • away from dense foliage and other objects that hinder direct sightlines.
Intersection design	• location of station preferred on the departure side to minimise conflict with turning vehicles (and their storage) and light rail vehicle delay • to consider priority measures for light rail vehicles, for example signal priority.
Provision for future infrastructure	Where applicable, a reasonable attempt must be made to protect for any planned or upgraded infrastructure by local government or other State government agencies.

11.6.3 Light rail corridor

A centre (or side) running alignment within a dedicated right of way corridor is the more typical arrangement in light rail networks. This is generally constrained by road widths and the required running lane sizes to accommodate light rail vehicles and other traffic.

- Light rail corridors should be delineated to show clearance to light rail transit infrastructure from adjacent road users
- It is preferential for light rail to have priority through traffic signals, and it is essential to have coordination between traffic signals to optimise phasing and timings.

11.6.4 Light rail station arrangement

The *PTIM* identifies a number of typical light rail station layouts that would need to be tailored to meet operational and site requirements for specific station in order to address customer needs.

- Station size, configuration and function is dependent upon several factors including:
- maintaining level of safety for travelling and non-travelling customers and road corridor users
- level of pedestrian activity for travelling and non-travelling customers
- context of the station within adjacent infrastructure and surrounding land uses and precincts (such as commercial, retail, and residential uses)
- terminus station
- adjacent road traffic volumes
- intersection spacing
- light rail corridor alignment
- land constraints
- topography i.e. elevated, grade-separated structure required.

Table 11.8 summarises passenger specific considerations associated with different station configurations.

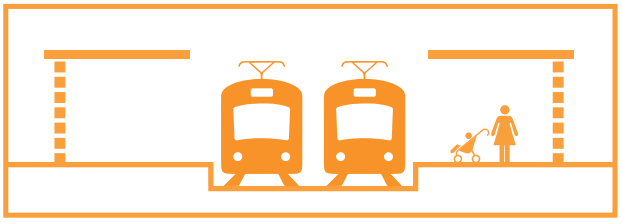


Figure 11.7
Single-side platform

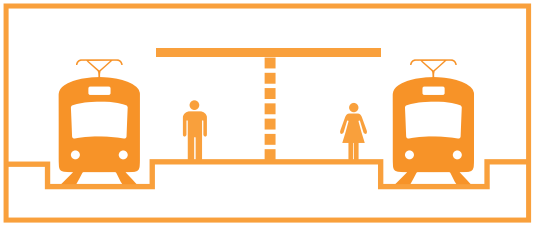
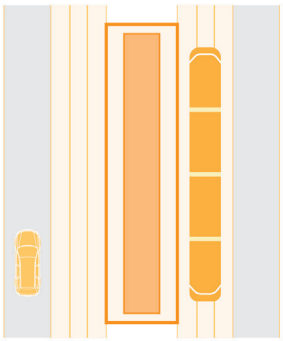
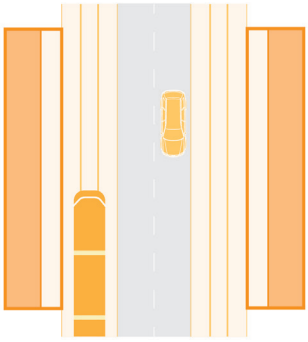
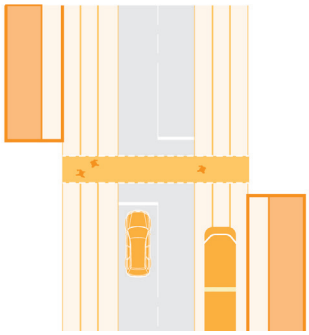


Figure 11.8 –
Island platform

Table 11.8:
Light rail station arrangement

Station type	Description
Centre island station 	• a single platform is positioned between two light rail tracks, allowing opportunity to rationalise canopy and platform furniture and cater for tidal passenger flows • access and egress: – passengers do not need to cross tracks and traffic lanes to access other platforms – opportunity for passengers to use pedestrian refuge at platform ends and a two-stage track crossing system – passengers need to cross tracks and traffic lanes to access station – passengers need to cross tracks and traffic lanes to access other modes.
Dual station (also known as Side Platform) 	• a platform(s) positioned to the side of a single or pair of light rail tracks • requires duplication of vertical transport for grade-separated platforms • access and egress: – Passengers can use a single point of access for both platforms enhancing safety as light rail driver is only required to assess a single location – direct access from adjoining street or precinct, with opportunity for at-grade access – passengers may need to cross tracks to access platform – passengers may need to cross traffic lanes to access platform. • opportunity for seamless transport integration (shared multimodal platforms) • greater opportunity for integration with the adjacent environment, including environmental and visual features • requires greater footprint to accommodate two platforms.
Dual station (staggered) 	• Single-side platforms located tail-to-tail with sufficient space between stations to ensure vehicles can pass and passengers can safely cross behind light rail vehicles at the stations • May be suitable in constrained urban corridors where there the road reserve has a limited width • Potential to result in longer station footprint • Passengers can use a single point of access for both platforms enhancing safety as light rail driver is only required to assess a single location • Opportunity to have flexibility to integrate with surrounding environment, maintain building accesses and servicing arrangements • Can be installed at intersections to utilise the 'dead' space required for right turns.

11.6.5 Platform footprint

This section highlights the need to assess platform footprints with a focus on the ease of movement for and safety of passengers. Due consideration should be made for both the layout and alignment in determining the platform size of certain light rail stations.

11.6.5.1 Platform width

Factors that should be included in determining light rail station platform dimensions include:

- accessibility requirements [refer to the *Disability Standards*]
- circulation space in front of fare payment machines (such as Add Value Vending Machine (AVVM))
- circulation space in front of emergency assistance phone
- circulation space in front of each lift door linking through to boarding point (as required)
- circulation space in front of station furniture
- assisted boarding point
- information zones and supporting infrastructure/ components
- ground space of canopy structure
- clearances from platform edge.

It should be noted that all platform widths need to be assessed in partnership with TransLink with a rationale based on the above factors. Typically absolute minimum platform widths can be used as a basis for design, specifically for standard station, where it is expected that appropriate demand analysis is undertaken for interchange stations.

Consideration of other uses (passing pedestrians) to be undertaken where the platform is part of an existing footpath environment.

11.6.5.2 Platform length

The light rail station platform length may vary, however the length of the platform must be greater than the length of the proposed light rail vehicle.

Subject to specific operational requirements or for capacity (depending on the service pattern), extending length at the station may need to be provided for introducing a turn-back or to accommodate an additional or broken down light rail vehicle.

11.6.6 Light rail station operations

Light rail station design should not compromise the physical condition or operating performance of light rail transport infrastructure and associated light rail networks. The following light rail station operations can impact the design and layout of light rail station infrastructure:

- **Frequency -** the peak and off-peak frequency of services needs to be considered
- **Hours of operation -** consider any additional requirements (i.e. lighting, security etc.) for light rail stations whether they have 24/7 opening hours or first to last service hours of opening
- **Operational impacts -** mobility aids, wheelchairs, prams and bicycles increase boarding times and can impact operational capacity of light rail stations and platforms. Additionally, insufficient pedestrian capacity or obstructions to pedestrian movements on platforms can affect on-time running
- **Night or replacement bus -** Night or replacement bus service provision should be considered early in the planning of a light rail service, and the location of proposed light rail stations. Ideally night and replacement bus stops should be located in close proximity to the light rail station so the customer can maintain ease of transition in terms of wayfinding and walking distance. TransLink shall be consulted with regards to the appropriate provision of infrastructure for night or replacement bus services, such that an appropriate level of infrastructure is provided to meet anticipated customer demand and management requirements
- **Event services -** during events, passenger demands can be high with a number of these being first-time visitors to the light rail station. As such, the planning and design of light rail stations that are envisaged to be used during events, should consider how comfort and security for passengers during peak event travel can be achieved; and ensure signage and wayfinding is clear and legible
- **Revenue protection -** fare collection equipment (for example, SACID, AVVM) to be provided at entry/exit points to light rail station. Location of fare collection equipment to consider passenger queuing and run-off.

11.6.7 Operator requirements

11.6.7.1 Depot

The location and size of depot sites should consider:

- maintenance activities and stabling the light rail vehicle fleet
- future expansion if further light rail transit routes or extensions are planned and additional light rail vehicles will be required
- topography to be almost flat, otherwise significant earthworks are required. For operational availability and reliability the site should not be flood prone
- should be located close to the light rail transit routes and positioned with operational efficiency in mind to minimise dead running of light rail vehicles when out of service
- driver and workforce facilities
- vehicle parking needs
- if located near residential areas, consider the need for noise impact mitigation measures during maintenance activities.

TransLink acknowledges that the above are operational considerations, and may not have a significant or direct effect on customer requirements at light rail facilities. However these are an important consideration in early light rail planning, particularly where in the long term it may influence customer experience of the service.

11.6.7.2 Maintenance vehicle access

The design of the public transport infrastructure should consider how maintenance vehicle access and parking will be achieved to ensure public transport vehicle accessibility, reliability and operation is not negatively impacted.

11.7 Light rail station components

11.7.1 Component selection for light rail stations

It is important that the design of infrastructure provided at light rail stations is of a consistent standard and quality so that a diverse range of passengers can access public transport conveniently and safely. These are detailed in Table 11.9 where:

- **M** is mandatory (component must be included)
- **P** is preferred (components will be included unless justification is provided and approved by the provider of the light rail station in response to site constraints)
- **S** is site-specific response (component may be required or desirable subject to specific light rail station function and/or site requirements)
- **O** is optional (component may be optional or applicable to specific regions across the state)
- **-** is not applicable (component does not apply to the light rail station type.

Table 11.9:
Light rail station infrastructure components

Category	Light rail station component	Standard	Local Interchange	Major Interchange
Information				
Station-specific information	Real time passenger information	M	M	M
	Information zone including signage, fare, zone, identification marker, routes etc. servicing the station	M	M	M
	Customer public address system (CPAS) (including hearing augmentation)	M	M	M
	Wayfinding	M	M	M
Regulatory	Statutory signage (refer to Manual of Uniform Traffic Control Devices, Part 10)	M	M	M
Network Information	Network Map	P	M	M
	Locality Map	P	M	M

Category	Light rail station component	Standard	Local Interchange	Major Interchange
Accessibility				
General Access	Full level access from station to light rail vehicle	M	M	M
	Platform/hardstand area	M	M	M
	Clear path of travel	M	M	M
	TGSI	M	M	M
Station Access including Circulation	Independent access to all platforms	M	M	M
	Independent cross corridor access	M	M	M
	Ramps (significant level difference/down from grade separation)	S	S	S
	Stairs and escalators	S	S	S
	Lifts and overpasses	S	S	S
	Allocated space (PWD waiting zone)	M	M	M
Supporting Access facilities	Cycle parking/enclosures (refer to *PTIM, Supporting access infrastructure*)	P	P	M
	Other public transport (for example bus stop)	S	P	M
	Kiss 'n' ride/passenger loading zone	P	P	M
	Taxi[3]	S	S	S
	Park 'n' ride	S	S	S
Local connectivity	Connecting footpath to/from station	M	M	M
	Kerb ramp	S	S	S
	Pedestrian crossing facility	P	P	P

3 *Where taxi bays are provided, they are to be accessible and located adjacent to an accessible entry to the station*

Category	Light rail station component	Standard	Local Interchange	Major Interchange
Station furniture				
	Canopy/Shelter	M	M	M
	Canopy coverage (%) [4]	30-50%	50-70%	70-100%
	Seating [5]	M	M	M
	Bin	P	M	M
Fare Collection				
	Add value vending machine	M	M	M
	Stand alone card interface device	M	M	S
	Fare gates	-	-	S
	Ticket window/customer Service window	-	-	S
	TransLink equipment room (TLER)	M	M	M
Security and safety				
	Platform lighting	M	M	M
	Lighting in shelter	P	P	P
	CPTED principles	M	M	M
	Security Camera/CCTV	M	M	M
	Help phone (CCTV monitored)	M	M	M
	Security identified surface transport operations (SISTO)	-	S	S

4 *The proportions of canopy coverage provided reflect the preferred outcome sought by TransLink*

5 *Including allocated space*

Category	Light rail station component	Standard	Local Interchange	Major Interchange
Optional enhancements				
Station furniture	Drinking fountain	O	O	P
	Shopping trolley bay(s)/storage	-	S	S
Customer facilities	Accessible toilet	-	P	P
	Parenting facilities[6]	-	S	P
Context material	Public art	S	S	S
	Historical material	-	-	O
Commercial	Vending machine (third party)	O	O	O
	Advertising panels	O	O	O
	Retail	O	O	O
Landscape treatment	Landscape treatment	P	P	M
Integrated transport requirements				
	Maintenance vehicle parking	M	M	M
	Night or replacement bus services	M	M	M

6 *Including baby change table*


Southport

Appendix 11-A Design considerations

The use of quality components (including materials and furnishing) will support effective light rail station operation by:

- providing a comfortable and safe passenger environment
- delivering robust infrastructure that minimises the need for maintenance.

TransLink in partnership with the asset owner shall be consulted on infrastructure component inclusions for each light rail station. The correct level of design components making up a station will depend significantly on the role of the light rail station in the TransLink network (that is, TransLink's hierarchy of light rail stations).

Table 11.9 provides an overview of the requirements in choosing light rail station components. All components must comply with the relevant *Disability Standards* to the maximum extent possible, *Australian Standards* and relevant building codes.

A detailed list of the standards and other references applicable to the components listed in Table 11.10 can be found in the *PTIM, Background and applicatio*n.

Table 11.10:
Design considerations for light rail station components

Element	Consideration
Information and signage	
Signage and wayfinding	• station design must demonstrate consistency with TransLink design, branding and signage. Refer to *PTIM, Branding, theming and signage,* TMR *Rail Station Signage Manual* and ensure compliance with applicable *Disability Standards* and *Australian Standards* • incorporate inclusive signage and wayfinding: – to ensure that public transport information is provided in advance of decision points – to ensure customers can easily recognise and find their way to and within the station – to assist in aiding equitable access for all passengers, especially people with vision impairment. For example, through use of wayfinding beacons as an enhancement for blind and low vision passengers.

Element	Consideration
Signage and wayfinding (cont.)	• identify need for wider precinct wayfinding signage to enhance legibility of access to the station • consider signage height, colour contrast and orientation • consider use of universal/international symbols, icons and indicators • wayfinding may include non-text or map-based indicators and themes to assist people to travel in their preferred direction • physical infrastructure should be designed to be intuitive and minimise the need and reliance on extensive signage i.e. wayfinding can incorporate handrails, tapping rails, building or shore lines, path widths, lighting, paving patterns, arrows, vistas, colours, shapes and TGSIs • TGSIs: – warning TGSIs identify hazards such as stairs, change of direction, or gradients. For light rail stations, TransLink requires warning TGSIs to be provided along the front of each platform edge and may be used to represent the yellow safety line. Contact TransLink for requirements – directional TGSIs are used as a walking guide to light rail station platforms and may be used to show the most appropriate and desirable route of travel through a light rail station. However, good facility design will provide other preferred alternatives such as the use of shore lines, and consistent and logical use of spaces – TGSIs must achieve or better the Disability Standard's minimum contrast required from the surrounding pavement surface colour – designs and layouts should be reviewed by specialist access personnel, as well as appropriate user groups, to achieve the most suitable outcome for each location – TGSI should not direct a passenger to obstructions.
Public transport information	• information amenities should be integrated within the design of the light rail station structure and environment, and in locations that do not impede free flowing access paths and walkways • passenger transport information can consist of electronic kiosks and static or real-time displays. Information should be located in waiting areas and decision points within and on approach to the light rail station. Information should include light rail timetables, maps, services, special notices etc. with the message displayed appropriate for where the customer is within the precinct and relevant to where they are on their journey. For example, next service departure time displayed is directly related to the travel time required to walk to the platform for boarding • electronic information displays should face passengers and be positioned at a comfortable viewing angle and height. Designers will need to determine the most suitable quantities, locations, technology requirements and expectations, service levels and design intent for electronic displays and help phones • the location of information amenities must be considered early in the design phase to incorporate appropriate security surveillance and power and data requirements.

Element	Consideration
Station precinct	
Architecture	• while light rail travel facilitates the journey, it is important to consider the station form, function and its relationship to the local community and wider precinct. Creation of the station as a focal point can promote sense of ownership, pride and joy to the community and users of the station • stations must not be designed to be purely functional • designers must attempt to create visual interest by integrating: – colour significant to the area – design elements from local flora and fauna – design elements highlighting site's cultural heritage and significance – the site's significance of place. • station design should promote improved customer satisfaction, comfort and convenience.
Retail	• during design all opportunities to integrate or co-locate retail facilities must be explored in conjunction with TMR. These facilities must be designed so that they provide an enhanced user experience while prioritising public transport • retail facilities could be included where opportunity exists and be designed to provide an easily accessible and affordable shopping experience offering merchandise or services that users might require while travelling • facilities designed may range from space provision for future private investment or complete development with and opportunity to rent space for private operation • retail facilities may provide passive surveillance, activation and assistance while improving precinct safety • facilities may range from: – small news agent/coffee shop – small grocery store/mixed retail store – mixed-use development – Transit-Oriented Development (refer to *PTIM, Planning and design Appendix 2-A*).

Element	Consideration
Pavement and access	Pedestrian pavements: • to be compliant with Austroads *Guide to Road Design* and *AS1428.1* • provide a consistent, attractive, durable, easily-maintained surface that is appropriately graded and sheltered • suitable for access, waiting and queuing, as well as accommodating the full range of furniture elements • integrate TGSIs and wayfinding aids for persons with a vision impairment and comply with applicable *Disability Standards* • external access paths and links to and from the light rail station should be reviewed and considered in the planning and design phase to ensure direct and equitable access for all users. Pedestrian crossings: • design should remove conflicts between pedestrians, general traffic and public transport vehicles, if any • 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*, *Transport Operations (Road Use Management - Road Rules) Regulation 2009*, Austroads *Guide to Traffic Management*, and *Australian Standard*s 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 • grade-separated crossings between platforms may be needed. Lifts or escalators are the preferred options, depending on access requirements. Where possible, the grade-separated structure should be integrated into the primary facility structure in order to minimise passenger travel. Road design: • vehicular pavement design must accommodate the loads and turning movements associated with all vehicle types expected to access the light rail station. Concrete rather than asphalt should be used to minimise maintenance • overall pavement finish options must be endorsed by relevant stakeholders • appropriate road speed limits should be adopted considering the increased number of pedestrians and cyclists on the road network adjacent to stations . Access intersections: • In line with the TMR *Road Safety Policy*, the following provisions are required at public transport infrastructure access:

Element	Consideration
Pavement and access (cont.)	– unsignalised left turn slip lanes should be avoided, however if unavoidable, pedestrian crossing control shall be either two-aspect controlled signals or raised platform or zebra crossing – at signalised intersections, pedestrian crossing shall be provided on all legs of the intersection. • Access design to provide adequate sight distance for entering and exiting traffic. Refer to TMR *Road Planning and Design Manual Volumes 3, Part 4* and *4A* and Austroads *Guide to Road Design*. Other: • footing details for platform shelters and other facility infrastructure, as well as all pavements, need to meet current regulations and standards and be approved by a certified engineer.
Materials and furnishings	• common visual appearance by aligning structures, pavement, signage wayfinding and other infrastructure with the TransLink branding and theme (or as agreed with stakeholders) • design elements to be tailored to meet site-specific operational and functional requirements within the overarching TransLink theme • components are durable, easy to use and maintain • kit of parts and consistent facility components are used to facilitate future maintenance and expansion of infrastructure • materials (such as steel) for structure supports and beams should emulate a lightweight appearance to achieve a modern, open and safe environment • comply with all applicable standards and regulations including *Australian Standards* and the *National Construction Code* • approved by relevant stakeholders.
Handrails, balustrades and fencing	• Handrails: – handrails are generally used in conjunction with ramps, stairs and walkways – can be used as a form of support and wayfinding aid that is compliant with relevant standards – a grabrail or handrail must be provided at fixed locations where passengers are required to pay fares, for example, AVVM and ticket window. • Balustrades and fencing: – provide vital separation between people and hazards where access is not permitted – Fencing can provide a discreet barrier between hazards to promote safe alternative access routes via dedicated overpasses. Fencing can also be used to protect and secure assets including the light rail corridor and restricted areas – fencing should be used at a minimum, and only installed where necessary while still able to promote an open station layout – provide a visually attractive, semi-transparent, and functional system, and be constructed from materials that are robust, contemporary and easily maintained. • all handrails, balustrades and fencing are to comply with applicable *Disability Standards* and *Australian Standards*.

Element	Consideration
Access and interchange	
Supporting access facilities	• **Walking**: when designing pedestrian infrastructure, reference to *Austroads, Australian Standards, National Construction Code, Disability Standards* and *PTIM, Supporting access infrastructure*, Section 3.3 Pedestrian infrastructure should be made. • **Cycling**: refer to *PTIM, Supporting access infrastructure* for further detail regarding cycle infrastructure. Refer to Austroads guidelines and the TMR Technical Information for Cycling for further information about cycle demand and forecasting. Specialist cycle design advice should be sought when designing cycle amenities including end-of-trip facilities. Advice on TMR technical standards and publications relating to cyclists can be sought through TransLink, other relevant government stakeholders and the TMR Technical Information for Cycling. • **Bus stop and interchange**: design of light rail stations should consider nearby bus stops and bus feeder services to ensure that passengers can access this public transport infrastructure conveniently and safely. For transferring and destination customers, bus stops locations should limit the need to cross roads. Refer to *PTIM, Bus stop infrastructure* for detail on designing bus stops. • **Taxi**: as a key part of a balanced transport network, taxi facilities need to be integral to light rail stations. The primary integration issue is to ensure passengers can transfer easily through the light rail station and readily identify the taxi facility location upon exiting public transport facilities. Taxi bays are to be accessible and located so that connection to station and platform is accessible, direct, legible and minimises walking distance. Refer to *PTIM, Taxi facilities* for detail on designing and incorporating taxi facilities. • **Personalised Public Transport (PPT): [placeholder]** • **Kiss 'n' ride:** direct vehicle access to and from arterial, sub-arterial and distributor roads is preferred. Connections between kiss 'n' ride infrastructure and light rail station facilities should be accessible, direct and legible, and incorporate CPTED principles. Kiss 'n' ride activity should be accommodated within a formalised facility. Informal kiss 'n' ride activity should be discouraged, particularly where safety issues are likely to occur. Kiss 'n ride infrastructure is to include at least one accessible bay (number of accessible bays to be agreed in advance with TransLink with additional potentially required depending on surrounding land use i.e. hospital, aged car facility). The location of kiss 'n' ride infrastructure should aim to minimise the need for pedestrians to cross the road. Where this is not possible, pedestrian crossing infrastructure will be required. Kiss 'n' ride infrastructure should not interrupt cycle movements, and should minimise the need to cross cycle paths. Refer to *PTIM, Supporting access infrastructure* for further detail regarding passenger set-down infrastructure. **Park 'n' ride**: refer to *PTIM, Park 'n' ride infrastructure* for further detail regarding the planning and design of park 'n' ride facilities. Well-designed park 'n' ride facilities can improve access and customer reach to the light rail network • **Other access requirements**: requirements for service and emergency vehicles should also be considered.

Element	Consideration
Cycle storage	• cycle parking/enclosure facilities, when provided in the design and layout of light rail stations (refer Table 11.9) are to be scalable and accommodate future demands as required • secure cycle storage facilities and cycle rails should be close to light rail station platforms for a safe and easy transfer to passenger transport. The location of cycle parking facilities should, where possible, lead to and be in direct line of sight to the cycle route • cycle storage must be located in a visually-prominent position within or immediately adjacent to the light rail station environment, to allow passive surveillance • materials used for these facilities should be secure, transparent, durable, easily cleaned and resistant to vandalism or abuse • the amount of cycle storage provided will be determined by the size and location of the facility and availability of adjoining cycle access paths • cycle storage/enclosure may be required on either side of the light rail corridor • consideration should be given to providing appropriate electrical conduits for lighting and in preparation for electronic card access and other future electronic requirements • For further details on cycle storage facilities and amenities, refer to the *PTIM*, *Supporting access infrastructure,* Austroads *Cycling aspects of Austroads Guides,* TMR *Supplement Traffic and Road Use Management Volume 1, Manual of Uniform Traffic Control Devices* and technical notes • Liaison with TMR should be carried out to confirm type and location of facilities.
Station and platform	
Automatic Fare Collection equipment	• TransLink will provide and install electronic ticketing system (ETS)/Automatic Fare Collection (AFC) equipment and is responsible for: the provision, installation, testing and commissioning of AFC equipment • ticketing amenities should be integrated within the design of the light rail station structure and environment, and in locations that are easily accessible and visible, and do not impede free flowing access paths and walkways • the location of ticketing amenities must be considered early in the design phase to incorporate appropriate security surveillance and power and data requirements • TransLink will provide and install electronic ticketing system (ETS)/Automatic Fare Collection (AFC) equipment and is responsible for: the provision, installation, testing and commissioning of AFC equipment • ticketing amenities should be integrated within the design of the light rail station structure and environment, and in locations that are easily accessible and visible, and do not impede free flowing access paths and walkways • the location of ticketing amenities must be considered early in the design phase to incorporate appropriate security surveillance and power and data requirements fare machines issue TransLink's integrated transport fares/tickets for use on buses, trains, light rail and ferries: – Add Value Vending Machine (AVVM) - A self-serve electric ticketing fare machine consisting of a touch screen display, card reader and cash payment options, used to purchase paper tickets or perform a limited range of go card functions including displaying the card balance, transaction history, or adding value to the go card

Element	Consideration
Automatic Fare Collection equipment (cont.)	– Stand Alone Card Interface Device (SACID) – An electronic device (usually placed at the entry/exit and key decision points of light rail stations) used by passengers to validate a go card at the commencement and end of their trip so that their trip fare can be calculated. • locate AVVMs and SACIDs close to entrance points or nominated boarding points taking into consideration the sequence of movement and paid/unpaid areas, and maintaining a safe distance from any stairs or ramps. Locate AFC clear of other obstructions on the platform to maintain visible connectivity and access along the path of travel • SACIDs are to be located: – away from platform access ramps to ensure there is a level queuing area for customers – clear of boarding and alighting queuing areas. • locate AVVMs near the Help Point, within CCTV coverage and underneath canopy/shelter to provide weather protection for customers • a grabrail or handrail must be provided at fixed locations where passengers are required to pay fares, including AVVMs and ticket window • when fare gates are to be provided, they are to be located to control, in a single line, all customer flows at all entry and exit points within a light rail station precinct. Design to consider a suitable location of a gate attendant so they have visual oversight along the length of the barrier line • should fare gates be installed on overpasses, subways or on platforms, consider space, capacity and queuing requirements • location of fare gates should also consider adequate provision of space for passenger run-on and run-off • the ticket office allows customers to purchase paper tickets, purchase/validate electronic go cards and provides a customer service function • liaison with TransLink shall be undertaken to identify the number, type and location of ticketing infrastructure needed based on current and forecast demand. TransLink will also provide the requirements for installation of ticketing infrastructure at the light rail station. This is essential to address ticketing infrastructure needs, and installation requirements (for example, power, conduits, cabling, connections, and so on). Final approval of the design and installation of ticketing infrastructure must be sought from TransLink.
Public toilets	• inclusion of public toilets will depend on the light rail station location, level-of-service, staffing arrangements, asset management and passenger comfort and safety. Refer Table 11.9 for component requirements for each station type • toilet amenities must meet *Disability Standards* and *Australian Standards* • toilets should be located in visible and practical, yet discreet, locations and include security requirements • inclusion of toilet amenities must consider construction and installation requirements within light rail station design, such as plumbing and drainage.
Staff amenities/ cleaning room	• depending on the light rail station, staff amenities (kitchen and toilets) may need to be provided. Consultation with relevant stakeholders is required to ascertain the need and requirements for these staff and operational facilities.

Element	Consideration
Stairs and escalators	• escalators and stairs should not conflict with the direction of established horizontal pedestrian flow for those entering or leaving the flow of vertical travel • Stairs – use where grade-separated treatments are necessary for access or movement within a light rail station – should provide simple and safe transition between levels and comply with all applicable design standards (the proportion of treads to risers, landings, slip resistance, TGSIs, colour contrasts and hand rails/balustrades) – typically accompanied by ramps/escalators/lifts for compliance, when required – TransLink prefers design to accommodate LOS C based on pedestrian flow during peak periods, allowing for both ascending and descending movement. • Escalators – alternative to stairs for light rail stations operating with consistently high volumes of passengers during peak periods, or light rail stations that feature high levels of grade separation – should be co-located with stairs and lifts to offer passengers alternate and accessible options – if the option of including bi-directional escalators is not available (due to site constraints or light rail station capacity volumes not being sufficient), escalator travel should be given preference towards ascending passengers or the dominant peak flow – escalator width should be sufficient for passengers to queue in a single file by simply standing, while still allowing pedestrians who wish to walk (in the travel direction) to pass with minimal obstruction – escalators must comply with applicable structural Building Standards and should be consistent with the overall light rail station architectural design.
Ramp	• comply with applicable Building and *Disability Standards*, with adherence to the particular construction details shown in the *Australian Standards* and *National Construction Code*.
Lifts and over/ underpasses	• some light rail stations will need a lift and over/underpass structures to connect platforms. The number and size of lifts will need to be determined with consideration to likely pedestrian demands • identify measures for maintaining access for all users, including people with a disability, during a degraded state (for example, broken down lift) • minimum LOS C during peak is preferred for over/underpass walkways • LOS D acceptable for lifts during peak periods • comply with applicable *Disability Standards* and *Australian Standards* • should appear to be of a lightweight modern structure, transparent to ensure passive surveillance, durable, easily cleaned (such as stainless steel finish) • be consistent with the overall look and feel of the light rail station • design of lift areas should also consider adequate provision of space for passenger run-on and run-off.

Element	Consideration
Shelters	• shelters and all facility structures should project a consistent design language that: – appears modern, light and spacious – is quality and standard – is reflective of the Queensland sub-tropical climate – is reflective of TransLink's infrastructure theming and architectural design. • structures at platforms must be cantilevered to provide an unobstructed kerb-line (free from posts or other structural supports) and can be single or double-sided cantilever, depending on platform layout • structures must provide complete weather protection during all parts of the day to minimise head island effect on platforms and to improve customer waiting experience • passenger information displays, signage and wayfinding can be attached to the cantilevered structure providing they do not obscure sightlines (including CCTV sightlines) • shelter structures should include quality finishes with modern, durable, and easily maintained materials that are reflective of the overall light rail station environment and climatic conditions (that is, sun, rain, natural light and airflow) • the following areas to be sheltered and under cover: – all fare gate infrastructure other than SACIDs – assisted boarding point – circulation space in front of the ticket counter and AVVM – circulation space in front of each lift door linking through to the boarding point – path of travel from platform access to the assisted boarding point. • maintain clear sightlines for vehicle movements at nearby intersections (refer TMR *Road Planning and Design Manual 2nd Edition Volume 3*) when designing shelter structures.
Platform	• platform design should be uncluttered and sized to suit demand, pedestrian access and circulation requirements, seating needs and operational needs • design of station platform to consider the potential for future implementation of screen doors.
Assisted boarding point and priority waiting area	The assisted boarding point is a designated area on light rail station platforms that include, but is not limited to, priority seating area, an assisted boarding point, emergency phone and service information.
Drinking fountains	• appropriate water supply and drainage to the drink fountain required • they are generally located close to waiting or congregation areas, seating, information displays, cycle storage areas, and light rail station entries and exits • drinking fountains should be constructed from materials that are easy to maintain, and should include stainless steel water catchment and drainage. Furthermore, they must be designed to be accessible for people with disabilities.

Element	Consideration
Seating and lean rails	• must be provided in quantities reflective of the expected waiting times and levels of anticipated patronage for the light rail station • seating should be provided at all allocated waiting areas without impeding free flowing access paths and walkways (i.e. set back from the path of travel by 500mm) • seating and lean rails should be provided on platforms where passengers can easily see approaching light rail services, typically where there is complete weather protection and where the environment is safe and well lit. They are typically positioned facing the conveyance and either at the rear of the single-sided platform and shelter or in the centre of a double-sided platform and shelter • seats should be designed as per *AS 1428.5,* include backrests and armrests and be constructed from durable, easily cleaned and maintained materials that allow drainage from liquids • all furniture must offer appropriate contrast in colour with the immediate background • lean rails provide passengers with a convenient waiting option by allowing passengers to perch or lean, rather than be seated, when waiting for brief periods or where waiting space is limited
Bins	• bins are generally located close to waiting or congregation areas, seating, information displays, boarding points, cycle storage areas, and light rail station entries and exits • use of bins at high passenger volume light rail stations, such as CBD and regional facilities, may warrant careful consideration due to potential security risks • bins at particular light rail stations should be designed to allow for detection of suspicious objects. They may be constructed from materials with an open gauge to provide transparency (with a transparent clear plastic liner) that is easy to maintain • bin design should aim to be vandal-proof, water-proof and bird-proof. The provision of recycling bins may also be an option and should be considered during the facility detailed design phase • recycle bins may be incorporated adjacent to general waste bins to promote recycling, with appropriate recycling collection arrangements in place.
Shopping trolley bays/storage	• where light rail stations co-exist with shopping centres or other retail outlets, there may be the requirement to include appropriate, discreet, and easy to maintain shopping trolley bays or storage within or close to the facility • an agreement from the retail outlet to collect shopping trolleys on a regular basis is also required.

Element	Consideration
Safety and security	
Intelligent Transport Systems (ITS)	• ITS functionality should be considered for all public transport facilities within the context of the broader TransLink network and 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 adjoin other facilities within the light rail station, such as toilets or storerooms. They should be located in discreet locations within the facility environment and not impede public spaces or free flowing pedestrian access to the light rail station • design of the facility must not attract attention • the specific installation (including power, conduits and security) and asset management schedule requirements for the inclusion of the ITS at each facility should be investigated on a site-specific basis prior to detailed design.
Public address system	• a public address system should be integrated into the design of all light rail station facilities. The aim is to provide a robust, functional and visually discreet system that can provide communicative information and be linked to the security system for warning in the event of an emergency • the public address system is to be clearly audible throughout the passenger waiting areas. Loudspeakers for the system should be distributed appropriately throughout the light rail station, including the assisted boarding point, and may be wall or ceiling mounted, depending on acoustic requirements. Speaker units should be mounted at an appropriate distance away from direct reach, or sit flush with light rail station structures, to minimise potential vandalism and damage • the possibility of background noise affecting the audibility of the address system should be treated with appropriate acoustic absorption techniques. Loudspeakers for the system should be distributed appropriately throughout the light rail station • hearing augmentation, hearing loops, and the use of visual/non-auxiliary equivalents should be included and linked with the public address and emergency systems to assist persons with hearing impairments. These are to be located at ticket office, assisted boarding point, internal waiting areas and as per *AS 1428.5*.
Animal and pest problems	• within the light rail station there must be minimal horizontal ledges, overhangs, or concealed spaces where birds and animals are tempted to perch, nest and pollute the light rail 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. This can include designing ledges of structures to be angled (approximately 45 degrees or greater) to make it uncomfortable for birds to perch.

Element	Consideration
Graffiti deterrents and treatments	• all infrastructure components—furniture, lighting equipment, timetable and information devices, walls, floors, ceilings, balustrades, glass panels, screens, elevators, escalators and other components (for example, landscape treatments) —coming into contact with passengers must be resistant to acts of vandalism, littering and graffiti. This may involve components being applied with anti-graffiti coatings or constructed from non-porous graffiti-resistant materials • the design and arrangement of platforms and structures should maximise natural surveillance in order to minimise the incidence of graffiti and anti-social behaviour • in some instances, vegetation may be planted adjacent to structures or walls to prevent access by vandals. Note, choice of vegetation is not to facilitate filling with rubbish • the use of appropriate colours or artwork that complements the light rail station architecture and theming can also deter graffiti.
Security	• security infrastructure refers to security cameras (CCTV) and other items used for the creation of safe and well-monitored waiting environments • details on the specifications and management schedules for these systems will be established by the relevant stakeholders • appropriate 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 in the assisted boarding point. Ultimately, the location of all these elements should be the subject of light rail station specific design, as each site is likely to have a range of differing sightlines and movement patterns • counter-terrorism design considerations should be explored where possible on a site-specific basis, depending on light rail station location, level-of-service and potential security risk. Where applicable, light rail station design should strive towards universal standards for security and counter-terrorism measures. Liaise with the Emergency Management and Transport Security division in the Department for advice on requirement for a security and risk assessment, and on including security and counter-terrorism measures at the earliest phase in the light rail station planning.
Lighting	• ambient lighting is to be provided for a safe, comfortable and functional light rail station • feature lighting may highlight architectural features • for day-time use, consider translucent materials to allow natural lighting • for night-time, bright white artificial lighting should ensure a safe and visually attractive environment • quality light fixtures and fittings should be robust, tamper-proof, discreet and complement the light rail station environment • use of common fixtures will improve maintenance and lower ongoing costs • provide lighting on pedestrian areas, roadways and light rail station information • refer to *AS/NZS 1158.3.1* for minimum lighting requirements • for additional disability compliance lighting requirements refer to *Disability Standards for Accessible Public Transport* (2002).

Element	Consideration
Optional enhancements	
Commercial opportunities	• commercial opportunities are typically developed and operated by external companies under an agreed arrangement • the placement of commercial opportunities needs to consider the active transport requirements of the station which should have first priority • it may be appropriate to incorporate: – vending machines, self-serve kiosks – commercial advertising – shared cycle, micro-mobility devices etc. • endorsement of commercial facilities is required prior to detailed design to make allowance for space, power, data and conduits for installation.
Landscape treatment	• landscape treatment is to be incorporated (where appropriate) to complement the light rail station architecture, enhance the identification of a particular location, and integrate the facility with the surrounding environment. It is preferred that plantings used for landscaping are: – Hardy, low maintenance and drought resistant species – Suited to local climatic conditions, soil condition and available root zone development volume – Consistent with and enhancing of existing amenity streetscape plantings and themes – At maturity, achieve required branch and canopy clearances above pedestrian areas, access points, CCTV coverage, lighting and adjacent infrastructure elements without need for ongoing maintenance intervention – Maximise shade where not in conflict with infrastructure, lighting, CCTV & passive surveillance sightlines and CPTED considerations – Unlikely to unduly attract or create refuge for fauna and vermin – Unlikely to drop large amount of litter (leaves, fruit, flowers, seed and so on) on pedestrian thoroughfares that may become a public safety hazard or maintenance problem. – Assist with graffiti management by providing dense screening to exposed and at-risk walls – Utilise WSUD principles where applicable – Species will not grow to encroach into pedestrian areas and other infrastructure elements requiring maintenance intervention. • integrate subsoil and surface drainage with the landscape design • refer to the TMR *Road Drainage Manual* and *Queensland Urban Drainage Manual (QUDM)* for technical guidance in relation to the management of drainage, stormwater runoff and water quality.

Element	Consideration
Ancillary services	• key ancillary services can include vending machines, ATMs and other third-party services not directly concerning passenger transport • should be located in convenient locations, but not impede a passenger's ability to access and move through the light rail station • inclusion and location of these services will depend on agreement with third-party stakeholders, light rail station asset management and light rail station designers, and will be determined on a site-specific basis • consideration should be given to the consolidation of ancillary services to reduce visual clutter and to provide a more integrated service for passengers. Generally, these facilities are positioned close to other passenger services such as fare machines, information displays and help phones • materials used for ancillary services should be consistent with other passenger facilities to achieve a visually integrated suite of services. Ancillary services should be considered early in the detailed design phase to incorporate relevant security, monitoring, power and data requirements.
Other enhancements	• artwork can enhance a light rail station identity and cultural significance of a place, and should be investigated where appropriate • public art should not conflict with light rail station architecture, colour schemes, branding and access requirements • wireless internet access options and connections may be investigated and incorporated • the facility owner and/or asset manager, along with relevant stakeholders, should endorse all enhancements prior to the detailed design stage of the facility.